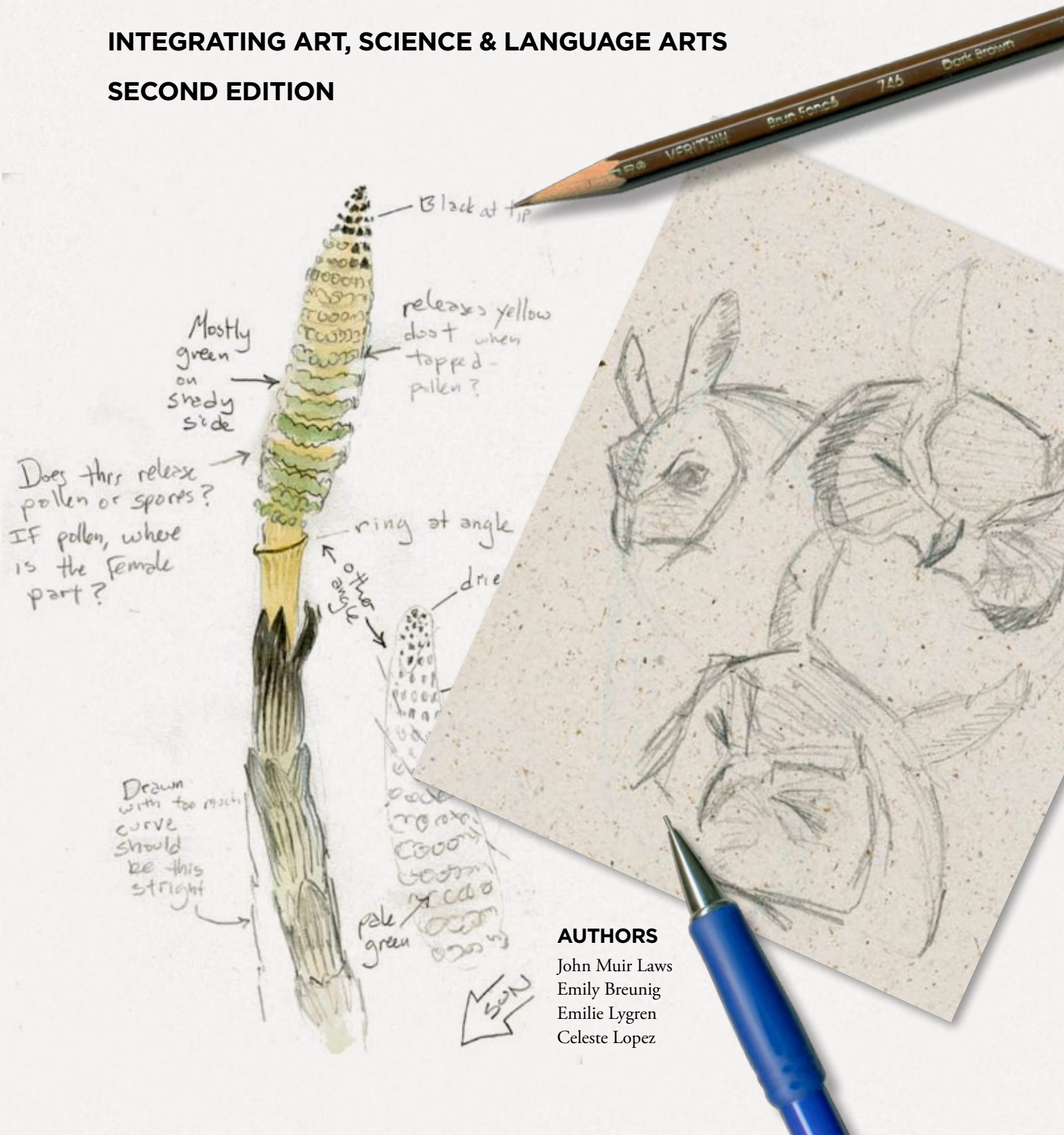
CNPS California Native Plant Society

OPENING THE WORLD THROUGH NATURE JOURNALING

INTEGRATING ART, SCIENCE & LANGUAGE ARTS

SECOND EDITION



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FOREWORD

Children need nature—and we, as parents, educators, and caring adults, have a duty to make it accessible to them. It becomes harder and harder for kids to experience nature in this world of standardized tests, electronics, and organized sports.

Our goal in creating this guidebook to nature journaling is to help adults and children discover (and rediscover!) the natural world through a combination of art, writing, and science. This interdisciplinary approach exemplifies the California Native Plant Society's goals in creating educational programs: to engage students of all ages in the incredible natural world of California, to inspire them to become keen observers of the wildness in their own backyards, and to foster in them a desire to protect wild habitats.

We are very pleased to present this second edition of *Opening the World Through Nature Journaling*, and we hope that it will help children and adults connect with their natural surroundings. In classrooms and parks and vacant lots around the world, more and more people are taking up their sketchbooks and letting nature journaling guide their appreciation of the outdoors.

May these activities bring the same passion to you and the children you love!

INTRODUCTION

A journal or notebook is an indispensable tool in all branches of scientific investigation. It is where the researcher records and preserves what has been seen, done, and thought in the course of his or her work. Keeping a science journal sharpens and focuses observational skills and provides reliable documentation of past events. The process of carefully recording observations in a journal forces one to see and take note of things that may otherwise be overlooked. Journaling, as part of a school curriculum, strengthens and refines students' cognitive skills by teaching them to observe, to become aware of what they have observed with all of their senses, and to exercise their imaginations and critical skills through developing hypotheses to explain what has been observed. Observation is a skill that can be taught and developed.

Many people look casually but do not see the details of what is before them. A scientist must see deeply and recognize subtle differences. Human memory is unreliable. Details of the immediate past slowly slip from mind as they are replaced by more recent events. Memories of emotionally charged events may be vivid, but are not reliable records of data. Furthermore, what is only held in memory is lost at the death of an individual. Keeping a science journal not only sharpens and focuses observational skills, but also provides reliable documentation of past events.

Observing deeply through journaling facilitates more than a capacity for scientific thinking. Those who journal, write, and sketch regularly are better learners. They are more connected to their surroundings, develop identities within their community, and gain the ability to look outside of themselves and reflect on their lives. Creating the space for personal expression within a field journal brings students closer to their environment and connects it to the information that they record. In these ways, journaling changes the journaler. Keeping a journal and looking back on thoughts and observations made at an earlier time records progress. For a young student (or anyone, for that matter), this is a powerfully rewarding experience and an opportunity to trace growth.

If you (as a teacher and guide) introduce your students to taking notes in a field journal at the start of the academic year, their books will spin a thread that links the whole year. As the seasons progress, you can record the changes seen in plants and animals around the school. Other notes such as weather and cultural events can also be recorded in their books. Their journals should also become a place for creative writing, scientific observations, and personal reflections. If you encourage your students to write personal material in their journals as in a diary, you can give them the option of folding a page over on itself to indicate that the contents underneath are something that they are not yet ready to share. If they later decide that they do want you to look at the page, they can unfold it and let you know.

Field journal projects can also extend into larger classroom projects. One particularly successful project is creating a classroom guide to the plants and animals in your community. Students can illustrate, research, and write-up descriptions and notes about the behavior of local species. All the students' work can be combined into one volume and photocopied to make books that can be sent home. The possibilities are numerous. Use field journaling as a tool to bring your students together and create a culture of self-driven learning and community within your classroom.

HOW TO USE THIS BOOK

Field journaling activities are successful with both young students and adults. They have been successfully used in college field studies, adult education programs, and with third graders. When children are very young, their artwork is symbolic. They will draw a peak-roofed house to represent "my house" even if they live in a square apartment building. Around third grade (about eight years old) they begin a transition to representational drawing and draw what they see rather than symbols. Once students have begun representational drawing, journaling activities can guide them into deep nature discovery. These activities address the most important science process skills and should be used at all grade levels to reinforce those skills even if they do not address specific standards of your grade level.

Field journaling activities do not have to be done in any particular order but can be scheduled to fit the teaching environment and objectives. The language arts extensions can be paired with field journaling activities and are a good follow up to a session of sketching (though many can stand alone). Sketching activities should be completed in the field. Language Arts in the Field exercises are best done outside in a schoolyard, garden, or park but can be completed indoors.

Keeping a field journal develops and reinforces the most important science process skills—observation, questioning, and documentation. All other parts of the process of science depend on these skills. We assume that we are naturally good observers, but learning to really see what is in front of us is a skill that must be learned, developed, and practiced. Journal activities tie directly to the State of California science framework content standards and the visual and performing arts

framework content standards. Supplementary language arts activities are linked directly to the language arts standards as well. The full content of the California State standards can be found at www.cde.ca.gov/be/st/ss/.

HOW TO MANAGE STUDENTS IN THE FIELD

Field journaling activities take concentration and focus. If you work the students through several activities in a row, they may get exhausted and burn out. Instead, intersperse focused journal activities with hikes and other nature exploration. Once a walk up a hill tires them, the students may be more ready to sit down and focus again. Pay attention to weather conditions. If it is excessively hot, cold, or windy, students will be less capable of focusing on journaling activities. Use your own comfort level to gauge how they feel. Children are more susceptible than adults to the effects of temperature. Be mindful that if you are hot, they may be verging on heatstroke. If you are cold, they may be in the early stages of hypothermia.

THREE PROMPTS FOR DEEPER NATURE OBSERVATION

Imagine seeing a bird for the first time. The novelty of the experience helps us concentrate and focus more carefully than we would on the familiar House Sparrows that are always present in your garden. Now imagine how hard you might look if you knew you were seeing something for the last time. How can you bring such focus to every observation that can be employed in your own nature observations or with students? Telling yourself or your students to "look carefully" or "look hard" is not helpful. The human brain quickly clears itself of details that are not necessary for survival. This is useful because it frees up working memory for new things. You will find that if you observe a bird with a group of students until it flies away, and then ask them what they saw, you will only get a few superficial responses. You want your students to really see what is happening in front of them and we assume it is just a matter of looking harder, but it requires deep observation, a skill which must be learned. Developing that skill will change the way both you and your students experience the world. It will enhance the experience of field sketching and enrich a wide range of other undertakings. There are three prompts you can use in any nature observation to help you or your students get more out of any observation session. These are: I notice, I wonder, and it reminds me of. Here is how to use the prompts and why they work.

I NOTICE...

When making a nature observation, ask students to say all of their observations aloud. Do not filter out any of your observations. Anything that you see (structure, behavior, color, interactions with other species) you should say out loud. If you are gathered in a group of classmates or nature explorers, listen to the observations that are said by other students and build on or modify what you hear. This makes nature observation a social activity. By describing what you see, your brain also processes each observation more deeply. This is reinforced by the auditory feedback loop of hearing your own voice describing what you see. You will find that the things that you say remain in your working memory much longer than those you only think quietly to yourself. By the time the bird flies away you will have gained access to a rich and detailed set of observations. Give it a try. You will be surprised how much more you will see and remember.

I WONDER...

As you say your observations out loud, be aware of any questions that occur to you. Ask these out loud to the group (or yourself if you are alone). Do not be afraid of asking questions. The point is not to answer them now but just to get them out there. Saying the question aloud will help you remember it later. A good scientist should be able to ask many more questions than they can answer. Some of the questions you can answer with further observation. Some questions you will be able to research, or explore how one might go about answering the question with research or observation. There are other questions that cannot be answered because they are outside the realm of science. If no questions come to you, try saying "I wonder..." and see what fills the silence afterward. A question may come when thus prompted. If you make this a regular practice, questions will flow more easily. You can make yourself a more curious person!

IT REMINDS ME OF...

Ask yourself what your observations remind you of. Try to come up with as many connections as you can. Go into your own network of memories and see how this new set of observations fits in. Is this like something you studied before, observed in another context, or saw on a nature special? Have you seen this bird before or seen similar behavior? Can you make an analogy or metaphor that ties to a new observation? Why does this new observation reminds you of that? Connecting this new observation to those already in memory will help you remember what you are seeing. Connecting with existing memories can also help you develop more interesting and deeper questions. The relationships and similarities that you uncover in this way often reveal unsuspected connections—it triggers a memory for a reason. Be sure to say your "it reminds me of's" out loud as well.

This process keeps observations in conscious working memory long enough for your brain to convert them to long term memories. Memories are formed by the connections of neurons in your brain. The more of these connections you make, the stronger and richer your memories will be. Now, when the bird flies away, you can ask your students: "What were some of the most interesting observations that you made or heard one of your classmates say? What were some of the most interesting questions that came up? What things did this remind you of?" Responses will come flooding back. The trick is to make a habit of exploring these three modes of observation and to share what comes up out loud (even if you are alone). In fact, try it right now. Pick up an object near you and give it a try. Talking to yourself will feel strange at first but overcome this self-consciousness and see how much more you can take in and retain.

To further investigate this approach and integrate it into your classroom activities, read *The Private Eye - (5X) Looking / Thinking by Analogy* www.the-private-eye.com. This outstanding curriculum uses 5x jewelers loupes to focus observation and inspires open-ended questioning and analogies.

THE CONTEXT OF KNOWLEDGE

Science is a system of creating and testing predictions about the natural world. This approach builds our understanding of varied aspects of nature. The fruits of scientific discovery are most useful when anchored to the roots of how that fact was obtained. Scientific papers use footnotes to maintain this relationship. If a scientist refers to a pertinent fact, he or she will cite where fact came from in existing scientific literature. The statement "leaves are darker green on the top surface because there is more chlorophyll there" is interesting but says nothing about how the speaker obtained this information. Is this something you were told, read in a textbook, found online, or observed from personal experience while dissecting a leaf under a microscope? As science educators we should endeavor to sharply maintain the connection between what we know and how we know it.

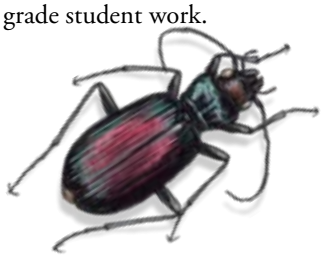
Humility and strength come from citing sources and analyzing and being explicit about your assumptions. Be clear with yourself and your students about what you know and how you know, what you believe to be so but have no data to back up, and what you do not know. It is OK not to have the answer. You do not need to impress anyone by being the universal expert. Many of the interesting questions that you and students will generate may well not been scientifically studied. You can discuss how one might design an experiment or a set of observations to help answer the question. This maintains your credibility and demonstrates the usefulness and power of scientific inquiry. There are also questions such as the nature of the soul, or the spirit of a rock that are outside of the realm os scientific inquiry because they cannot be observed or measured. It is valuable to explore and speculate about these subjects outside of the science classroom even though we can never explore them through science.

SKETCHING IN FIELD JOURNALS

Drawing develops skills that are essential to accurate scientific observation. When drawing a subject, one looks again and again at the parts of the object that are least familiar and beyond the gross contours or minimum features needed to identify it. Counter intuitively, this process is often most helpful when we are sketching what we think we already know! We are least likely to carefully observe those things with which we think we are the most familiar or which are easy to identify. We have all looked at poppies and robins, but how many of us have looked long enough and often enough to really know their structures or to have noticed the white pattern around the robin's eye? By drawing a poppy or a robin, you force yourself to see it in minute detail. Trouble spots in a drawing may be warnings of a missed or poorly observed detail.

In addition to developing observational and documentation skills, there are many other benefits to keeping field journals that incorporate sketching. The first is simply that it is fun! Students love it, and teachers do too. Many teachers find that their students cannot wait to pick up their science journals and enthusiastically go to work. Because journaling activities are fun, students buy in and focus on their work, which leads to even stronger observational skills. Students will draw biologically significant details, such as leaf position or the angle at which stems leave a branch, features that they did not know were important and could have easily missed in a written account alone. Nature journaling can also help teachers reach students who may otherwise be underserved. Many students have difficulties with written language because of learning disabilities or limited English proficiency, difficulties that disappear when they move to other ways of communicating. Such students may excel through science journaling where they can express their observations non-verbally.

Finally, teachers can directly, and easily, assess students' developing observational skills by looking at their journals. Journal pages record the quantity and quality of observations. By setting clear expectations for journal entries, teachers can objectively evaluate and grade student work.



For kids to fully buy in to nature journaling—and for journaling to work its observational magic—they must understand that the goal of such drawing is not to make pretty pictures, but to accurately observe and record data. If the goal is to make pretty drawings, the pressure for pretty can get in the way of documenting observations. One becomes hesitant to start a sketch as the words of an inner art critic or memories of disparaging comments from a previous teacher ring in one's memory. Children (and many adults) will remember the thoughtless words of a teacher who dismissed their drawings with an offhand comment. For people who have been so discouraged, starting to draw again is intimidating. On the other hand, if the goal is to clearly and accurately observe and record observations without regard to whether it "looks good," the pressure of producing ART is lifted, and the student's focus shifts to making and recording observations. Any drawing, however crudely executed, is a success if it enables the student to see more clearly or document his or her observations. In this way, students who do not consider themselves artists are liberated to draw without the pressure to produce a "masterpiece." An interesting side effect of approaching science drawing in this way is that it frees students to draw. As a result, students do draw and their work improves with practice.

The ability to draw well is not a gift. Drawing, and drawing well, is a skill. Like any other skill, it can be learned and will improve with practice. Keeping a nature journal is a part of the science curriculum in many European countries. There, students maintain regular logs of observations of the comings and goings of natural phenomena, e.g., weather, bird migrations, when plants bud, bloom, take seed, or drop leaves. As a result of regular practice, many adults continue to keep such journals into adulthood. Because simple sketching is a part of these journals, adults emerge from such a program unintimidated by drawing and are more likely to consider themselves artists. Were all of these adults somehow born with a "gift" for drawing? Not in the slightest. They honed their skill over time through constant practice. This is a skill that is available to anyone who devotes the time to achieving it.

HOW TO CRITIQUE STUDENTS' SKETCHES

When setting up journaling activities, we make sure to stress to students that it is not about making pretty pictures. Then arrives the moment when a student shows you his or her work. What is your spontaneous response? "Good job! That looks great!" While such a response may be appropriate to an art class, it is deadly in a science classroom. What is wrong with this kind of feedback? It emphasizes and gives positive reinforcement and encouragement to the precise activity that the students were told that they should not emphasize. While we told them that we were not interested in their work looking pretty, our response demonstrates that this was indeed the goal. While students already comfortable with their artistic abilities will be encouraged in their artistic efforts, it sends the message to the other students that your stated expectations were insincere—just another adult trick.

Positive reinforcement can and should be given, but it needs to be given in a way that advances the goal of the curriculum. You have told your students they are to observe and carefully record what they have seen. Give positive reinforcement when you find accurately observed details in their work. "I see you have shown hairs on the stem. Details like that become important to botanists when identifying and studying plants." Give positive reinforcement to scientifically useful information that students add to their observations such as date, location, time and weather information, size or scale information, color notes, multiple views of the same subject, or behavior or interactions with other species. "You have put a scale next to your drawing. That will really help you remember this plant when you review your notes."

DON'T SAY:

"That is really pretty."
"What a good drawing."
"You are a great artist."
"That looks so realistic."
"You are really good at shading."

DO SAY:

"The way you use both writing and drawing to describe this flower is really clear."
"I see you measured the distance between the branches and added a scale."
"Oh, you found a spider on top of the flower! Great observation."
"The insect damage on that leaf you have illustrated really helps me pick out which flower you were looking at."

All the items in the "don't say" column may find a place in an art class, but have no place in this setting. Here we momentarily put aside our art values to shift the students' focus, and in doing so, free them to draw.

One final thought on talking to your class about their work. When reviewing a group of drawings with them, your attention will probably fall first on the most attractive pictures. There is a natural tendency to comment on such work in order of our aesthetic preference, beginning with the one we find most satisfying and ending with the one we like the

least. Students will quickly pick up on this. Instead, skip around among the drawings, keeping the focus always on the accuracy and completeness of students' pictorial and written recording of their observations.

INTEGRATING LANGUAGE ARTS & FIELD JOURNALS

The ability to link visual stimuli with language is an important part of life, both inside and outside of the classroom. In school, visualization exercises, group projects, and virtually all subjects require the ability to clearly describe or recall visual images in some form or another. Think how often we are asked in our daily lives to recount directions to a place, recall an old story from a friend, or visualize steps in the course of a project. Using both drawing and writing in the field strengthens a student's ability to observe his or her surroundings and communicate them to others. It also prepares students to enter the world as thinkers and scientists, ready to ask their own questions and to listen critically to the discoveries of others.

Adding writing to the process of field sketching also creates space for self-expression. If students write as they sketch, they will remember and observe their feelings as well as the landscape. When out journaling with students, always encourage them to write down things they notice, questions they have, or how they are feeling in a given moment. Tell them this will help them remember the positive memory or fun experience later. Creative writing in nature also helps students remember scientific information; studies have shown that the most effective means of retaining information and memory for the long term is through finding familiarity, relevancy, and meaning in an experience. The more deeply one engages with a subject on an emotional level, the more one remembers it. As such, it is important for students to develop the ability to think scientifically, to ask questions, and make observations, but it is equally important that students care about the answers. Creative writing bridges this gap and gives students the opportunity to make a personal connection with nature. As they form this connection, they find meaning in what they are seeing and the information gathered in that time is more likely to stay in a student's long-term memory. In short, writing in nature will in turn heighten a student's ability to observe nature, and ask questions.

Nature is a unique and essential venue for exploring the process of scientific discovery and self-expression, particularly for children. More and more, students are asked to work in front of a screen or to use technology to obtain answers. While these are important skills to develop, there is no computer program that can replicate the power of seeing a dragonfly up close or really looking at a flower. The writing and sketching material students produce in a nature journal will reflect the spontaneous, irreplaceable experience of being outside. Using a journal will enhance these experiences. Students will slow down, look around, and discover. And if they write, they will find meaning through self-expression and they will remember.

The language arts portion of this curriculum will add depth to and complement sketching activities outdoors or back in the classroom. The exercises are designed to extend and augment field experiences and to incorporate self-expression, bolstering a student's sense of place and sense of wonder. Some of these exercises use the observations collected during a sketching session as a springboard for writing self-reflection; others challenge students to analyze the data they have collected and to find new meaning and perspective in what they have experienced. Most of the exercises create a scaffold for students to write poetry about their surroundings and to form a personal and meaningful connection with nature

SCAFFOLDING AS A MEANS OF DIVING INTO POETRY

"Write a poem." For many students and adults, that command is intimidating and causes an emotional shutdown. While some students may be comfortable expressing themselves in this manner, many have never written a poem before and have no idea where to begin. Time and time again, students wonder, "does it have to rhyme?" when they are first asked to write a poem. Teachers often introduce more structured forms of poetry to students first in hope that the structure, like a haiku will help a student to know what to say. Structure is indeed an effective way to introduce the idea of writing poetry and there are a few exercises included here that focus on structure; these are helpful to beginning poets, but most of the following activities are designed to create other sorts of scaffolding on which to build poems. These exercises are wed to nature journaling in that they use observations that students have already generated while sketching and taking notes to create poems and reflections.

Having time to sketch, draw, and write observations often shows students that they already hold the power of poetry within them. Recently a student looked up at a redwood tree and said, "I'm going to call him Many-Armed Mack." Another called the purple flower of ice plant "a blushing artichoke." Yet another looked closely at the wings of just-hatched dragonfly and said, "it looks like they're made of stained glass." As students draw and sketch in these activities, they will record observations such as these and accumulate a record of their experiences and thoughts. This is raw material for poetry, and having such material at hand, along with an experience outside, answers the question of where to begin

with a poem and encourages the use of imagery and observation in writing.

Talk to ten teachers of writing and they will likely recount ten different definitions of what poetry is or is supposed to be. In the context of this curriculum, a poem is defined as writing that follows a form that is up to the writer, a work that reflects a student's experience and is authentic to their feelings, memory, and thoughts. If students ask what a poem really is, tell them it is a piece of writing that communicates experiences, observations, and thoughts to an audience in a way that is meaningful to the author. It is an opportunity to adopt the consciousness of another being and to change perspective. Poetry also pertains to our sensory world; we use our senses to navigate as scientists and as people, and poetry is rooted in noticing and sharing imagery and experience.

Any poem written by a student can be viewed as a success in some way. However, there are many literary devices that enliven and enrich the language with which one writes. Some of these literary devices are listed below and include explanations of how they can be taught, adapted, or emphasized in the context of nature journaling.

SIMILE

"It looks like." Simile, or the comparison of two things using "like" or "as," is the way we make sense of the world, especially as we are growing up. When first acquiring language, children will often say "it looks like…" when they encounter a new experience or object. As humans we innately sort and categorize our lives. There is safety in what has worked before and we seek out the familiar experiences. Children are born simile generators. The exercise "10 Analogies" plays on this ability to recall similarities and challenges students to strive for more and more comparisons. In literature, the simile is a powerful tool; not only does it speak to the author's state of mind and life experience, it gives the reader something to hold onto, creating a deeper understanding of the piece of literature. Whenever you are outside with students, encourage them to share as many similes and analogies as possible; you will be astonished with what they come up with. This is also an important part of the scientific process; the ideas for many scientific experiments are derived from observing one thing in nature that looks like something else, as are the designs for countless useful tools. Make it commonplace in your classroom to share similes. Put a poster up with one simple picture or graphic in the center and have students write down everything they think it looks like. Or, challenge students to redefine a simple cliché or idiom. As a group, come up with 20 new ways to describe the way sunlight shines on water like diamonds.

METAPHOR

"The sun is a lion." Metaphor differs from simile in that it removes the words "like" or "as" from the sentence. Though the idea is similar to a simile, metaphor holds more power because it forces one concept, object, or being into the mold of another. "I am a mountain" is a stronger statement than "I am like a mountain." "The moth was a lamp" speaks to how the moth affected the writer of that statement. Encourage students to use metaphor in their writing when they want to make a point or when they feel closely aligned to a certain force in nature. Or, when you exit the classroom to go sketch in nature, give each student a piece of paper that reads "I am the wind," "I am the grass," or "I am the sky." See how their perspective shifts, and how their awareness is heightened.

ALLITERATION

Alliteration is the repetition of the same sounds (mainly consonant sounds). It can be a series of words in a sentence that begin with the same sound or within a single word. This literary device creates interest on the part of the reader. Talk about alliteration as a means of drawing attention to a part of a poem. It is also a useful tool in mirroring natural sounds or phenomena. If a student is writing about a waterfall or the rain, suggest using alliteration to reflect the sounds they hear.

DICTION, PACE, AND FORM

A series of short sharp words darts off the tongue. Talk about diction (or word choice) and how it affects the sound and feel of the poem. A comma is not just a vestige of grammar; it is an invitation for the reader to pause. A long line of poetry keeps the reader holding on while placing one word on each line of a poem forces the reader to take more time when reading. Have students experiment with writing in different shapes or using varying word length to communicate more about their surroundings As an example, a poem about an icicle could be wider at the top and thinner at the bottom.

ONOMATOPOEIA

Splat. Bang. Squish. Students love these words. Onomatopoeia are words that mirror their sound. Whoosh. Hum. Hush. Explain the term and ask students to refer to specific sounds in their poetry, or to make up new onomatopoeia to reflect the sounds they hear around them. What birds say their name? What sound does a bus make when it slows and stops? What does the wind sound like here? As a class, create a sound map of the schoolyard or a classroom glossary of everyday sounds and onomatopoeia.

IMAGERY

Imagery and specificity add much to the reader's experience of a poem. As much as possible, have your students use concrete details and images in their poems. Instead of "the tree," say "the stooped old oak." Instead of "a bird," say "a Stellar's Jay." Writing in nature is creating the poetry of place; discuss specificity and imagery as a tool for recording a student's unique place and experience. Indeed, imagery is also tied to forming emotion and memory. If students use observations and specific images they encountered while out sketching in their writing, they will be able to return to their writing and remember more about their time outside. And, a reader will have a more concrete sense of what the writer was seeing, hearing, and feeling.

SLAM OR SPOKEN WORD; PERFORMANCE STYLE POETRY

Most lyrics of songs are, in essence, poetry. Today's popular music includes rap, which is at its core spoken, performed poetry. Over the past few decades a style of poetry that reflects some aspects of rap and includes a dramatic, performed style of reading has become increasingly popular among youth. For this reason, it is important to include this style in one's teaching; it is, after all, the culture from which many students come, and while they may not connect well with old poems, they respond eagerly when they are performed in a way that is accessible to them. Slam Poetry also has the benefit of getting the poem off the page and into a student's consciousness and body. Performing poetry allows students to develop their public speaking skills and to work on skills like eye contact and delivery. For youth, this is a powerful opportunity to share their thoughts within a community, to address their own emotions, and to have a voice.

To introduce the concept of Slam Poetry, show students videos of slam poets online; direct them to positive role models and poets. Print out the text of one of these poems and discuss how the performer engaged the audience. Then, print out a seemingly archaic poem by Edgar Allen Poe or Walt Whitman. Challenge students to perform it in a slam style, placing emphasis on important words, creating space where they want the audience to breathe. Instantly, the older poem seems more relevant and accessible. Given these models, students can take their own words and begin to shape them to reflect their feelings and thoughts. Challenge students to memorize and perform a poem, modern or older, in front of the class in a slam or rap style; ask students to memorize and share their own poetry. The performance aspect allows students freedom of expression and the chance to place their own unique perspective on a poem. If you ask a class of 30 students to perform an excerpt of "The Raven," each one will have a different take on it. Use performance as an incentive for students who might otherwise be nervous.

In nature, there are many opportunities to incorporate this writing style. Challenge students to create a group poem based on observations they have collected about their schoolyard to share in a talent show; if you have a school garden, have each student draw and perform a poem about a different aspect of it. If there is not an outdoor area easily accessible near your school, have students use performance poetry as a tool for advocating for their hopes and dreams for a space to go outside. If your students are English Language Learners, encourage them to write in their language of highest comfort. Collaborate with students who are musicians to create a rap or song.

SIMPLE PROMPTS

In addition to the exercises described here there are countless ways to prompt students to write poetry. Sometimes asking a question as simple as "How does the forest make you feel?" and giving students time to write about it draws out poetry. Freedom in writing poetry is just as important as structure. Try an open-ended question or giving a very short prompt. Ask students to write poetry to music, or to walk outside with their journals and write about whatever inspires them. Write and share haiku as a class each morning for a week. When you are about to facilitate a writing activity, read your students' energy and enthusiasm and alter these activities in whatever way suits their needs.

CRITIQUING STUDENTS' CREATIVE WRITING

Critiquing students' creative writing, especially poetry, requires respect and sensitivity. While formal assessments have a place in other types of writing assignments, it is difficult (and often detrimental to a young student) to judge a poem's worth. Even poets who are regarded by some as the best in the language may be disliked by another. For this reason your own personal preferences and definitions of "good" poetry should not define your reaction to student poems. As with critiquing student sketches, in this context try to refrain from general statements about the quality of a student's work; if a student was able to reflect on their life, change their perspective, describe their surroundings, or notice something new, then that is a successful poem. Instead of commenting on the quality of the work from a literary standpoint, highlight successful uses of literary devices or comment on a student's unique experience and observations. Commend them on their memory of a past event or their ability to communicate it using imagery. Thank a student for pointing out a feature

in the landscape you would not have noticed otherwise. Encourage students to keep writing and make sure they feel that their writing is worthwhile; many adults can share a story about engaging in some sort of artistic activity as a child then ceasing the practice because of an unkind comment from an adult. Be conscious in your critique and keep bringing your comments back to a place of emphasizing the importance of observation, attention, and joy in nature. As students develop as poets and writers, it becomes possible to offer constructive criticism regarding sentence structure and the use of literary devices. Initially though, it is vital that students feel they can write without judgment.

A powerful way to build community within a class is to encourage students to read their poetry aloud to each other. Students should not be forced to share their writing, but if a safe space is established they are often excited to read their work to classmates. It is astonishing to observe the variety in what students notice or learn through writing poems, and in this way also learn from each other when they share their poems.

RESOURCES FOR EXPLORING POETRY WITH YOUTH

There are numerous books and online resources that pertain to teaching and reading poetry with students. We have listed a few of these resources.

BOOKS

For the Good of the Earth and Sun: Teaching Poetry by Georgia Heard
Awakening the Heart: Exploring Poetry in Elementary and Middle School by Georgia Heard
Writing Toward Home: Tales and Lessons to Find Your Way by Georgia Heard
Wingbeats: Exercises and Practice in Poetry Ed: Scott Wigger-man and David Meischen
Poetry 180 by Ed: Billy Collins
Honeybee by Naomi Shihab Nye
The Same Sky: Poems from around the World Ed. Naomi Shihab Nye
Poemcrazy: Freeing Your Life With Words by Susan G. Woolridge

ONLINE RESOURCES

Poetry.org
Youtube.com (for countless spoken word poets)
Project Vocal Outreach Into Expression (V.O.I.C.E.)
Poetry 180, a poem a day for American High Schools

ENGLISH LANGUAGE LEARNERS

Learning academic English is one of the major challenges English language learners (ELL) face. On average, it takes 5-10 years to learn this particular linguistic skill (Cummins, J., Language Proficiency in Academic Contexts, 2000) Teachers need to be aware of this in order to help their students reach their academic goals.

Journaling is an excellent tool teachers can use to help a language learner become familiar with English words, since it provides a stress-free language experience. It is also a great way for teachers to get closer to their ELL students and make them feel comfortable, and thus engaged and motivated. Once a teacher knows his or her students – how they think and where they come from – the teacher can focus instruction to be more meaningful to both native speakers and language learners.

Throughout this booklet you will find specific techniques and adaptations for your ELL students. Using these techniques will help you understand more about your students and to develop strategies to use these activities creatively and meaningfully in the classroom. Students will feel more socially and emotionally comfortable, thus willing to learn academic language. If used properly, cultural and linguistic diversity can become a powerful intellectual resource.

TIMING

Most of the field based activities in this book can be completed in 45 minutes to one hour, including instructions, activity and wrap up. When sending students into the field, tell them how much time they will have to complete the activity. Many students do not wear watches or become so engrossed in jounaling that time slips by quickly. Explain that you will call them black or blow a whistle when it is time to regroup. Should a student feel they are done before the signal, they should remain in place and try to add more detail to their journal rather than walking about and distracting classmates.

Once students are in the field working in their journals, pay attention to their body language as a cue to when to call them back in. If you told them they have ten minutes but see that they are deeply engrossed in their work, let the clock run. They are doing the most important part of the activity on their own. Similarly, if you see many students becoming restless and distracted, your ten minutes could end up being only seven. This is particularly true if the students are unprepared for environmental conditions such as strong wind, a cold snap or hot weather.

You can also ask the group "How many people would like more than two minutes to finish?" This lets them know time is almost up and gives them room to finish their work.

ASSESSMENT

It is easy to get pulled into evaluating journals on the basis of the quality of the artwork in them. However, we have clearly told our students that it is not about art, rather observation. In grading we must be consistent. Ignore the pretty picture and focus on the content. Are you seeing evidence of real life observations that are documented on the paper? Even if the student has a well drafted generic bird (as one might see in countless how to draw books), we are less impressed with that than a less well drawn bird that shows features observed in the field.

A teacher can qualitatively assess work in field journals. If students are given clear expectations for a journaling project, you can make an assessment rubric to tally the number of required elements that students include in their work. Use a rubric (below) as a starting point and adapt it to your needs. A good way to be clear on your expectations is to pass out a grading rubric before doing a project. Have your students circle all the points that should be included. Once the project is complete, have a partner check off all the elements that their partner included and total these up.

Some of the most exciting elements of journaling can only be evaluated qualitatively. Looking at student journals can give you deep insight into what your students are experiencing and feeling. When reviewing your students' journals, find a quiet and peaceful place and take your time. A journal is a window into the mind of the child.

Name: Date:

Circle the required items for this journaling project. Add up the total points possible and put this number at the bottom of the page. Then have a classmate score your sketch and you score their sketch. Check off the required point or points your classmate included. Add up the total points received and put the number on the line at the bottom.

Baseline Data
____Date (1 point)
____Place (1 point)
____Weather/temperature (1 point)
____Time (1 point)

Sketch and Description
____Drawing or diagram (1 point)
____Notes and descriptions (1 point)
____Detail of interesting part (1 point)
____Label parts (1 point or more ____)
____Color or notes about color (1 point)
____Identify object sketched (1 point)
____Habitat sketch (1 point)

Measurements
____Indicate size of object sketched (1 point)
____Indicate parts that are life-sized (1 point)
____If magnified, indicate magnification (1 point)

Other Things to Include
____Connections (1 point)
____Questions (1 point)
____Other-specify (1 point or more ____)

Total points received: _____
Total points possible:

BOTANY 101— A QUICK REFRESHER

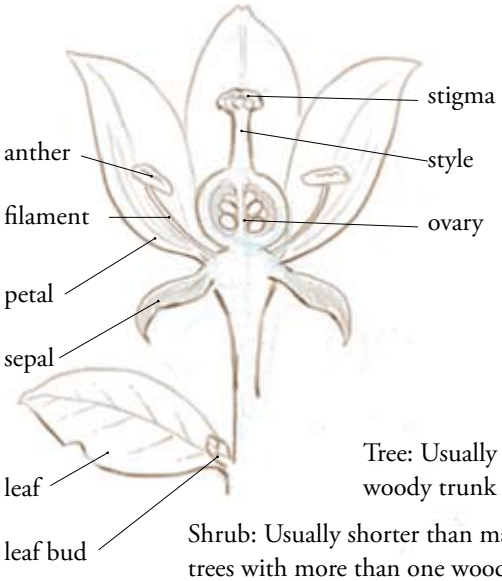
Don't be afraid. Have fun with this. Basic flower structure has 4 "layers", with millions of variations. The outermost parts are called sepals followed by the petals. In the center of the flower are the male and female parts (most plants have male and female parts but some have only male or only female parts. First the stamens (male) composed of anthers with pollen grains on top of filaments. The female parts are usually in the center, often surrounded by the stamens. The whole female part is called a pistil and it is composed of a stigma on top of a tube called the style that leads to the ovary. Inside the ovary are the ovules (equivalent to eggs). There are many variations in flower structure. Some species have parts that are fused together or look alike. Others have missing layers while other plants' layers are greatly reduced or exaggerated in amazing shapes and colors.

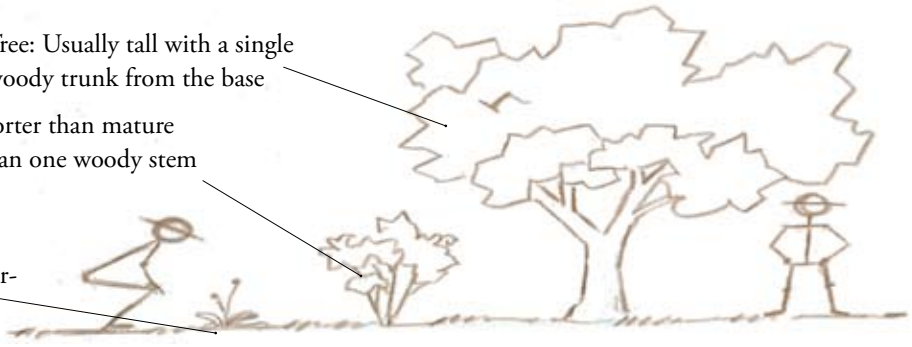
Flowers, in all their stunning glory and variation, exist for the purpose of sexual reproduction. Only plants require an intermediary between the mates- usually a pollinator or the wind. They produce flowers to attract pollinators or use the wind to capture pollen in order to fertilize their ovules and produce seeds. Most flowering plants make seeds. Animals such as bees, flies, birds, or bats carry pollen (with the genes of the father plant) to the stigma of another (mother) plant of the same species. Usually there is a reward for the animal –nectar and/or pollen or a place to meet mates. Flowers are beautiful not to attract you so much as to attract their pollinators. Flowers advertise their sweet nectar or protein rich pollen with shape and color. Some plants and animals have co-evolved over thousands of years and are perfectly fitted to each other and no others. Wind pollinated plants do not spend energy making beautiful flowers. Instead they make less showy flowers that dangle and whip around in the wind to send and catch pollen from other flowers. Grasses, willows, oaks, alders, and conifers are examples of wind pollinated plants.

Once pollen lands on the female parts or stigma of the flower, the pollen grains grow a pollen tube down through style to the ovary and one of the ovules. If all goes well, the ovules will be fertilized by the pollen grains. After fertilization the ovary swells and the ovules develop into seeds. Biologists call the developing ovary or container that holds the seeds "fruit". They call them fruits even if they are vegetables. Not all vegetables are fruits (beets and carrots are roots). However, zucchini and beans and squash are all fruits because they hold the seeds. Those seeds, which contain genes from the mother and the father plants, will start the next generation of plants.

Plants have many ways to disperse their seeds. Some seeds are adapted to blow away in the wind- think of umbrella parachutes of dandelions and the "helicopters" of maple trees. Other seeds stick to the fur of animals or to your socks- we call these hitch-hiker seeds. Some seeds have delicious fruits which animals (including us) like to eat. The seeds inside some types of delicious fruit need to pass through the gut of an animal before planting. Animal poop itself makes good fertilizer too! Other fruits are dry and crack open or shake their seeds out of pods or capsules. These seeds stay close to the parent plants. There are many designs and adaptations for fruit and seed dispersal. Try to figure out how seeds of other plants are adapted to disperse. How many different seeds are in your diet?

Almost all flowering plants have this cycle of flowering, then producing and dispersing seeds. Once you open your eyes to the biodiversity of plants, flowers, and seeds in your neighborhood, you will be amazed.



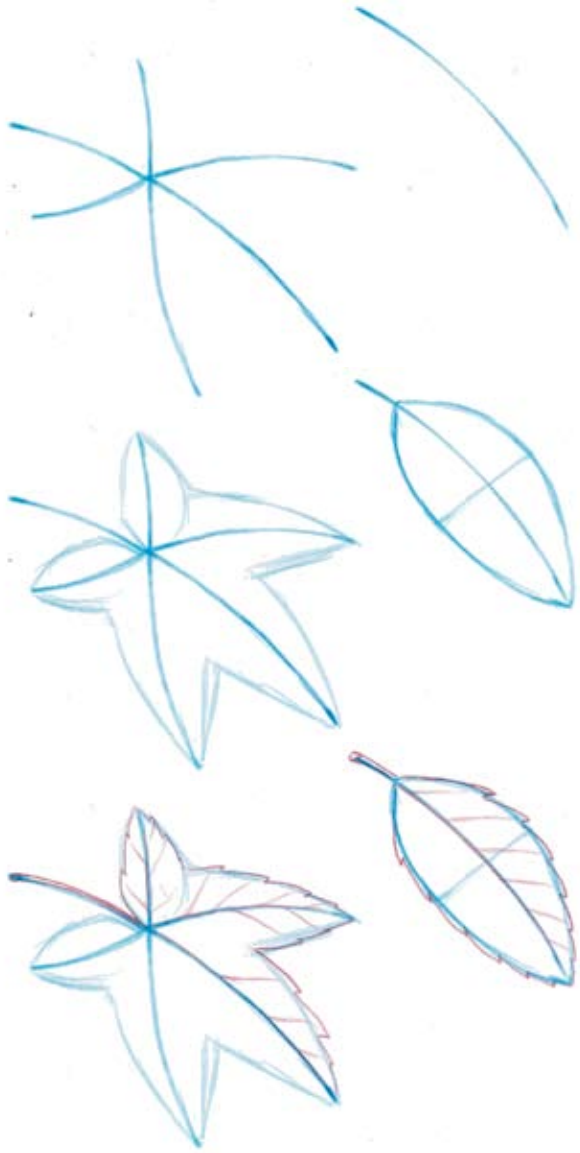


DRAWING TECHNIQUE

Again the purpose of field sketching is not to make pretty pictures, but there are techniques that you can share with your students that will help them to more accurately render what they see. The best way to get better at drawing is to draw more often. To supplement these materials the California Native Plant Society has developed a series of free instructional videos that can help you learn and teach how to draw plants at www.youtube.com/user/JohnMuirLaws.

SHAPE BEFORE DETAILS

When you start drawing, ignore the details and go for shape and proportions. Once you have sketched these in, turn your attention to detail. Start a drawing with fast ghost lines. Sketch the whole form loosely and lightly. Accent the shapes that you like as they begin to emerge. Focus on trying to capture the basic shape, posture, and proportions at the start. Check your proportions early on. If you add details too early, you cannot make changes without erasing significant amounts of work. The quick lines also help students get over the fear of putting the first mark on blank paper. Once you have the basic form, draw over the ghost lines to add detail. For example, when drawing a leaf start by getting the basic shape and proportions (length vs. width) and then add toothed edges over the shape. Draw the leaf veins last going from the mid rib to the tip of each tooth. Make your starting lines, circles, and ellipses very light so you can draw over the guidelines without their showing up too much in your final drawing. A great trick is to make all starting lines with an erasable non-photo blue pencil. It makes light lines you will not need to erase.



SKETCH VS. PORTRAIT

Students typically draw a single picture then continue working to improve. Instead, encourage them to make several sketches of the same subject each next to the other on the same page. They are not obliged to finish every sketch. Rough sketches can contain important information. Their impressions can be used for reference to make a more finished drawing later if they wish, but that is not the objective. The object is to focus on seeing accurately and recording what was seen. Their field sketches will not be perfect. Nor is there a need for them to correct their sketches by comparison to a field guide. Let their field notes stand for themselves as their best impression of what they saw at the time. Altering the notes at a later date risks replacing observation with less reliable memory.

ERASING

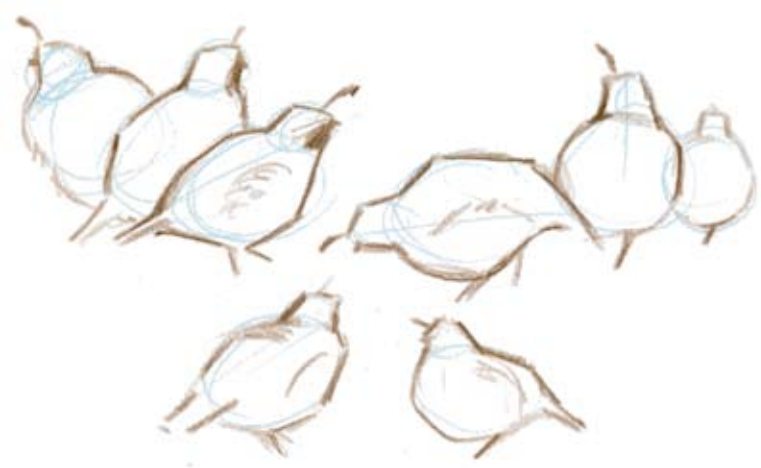
Discourage erasures. When students erase a picture, cross it out, or tear it from their notebook, they are destroying information that they have collected. If part of the sketch is inaccurate, they can instead add written notes or draw another detail of that part.

SIZE

Many students will draw very small pictures. It is difficult to see or add detail to these cramped drawings. Encourage them to work larger, perhaps making enlargements of the objects that they are drawing. You may have to specify, "I want the flower or bird drawn at least as large as your fist." In contrast, students will often undertake too large a landscape drawing. Halfway through the project they tire of drawing trees. They will find smaller "thumbnail" landscapes perhaps 1"x 2" or 2"x 3" to be much more manageable.

DRAWING MOVING SUBJECTS

When drawing a moving animal, work on one drawing until the animal moves to a different position, then start another drawing on the same page. If it moves again, start another drawing. If it returns to a position you have already started to draw, go back to that drawing. The drawing on which you get the furthest along will probably capture the animal's most characteristic posture.



USE WRITING AND DRAWING TOGETHER

Sketching is an important tool to focus observations. If a drawing helps the student see something new or remember it later, then it is a success. The more that students draw, the more they will see. However, students who are more comfortable drawing should include writing in their notes as well, while students who prefer writing should include sketches and diagrams with their writing. Combining writing and drawing gives the pages less of the feel of an art project and more of a place where information is collected. Spelling should not count either. Worrying about spelling or punctuation in field notes only impedes the flow of data recording.

SET AN EXAMPLE

Keep your own field journal and sketch while the students do. You can help them see sketching as a part of what a scientist does instead of just an assignment. Many adults are afraid to draw. If your journals are free of pretty pictures, your work reinforces what you have told the students; that the project is not about art. Nonetheless, as you continue to keep a field journal, you will discover that your drawing will rapidly improve and that the more you sketch, the faster that improvement will occur. Drawing is a skill developed by practice. Journaling is that practice. You can and need to do it.

CONNECTING WITH ART LESSONS

If you are interested in developing art lessons to supplement science journaling, get a copy of *Nature Drawing: a Tool for Learning* by Clare Walker Leslie. The book contains a series of lessons and drawing projects that you can do alone or with your class. The basic drawing exercises at the start make an excellent beginning for any art class and the separate chapters on drawing birds, flowers, trees, and more are very helpful.

EQUIPMENT

Field journaling requires no special equipment. While fancy paper and drawing pencils can make students feel that they need to create art instead of record science, some field supplies are useful. The most important is a good journal. If you can afford them, bound hardcover notebooks that students can use throughout the year and will stand up to field use lend dignity to the process of taking notes. You can also make you own journals as part of a class project. A journal should feel like something that one will continue to use. A clipboard of loose-leaf paper does not feel like part of a permanent record but if that is all you have, use it.

Start with pencil. Once students become familiar with journaling introduce colored pencils. Watercolors are logistically difficult to set up and use in the field and can distract from note taking. Binoculars or magnifying loupes are great tools and open up new worlds of discovery but using them requires a learning curve. Introduce them separately and after students have had success observing with their unaided eyes.

To help you draw leaves or branches life size, place the branch on the paper and draw a series of dots around the edge. This is easier than trying to trace because tracing will move the object. Now use the dots as a reference to draw. Keep the leaf or branch on the paper next to the drawing as you work.

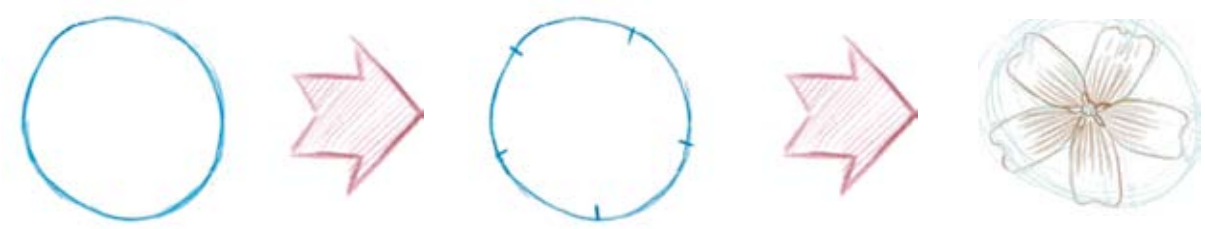
DRAWING PLANTS & FLOWERS

PRACTICE IS MORE IMPORTANT THAN ANY TRICK

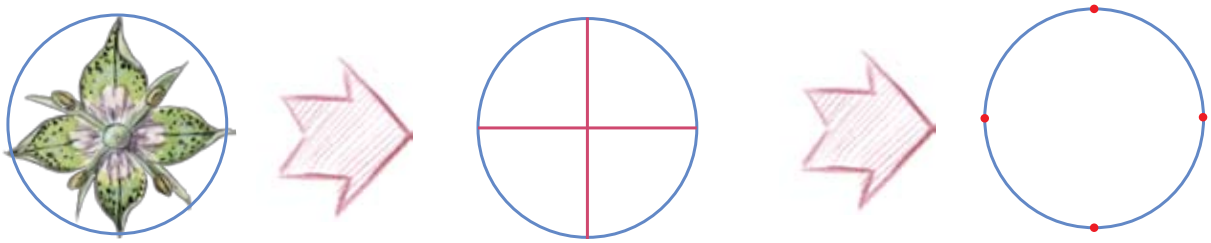
Plants are great subjects to draw. They do not run or fly away and can be observed closely. There are a number of tricks that will help make your own drawing easier and that are easily taught to students. Rather than teach it all at once in a massive drawing lesson, consider breaking it up into mini lessons that you insert between journaling and sketching activities. Pick lessons that will be particularly relevant to what the students are about to work with. There is no right or wrong way to draw. If a specific trick does not work for a student, that is okay, encourage them to absorb what is useful from the lessons. The most important thing is to start drawing on a regular basis. The more you draw the better you get. This is more important than any trick.

HOW TO MASTER FLOWER SYMMETRY

Have you ever had problems placing petals evenly around a flower? Starting with a circle can help. Train yourself to see the circle formed by the edges of the petals. You can also often see circles formed by the parts of the flower in the middle. Draw the flower's circle, then add little tic marks where you see the tip of each petal. If your tic marks are not symmetrical, it is easy to move them around until you get them roughly evenly spaced. Once these are in place you can use them as guides to draw your petals symmetrically. We will use this same system for all the other flowers as well. The trick is to train yourself to look at a complicated shape and to simplify it in your mind. Your eye will be initially drawn to the detail of the flower but ignore it at the start. Make a simple diagram that focuses on the symmetry of the flower, then you can make your detailed drawing, petal by petal, on top of it. Make all of your preliminary lines as light as possible, or work with a non-photo blue pencil for this part of the drawing.



You will usually see flowers with three, four, five, six, or many petals. Getting used to these forms of symmetry and how to quickly place tic marks around the circle helps a lot. This is a great way to review or introduce geometry. Lets take a look at how this works:

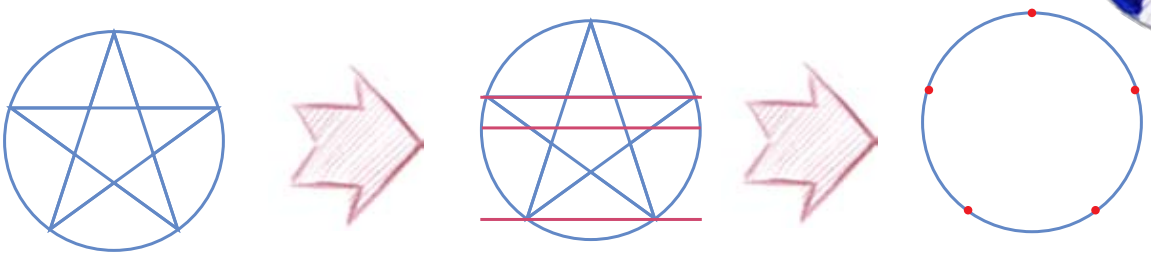


When you see a flower with four petals, visualize the circle that is made by the tips of the petals.

Visualize cross hairs through the middle of the circle. This divides the circle into four equal sections.

Draw small dots or tic marks at those points to guide you in drawing the petals of the flower symmetrically.

Now let's try it with a five-petaled flower. This will be a little more complicated but with a little practice, pentaradial symmetry will become easy to draw.

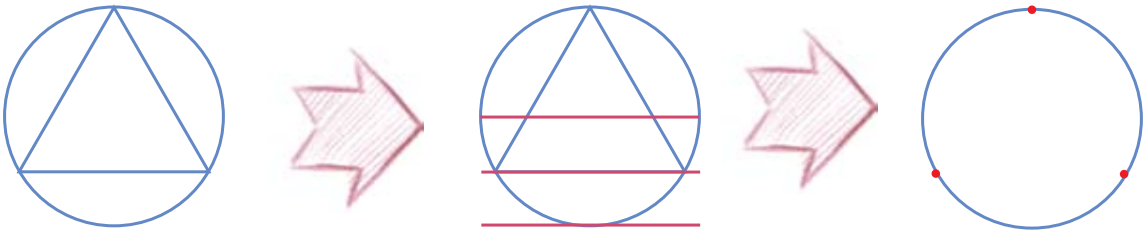


Let's start with the symmetry of a five pointed star. The top point is at the top of the star and directly on the centerline .

The "shoulders" of the star are significantly above the midline. The "feet" of the star are close to the bottom of the star.

With these points in mind, practice drawing a circle and placing five points symmetrically within it. You do not need to try to draw the star, it is just a useful reference point.

What about the symmetry of a flower with three petals?

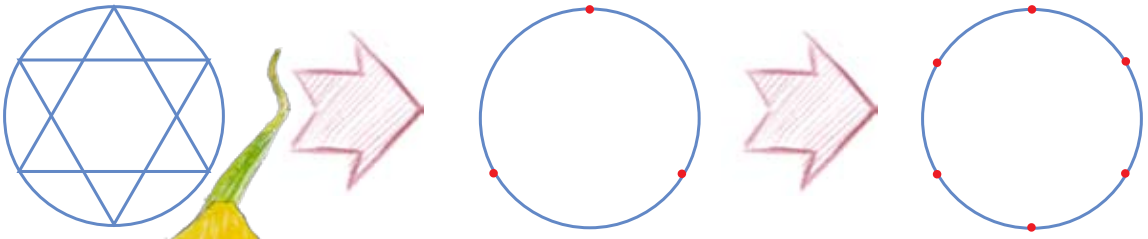


Visualize an equilateral triangle in the middle of a circle. Once again, the middle point is right at the top and directly on the centerline.

The bottom of the triangle is half-way between the bottom of the circle and the midline.

With these points in mind, practice drawing a circle and placing the three points symmetrically. Again, there is no need to draw the triangle, it is just a helpful visualization tool.

If you can do a three-petaled flower, you can do a six-petaled flower. Use the same approach as you did with the three-petaled flower. Just divide the circle into thirds as above, then add a point in the middle of each segment. Each point should now have a match on the opposite side of the circle.



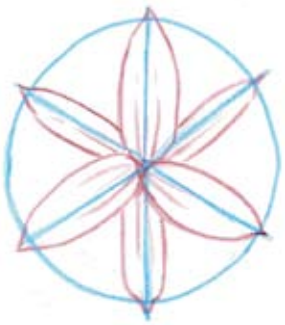
Draw points on the circle, dividing it into three sections as shown above.

Then cut each remaining section in half. Make sure all points are directly across the circle from another point.

Six-petaled flowers are actually organized in two sets of threes. The top three are technically the petals while the bottom three are the sepals. If you look careful you will see differences in the shape and patterns on these two sets.

BROAD AND NARROW PETALS

Points around the edge of the circle help you draw broad and narrow petals. The trick is to use the points to find the tips of narrow petals and the sides of broad petals.



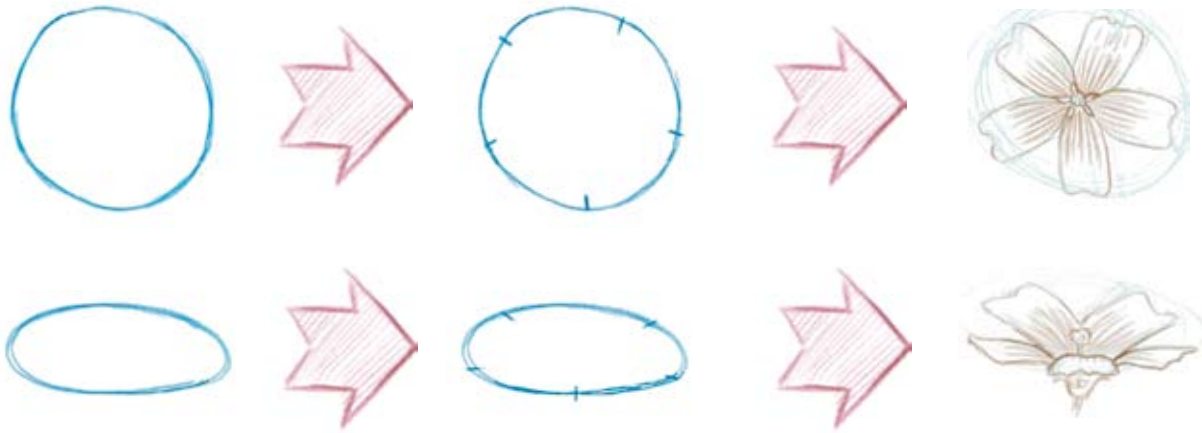
If the flower has narrow petals, use the points on the circle to locate the tips of each petal.

If the flower has broad petals, use the points on the circle to locate the sides between the petals. Here I have drawn a line from the point on the circle to the middle of the flower. This helps in drawing the edges of each petal.

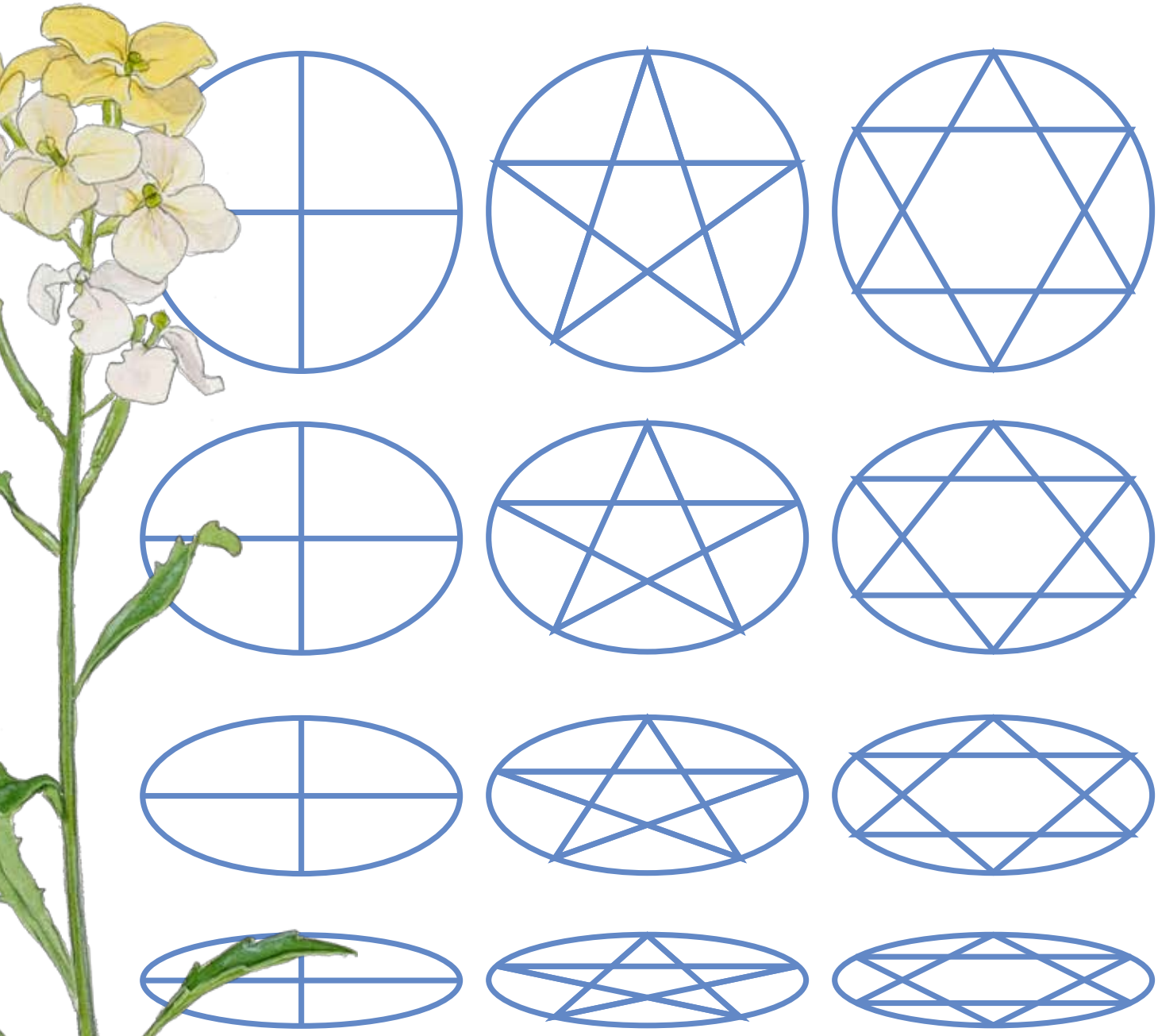
If the petals are intermediate in width, you can use both of these techniques together (finding the tips and the sides of the petals) to help you draw the shape.

FORESHORTENING FLOWERS

If you use a circle to map out the symmetry of flowers, you make it a lot easier to draw the flowers in a foreshortened view. If you foreshorten a circle, you see an ellipse. Similarly, if you foreshorten a flower that is based on a circle, the flower makes an ellipse. Note that the locations of the tips of the petals remains the same in the foreshortened circle.



If you look at the head of a cluster of flowers, you will see blossoms from many different angles. Each flower will be foreshortened to a different degree and be oriented at a different angle. Make a series of ellipses to match the orientation of the individual flowers in the cluster. Flowers in the middle will tend to be seen more head on and have a circular outline. Flowers at the edges will tend to be oriented at an angle to the viewer and have elliptical outlines.



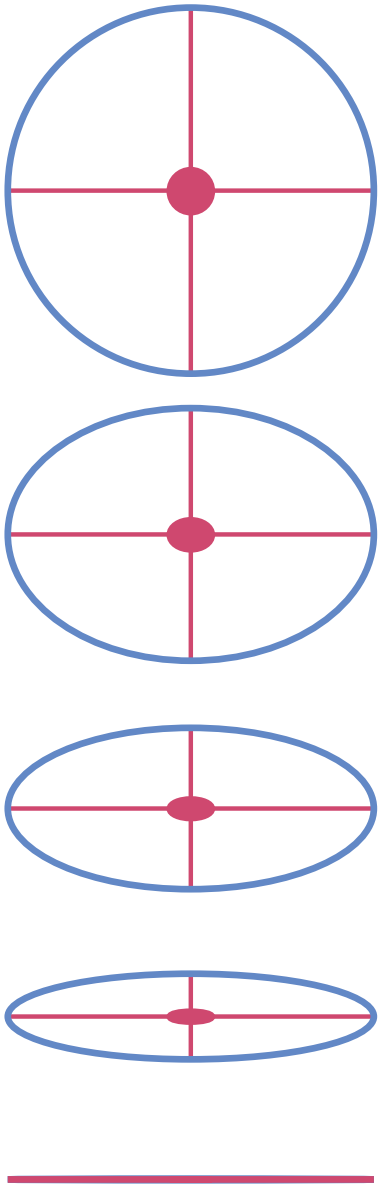
As a circle foreshortens, it becomes an ellipse. Note how the length of the horizontal cross-hairs do not change while the length of the vertical cross hairs shortens.

As you foreshorten a pentagram, the 'shoulders" of the star get skinnier as the star foreshortens. The height of the top section of the star gets shorter but its width does not change. In both of these cases, only the vertical dimension is altered. The height is reduced while the width stays the same.

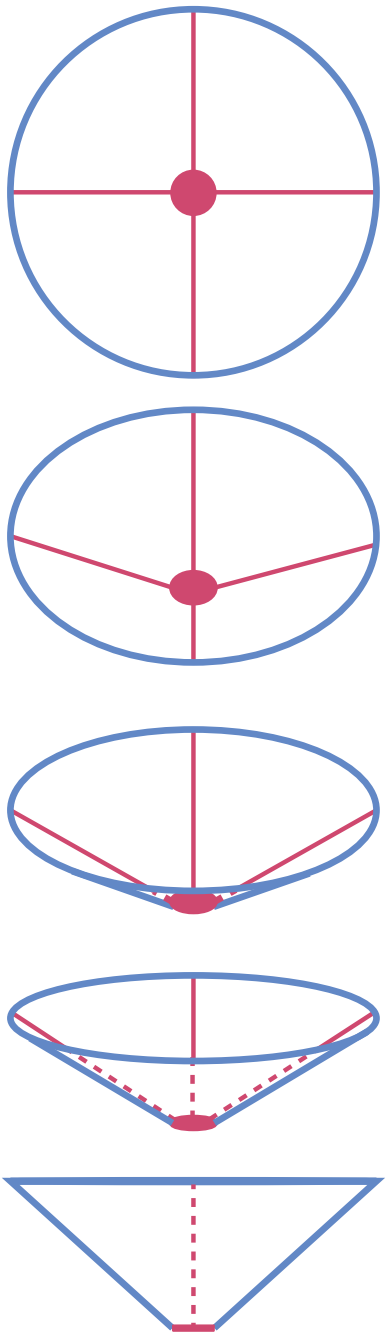
Again you see that it is only the vertical dimension that is altered as the shape foreshortens.

CONE-SHAPED FLOWERS

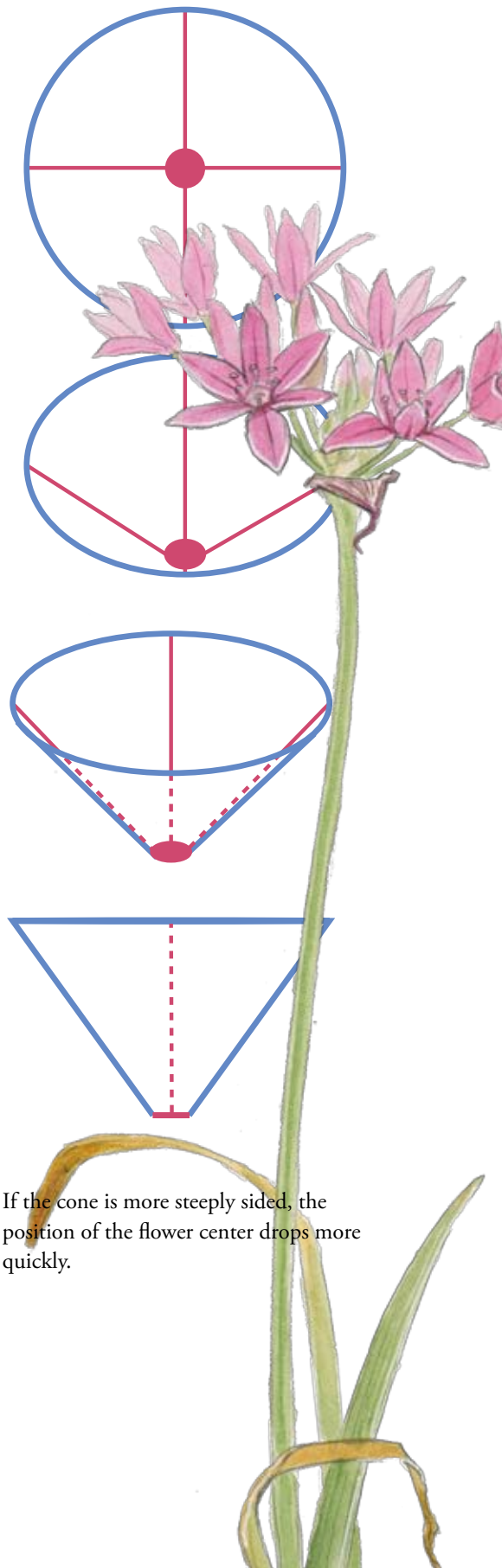
Many flowers are cone-shaped. Such flowers foreshorten differently than flowers whose petals are on the same plane. Compare the location of the center of the flat flower and a cone-shaped flower as the blossom rotates.



As you tilt a flower whose petals are in a flat plane, the circle of the outer petal edges becomes an ellipse. The center of the flower stays in the middle of the flower. The "top" and "bottom" petals appear to get shorter but keep their width while the petals on the sides retain their length but get narrower.



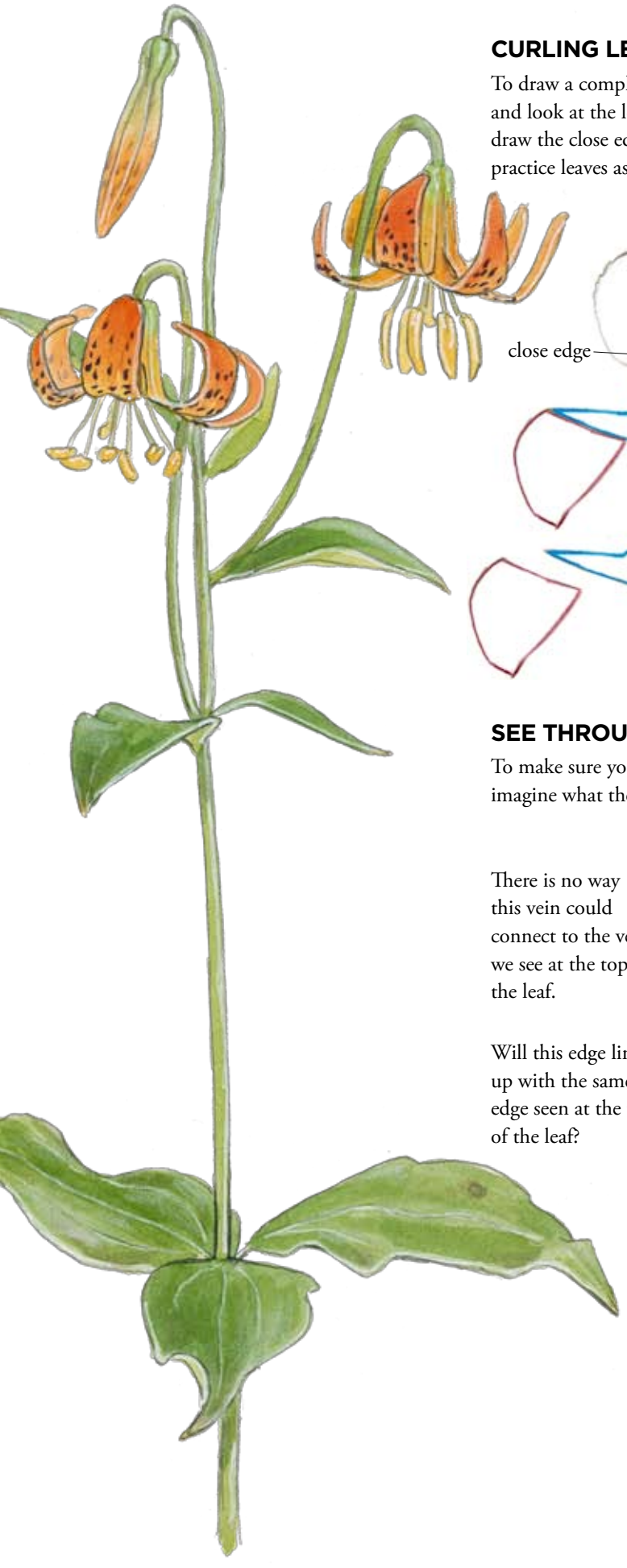
In a cone-shaped flower, the center of the flower drops as the flower rotates. The length of the top petal grows as it is rotated to a position that is perpendicular to the viewing angle. The bottom petal gets shorter. Once the center drops below the lip of the ellipse, the underside of the cone becomes visible.



If the cone is more steeply sided, the position of the flower center drops more quickly.

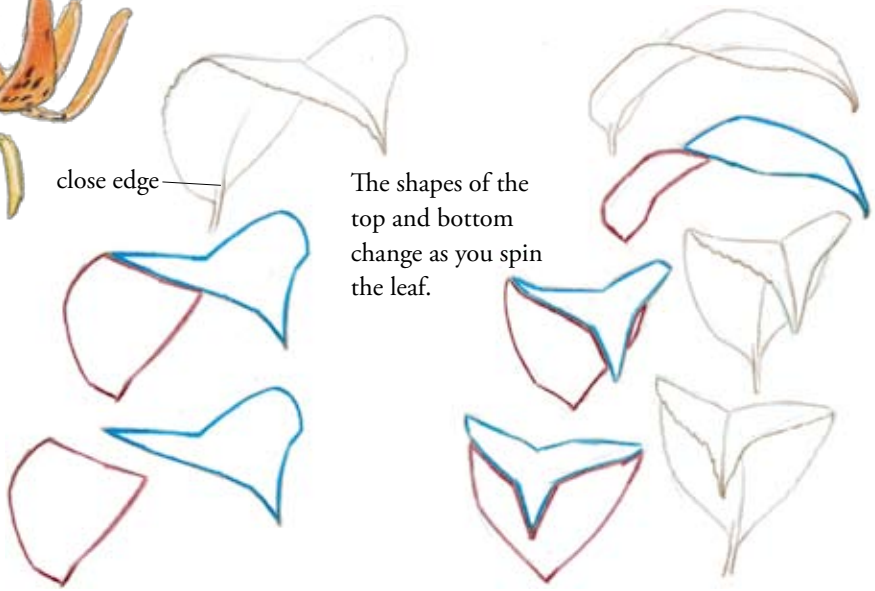
CURLING AND OVERLAPPING PETALS

Petals or leaves that curl and twist are challenging to draw. Try this approach: close one eye to flatten the three dimensional image to two. Think of the top surface a flat shape and draw its edges. Draw the undersides in the same way, using the flattened shape next to that of the top. Train yourself to let go of your thoughts about how the petal should look and record the shape as you really see it. These shapes will not look like petals on their own but put them together and a petal appears.



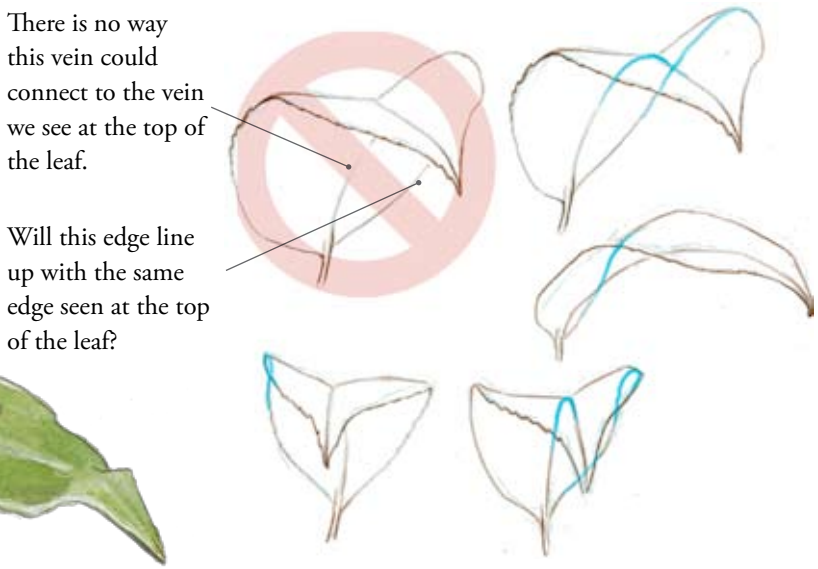
CURLING LEAVES AND PETALS

To draw a complex foreshortened leaf, close one eye (to disrupt your 3D vision) and look at the leaf as two flat shapes that are placed next to each other. Then draw the close edge that unites the two shapes as one continuous line. Draw several practice leaves as an exercise.



SEE THROUGH THE LEAF

To make sure your mid-vein and the far side of the leaf emerge at the right spot, imagine what the curves of those lines do when they are blocked from your sight.



BILATERALLY SYMMETRICAL FLOWERS

Many plants have bilaterally symmetrical flowers that do not fit the three, four, five, six symmetry. They can only be divided into two equal halves along one central axis. These flowers may appear singly or as a part of a complex inflorescence such as lupine (right). When drawing these flowers it helps to keep track of the axis of symmetry to make sure that both sides of the flower will look the same. If you are drawing a flower cluster, start by drawing the flowers that are closest to you (the ones pointing straight toward you). Then add the flowers in progressive layers behind them. This trick of drawing from front to back can also be applied to leaves and other overlapping shapes.

HOW TO SHOW DEPTH

If your leaf or flower looks flat, try strengthening the line's edge that is coming toward you. This will make it pop out from the lines in the back. Also add more detail in the parts that are closer to you, less detail in the background.

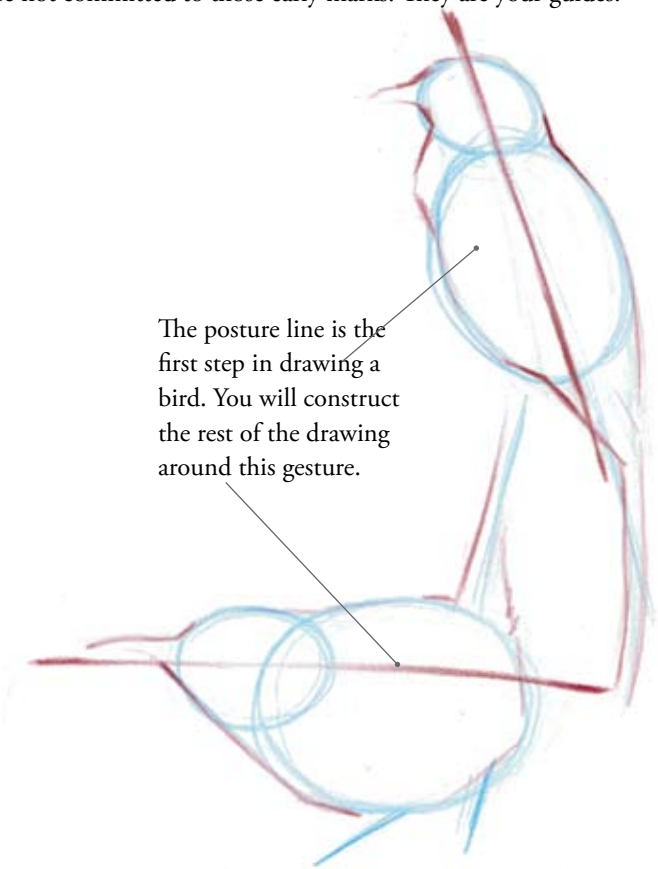
DRAWING BIRDS

SIMPLIFY A COMPLEX SUBJECT

Start a bird drawing by capturing the posture, proportions and angles. These first strokes create the framework over which to draw details and final lines. Instead of starting with details, begin your drawing by capturing the basic shape of the bird with as few lines as possible. Keep your first lines light and loose. You are not committed to those early marks. They are your guides.

POSTURE- THE FIRST LINE

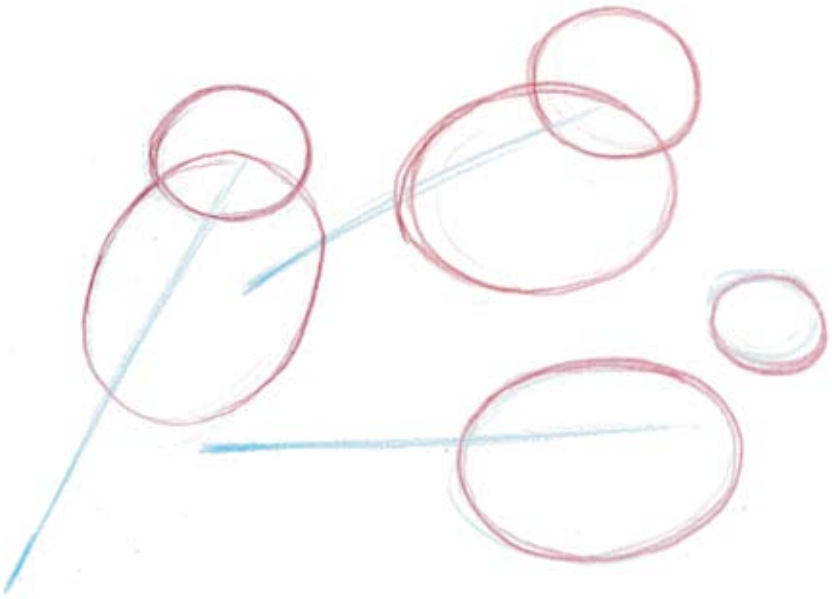
Your bird drawing starts to fly from the first line. Start it by capturing the angle of the body. Birds rest at characteristic angles: Scrub Jays sit vertically while a shrike or kingbird will often sit at a 40 degree angle. Postures change as birds preform different behaviors or face into the wind. Begin by drawing a faint line that indicates the angle of the head and body. You will build the drawing up over this line. If your drawing starts with a proper indication of posture, your completed bird will also hold its body at the right angle. If you just start by drawing a beak and work your way to the tail, it is very unlikely that your resulting bird will convey the attitude of the live bird. If your subject flies away after you have drawn this first line, you have already conveyed something important about the subject. Write "jay posture at rest" or a similar note in your sketchbook. This may be useful to you some other day.



The posture line is the first step in drawing a bird. You will construct the rest of the drawing around this gesture.

PROPORTION

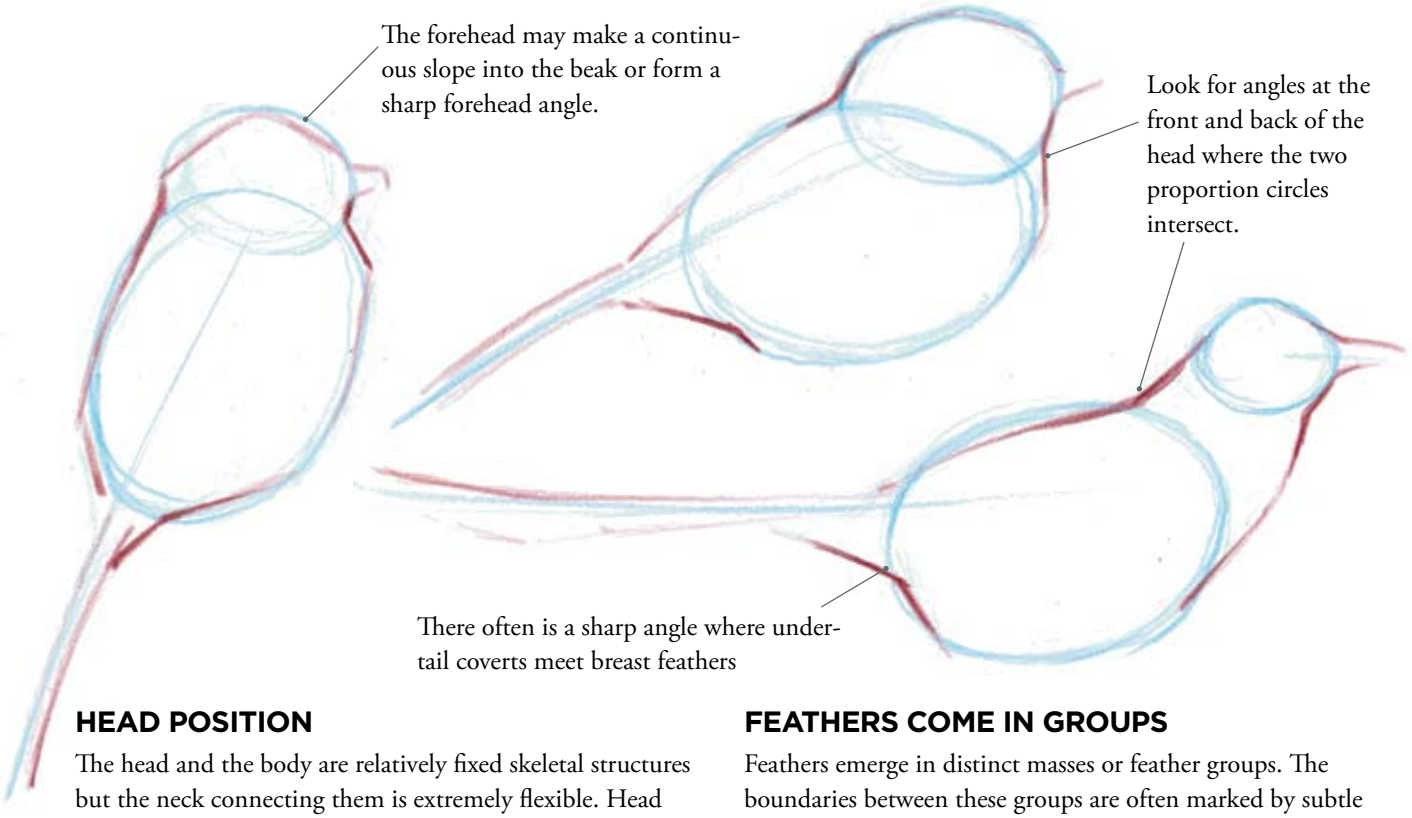
Proportions differ within a species as it fluffs its feathers and between species with different size bodies. Generally, smaller birds will have larger heads. The three illustrations (below left) show the relative proportions of a shrike, chickadee and magpie. The body shapes have been resized so that the body sizes are the same. Note the differences in the sizes of the heads.



Build the body around the posture line and then add the head. It is easier to make the smaller circle proportionate to the larger one.

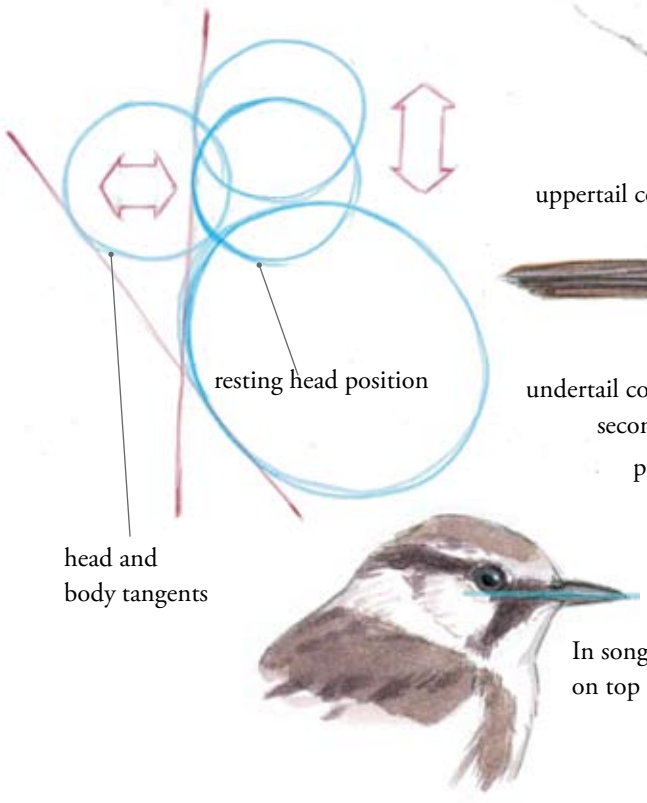
ANGLES

Because you have built the body with circles, it is easy to "over round" it. Look for angles where the head meets the body and the tail meets the body. Carve these into your proportion circles with straight lines. This is the point at which your drawing begins to look like the real bird.



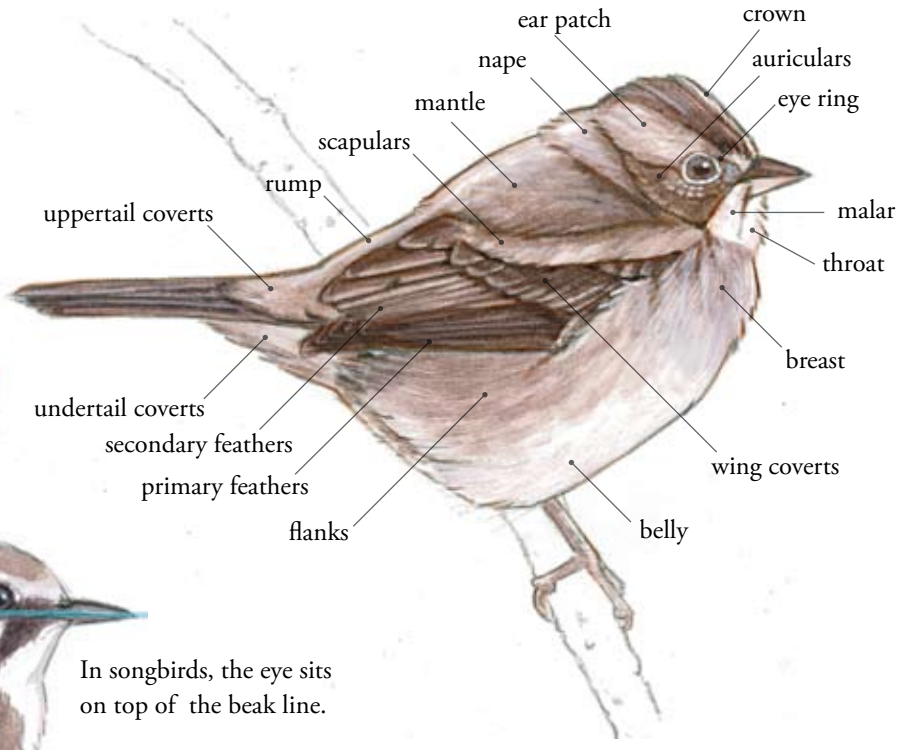
HEAD POSITION

The head and the body are relatively fixed skeletal structures but the neck connecting them is extremely flexible. Head position will dramatically change the shape of the bird. Place the head with care.



FEATHERS COME IN GROUPS

Feathers emerge in distinct masses or feather groups. The boundaries between these groups are often marked by subtle creases or color changes.

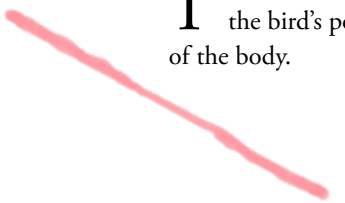


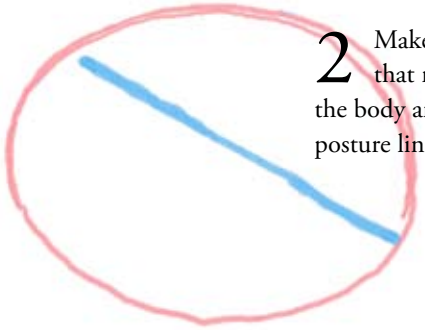
In songbirds, the eye sits on top of the beak line.

CREATING FOUNDATION LINES

Do not start your drawing by putting in details. Your initial strokes create a structure on which you can add detail later. Start lightly and loosely. Make your initial lines as faint as you can. Once you have established the shape, you can add eyes, beak. feathers and other details. You do not have to draw every bird from a step-by-step formula but this approach will help you key in on important aspects of drawing. These basic concepts of starting with posture, proportion and angles (contour) before drawing detail can be applied to any subject.

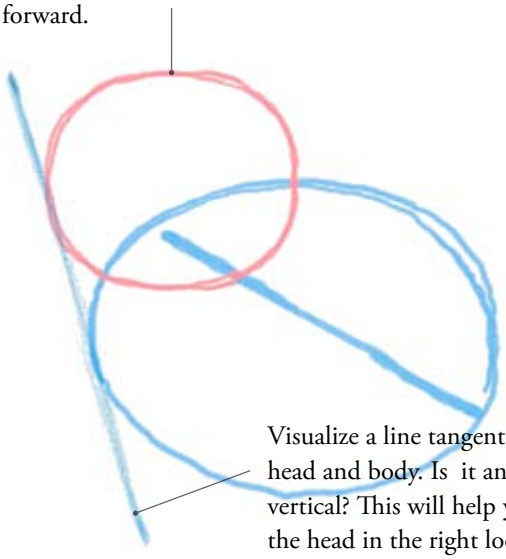
1 Start with one line indicating the bird's posture or long axis of the body.





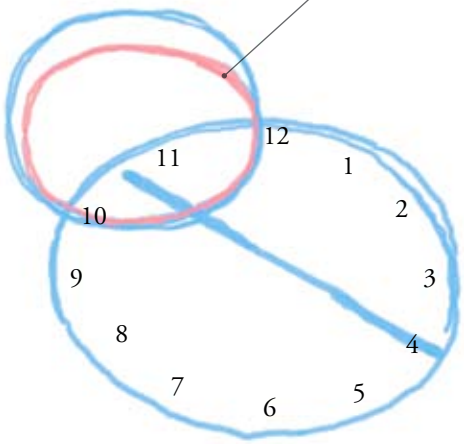
2 Make an oval or egg shape that reflects the form of the body around the axis of the posture line.

3 Add a head, paying attention to size and location. It is easy to make the head too big and to place it too far forward.



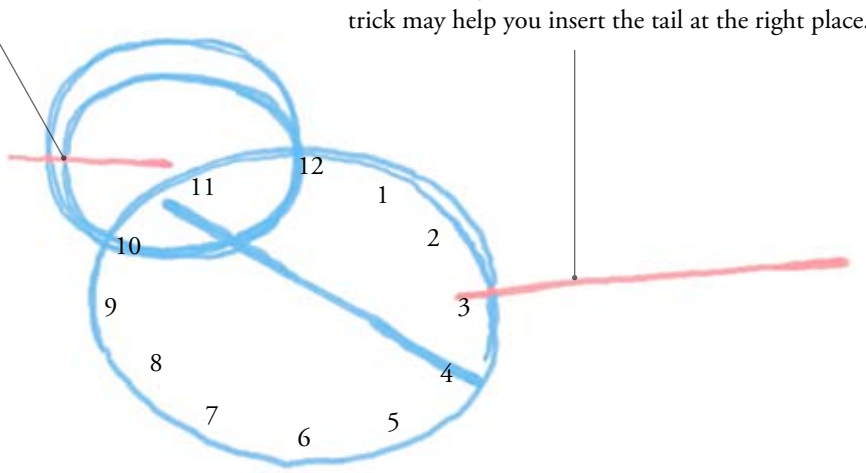
Visualize a line tangent to the head and body. Is it angled or vertical? This will help you place the head in the right location.

4 Stop and check your proportions. Here I realized that the head was too large and drew it smaller. If you had already added detail, it would be more difficult to change. It may be helpful to visualize a clock to say to yourself, "this head settles between 10 and 12".



5 Add the eye-bill line indicating which way the bird is looking. The eye will sit on top of this line.

6 Draw the tail from the upper part of the body oval. The tail originates from a point inside the body. The clock trick may help you insert the tail at the right place.



7 Carve in the angles on the contour of the edge of the body. Pay attention to changes in angles where the head and tail connect. It may help to look at the negative space (shape of the empty background, not the bird). Can you identify a bird or your sketch by its silhouette?

8 Carefully note the location of the wrist (front end of the wing) and draw a line along the leading edge of the wing. Is the wing up or drooped?

9 Add a line along the rear edge of the secondary feathers.

10 Note where the legs meet the body (clock trick), as well as the angle and length of each leg (they may be different). Observe the negative space under the legs.

The details come last. Add these on top of the foundation lines you have created.

STIMULATING DISCOVERY & INQUIRY

Nature journals are invaluable tools to uncover hidden secrets of nature and develop a questioning scientific mind. Journal activities in a science curriculum are more effective and easier for students to initiate in a structured format with well-defined objectives. If you just tell students to make a drawing of a plant, those who are comfortable with art will treat it like an art project but may not push their observation skills, and those who do not like art will shut down. Instead, students should be given explicit goals for a journaling activity that stresses looking at details and recording the data they observe. There are many ways to introduce journaling activities to your students. What follows are only suggestions of how journaling activities might be explained to a class. Modify and adapt them to your own style. Start with activities that train students to accurately and intensely observe what they see. Observation is the most fundamental science process skill.

SECRET PLANT SCAVENGER HUNT

OVERVIEW

Students record detailed observations of a plant and challenge a partner to find the plant they drew. This activity will get students to concentrate on details and drawing a real plant instead of simply reproducing a mental image of how a plant should look. Because the activity is presented as a game, it is a non-threatening introduction that gets everyone drawing and focused on natural details.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors in an area with a variety of plants.

PROCEDURE

Give suggested Group Instructions below. As students disperse, look for those who are spending too much time wandering around trying to choose a plant. They may need help. Pick a plant and say, "This one is good. Look, it has a bug bite on this leaf." At the end of the time period, tell the students to find a partner. Important: if some students are still working on their observations and drawings, let them continue. They may be so absorbed in that part of the exercise that they want to continue. This is more important than finding the plant with a partner. Remind partnered pairs to show their partner the general area that their plant is in. The area will be smaller for a smaller plant, perhaps as small as a square foot. They can further narrow the search area if their partner has trouble. Once the partner finds the plant, the partner should point out what drawn details or notes were most helpful in finding the plant. When students return, ask the partners what clues were most helpful to them. Students are often pleasantly surprised at their success.

GROUP INSTRUCTIONS

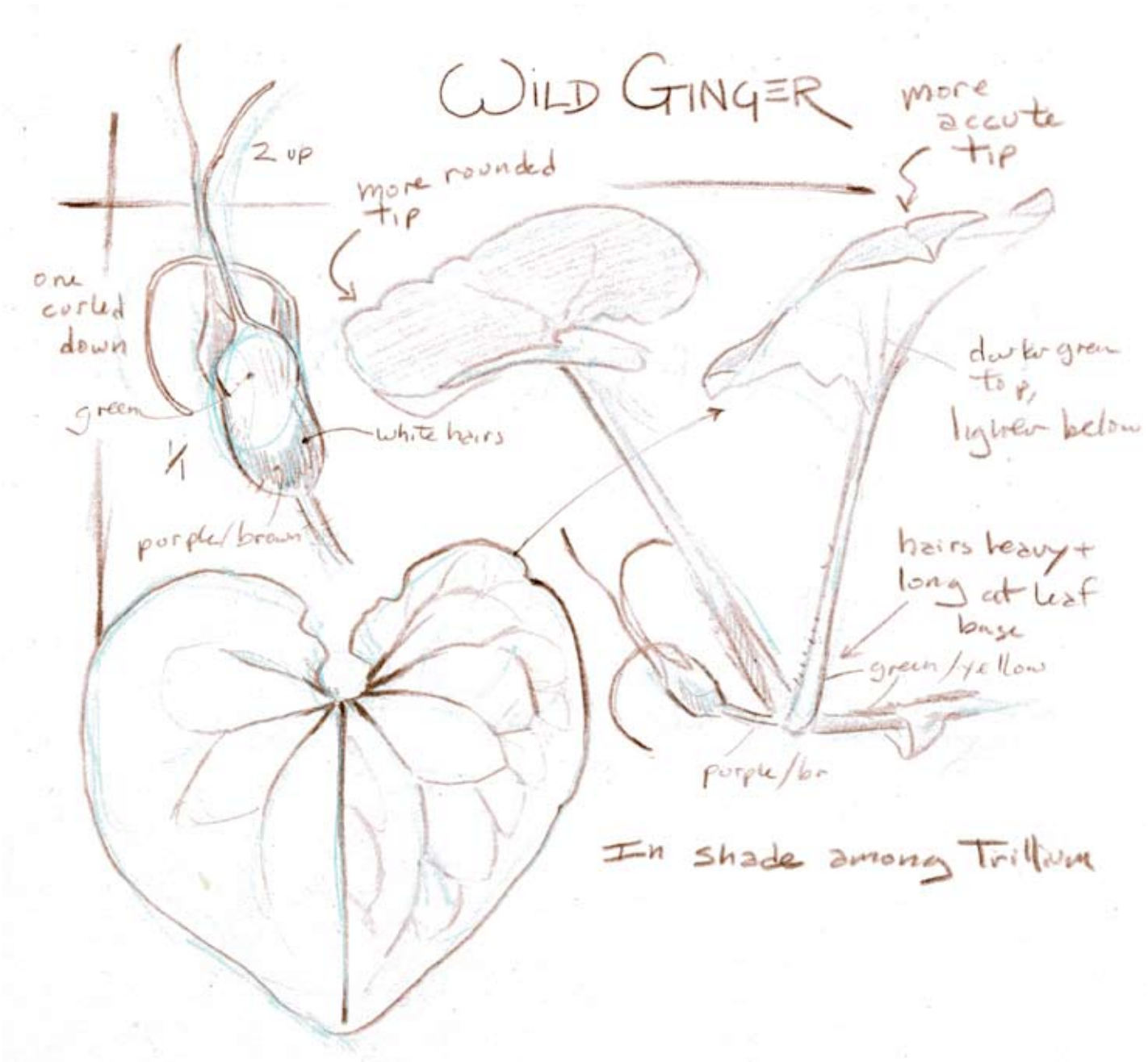
"We are going to play a nature observation game. When I give the signal we are going to spread out and each of you will find a different plant to study. You will have fifteen minutes to record as much information about your plant in your journal using both writing and drawing. You want to be very thorough because at the end of the time period I am going to call you back to this spot. You will then select a partner, take your partner to the area you were journaling, and see if your partner can pick out the specific plant you drew (not just the species that you were looking at) just by comparing plants with your journal entries. Show your partner the general area where your plant is located. Narrow down the area if your partner is having trouble locating your plant. Remember, the goal of this activity is to make drawings and notes that will make it as easy as possible for your partner to find the plant that you drew. Here are the boundaries for this activity." Define boundaries so students will not wander too far. "If you would like to have a partner, make sure that the two of you are not sitting near each other while you are taking your notes. If you finish before the time limit is up, remain sitting and try to add a few more details. What might some of those details be?" Get suggestions from students: color and detailed notes, bent leaves, insect bites or discolored spots. "Any questions? Ready, set, go!"

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

This activity will help ELL students learn how to communicate their thoughts as well as acquire some vocabulary relevant to the lesson. Ask your ELL students to describe their drawing in as much detail as possible in the language they feel most comfortable. Pair them with a proficient English speaker and ask him or her to help the ELL student make a vocabulary list of the words they do not know. Use this as a reference in further activities.

STATE OF CALIFORNIA STANDARDS

Science
- 3rd Grade 5.b, 5.e
- 4th Grade 6.a
- 9th-12th Grade 6.a


WILD GINGER
2 up
more rounded tip
more acute tip
one curled down
green
white hairs
purple/brown
darker green to p, lighter below
hairs heavy + long at leaf base
green/yellow
purple/br
In shade among Trillium

DIAGRAMMING

OVERVIEW

Students observe a complex natural object, break it down into component parts, and draw them. This simplifies drawing and helps students focus on observation instead of making pretty pictures.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors in a place where you can find complex natural objects with repeating parts such as ferns, lupine flowers, or pinecones.

PROCEDURE

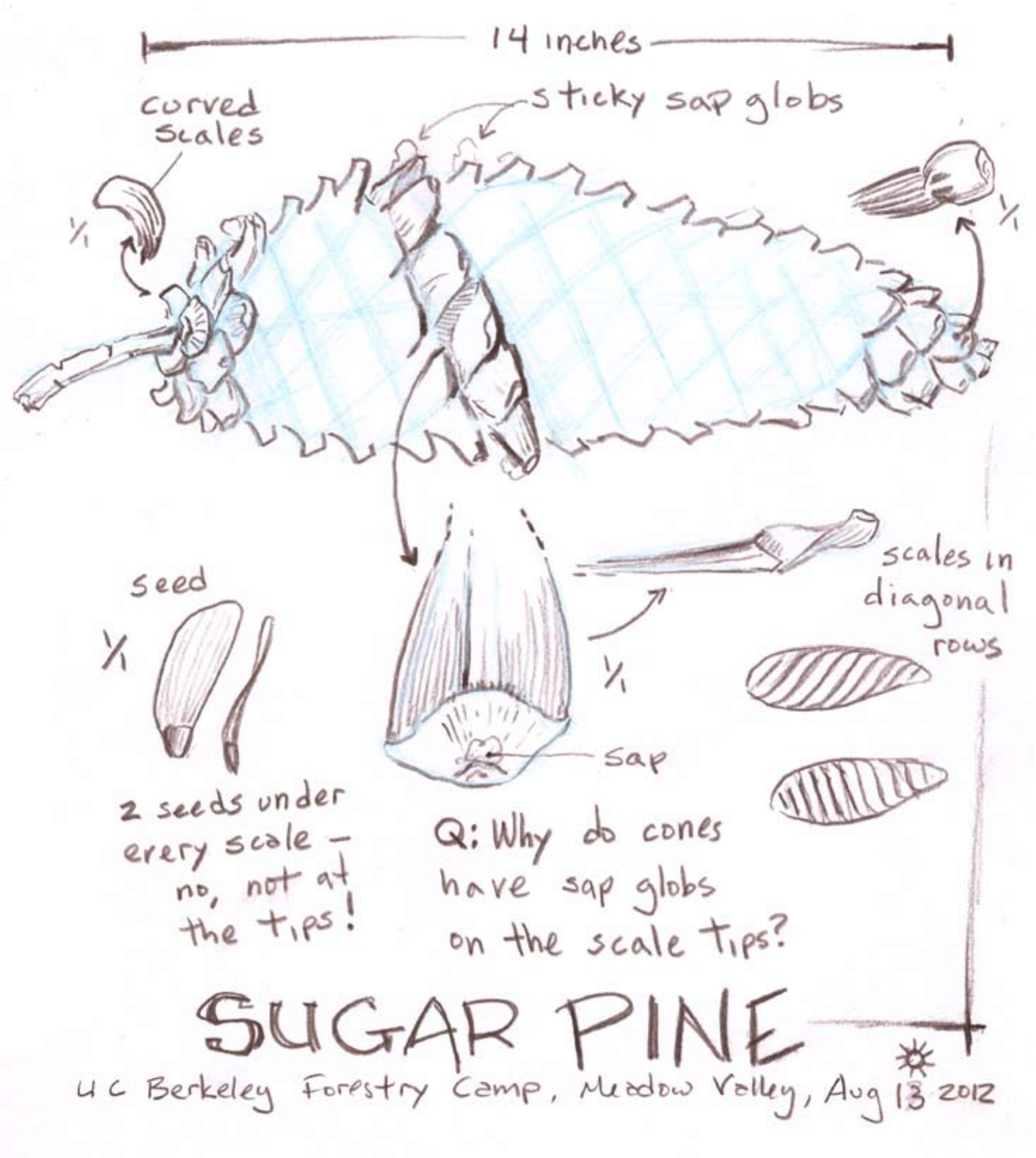
This is a great activity to take the "Art" pressure out of field journaling. Many students think that a drawing must create a likeness of the object being drawn. This pressure can be daunting when faced with a complex and intricate object with many repeating parts. In this activity, students deconstruct the subject that they are observing and create a diagram of the key parts and how they fit together. This gets students to observe the big picture and look for patterns and relationships. This approach to drawing also is a great time saver. You can focus on observing instead of monotonously drawing repeated shapes. Think of the blueprints that an architect makes to build a house. There is no need to draw the details of every joint if they are repeated throughout the structure. One is enough. This saves a lot of time and paper. Once students have experienced diagramming, they may find many other ways to use it in many of the other journaling activities. The trick is to get them away from the idea of making a portrait and into using this approach to document what they see efficiently.

GROUP INSTRUCTIONS

This hypothetical class takes place in a lupine patch. The instructor can create a simple diagram demonstrating what is being described. "A lupine plant like this one can take a long time to draw. Look at all those flowers and leaves. But I am going to show you a trick that will allow you to record a lot of information about it very quickly and without having to draw fifty separate flowers. Instead of a drawing, we are going to make a diagram of this plant. I first look at what parts are repeated over and over again. What do you see?" Students point out repeated flowers, leaves, and perhaps other features. "I do not have to draw every one of those flowers. I will draw it once, perhaps with a side view and a front view. Now look at how those flowers emerge from the stem like spokes of a wheel making a layer of flowers. Let's see, there are one, two... eight of them. I am going to make a diagram showing a cross section of the stem with the flowers radiating out from it. This little 1/1 note means life size. Now I am going to make a side view diagram. There are six layers of these flowers so I am going to make a life-size sketch showing how they are spaced up the stem. I do not need to draw in the flowers, I already have one drawn right here. I am just going to put in a few circles on one of the layers to show how they are spaced. The layer at the top looks a little different so I can do a little drawing of that and the layer at the bottom is wilted and I see what I think are seed pods. I can draw that separately too. Now I can add some written notes, the stem is hairy, this upper row has a different color at the top of the flowers, these flowers are wilted. Now I draw in lines to show where these written notes fit in with the diagram. Done. Look at how much information I have recorded with a minimum of drawing and that did not take too much time. We can apply the same sort of thinking to drawing the leaves too. Now lets take sixteen minutes to make your own diagrams of these plants. Include both the flowering stems and the leaves. Remember we are not just making a regular drawing of the plant. The challenge is to use as many shortcuts as you can to get the information down on your page without having to redraw a lot of the parts. Your diagram does not have to look like mine; this is not the only way to approach this. When we are done we can see who came up with some of the most creative and efficient ways of documenting what you see. Are there any questions before we begin?"

STATE OF CALIFORNIA STANDARDS

Science
- 3rd Grade 5.b, 5.c, 5.e
- 4th Grade 6.a, 6.b


14 inches
curved scales
sticky sap globs
1/1
1/1
seed
1/1
1/1
scales in diagonal rows
sap
2 seeds under every scale – no, not at the tips!
Q: Why do cones have sap globs on the scale tips?
SUGAR PINE
UC Berkeley Forestry Camp, Meadow Valley, Aug 13 2012

TO EACH ITS OWN

OVERVIEW

Students choose similar objects such as fallen branches beneath a redwood tree, and draw and describe them on their page. Then the class plays a matching game, pairing each branch with a sketch. No two branches or leaves are the same. This activity gets students to observe and record the micro differences that distinguish similar objects.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors in a place where you can find sets of similar objects such as leaves under a tree. Can also be played indoors if you bring the objects in.

PROCEDURE

Play this activity when you have easy access to a set of similar objects such as branches below a redwood, leaves under a bay, or shells at a beach. The more variable the objects, the easier it will be to play. Objects that are more similar provide a greater challenge. Instruct each student to document their object on a page using both drawing and writing. Life-size drawings are particularly helpful. Students should highlight irregularities or imperfections that makes their object unique. When the students have finished drawing, collect the objects in a hat or a bag. Seat the students in a small circle or cluster them around a picnic table. Place the journals in the middle; open to the pages with the notes. Then place all the objects in an open pile (make it easy to see each one).

Now students can take turns matching objects to the notes by placing the objects on top of the journal illustrations that they think most accurately match the size or shape of that object. As you go around the circle, each student can move a new object to a journal, move an object from one journal to another, switch the objects between two journals, or pass if they feel everything is placed correctly or if they do not feel they have enough information from the notes to make a move. Once everyone feels the objects are placed correctly double check by asking if everyone sees their own object on their journal. Use this experience as a vehicle for discussing the importance of specific and clear observations in science and writing. It is important to train students (and yourself) to see details and to learn ways of recording them. Ask: "what notes or sketches were most helpful to distinguish specific objects?"

GROUP INSTRUCTIONS

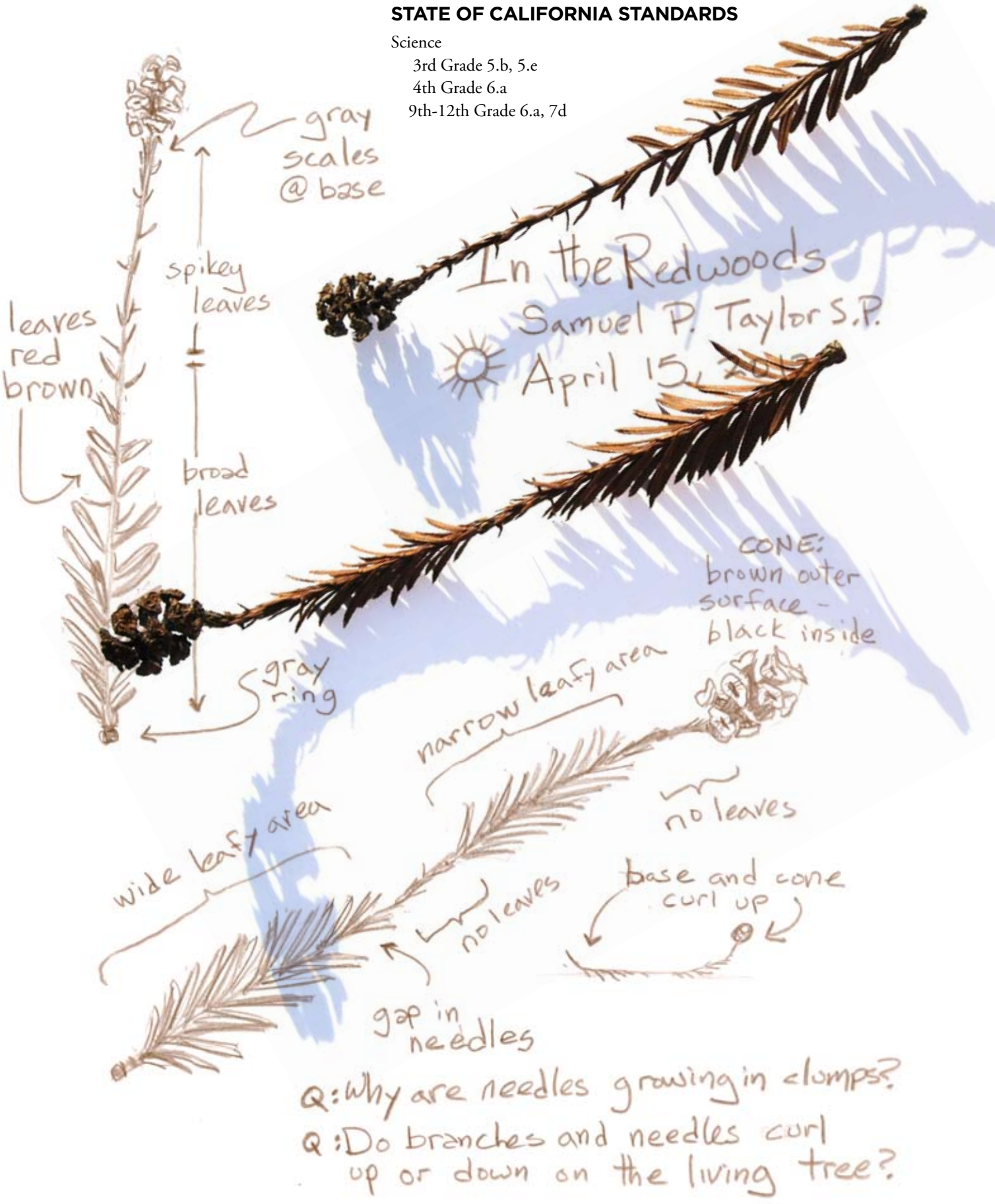
"Lets play a journal matching game. I need everyone to find a piece of a fallen redwood branch that is shorter than the page of your journal. See which one catches your eye and pick it up. Here are the rules of our game. When I say go, you will only have eleven minutes to copy details about this branch into your journal. I want you to use both writing and drawing to record your observations. Start with a life-size drawing in the middle of the page. Make sure you have room to put the whole branch on the page. You might try lightly tracing the shape of the branch as you start to help you make the drawing the right size. Look for details on the branch that would help people pick out your branch from everyone else's and write or draw these notes on your paper. For instance, if you see a dark brown spot on one leaf you can add a note "dark brown spot" and draw a line to show where it goes on the drawing. Little details are important. When we are done, we will try to match everyone's drawing with their branch. Your goal is to include the clues that will help your classmates know for sure which branch you drew. What are some clues that you think would be really helpful in telling one branch from another? Make sure you do not discard or tear up your branch when you are done. We will need it to complete the activity. Does anyone have any questions before we begin?"

Give times that are specific- eleven minutes feels little more urgent than ten minutes because it is specific. You are not locked into times that you give for these or other activities in this guide. If you see that students are engaged and still observing carefully when the time is up, let it run a little more. Observing, drawing, and making notes are the point of the experience. If you see that many students are getting fidgety early, you can also cut the time shorter. You can often refocus students by saying to the group. "Only two minutes, thirty seconds left. In the time remaining write in details about where you see odd color changes or add any last critical details."

STATE OF CALIFORNIA STANDARDS

Science

3rd Grade 5.b, 5.e
4th Grade 6.a
9th-12th Grade 6.a, 7d



ZOOM IN, ZOOM OUT

OVERVIEW

Students investigate and draw an object in three scales and observe how features move into and out of focus at each scale. By focusing at three levels of magnification, students will make different types of observations. We can easily miss important features by getting stuck at one level of focus in our observations and drawings. Some people are more apt to zoom in on details while others typically get the big picture. This activity teaches students to move across levels of focus, e.g., from small details to habitat and the range of observation shifts at each level of focus.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors. Can also be played indoors if you bring objects in.

PROCEDURE

Stand at a distance from a plant where you can see it in its habitat. Ask students to offer the range of observations possible at that distance. Walk up to the plant. Ask students to offer their observations from close up. Compare the changing range of observations taken at different distances. Give the suggested Group Instructions and set boundaries and a time limit as needed. At the conclusion of the activity, discuss why it is important to change the level of focus. How might the students apply this to other activities? A hand lens, loupe, or magnifying glass is useful but not essential. Using a magnifier for the first time is sometimes distracting.

GROUP INSTRUCTIONS

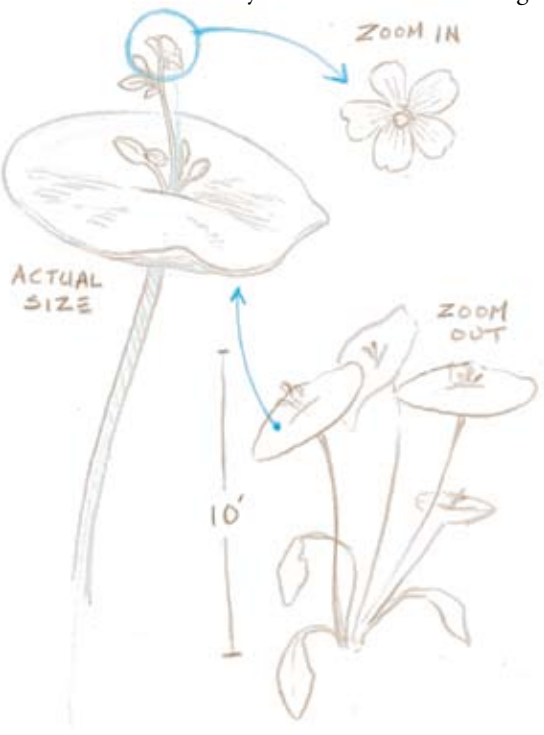
"In the middle of your page draw a view of your subject that is exactly life size. If the object is larger than your page, only draw part of it. Add some written notes. Then choose some part of the subject that you find interesting and draw a little circle around that part of your drawing. At the side of the paper, draw a larger circle and draw a magnified view of that same area showing details that are too small to be shown in the life size picture. Include written notes. Finally, take a few steps back from the plant and make a final sketch, this time zoomed out to take in the whole plant, and some of its environment. Use both writing and drawing. We are looking from three levels of focus, life size, a magnified view, and a more distant view, all on the same page. Now let's see what you observe by changing your level of focus."

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

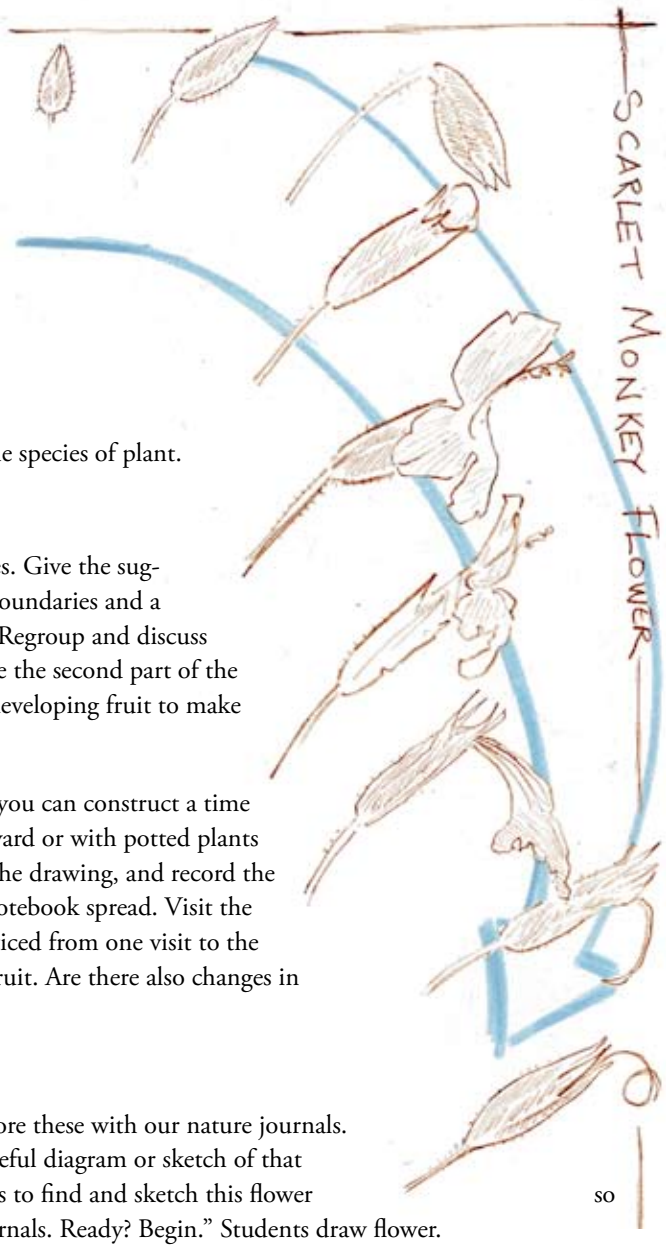
Demonstrate to your ELL students exactly what you expect from them. It is crucial for them to see what the final product should look like. Pair English proficient students with ELL students and ask them to write keywords next to the drawings.

STATE OF CALIFORNIA STANDARDS

Science
- 3rd Grade. 5.b, 5.e
- 4th Grade, 6.a



PLANT TIME LINE



OVERVIEW

Students follow the process of budding through fruit development by looking at plants in different states of growth. By comparing plants in different states of flower to fruit development, students can construct models of plant development. This activity helps students focus on and understand the function of plant parts and their change through time.
Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors where you can find a variety of life stages of one species of plant.

PROCEDURE

This activity is best done in a field of wildflowers of the same species. Give the suggested Group Instructions for the first part of the exercise and set boundaries and a time limit. Students will draw one flower in the peak of its bloom. Regroup and discuss the function of flowers (attracting insects for pollination). Now give the second part of the Group Instructions. Students will try to find buds, blossoms, and developing fruit to make a complete chronology of flower-fruit development.

If you have access to one plant over weeks or months in the spring you can construct a time line for that individual. This can be done with plants in the schoolyard or with potted plants in the classroom. When the plant is in bud, draw it in detail, date the drawing, and record the weather. Leave room for more drawings and notes on a two-page notebook spread. Visit the plant over a series of days, weeks, or months. What changes are noticed from one visit to the next? Record changes as the plant comes into bud, leaf, flower, or fruit. Are there also changes in the rate at which change occurs?

GROUP INSTRUCTIONS

"What a beautiful field of California Poppies! We are going to explore these with our nature journals. Find a flower that you think is at the peak of its bloom. Make a careful diagram or sketch of that flower in the middle of your page. You will only have seven minutes to find and sketch this flower so you are going to have to work fast and accurately. Get out your journals. Ready? Begin." Students draw flower.

"Now we are going to take this a step further. When I say go, find a flower that is a little further developed or older than the one you sketched. Draw it to the right of your first flower. Then find one that is a little less open and draw it to the left of your flower. Continue like this, adding flowers on either side and see if you can find ones that are still in bud or perhaps even producing a fruit. We want to see if you can find the youngest and oldest stages. You will need to look carefully; it gets tough once the flower starts to drop its petals. Any questions? You have sixteen minutes (or more) to see how far you can take it in both directions. Ready? Go."

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Ask each of your ELL students to add more adjectives in the language he or she feels most comfortable with. It is also an opportunity to teach/reinforce the "date format" since it varies from country to country. Supervise their work; it is better to demonstrate the right way instead of just pointing out mistakes.

STATE OF CALIFORNIA STANDARDS

Science
- 3rd Grade 3.a, 5.e
- 6th Grade 7.g, 7.h

COMPARISONS

OVERVIEW

Students find two specimens of similar species (such as two species of lupine), branches, mushrooms, flowers, grasses, etc., and draw them side-by-side, noting differences between them. By comparing two similar objects, students find differences between objects and see variability within a single species. By looking for differences within species, students are forced to observe more closely and are introduced to the concept of environmental and genetic variation.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors where you can find two similar species such as two species of pine trees.

PROCEDURE

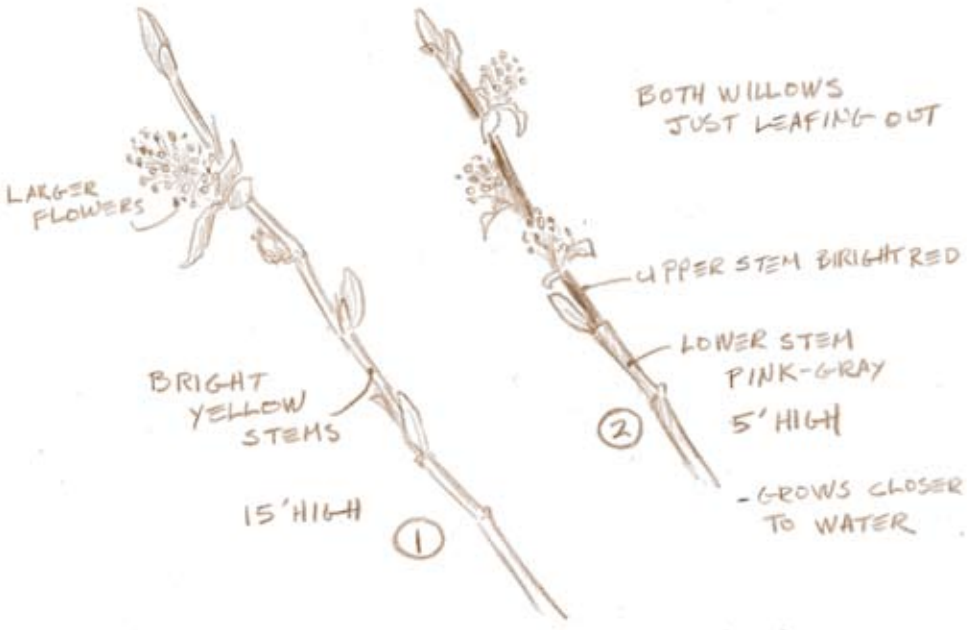
This activity is best done in a location where you have access to many individuals of the same species, such as a patch of buttercups. Give the suggested Group Instructions. Set boundaries and time limits as needed. Depending on the level of focus of the students allow twenty to forty-five minutes. Regather the students to discuss the subtle differences that they have found. Discuss differences in appearance due to environmental and genetic factors.

GROUP INSTRUCTIONS

"We are used to seeing differences between individual humans. None of us look alike. There are differences between individuals of other species as well, but we have to train our eyes to see them. No two flowers in a meadow, mushrooms on a hill, or leaves on a tree look exactly alike. Here's your challenge. Find two similar appearing flowers, leaves, mushrooms, grasses, etc., of the same species. Make a careful diagram in your journal of each side-by-side. If they are small, you may want to draw them larger than life size. Look for as many differences between them as you can find and point them out in your drawings or written notes. You will have to look very carefully because the differences will be very small. If you are drawing a live plant, do not pick it but make your drawing while it is still rooted in the ground.

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

New information is best learned and retained when it can be linked to things you already know. Encourage your ELL students to not only draw the plant they are observing, but also ask what the plant reminds them of. Also, ask questions like: "Are these from the same species? Which one is taller? Are the colors the same? Do they have the same number of leaves (petals, branches, twigs, etc.)? What else makes them different? Do they grow close to the water?" Students will benefit from this guidance, which encourages them to write the words they have trouble understanding in their vocabulary list.



STATE OF CALIFORNIA STANDARDS

Science
- 3rd Grade 5.b, 5.e
- 4th Grade 6a
- 5th Grade 6a
- 9th-12th Grade 6.a, 7d

GROUP OBSERVATIONS

OVERVIEW

Students cooperate or compete to make as many unique observations as they can of the same species or individual plant exploring the great variety and depth of observations that can be made of a single subject. Students also learn how other students looked at the same subject and how the focus of one person's observations differs from another's.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors, focused around one plant or natural object that can be observed by the whole class.

PROCEDURE

Find a common object, such as an abundant species of flower, or one that all the students can observe at the same time, such as a tree. Give either the cooperative or competitive Group Instructions. After ten minutes, assemble them away from the object they have been observing. For the cooperative data collection exercise, let each student report on what feature or features he or she found most interesting. For the competitive version, ask if anyone thinks they have an observation that no one else made. If so, what is it? Check to see if anyone else recorded, not just saw, the same thing. Ask who thinks they have the most observations. Let students read out their numbers. Ask if anyone has an observation that no one else has recorded.

GROUP INSTRUCTIONS (COOPERATIVE)

"You are a part of a science research team. We have discovered a new species of tree, flower, etc.. We need to record as much information about this species as we can, but we only have ten minutes to do so. All the observations we make must be entered in our journals, or they will not count. If we are all looking at the same features, those features will be covered very well, but other aspects of the tree will be missed. We want to record as much information as we can. If you wish, I will give you a moment to divide the work among yourselves. When you are ready we will start the clock."

GROUP INSTRUCTIONS (COMPETITIVE)

"Welcome to the Observation Olympics! At the blast of my whistle, you will compete to see who sees what no one else sees. Here are the rules. Record as many observations as you can of this Buckeye tree, species of wildflower etc., in your journals. Make as many observations as you can. Avoid observations such as 'this leaf has two spots on it, but look for features that have some general applicability such as 'leaves have brown spots surrounded by a pale yellow ring'. You win if you can make at least one observation that no one else recorded. Remember: if it is not recorded in your journal with a picture or in writing, it will not count. Any questions? On your mark, get set, tweeeeeet!"

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Suggest to your ELL students to write the description of their object in the language in which they feel most fluent. During the activity, supervise their writing and do not correct them. Instead model correct grammatical forms, such as, "You are right, the tree is very tall and wide!" Ask them to write the key adjectives and add them to their vocabulary list.

STATE OF CALIFORNIA STANDARDS

Science

3rd Grade 5a, 5.b, 5.e
4th Grade 6a

MAKE A FIELD GUIDE OR COLLECTION

OVERVIEW

Students make a field guide or an illustrated collection of common natural objects, e.g., flowers, tracks, etc., highlighting differences between species. When students explore a small aspect of local biodiversity they develop the basic skills to distinguish between species.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors in an area with a variety of plants or animals.

PROCEDURE

Show the students a field guide. Note how simple, clear, text and drawings show distinguishing characteristics. Give the suggested Group Instructions and set boundaries and a time limit as needed. Forty-five minutes is a good average time.

Students already collect things: model planes, marbles, etc. This activity taps into that aspect of their interests. It is open-ended and can be done in places such as National Parks where you cannot physically collect specimens. Students can instead make illustrated collections of what they find. They are not restricted to obvious plants and flowers. They might include tracks, insects seen in a particular patch of flowers, things that are red, patterns in sand or snow, things with a strong smell, insect galls, cloud shapes, or insects under rocks.

This activity can be a continuous one and does not have to be done at one time or in one place. If some students finish long before others, suggest that they try to include another plant or add more detail to the notes that they have already taken. Students may begin entries at the start of a hike and add to them throughout the day or continue adding to them on subsequent days. Once students start a collection, they may become enthused to enlarge it. Encourage that energy.

A collection becomes a field guide if the species in the collection are identified and labeled. After students have completed their work, regroup, review their work, and identify the species that they have drawn. Depending on the age of the students, you may want to include scientific names. There will be much greater interest in identification after students have drawn their plants.

GROUP INSTRUCTIONS FOR DIRECTED FIELD GUIDE

"Each of us is now going to make a field guide to wildflowers (grasses, lichen, trees, tracks, etc.). You do not need to know their names, but you do need to look closely enough to see the differences between different species of flowers. A field guide compares kinds of flowers, not individual flowers. Your drawings should show the differences between each species of flower, not differences between individual flowers of the same species. To get started, try to include at least four to six flowers. Are there any questions? Let's begin."

GROUP INSTRUCTIONS FOR OPEN-ENDED FIELD GUIDE

"Each of us is now going to make a field guide. You can choose whatever topic you want like, wildflowers, grasses, lichen, or trees. You do not need to know the names of whatever you draw. We'll get to that later, but you do need to look closely enough to see the differences between species. You can also choose creative topics such as things that are red, animal tracks, things with a strong smell, or types of spider webs, etc. First you need to pick a topic. Let's take two minutes to look around the area for each of you to decide what you are going to put in your field guide. When we come back we will each announce our topic. Let's go look." Reassemble. "Okay, lets share our field guide topics." Students give topics. Make sure the topics are ones of which the students will be able to find enough material. "Remember that a field guide compares kinds of things, such as different kinds of plants, not individual plants. Your drawings should show the differences between each kind of plant, not differences between individual plants of the same species. If you are studying spider webs, for example, look for ones made by one kind of spider and compare those with webs made by other kinds of spiders. To get started, try to include at least four to six subjects in your guide. Are there any questions? Let's begin."

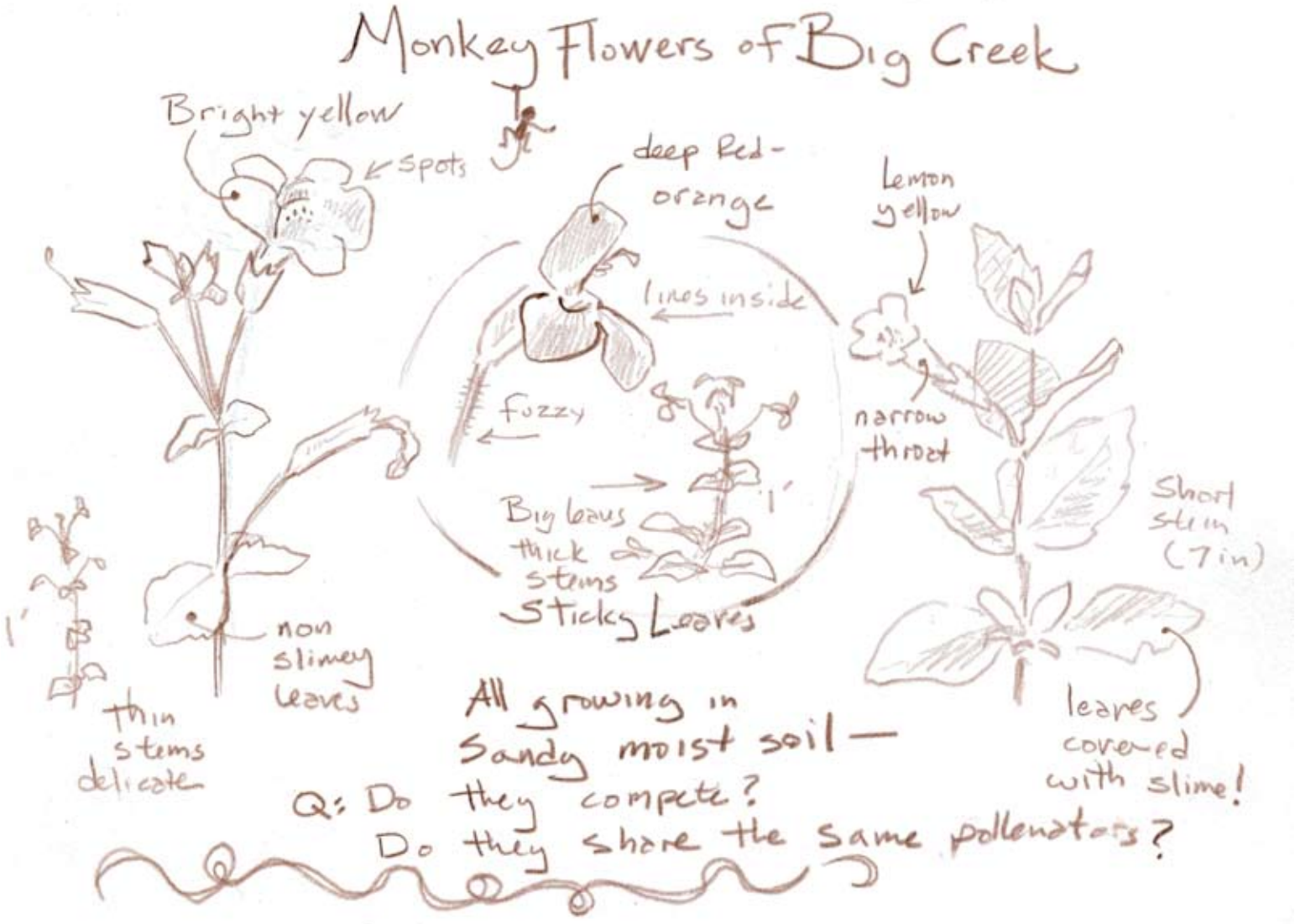
CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Observation is a skill common to all, regardless of ethnicity, age, or sex. This activity is easy to do and helps ELL students become more comfortable writing a list of what they observe. When one of your proficient English speakers finishes the activity, ask him or her to compare their findings with an ELL student. Encourage the pair to find common plants or trees together. Have them answer the following questions: Did they write the object in the same language? How is it said and written differently in each student's primary language? In this way, they will both benefit from the diversity of each language by learning new words. It is also a way to let your ELL students know that you respect and value the diversity of each language and culture.

STATE OF CALIFORNIA STANDARDS

Science

3rd Grade 5.e
5th Grade 6.a
9th-12th Grade 6.a



MAPPING

OVERVIEW

Students define and map vegetation zones. By creating maps of plant distributions, students focus on patterns made by species growing in a variety of conditions, such as soil moisture, light, or disturbance. Students learn that plants are not randomly distributed but form patterns on the landscape in response to growing conditions.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors where students can observe an area where a natural feature (creek, hill, etc.) affects plant growth.

OPTIONAL EQUIPMENT

Aerial photos showing local vegetation patterns can be found on Google Maps.

PROCEDURE

Find a small area with distinct boundaries between vegetation such as zonation in a meadow, marsh, or pond edge. Note how clear boundaries of vegetation patterns are visible from aerial photographs. Look across the landscape and correlate patterns you see on the photo with changes in vegetation found on the ground. Explain how those patterns show the differing growing conditions required by different species of plants.

Explain to the students that they will create a map of an area spanning several vegetation zones. Help them make a key to significant plants or vegetation zones. Clearly define the scale, e.g., 1 inch= 10 paces. Help them understand scale by drawing themselves on the map at the center and pacing off the distance to a nearby landmark. You can also use a pile of backpacks or other equipment and locate it on student maps to get them started, essentially a "you are here" sign. Set boundaries and a time limit as needed.

GROUP INSTRUCTIONS

"Plants are not randomly scattered across the landscape. We are going to map plants at the edge of this marsh to see what patterns of growth we can find. To do that, we must do several things. Let's first look around and see if we can pick out four major plant types in this area." Students point out plant types. "Now let's make a simple key to those types of plants for use on our map." Develop a key with the students. "Now we need a scale for our map. On this map one inch will represent ten steps" or other scale as appropriate." Draw scale on page. "While we are working on this project, we can leave our backpacks here. Let's start by putting ourselves on this map." Mark backpack pile. Demonstrate how to map using the key. "If you find any interesting landmarks or evidence of animals, put them on the map. Any questions? You have twenty minutes to complete this map. Return to this spot when you hear my whistle."

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

This activity could be especially challenging for ELL students to understand since it involves scientific terms and units of measurement they might not be familiar with like inch, biotic, abiotic, etc. Be clear while explaining what you expect. Show them what the final product should look like. It is very important for them to add all the new words to their vocabulary list.

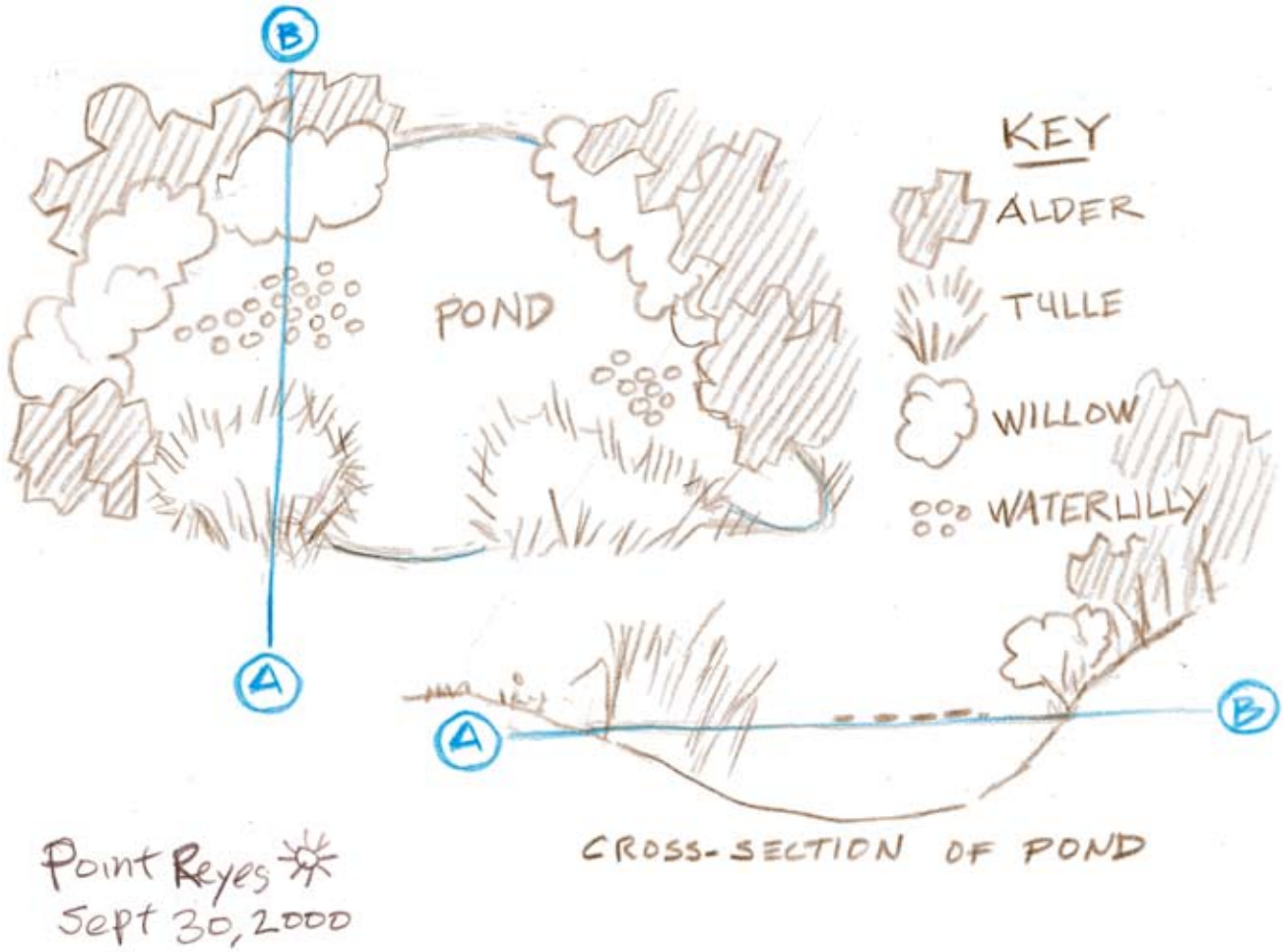
EXTENSION

Once the map has been completed, choose two points and have the students draw a cross-section of the route between them. Discuss patterns in the landscape and how biotic and abiotic factors affect where species of plants occur. What are the most important natural forces in the mapped area? See the Cross-Section activity (page 44) for more details. Use compasses, light meters, soil thermometers, or moisture gauges to test student's theories about forces that determine plant distribution. It is important to indicate which way is north. It is fun to explore and test the accuracy of ways of finding north without a compass and then check your guess.

STATE OF CALIFORNIA STANDARDS

Science

3rd Grade 3.b, 5.e
4th Grade 6.b5th Grade 6.a, 6.b, 6.c, 6.d, 6.e, 6.f, 6.g, 6.h
6th Grade 7a, 7.f
7th Grade 7.d



CROSS-SECTION

OVERVIEW

Students diagram a cross-section or transect of an area that shows a transition of plant types. This study helps them to understand how plant growth is affected by changing environmental conditions. Students map the change in plant types across an area that shows strong vertical zonations such as an intertidal area, shore to pond, across a riparian corridor, or other plant transitions, such as a ridge with north-south facing slope differences.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors where students can observe an area where some natural feature (creek, hill, etc.) affects plant growth.

PROCEDURE

Explain to the students that they will be creating a side-view diagram of an area. Help them draw the ground profile across their paper showing changes in elevation. Instruct students to draw themselves standing on the ground to set the scale. You may also help them make a key to species (like the example on the previous page) before they begin. Alternatively they may draw plant silhouettes as they walk across the transect, labeling the plant species below the ground line and showing any animals that they find above the ground line (see example opposite page). Walk slowly across the transect sketching the distribution of plants or animals. Discuss patterns in the landscape and why species occur and where they do, e.g. north/south slopes, or zonation near water due to soil moisture.

GROUP INSTRUCTIONS

"One way that scientists study an area is by making a transect. This means walking in a straight line through an area and noting changes in plants or animals. We are going to make a side view chart of a short walk. We are going to add symbols for the plants and animals we discover along the way. The trees and other symbols can be simple cartoons, but their locations must be accurate. We are going to hike straight over this ridge and a little way down the other side. I am going to draw the shape of the hill on my paper and I want you to copy the line I draw as closely as you can." Draw hill profile. "Now we are going to make a simple key to a few of the most common trees and plants we will see. I will show you a few important plants and we will make symbols for them along the left side of our page. We may add a few more as we make our way over the hill. Let's start with this one over here. This is a Douglas-fir. Let's look closely at its needles and cones so we can pick it out later. Here is an example of a simple symbol we can use for these trees on our cross section key. Now pick out another type of tree and give it a symbol." Students add plants to their key; more will probably be added as they make their way over the hill. "Now let's start our way up, adding trees and other plants to our diagram. The top of the hill is about two city blocks away so leave room on your chart for the changes near the top. I will tell you when we reach the halfway point."

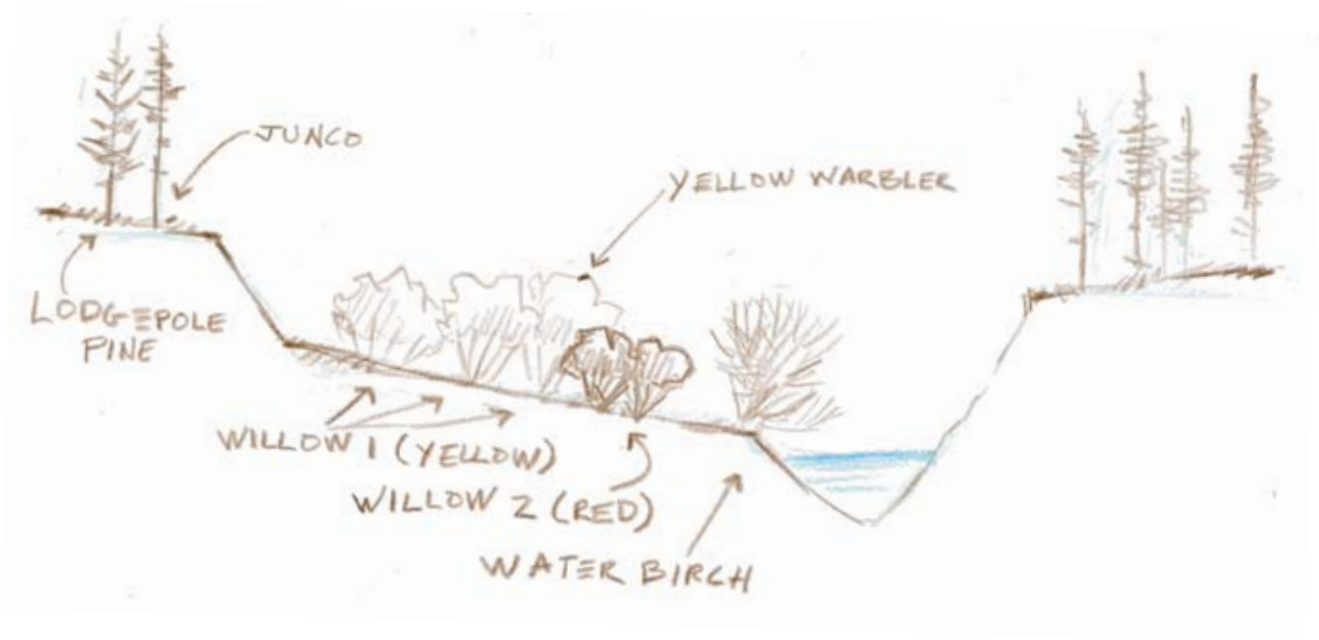
CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Pair your ELL students with native English speakers. By doing this you will provide students with rich language experiences that integrate speaking, listening, and writing. Remember that helping ELL students become proficient in English is central to this mission. This activity will provide a stress free environment where students will be able to practice and develop social, academic, and communication skills. Make sure that your students understand the concept of "cross-section" by drawing one. Explain that this is what they are going to do with the area and what's the objective of the activity. If you model for them what they are expected to do, it is more likely they will understand and be engaged.

STATE OF CALIFORNIA STANDARDS

Science

3rd Grade 3.b 5.e
4th Grade 6.b
5th Grade 6.a, 6.b, 6.c, 6.d, 6.e, 6.f, 6.g, 6.h
7th Grade 7.d



Rock Creek
July 2, 2005

NATURE'S TREASURE MAP

OVERVIEW

Students construct a map of treasures found along a trail as they hike, making quick sketches and creating place names for the sites of their sketches. In making this map, students process their experience and can better recall events along the way and the spatial relationships between their discoveries.

Age level: 8 years-adult
Suggested time: 1 hour.
Location: Outdoors where students can hike along a section of trail.

PROCEDURE

The treasure map is made along the trail while hiking. Give the suggested Group Instructions. Move slowly along the trail looking for interesting nature discoveries for students to map as they go. Include quick sketches and invent place names along the way. If you are making a loop hike, consider which side or corner of the page would be the most appropriate to start the map so as to leave room for the full loop on the page. Review the hike in a circle with students displaying their maps and discussing their observations.

GROUP INSTRUCTIONS

"We are going to search for hidden treasure. You will each make your own map. Unlike a pirate map where the treasure is found at the end, this map is of the treasures we discover along the way. To get started, make one drawing in this corner of your journal page."

Instruct students to draw a plant, landform or other feature that can be easily seen from your location. "Then start the dashed line that will show the hike route. It will grow as the hike progresses. The first treasure along our way is right ahead. Keep your eyes open and see if you can spot it."

Stop at the next interesting natural feature you find or one that a student points out. Make a one-minute sketch and move on. Add quick sketches of hawks flying over and of their trajectories, landmarks, tracks, galls, opening flowers, and whatever else you find of natural interest. Connect these discoveries with the dotted line showing the route. The end result will resemble a pirate's map. Students can be playful with species and place names, making up evocative fanciful ones where they do not know the accepted names.

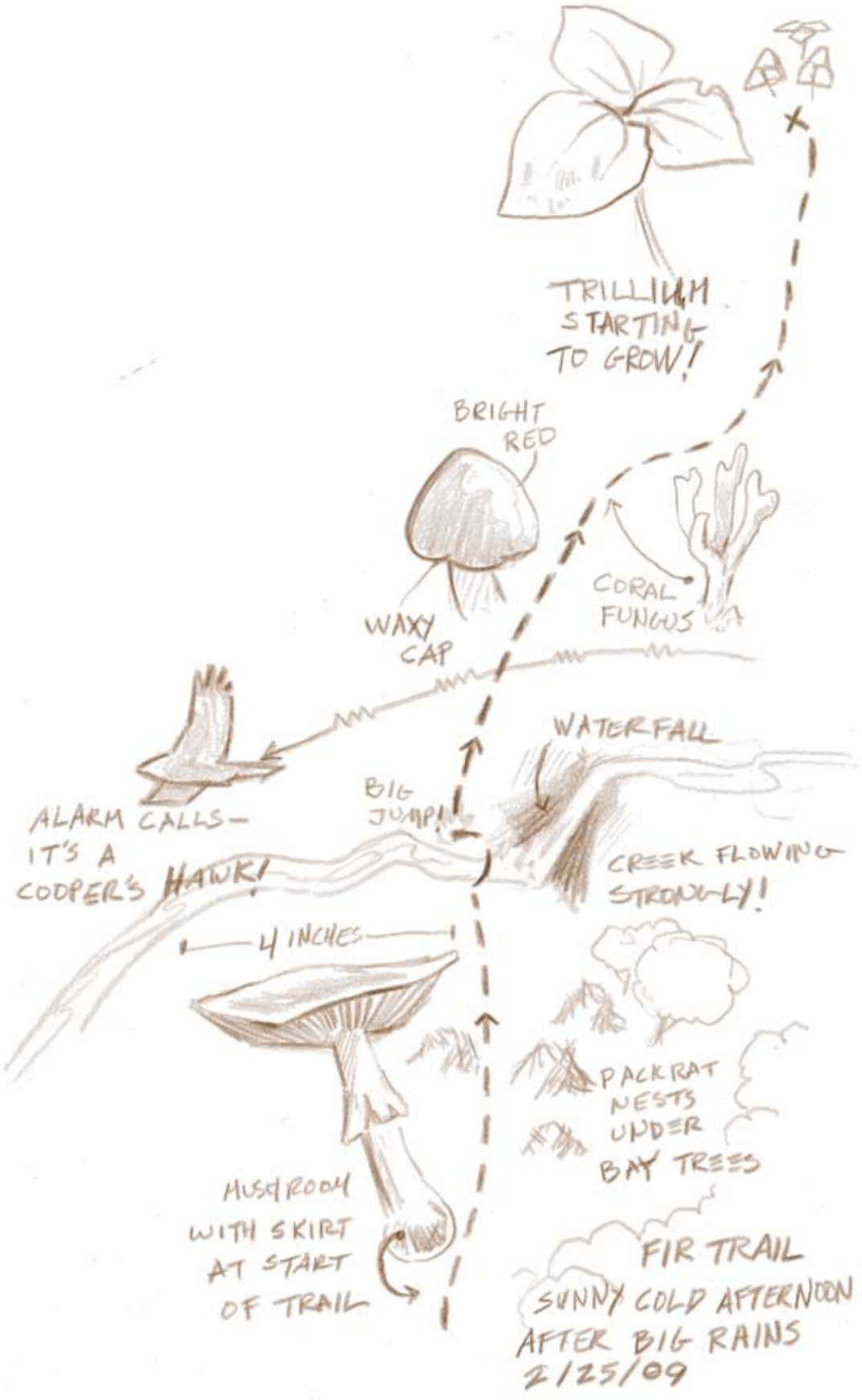
CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Some students might not be familiar with what a treasure map is, so have one on hand so they can see how it looks and be sure to explain what it is used for. Pair ELL students with peers proficient in English and ask them to do this activity together. This is an activity that could introduce lots of new words for ELL students to add to their vocabulary list.

STATE OF CALIFORNIA STANDARDS

Science

3rd Grade 5.e


TRILLIUM STARTING TO GROW!
BRIGHT RED
WAXY CAP
CORAL FUNGUS
WATERFALL
BIG JUMP!
ALARM CALLS— IT'S A COOPER'S HAWK!
CREEK FLOWING STRONGLY!
4 INCHES
PACKRAT NESTS UNDER BAY TREES
MUSHROOM WITH SKIRT AT START OF TRAIL
FIR TRAIL
SUNNY COLD AFTERNOON AFTER BIG RAINS
2/25/09

TIMED BEHAVIORAL OBSERVATIONS

OVERVIEW

Students watch and sketch wild animal behavior, quantify it, and then graph the time spent in observed categories of behavior. This activity starts by exploring animal behavior qualitatively, giving students time to see different types of behavior. Students then quantify the time that the animals spend in each behavior in a timed interval. The example below is one way of quantifying and graphing observations. Many more are possible.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors where students can observe a group of animals for a long time (flock of birds, ground squirrel colony etc.).

PROCEDURE

If you find a stationary but active animal or group of animals, such as a colony of ground squirrels, Robins on a lawn, or flock of ducks, instruct students to pick one animal and quickly sketch what it is doing. Sketch its basic behaviors and postures. Help students divide the sketches into categories of observed behavior, e.g., feeding, alert/watching, walking to search for food, walking away from danger or disturbance, running, resting, courtship, etc.

When the students have entered those categories into their notebooks, begin the timed interval study. Give students a signal every twenty seconds for five to ten minutes depending on the group's attention span. Students will each watch one animal, and, at the signal, put a tally mark under the symbol or sketch that corresponds to the observed behavior at that instant. Students should be alert to add and record new behavioral categories as they are observed.

Note how we see different things when we study behavior qualitatively as when sketching, or quantitatively, as when counting behaviors. Both are important. Compare data between different students' observations. What do the animals spend most of their time doing? Why? Do you think the time allocation would change if we repeated the activity at different times of the day or year? How might this change if predators were more abundant in the area?

GROUP INSTRUCTIONS

"We are about to perform an animal behavior study. We are going to classify the kinds of things these animals do, then count how many times the animals do those behaviors. To get started we are going to make a series of sketches to represent the basic postures or behaviors that we see these animals engaged in. These can be simple cartoons but should capture the basics of the posture. Does it have its head up or down? Does it have a feeding position or characteristic postures for other activities? Can you capture the major poses that these animals take. We record these behaviors for ten minutes and then compare what we have each recorded. Are there any questions? All right, let's begin."

Now review and categorize the students' behavior observations. Help the students develop category groups. Possibilities include feeding, alert/watching, walking to search for food, walking away from danger or disturbance, running, resting, and courtship. "Now stop your drawing and reassemble here. Let's compare the basic behaviors we have seen so far. We need to put the behaviors into categories and name them. What is one type of behavior we have seen?" Student suggests eating. "Good. Let's label one of our sketches eating. Pick your sketch that best represents eating. What is another?"

"Now let's do a scientific study of how much time these animals spend doing these different behaviors. I am going to give you a signal at twenty-second intervals. At each signal, note which behavior this animal is performing at that instant and put a tally mark under your labeled sketch." If you are looking at more than one animal, you can assign different animals to different groups of students.

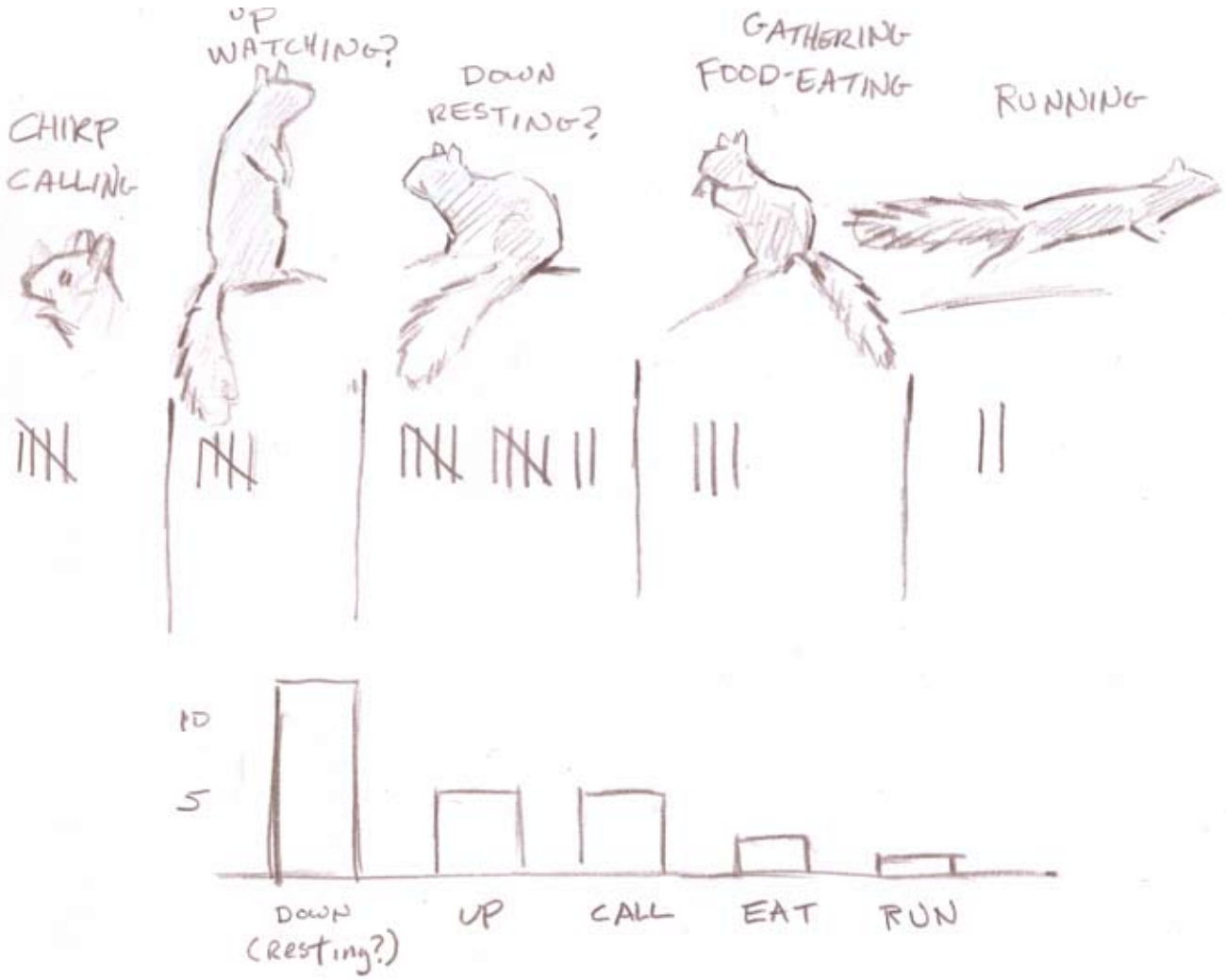
CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

After giving the instructions for this activity, but before going out of the classroom, ask your students to brainstorm for predictions with another student. Give them questions to answer like: What animals do you think we will find? What do you think they will be doing? This will allow your ELL students to bring in their personal experiences to help anticipate what they will find. This strategy helps students make connections between their prior knowledge and the activity at hand.

STATE OF CALIFORNIA STANDARDS

Science

3rd Grade 5.a, 5.b, 5.c, 5.d, 5.e
4th Grade 6.a, 6.e
5th Grade 6.b, 6.c, 6.d, 6.f, 6.g, 6.h



WHO AM I?

OVERVIEW

Students record detailed observations of a plant or animal while in the field, then use a field guide to identify the species that they drew using the data they recorded. This allows students to explore biodiversity and develop identification skills. If students cannot identify species based on their field notes, they learn what information they need to make an identification.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors in an area with a variety of plants or animals.

ADDITIONAL MATERIALS

Regional, age appropriate, field guides.

PROCEDURE

This activity can be done at any time that an unknown plant or animal captures a student's curiosity. Students record their observations in their journals and compare their field notes with field guides and attempt to identify what they have found. If they cannot identify what they have seen from their notes, they should make notes of what they think they should look for and record the next time to clinch the identification. Students can give an unidentified species a "working title" or name for use until it is identified.

A second variation of this activity is to define boundaries for students (depending on the group, this can be as simple as "within earshot" or a more clearly defined area if students may tend to wander) and give them a sufficient period of time to record observations of an unknown species in order to identify it later using a field guide. In this case, each student records information about any species within the defined boundaries that catches their interest.

Field guides do not contain all species and this can be frustrating. Consult experts when you are stumped. This is what biologists do all the time. You can find experts though local chapters of the Audubon Society, California Native Plant Society, Xerces Society (butterflies), botanic gardens and local colleges. In this way, students can meet experts who might stimulate their curiosity or introduce them to new interests or even career paths.

GROUP INSTRUCTIONS

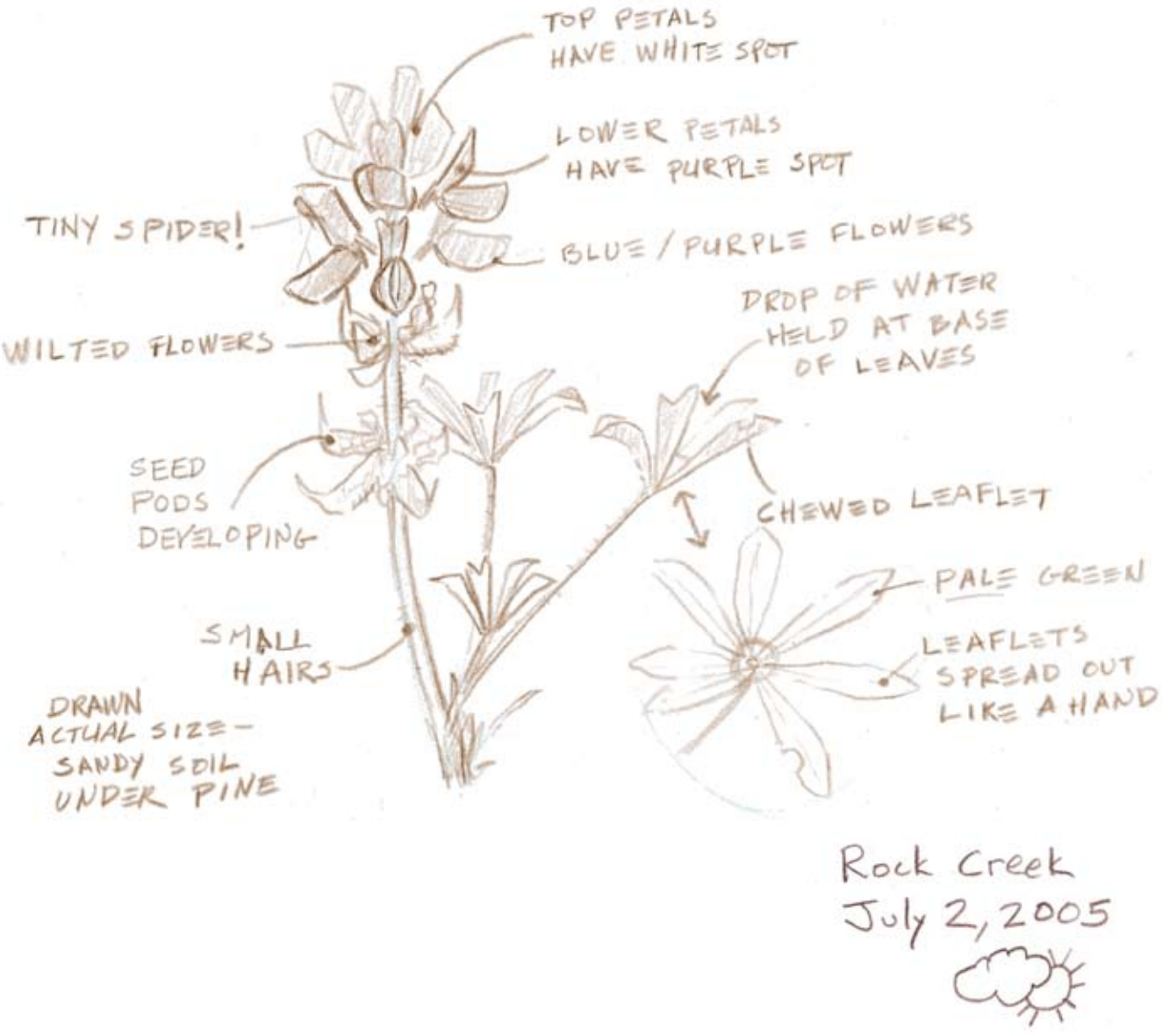
Students will ask: "What is that?" Respond with: "Let's find out! Get out your field journals and record as much information as you can. We will use all our notes later to find it in our field guides. Use both writing and drawing to record information about it. Remember, you may notice some detail or behavior that no one else sees, so put down everything that you think might help to identify it."

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Encourage students to write in the language they feel most comfortable with. After students have completed the journaling activity, pair ELL students with English proficient students and ask them to help each other translate the ELL student's words into English. Once this is done, ask them to leave their journals on your desk, review them, and make sure they wrote down the correct word. It is a good idea to have a word wall where students can become familiar with new vocabulary.

STATE OF CALIFORNIA STANDARDS

Science
- 3rd Grade 3.b, 5.e
- 4th Grade 6.a
- 5th Grade 6.a
- 9th-12th Grade 6.a, 7d


TOP PETALS HAVE WHITE SPOT
LOWER PETALS HAVE PURPLE SPOT
TINY SPIDER!
BLUE / PURPLE FLOWERS
DROP OF WATER HELD AT BASE OF LEAVES
WILTED FLOWERS
SEED PODS DEVELOPING
CHEWED LEAFLET
PALE GREEN
SMALL HAIRS
LEAFLETS SPREAD OUT LIKE A HAND
DRAWN ACTUAL SIZE — SANDY SOIL UNDER PINE
Rock Creek
July 2, 2005

DIVERSITY INVENTORY

OVERVIEW

Students inventory plants and animal diversity in two distinct habitats and compare the number of species and their abundance. Students are able to evaluate both the number of species (species richness) and the relative abundance of individuals within each species (evenness).

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors in an area with a variety of plants or animals.

ADDITIONAL MATERIALS

Regional, age appropriate field guides.

PROCEDURE

Divide the class into teams of three to four students. Define activity boundaries and set a time limit (20 minutes to an hour). Students will use field guides to identify as many species of plants, fungi, and animals as they can and estimate the number of individuals within the boundary you have set. Unidentified species should also be tallied as "unidentified tree #2" or "unidentified bird #5." Repeat the activity with an area that is the same size in a different ecosystem. Discuss which ecosystem had the greatest number of species. This characteristic of an ecosystem is called "diversity." Also note if one habitat was dominated by a few species such as one species of tree, or if there were more equal numbers of several species. This characteristic of an ecosystem is called "evenness."

GROUP INSTRUCTIONS

"We are going to test our nature identification skills by doing a scientific study of this forest. We will start by making a list of as many species as we find. Instead of trying to identify everything, choose a few groups like trees, shrubs, birds, or wildflowers. Within those groups make as comprehensive a list of all the species you see within the boundaries of the study area. Once you have finished your list, count (preferred) or estimate the number of individuals of each species you have seen. Once you complete one group, start a second group. Your team can decide what groups you want to do and in what order." Repeat this activity in a second habitat.

MATHEMATICAL EXTENSION

Diversity can be measured and described in several ways. Both species richness and evenness can be calculated mathematically. Species richness is easy. Just count the total number of species (not individuals) observed. Calculating evenness is much more complicated and involves familiarity with logarithms. Calculating evenness may be appropriate for some high school classrooms. Consult statistical manuals or do a web search for instructions to calculate evenness.

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

By using cooperative learning, students work as a team utilizing each other's skills and strengths. Ask each team to highlight words that they consider "keywords" for this activity and make a word wall in your classroom so they can refer to those words and start using them more frequently. Once you have a word wall, be sure to define the words using short clear sentences.

STATE OF CALIFORNIA STANDARDS

Science

3rd Grade 3.b, 5.a, 5.b, 5.c, 5.e
4th Grade 6.a
5th Grade 6.a
9th-12th Grade 6.a, 7d

WILDLIFE GESTURE SKETCHING

OVERVIEW

Students make quick sketches and notes of moving animals. Careful observation develops note-taking skills without pressure to make a piece of art. Fast sketching helps students look more accurately and deeply.

Age level: 8 years-adult
Suggested time: As long as the animals cooperate and your students are focused.
Location: Outdoors anytime you discover an animal and want to focus student attention.

PROCEDURE

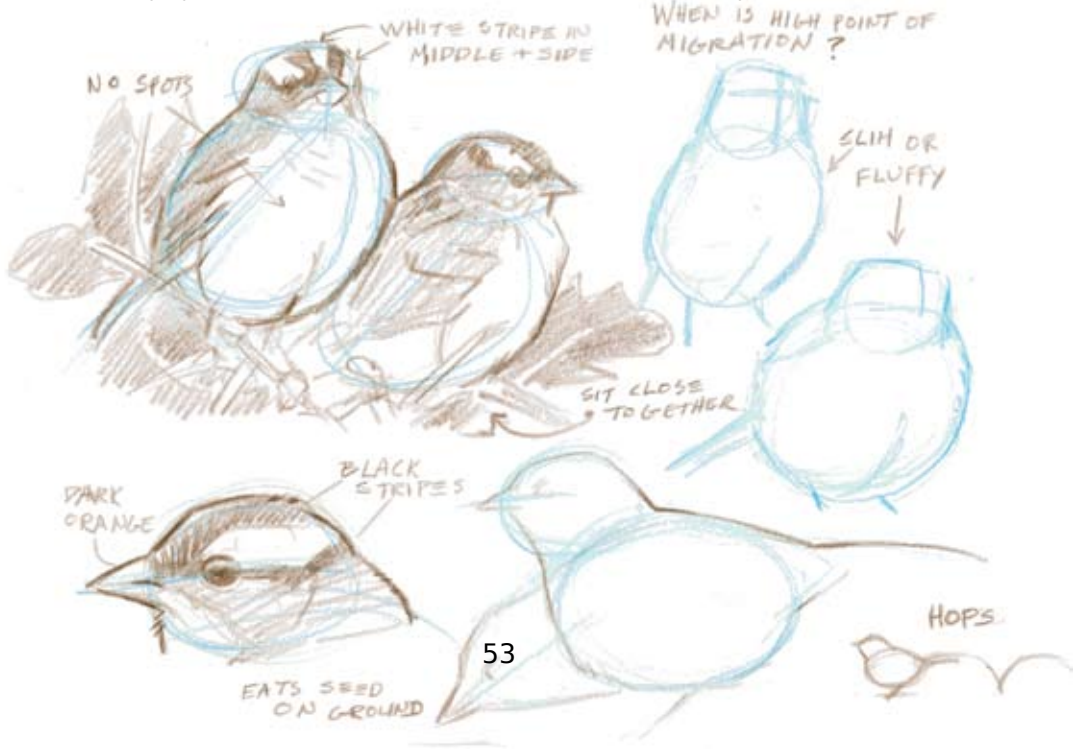
You never know when critters will show up. Mammals hide and birds fly away. If you are lucky and the animals ignore you and stay in the open, or you witness an interesting interaction between species, take advantage of the situation. Get out your journal and start sketching and taking notes. If the animals are not too close, say your observations out loud in a conversational volume (plumage, behavior, etc.). The teacher should also demonstrate this and get the students to do the same. It helps students to focus if these are structured. The moment the animal leaves, get the group to recount everything that they observed and the order in which events occurred. Then get all that detail into the journals. From these field observations, the experience can be written up or further illustrated later. If you find observable wildlife on a hike, take advantage of the moment with quick sketching. Encourage the students to make lots of quick sketches instead of one finished drawing. Use "I notice, I wonder, it reminds me of".

GROUP INSTRUCTIONS

"Look, there is a deer! Get out your journals quickly. While we can still see the deer, make some fast sketches of its shape." As students start to sketch "Say anything you observe out loud to help your neighbors catch all the details. Don't worry about details or about finishing one drawing. If it moves to another position, just start a new sketch on the same page. It is now looking at us. Make a quick sketch of the head from this angle. Try moving the pencil quickly, loosely, and lightly to help get down the basic shape. Do not erase what you have drawn but go over the lines, accenting the ones you like. You do not have to finish these drawings. They are only quick impressions of what you have seen. Try working a little larger. Make the drawing as big as your hand, not just little postage stamp drawings."

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Review your ELL students' journals after this activity to make sure they understood the activity. Give them feedback by praising their efforts and encouraging them to write a simple sentence next to their drawings



NATURE COMIC BOOK

OVERVIEW

Students record sequences of animal behaviors incorporating the familiar graphic style of a comic book. Making a comic is playful and creative. By integrating the comic into recording a real nature event, students push themselves further to record their data.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors immediately after observing interesting animal behavior.

PROCEDURE

If you witness interesting animal activity or behavior, make a serial comic or storyboard of what you witnessed. Gesture sketches (see activity above) make an excellent reference. Lay out several panels and fill them in, showing the flow of the action complete with sound effects. You can accurately document what you saw and still have a lot of creative freedom in creating the comic. Students can add sound effects, interesting points of view, or other touches.

GROUP INSTRUCTIONS

"Wow, we were so lucky to see that hawk catch a snake! Quickly now, before we start to forget the details, let's review what we saw, what happened in what order, and what details you remember." Students respond. "That is quite a story! We are now going to document this event in our journals by making a true-life nature comic. In your journal, make a series of panels that show the full sequence of events with as many details as you can include. You can have fun with interesting angles (like the snake's or hawk's eye view), long or tall panels, sound effects, and action symbols as in other comics, but we must accurately represent what we saw. There are a lot of ways to do it, so let's take the next fifteen minutes while we still remember what we saw. When we are done, we can compare our work. Are there any questions before we start?"

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Comics are well known around the globe, so this is a familiar term for ELL students. It is a great opportunity for students to be able to bring previous knowledge to an outing in nature. Encourage them to write by asking them questions like: "Why do you think the bird is singing? Where did the hawk go?" Remind the student to write in English as much as he or she can, then re-read the sentences in the correct form. Ask the student if he or she would like to share the story with the group. It is important to ask before putting the ELL student in the spotlight.

STATE OF CALIFORNIA STANDARDS

Science
- 3rd Grade 5.e
- 6th Grade 7g, 7h
- 7th Grade 5.f

KEEP YOUR QUESTIONS!

OVERVIEW

Students learn to generate and record questions that occur to them as a result of their observations. Asking good questions is a critical part of science. Documenting their questions helps students value them as part of the scientific process and encourages an active, creative, dialogue about what is being observed. This is not a separate activity but an add-on that can be used in any of the other sketching activities.

Age level: 8 years-adult
Suggested time: Varies.
Location: Any time students use their journals.

PROCEDURE

Asking good questions is an important science skill. Students are sometimes afraid to ask questions for fear that it may be seen as evidence that they have not studied hard enough or give a reason for them to be made to work harder. This addition to other journaling activities encourages students to actively think about what they are seeing as they work.

GROUP INSTRUCTIONS

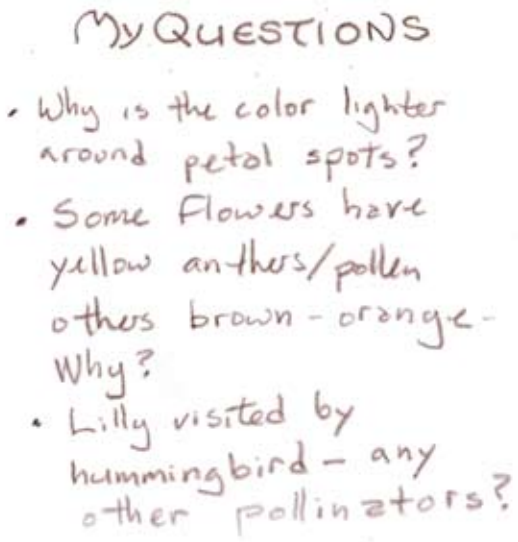
"Scientists will ask many more questions than they can answer. There are always things that we do not know. Every new discovery may generate a whole list of new questions and open the door to new discoveries. Before you start this next exercise, make a column on the side of your paper titled ' I wonder what, where, when, why, and how.' As you work, question what you are seeing and sketching, and list your questions. When you are done, review your list and put a star next to your most interesting question."

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

ELL students can learn more effectively when they are able to play an active role in their own learning. They can write questions in their native language, but encourage them to use English. The questions they have will be linked to what they already know, thus facilitating in the acquisition of new knowledge. Pair them with English proficient students and let them discuss their most interesting questions.

STATE OF CALIFORNIA STANDARDS

Science
- 4th Grade 6.a
- 5th Grade 6.b



LANGUAGE ARTS IN THE FIELD

Writing exercises that are initiated outdoors allow students to draw directly from the inspiration of nature. The emphasis of these activities is to observe carefully, to document those observations and to reflect and find deeper meaning within them. These writings often have a spontaneity and immediacy that may be lost in more refined work. The opportunity to write in nature also allows students to find personal connection and greater meaning from contact with wild places.

I NOTICE, I WONDER, IT REMINDS ME OF: POETRY'S BUILDING BLOCKS

OBJECTIVES

Students use entries from their journals to create poems about their experiences and their memories of being outside. This exercise gives students the opportunity to gather their thoughts in a creative way and to convince them that they are capable of writing poetry.

Age level: 8 years-adult
Suggested time: 30 minutes
Location: Outdoors where students can walk around and explore their surroundings, or after completing the sketching activity "Group Observations"

PROCEDURE

This activity is best introduced after students have been exposed to making observations ("I notice" sentences) and asking questions ("I wonder" sentences) while working outside with their sketchbooks. It is a great closing activity after sketching or completing "Group Observations" (page 39). First, have students gather and share observations and questions about their environment or surroundings. Then talk about parts of the landscape everyone focused on and what many may have overlooked. Give the suggested Group Instructions and give students as much time as they need to write a poem from their journal entries; let them know that they can add new observations, and may reflect on how they feel after spending time outside.

If you have not completed "Group Observations" or a similar sketching activity with your students, give them time for a focused period of observation where they can write down as many things that they notice, wonder about, or are reminded of as possible.

GROUP INSTRUCTIONS

"Look at your journal and the questions or observations you have recorded there. Now is the time to take these thoughts and weave them into a poem. Remember, writing poetry is just finding new perspective in the world around you, about your observations, and the meaning of your experience so that a reader can learn more about you, and the experience. You have already begun writing a poem without realizing it. Take the observations and questions you from your journal and put them in an order that feels right to you; add descriptions of significant parts of the landscapes or details of what you saw or heard. Try to include one line for each of your five senses, and also describe how you feel about this place. End with the line 'Right now, I feel…' You will have sixteen minutes to compose your poem. Begin writing!"

STATE OF CALIFORNIA STANDARDS

Science Standards
- Grade 5: Investigation and Experimentation 6a
- Investigation and Experimentation 6a, 6c, 6h
- Grade 6: Ecology (Life Sciences) 5a, 6c, 5d, 5e

Writing Standards
- Grade 3: Text Types and Purposes 1a, b, c, d
- Grade 4: Text Types and Purposes 1a, b, c, d
- Grade 5: Text Types and Purposes 1, b, c, d

Language Standards
- Conventions of Standard English
- Grade 3: a, b, c, d, e, f, g, h, i
- Grade 4: 1a, b, c, d, e, f, g, h, i

I've noticed that
the sound of dripping
water sounds
like rain.
I've noticed the
sound of peace
Is like wind.
I wonder why does
the moon shine
in the water like
a star?

—Vianna, Westlake School

COLLABORATIVE POEMS

OBJECTIVES

Writing collaborative poems builds community and encourages the writing of poetry. There are countless variations on writing collaboratively. Students can each contribute a line to a collective poem or they can add a line to a piece of paper, fold the paper over to hide what they wrote, and pass it to the next person. Students can also work together in small groups to compose a poem or part of a poem. The exercise that follows is a collaborative writing exercise that typically yields rewarding results and the anonymous nature of the writing gives more shy students a voice. This activity also helps convince students that they can write poetry.

Age level: 8 years-adult
Suggested time: 20-30 minutes
Location: Outdoors or indoors; anywhere a group of students can sit and write comfortably in a circle.

ADDITIONAL MATERIALS

Paper and a writing implement for each student

PROCEDURE

This exercise can be used as a closing activity after sketching outside or in the classroom before going outdoors. Seat students comfortably in a circle, at their desks or on the ground. Distribute paper and a pencil to each student. Before giving the suggested Group Instructions, tell the students that they are entering a safe writing space and that no one's work will be judged or evaluated; in fact, by the end of the exercise no one will know what they wrote! Tell students the object is to record the collective thoughts and feelings of the class at this time.

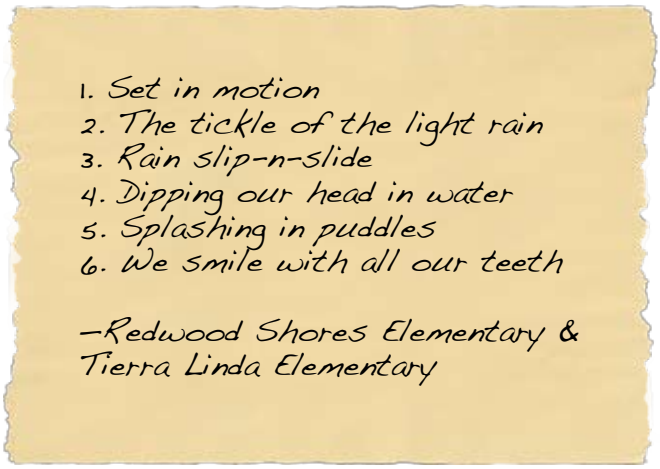
GROUP INSTRUCTIONS

"We will write a collaborative poem. Write the numbers one through six on the left hand side of your paper leaving space in between the numbers. Next to the number one write the words 'Set in motion.' Then pass the paper to the left. On the piece of paper you just received, write down the third line of the poem. It can be related to the first line or be something entirely new. Look up at me when you've finished writing your line. Is everyone finished? Pass the paper to the left twice. Write the fifth line of the poem. Again, the line you write can relate to what is already on the page or can be a new thought or idea. Please look up at me when you've finished. Everyone ready? Now pass the paper to the left. Now pass it again. Write the second line of the poem. Anyone not ready? Great! Pass the paper to your left. Now write the fourth line of the poem. Look up at me when you're done. Everyone ready? Pass the paper to the left one more time. Write the very last line of the poem. Guess what? You've all just written poetry! Pass the papers to the left one more time; read your poems aloud and applaud your beautiful work!"

STATE OF CALIFORNIA STANDARDS

English, Language Arts
- Reading: 4.2, 3.4, 4.5, 5.4, 5.5,
- Reading Standards: Foundational Skills:
- Grade 3 students: 3a, b, c, d; 4b, 4c
- Grade 4 Students: 3a, 4b, c
- Grade Five Students: 3a, 4b, c

Writing Standards; Text types and Purposes
- Grade 3 Students: 3a, b, c, d
- Grade 4 Students: 3a, c, d, e
- Grade 5 Students 3a, c, d, e
- Speaking and Listening Standards:
- Grade 3 Students; Presentation of Knowledge and Ideas:
- Grade 3 Students: 5



LETTER POEMS

OBJECTIVES

Students use observations and questions collected during a field journal session to write poems in the form of letters that are written from one object or organism to another. In this exercise, students consider the relationships between different species in their local ecosystem and how species and features in a landscape interact. They change their perspective to see how pieces of nature are dependent on one another, and they will use writing to explore and explain those connections.

Age level: 8 years-adult
Suggested time: 20-30 minutes
Location: Outdoors where students can observe many different species or objects, or indoors after sketching or completing the activity "Keep your Questions."

PROCEDURE

If you are using this activity following the activity "Keep Your Questions" or another sketching exercise, spend some time allowing students to share their questions with the group. (If you are going to bypass the sketching exercise and assign students a topic to write about, begin with the suggested Group Instructions. A list of possible letter pairings is included below. Then, as a group, pick a subject. It may be a plant, a bird you observed, or an abiotic object like a rock, the sun, or rain. Ask students to close their eyes and imagine what it would be like to be that organism or object. Then facilitate a discussion on what that object or organism is connected to. Some questions that are useful in this context: What could this animal not live without? What do you think is the wind's best friend? What does this plant help? What would this animal say to the sun if it had the chance? Brainstorm a few questions and then pick something for this organism or object to write a letter to. Then, give the suggested Group Instructions. For the purpose of this example, the instructions are for a letter from a leaf to the sun.

GROUP INSTRUCTIONS

"You are going to write a letter from a leaf to the sun. Look over the observations you made while sketching leaves. Observe how the sun and a leaf interact. What questions, if any, did you have about these two things? How are leaves affected by the sun. What would happen to leaves if there were no sun? What do you think leaves and the sun would say to each other if they had the chance? Write a letter from a leaf to the sun explaining all the ways they interact.

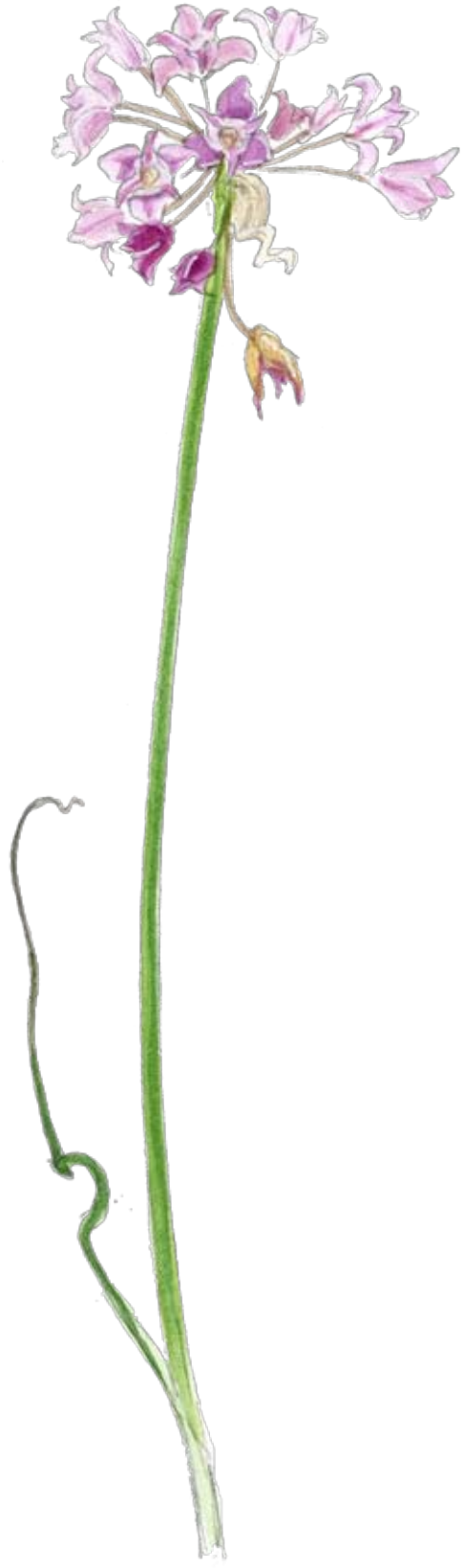
This exercise can be adapted almost endlessly. Writing letters between two entities, whether living and conscious or inanimate and insensible, is possible as long as students have some information about the identity and function of their subjects. Use this exercise to reinforce what you have already taught in class; ask students to write letters back and forth from two important parts of a recent science lesson. For example, ask students to write a thank you letter from a plant to the sun to show their understanding of photosynthesis. Or, emphasize the parts of the food chain by asking students to compose letters as different members of the food chain. Have your students trace the water cycle by writing a letter from a drop of water to a cloud.

Other possible subjects: a bird and the air, roots to soil, a bird to a tree, a cloud to the wind, waves to the sand, rocks to the ocean (or to a stream or river), grass to cement, sparrows to seeds, etc.

STATE OF CALIFORNIA STANDARDS

Science Standards
Depending on assignment, possible standards include:
Grade Four
Life Sciences 2a,b, c, 3a, b, c
Earth Sciences 5a, b, c
Grade Five
Life Sciences 2e, f, g
Earth Sciences 3a, b, c, d, e; 4 a, b, c; 5a, b, c
Investigation and Experimentation

6a, h
Grade Six
Earth Science 1a, b, c, d, e; 2a, b, c, d; 4a; 5a, b, c, d, e
Language Arts Standards
Writing Standards
Grade 3: Text Types and Purposes 1a, b, c, d
Grade 4: Text Types and Purposes 1a, b, c, d
Grade 5: Text Types and Purposes 1, b, c, d
Language Standards
Conventions of Standard English
Grade 3: a, b, c, d, e, f, g, h, i
Grade 4: 1a, b, c, d, e, f, g, h, i



REINVENTING OUR LIVES AS POEMS

OBJECTIVES

Students examine one aspect of nature in detail and use their observations to consider why it is unique. In this activity, students will practice recording observations and looking closely at their surroundings. They are also challenged to find meaning and beauty where they might not otherwise, and to frame their observations with language that expresses nature's beauty.

Age level: 8 years-adult
Suggested time: 30 minutes
Location: Outdoors, preferably, where students can look around and explore.

ADDITIONAL MATERIALS

"Valentine for Ernest Mann." by Naomi Shihab Nye

PROCEDURE

This exercise is designed with "the poet's eye" in mind. It is a way for students to enter a state of mind in which they can look at almost anything around them and find meaning or beauty—to look at the world as a collection of stories not yet told.

Share Naomi Shihab Nye's poem "Valentine for Ernest Mann." Preface the reading with the story of its origin: Naomi Shihab Nye, a Palestinian American poet, gave a reading at a school and a student walked up to her afterwards and said "Here's my address. Write me a poem." This is the "valentine" which she sent him.

After reading the poem, debrief and analyze it with the students. Talk about what the author is trying to communicate and how she accomplishes it. Ask students where the author said poems might get "lost." Then ask students how they were instructed to find poems.

To move students into a poetic frame of mind, hold up a piece of paper with a dot on it. Ask students what it is. Keep repeating this question. At first, it's likely students will remain very literal. "It's a dot on a piece of paper." "It is the mark of a pencil." Wait until a student unlocks the idea of metaphor and symbolism by saying something like "it's a planet." Watch how the group's observations explode. Relate this to how poems bring new perspectives to the world around them. Talk about how and where students could find or rescue poems around them. Then give the suggested Group Instructions.

GROUP INSTRUCTIONS

"You are going to reinvent something around you as a poem. We often hear poems about trees, flowers, the sky. Take a minute to look around you. What is one thing that has probably never been thought of as beautiful or has never had a poem written about it? Try to pick something you haven't seen before, or maybe something you see every day but have never truly looked at. First, spend five minutes looking closely at your chosen subject. Look deeply and write down observations, questions, or comparisons and add some sketches if you want. Imagine what it would be like to be this object. Write a poem that shows some of its beauty. You may be the only person to have ever looked at this subject in this way! Make sure you include all the things that make your subject beautiful and unique.

EXTENSIONS

A similar exercise can be completed using Pablo Neruda's *Odes to Simple Things* such as "Ode to my Socks," "Ode to the Tomato," or "Ode to the Watermelon" as inspiration.

STATE OF CALIFORNIA STANDARDS

Science Standards
- Grade 5: Investigation and Experimentation 6a
- Investigation and Experimentation 6a, 6c, 6h
- Grade 6: Ecology (Life Sciences) 5a, 6c, 5d, 5e

English, Language Arts
- Reading Standards
- Fluency
- Grade 3: 4a, b, c
- Grade 4: 3a, b, c
- Grade 5: 3a, b, c
- Writing Standards
- Grade 3: Text Types and Purposes 1a, b, c, d
- Grade 4: Text Types and Purposes 1a, b, c, d
- Grade 5: Text Types and Purposes 1, b, c, d
- Language Arts Standards
- Writing Standards
- Grade 3: Text Types and Purposes 1a, b, c, d
- Grade 4: Text Types and Purposes 1a, b, c, d
- Grade 5: Text Types and Purposes 1, b, c, d
- Language Standards
- Conventions of Standard English
- Grade 3: a, b, c, d, e, f, g, h, i
- Grade 4: 1a, b, c, d, e, f, g, h, i

SOUND MAPS

OBJECTIVES

Students sit quietly and create maps based on the sounds they hear around them. Then they write a poem about their observations and experience. This exercise engages students' sense of hearing and opens them to the idea of listening deeply. When students slow down to listen they are often surprised by how many sounds surround them! Students will have the opportunity to learn about making maps and to consider the landscape around them.

Age level: 8 years-adult
Suggested time: 30 minutes
Location: Outdoors in a space with some sort of soundscape, urban or rural.

ADDITIONAL MATERIALS

Example of a sound map

PROCEDURE

Begin by asking your students to make a list of sounds that they hear every day. Then, have students sit quietly for 30 seconds and lift one finger for every sound they hear. Ask students if they hear more or fewer sounds than they expected (usually, they've heard more). Talk about maps and how features of a map are visually represented and explained through a legend or key. Explain the concept of a sound map, show an example, and give the suggested Group Instructions I. When students have completed their sound maps, ask them to share and talk about their maps. Some questions to discuss: Do all the maps look the same, or are they different? What sort of symbol did each person use for any particular sound? How many different sounds did everyone hear? How were people in the group feeling while they made their maps?

Then, give them Suggested Group Instructions II and ample time to write their poems.

GROUP INSTRUCTIONS

I: "We are going to make sound maps. You will be at the center of the map and during a period of ten minutes you are going to record every sound that you hear on your map. Your map will have a symbol for each sound. For example, instead of writing the words 'I hear scratching pencils,' create a symbol that looks like what scratching pencils sounds like to you. Try to place each sound at an accurate distance and direction from where you are on the map. Once you've created a symbol, don't forget to include it in a legend on the side of the page. Draw the symbol and then write what it represents. If you want to include observations here, like 'bird call, repeated every three-seconds', do so. Keep recording sounds for the whole 10 minutes, and please stay silent for the whole time. Let's start!"

II: "Think about what you felt like when you were writing your sound map. What does it feel like to really listen to a place? Write a poem about what you can hear if you take the time to slow down and listen.

EXTENSIONS

Explore another approach to creating a Sound Map in *Sharing Nature with Children*, © 1998 by Joseph Cornell. This is an outstanding book and should be on every nature educator's bookshelf.

Read *The Other Way to Listen* by Byrd Baylor to set a tone of reverence and reflectance.

Have students make sound maps at different locations around your campus or sketching area to see how it varies.

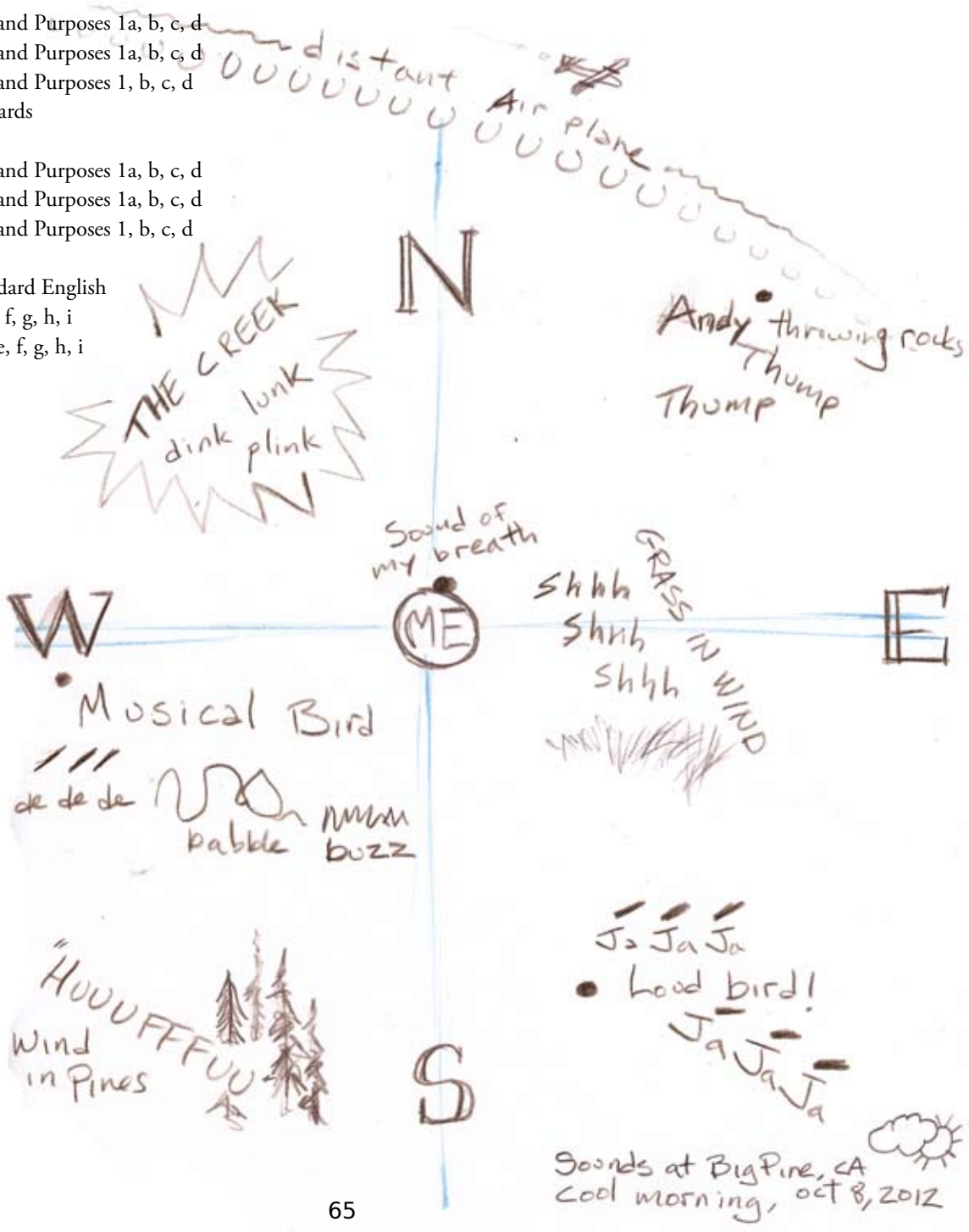
STATE OF CALIFORNIA STANDARDS

Science Standards
- Grade 5: Investigation and Experimentation 6a
- Investigation and Experimentation 6a, 6c, 6h
- Grade 6: Ecology (Life Sciences) 5a, 6c, 5d, 5e

English, Language Arts
Reading Standards
- Fluency
- Grade 3: 4a, b, c
- Grade 4: 3a, b, c
- Grade 5: 3a, b, c
- Writing Standards
- Grade 3: Text Types and Purposes 1a, b, c, d
- Grade 4: Text Types and Purposes 1a, b, c, d
- Grade 5: Text Types and Purposes 1, b, c, d
- Language Arts Standards
- Writing Standards
- Grade 3: Text Types and Purposes 1a, b, c, d
- Grade 4: Text Types and Purposes 1a, b, c, d
- Grade 5: Text Types and Purposes 1, b, c, d
- Language Standards
- Conventions of Standard English
- Grade 3: a, b, c, d, e, f, g, h, i
- Grade 4: 1a, b, c, d, e, f, g, h, i

The frogs start to sing
birds then follow.
After a chorus of songs
they let the rain fall.

—Richard



TEN ANALOGIES

OBJECTIVES

The objective of this lesson is for students to use perspective, change, and observation to make comparisons and analogies about an object. Students observe one part of a plant or object in detail and write down as many analogies to the object as possible. They use tools like hand lenses to change their perspective and are challenged to reach deeper and deeper for comparisons. Then, students use their analogies compose a poem about the identity of the object and to give it a new name.

Age level: 8 years-adult
Suggested time: 20 minutes if used after "Zoom in, Zoom Out" and 30 minutes if not.
Location: Preferably an outside location where students have already studied with their journals. An outdoor location with a few different types of plants is ideal. In the case of inclement weather, students can venture outside to find an object to work with and take it back to the classroom.

ADDITIONAL MATERIALS

Journal entry from "Zoom in, Zoom Out." (optional)
Hand lenses or jeweler's loupes

PROCEDURE

This is an opportunity to also introduce the concept of metaphor and simile and their use in poetry. Talk about how comparing something new to something known helps us to remember and to learn about it. Introduce the idea of analogy and talk about what it means to change perspective. It helps to say "I know I'm making an analogy, simile, or comparison when I say "it reminds me of" or "it looks like." Practice making some analogies as a group first so students have an idea of what they are striving to do.

If you are using this exercise as an extension for "Zoom in, Zoom Out," tell students to focus on one part of their plant or subject. Give the suggested Group Instructions, and then give students five minutes to write down at least ten analogies or comparisons for one object or part of a plant they see around them.

If students have not completed the exercise "Zoom in, Zoom out," have a more extensive conversation about what it means to change perspective and make comparisons. Give the suggested Group Instructions and then give students seven to ten minutes to write down at least ten analogies or comparisons for one object or part of a plant they see around them.

Once students have written down their analogies, share the template for the poem shown on the next page. Read the template aloud line by line so students can copy it in their journals, or write it on a large piece of paper in a central location so students can see it from where they are working. Give the second suggested Group Instructions. Then, encourage students to share their poetry.

GROUP INSTRUCTIONS

I: "You will have nine minutes to observe the object or part of the plant in front of you. In that time, write down ten analogies or ten things the object looks like to you. Remember, you are making an analogy, comparison, or simile when you say one thing looks like another. Be creative! Change your perspective if you are stuck. Look more closely with a hand lens or look at the object from a distance. If you think you've come up with every comparison possible, try harder! I challenge you to keep writing the whole time. "

II: "Great! Look down at your list of analogies. Now take these comparisons and weave them into a poem that follows this format. All you have to do is take the analogies you have already written and add them to the poem where you see or hear the word "analogy." If the poem says "because," add a reason why the analogy rings true for you. When you're done, look up at me so I know you're finished."

TEMPLATE:

Object's real name,
[One analogy,]
[Another analogy,]
Secretly you are [analogy].
An ant thinks you like [analogy]
When I saw you in a dream,
I thought you were [analogy]
But everyone knows you are really
[analogy]
because…

STATE OF CALIFORNIA STANDARDS

Science Standards
- Grade 5: Investigation and Experimentation 6a
- Investigation and Experimentation 6a, 6c, 6h
- Grade 6: Ecology (Life Sciences) 5a, 6c, 5d, 5e

English, Language Arts
- Reading Standards
- Fluency
- Grade 3: 4a, b, c
- Grade 4: 3a, b, c
- Grade 5: 3a, b, c
- Writing Standards
- Grade 3: Text Types and Purposes 1a, b, c, d
- Grade 4: Text Types and Purposes 1a, b, c, d
- Grade 5: Text Types and Purposes 1, b, c, d
- Language Arts Standards
- Writing Standards
- Grade 3: Text Types and Purposes 1a, b, c, d
- Grade 4: Text Types and Purposes 1a, b, c, d
- Grade 5: Text Types and Purposes 1, b, c, d
- Language Standards
- Conventions of Standard English
- Grade 3: a, b, c, d, e, f, g, h, i
- Grade 4: 1a, b, c, d, e, f, g, h, i

1. Hawaii
2. Starfish
3. The tropics
4. Hula
5. Beauty
6. Insect
7. Silk
8. Mom
9. Jellyfish
10. Hats

White and pink flower,
Starfish,
secretly you are silk
because of the way
your petals look.
To an ant you are
a hat
But everyone knows
you are
what is called
beauty

Nicole, Westlake School

NOTICING THE SEASONS

OBJECTIVES

In this activity, students use drawing and writing to observe their surroundings and to think about the seasons. During a focused period of observation, students will record information about their landscape and will use their thoughts to write a poem about what they have noticed; they will also include reflections about what each season signifies to them.

Age level: 10 years-adult
Suggested time: 30 minutes
Location: In an outside location where students can spread out and observe a few different types of plants or landscape features.

ADDITIONAL MATERIALS

"Spring," by Pablo Neruda in English and Spanish

PROCEDURE

Share the poem "Spring" by Pablo Neruda in English and Spanish. Ask students how the author described the season he was in and how he communicated it to the reader. Talk as a group about what marks the seasons in their home and landscape; brainstorm a few ideas. Give suggested Group Instructions and have the students set out to make their observations; then give the second half of the instructions and have students write their poems.

Before giving the instructions, have a conversation with the group about what each season means to them and what colors, activities, and traditions are wed to certain seasons for them. Include thoughts about what colors are associated with different seasons and have students compile a list of things that they most closely associate with each season. Words like pumpkin and crisp may be a part of fall, new and green for spring, dormant and quiet for winter, hot and light for summer. Encourage students to share these ideas in the poem to show the reader what season they are talking about.

GROUP INSTRUCTIONS

I: "You are going to have time to write your own poem about the seasons based on observations and information you collect in your journal about this landscape. But first, you need to record observations on which to build your poem. When I give the signal, spread out within the boundaries and spend nine minutes observing the landscape. Look around you with these questions in mind: What season are we in? How can you tell? Use drawings and writing to record your observations; write down things you notice and wonder about or what you are reminded of. Keep recording observations the whole time. Think about how the air feels to you, where the sun is in the sky, what plants are around (or not around), whether they are flowering, what people are wearing, what birds are singing. If you're stuck, just keep writing down any observation you have about your surroundings or think about how an animal or plant might feel at this time of year. Stop writing and return to the circle when you hear my signal."

II: "Did everyone come up with some observations? Great! Now take some time to look over what you have recorded. Could you see these observations and thoughts going into a poem? Many poems about nature consist mostly of observations and questions just like those you have generated. Use the information you recorded to write a poem about what season it is and how it makes you feel. If it helps you, repeat the line 'I know it is spring when,' or list what you notice with each of your five senses. Think about what color this season is to you and include that information. Mix memories with current observations, and try to answer the question 'What is this season, to you and this landscape?'"

STATE OF CALIFORNIA STANDARDS

English, Language Arts
- Reading Standards
- Fluency
- Grade 3: 4a, b, c
- Grade 4: 3a, b, c
- Grade 5: 3a, b, c

Writing Standards
Grade 3: Text Types and Purposes 1a, b, c, d
Grade 4: Text Types and Purposes 1a, b, c, d
Grade 5: Text Types and Purposes 1, b, c, d
Language Standards
Conventions of Standard English
Grade 3: a, b, c, d, e, f, g, h, i
Grade 4: 1a, b, c, d, e, f, g, h, i

EXPERIENCE MAPS

OBJECTIVES

Students reflect on what is important to their home by creating a map and complete a writing exercise about one particularly significant part of their life. This activity helps students pair mental imagery and feelings with visual symbols and gives them the opportunity to express themselves in writing.

Age level: 8 years-adult
Suggested time: 30 minutes
Location: Outdoors or indoors where students have room to spread out and draw quietly.

ADDITIONAL MATERIALS

Large pieces of paper, markers, crayons, and an example of an experience map.

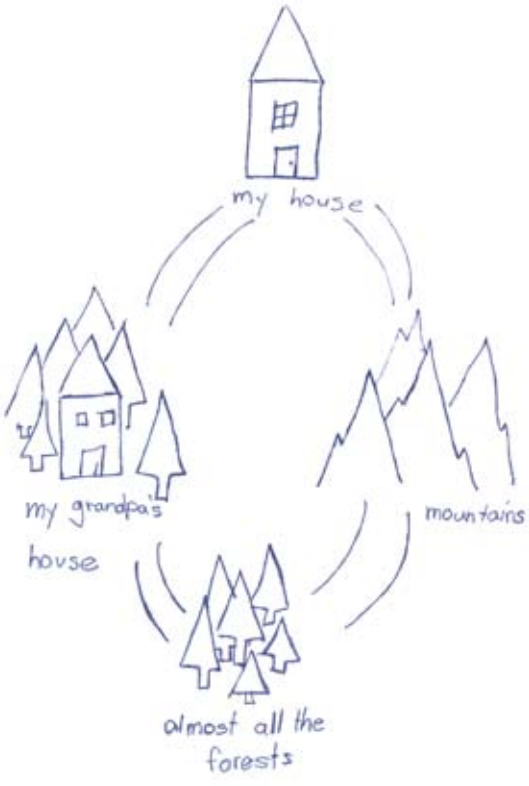
PROCEDURE

Show students an example of a real map. Ask them what features they observe on the map and talk about scale; how are the sizes of different features represented on the map? Then show students an example of an experience map. Distinguish between the function of the two maps; one is a tool to learn about a landscape and get from place to place, and the other is a means of reflection and visually representing a person's experience. Discuss how this affects the scale of an experience map. The largest parts of the map represent significant events, places, or experiences. Explain that students will be making a map of what they consider to be their home. Give the suggested Group Instructions and give students plenty of time to draw their map. Encourage them to include symbols and a key if that is helpful for them.

GROUP INSTRUCTIONS

"You will be making an experience map which is a map based on events and places in your life that have been important to you. Make a map of your home. Include the most significant places or events in your home. Your map need not be accurate or to scale in the same way a real map would be. This map is a reflection of what is most important to you, so it's up to you to decide where you want to place things on your map and how big you want objects to be. Your bedroom might take up a lot of space if it's important to you. Maybe you want to include a tree that is at your grandmother's house because it is important to you and is a place that makes you feel at home. Include any feature that is truly a part of what you think of as your home. Home to you might be a particular time of day or represented by a certain person or a special meal. Include anything that is important to you.

When you have finished your map, look it over. Find the feature or place that is most important to you or the place where you feel most at home. Write two paragraphs describing why it is important to you and why you drew it the way you did on your map."



EXTENSIONS

Students may also make a map of a field trip, time they spent outside drawing, or of a part or all of their school year; alter the instructions as is fit to the needs of the class.

STATE OF CALIFORNIA STANDARDS

English, Language Arts
- Writing Standards
  - Grade 3: Text Types and Purposes 1a, b, c, d
  - Grade 4: Text Types and Purposes 1a, b, c, d
  - Grade 5: Text Types and Purposes 1, b, c, d
- Language Standards
  - Conventions of Standard English
  - Grade 3: a, b, c, d, e, f, g, h, i
  - Grade 4: 1a, b, c, d, e, f, g, h, i

POETIC FORMS

OVERVIEW

Student will use guided writing techniques to create poetry of their own that is inspired by the observations that they have made in their journals.

Age level: 6 years-adult
Suggested time: 45 min.
Location: Outdoors (preferred) or classroom. A comfortable quiet environment is important.

PROCEDURES

Gather examples of poetry, either from other students or adult poets. These examples can either be printed on regular sheets of paper, on larger poster boards, or written on the board at the front of the classroom. Make sure students begin the activity with ample lined paper or room in their journals in which to write.

Ask students what they know about poetry. Explain that poetry arranges words and sentences in a way that helps the reader feel or see what the poet is feeling or seeing.

Tell students that they are going to write some poetry of their own. Reassure them that it does not matter that have never written poetry before!

Then, introduce the poetic form or forms. Students will respond to some forms and not to others. If one does not work for you, try the next. If the counting and structure of haiku is a turnoff for a student, perhaps they will respond to five senses poetry or nature rap. Once they have been exposed to options, let them go with what works best for that individual. Maybe some of them would like to write a song and sing it to the class. You never know, why not be surprised?

HAIKU

Haiku is a traditional form of Japanese nature poetry that has been adapted to fit the English language, and it is one of the best forms of poetry to use with children. Unlike many other forms of poetry that educators often use, haiku have the advantage of immediately looking and feeling like real, grown-up poems, no matter how infrequently a student may have done creative writing.

Haiku in English follow a very simple format based on counting syllables:

Line one: 5 syllables
Line two: 7 syllables
Line three: 5 syllables

As in Japanese haiku, English haiku often centers around nature observation, frequently mentioning the season or weather, local plants and animals, rivers and streams, etc. And all a student has to do to create her own haiku is count her syllables!

Counting syllables can be tricky, however. We recommend teaching children a very physical method to keep track of their syllables. Instruct students to hold one hand flat, just underneath their chin, but without touching it. As they speak, every time that their chins hit their hands counts as one syllable. Thus, the word “nature” has two syllables; “hummingbird” has three; “girl” and “boy,” even though we often draw them out as we say them, only have one each.

In order to help students get the hang of counting syllables, practice counting using familiar words. Creating a large-group haiku to begin with can also help to illustrate proper counting technique.

In the morning fog
I watch a deer cross the road.
I see her white tail.

Acorns fall from oaks.
Dry grass rattles in the wind.
Winter is coming.

If I sit outside
Nature sneaks around me
Until I am wild.

FIVE SENSES POETRY

Five senses poetry engages students' senses to create short, non-rhyming poems about a specific moment, place or experience.

For children just beginning to write poetry (or just beginning to write at all), the most basic form of five senses poetry is a record of what they perceive with each sense, using the first person singular pronoun to begin each line:

By the Pond
I see the water shining
I hear the geese honking
I feel the breeze on my cheeks
I taste a green piece of grass
I smell the mud by my feet

Students can begin to write this form of poetry by writing the start of each line in their journal or on a piece of paper, "I see" etc., and then take the list to the field to observe.

More advanced students can write one line per sense, but do not have to stick to the "I feel, I smell, I taste" format that younger students may need. For example:

By the Pond
The water is shining, and I can see fish coming up to the top.
The geese behind me honk back and forth.
The cool, dry breeze touches my cheek.
I chew a piece of grass, and it tastes sweet.
When I move my feet, the mud smells like plants and water.

As with haiku, this type of poetry does not require rhyming, nor does it require more than structuring observations that students are already learning to make. Encourage students, as they write five senses poems, to consider which details are the most essential to describe a scene. They may see many things, for example, but which would they most like to share with an absent friend? What would they most like to remember? As with journal entries, these types of poems can be praised for their attention to detail and their success within the form—NOT simply for being "good" writing.

SIMPLE RHYMING POETRY

Many students are familiar with rhyming poetry, and as they become more comfortable writing their own poems, it can be fun to encourage them to rhyme.

Rhyming poems follow a rhyming pattern. Here are some of the more common forms:

(A) The einsy-weensy spider
(B) Went up the water spout.
(C) Down came the rain
(B) And washed the spider out!

(A) Twinkle, twinkle little star
(A) How I wonder what you are!
(B) Up above the world so high
(B) Like a diamond in the sky.

The structure of many familiar children's songs can be starting places in helping students to create rhyming poems. Not only are they familiar (and great examples of rhymes), but the rhythm of these familiar lines is so ingrained in most students that if they take songs as their models, they will approximate regular line length without even realizing it. This will help make their poetry sound better—and will be easier for the student to remember when he's done!

Rhyming poetry can be more challenging than other types, as students not only need to think about what they'd like to describe, but must find words that rhyme to do so. Looking for rhymes can be an engaging game for some students, but for others, it will simply increase frustration and result in an abandoned task. Thus, in order to help students feel successful in writing this type of poetry, you might create a bank of rhyming words and have it available while students compose their own poems. If you are using familiar songs to help model rhyming poetry, celebrate success by singing the poems that students have created.

NATURE RAP

If students are interested in rap forms, they may be more motivated to create their own. One way to start is with a short observational phrase. "Frogs are jumping at my feet." Then focus on a word or words in the phrase that you want to connect with rhyme. These will often be words at the end of the line. Think "what rhymes with feet," and go from there. Rhyming couplets do not have to be perfect rhymes such as flower/power. "Slant" rhymes are words that almost rhyme and open up more possibilities and creativity in the rap such as flower and devour. Students can play with different beats for their rap, basing the beat on a familiar song or inventing one of their own. Encourage students to use multi-syllable rhymes where more than one syllable in a phrase rhymes with those in another line. For example: sky bird/my word. The rap does not need to rhyme or even make sense all the time. If you stay with a beat and know where you are going, it often works out. Have fun with it.

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

If your ELL students are not familiar with poetry, start the lesson by reading a variety of poems out loud, and discuss the difference between stories and poems. Start with poems that use simple and familiar language. Give your students (both ELL and native speakers) a chance to read poems out loud together as a class and to each other.

Visit your ELL students individually at their desks to make sure they understand the concept. Encourage them to write in English the best they can and brainstorm ideas with them.

Haiku could be especially hard for them because the student must be able to hear the syllables and get the wording right. If a student mispronounces a word they will not represent it correctly in the poem. Assess your students individually and praise their effort and successes.

EXTENSIONS

Regularly read published nature poetry to your students. Use those readings as models for students in creating their own original work and to inspire them to create and listen to poetry. Encourage students to memorize classic or contemporary poetry and to develop personal preferences and opinions of poets' work. To take the experience of creating poetry further, have students share their poems with another class or group of students. You can also encourage students to memorize their poetry and recite it without the help of their journals.

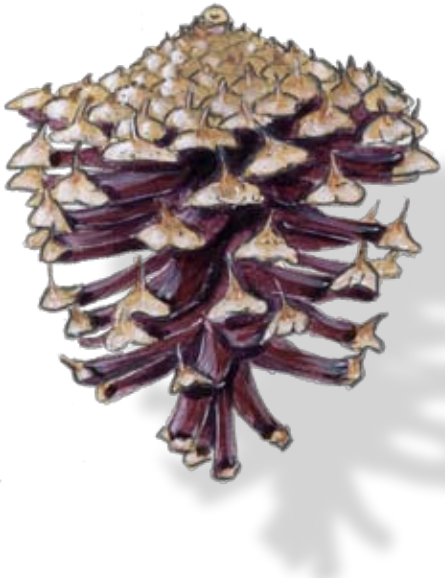
STATE OF CALIFORNIA STANDARDS

English, Language Arts

1st Grade Writing Applications: 2.2; Speaking Applications: 2.1 (recite poetry)

2nd Grade Literary Response and Analysis: 3.4

3rd Grade Writing Applications: 2.2; Listening and Speaking: 1.9



CLASSROOM EXTENSIONS

Carry the intensity and focus of nature journaling back into your classroom. Students' detailed and documented experiences and observations are rich material for language arts lessons and projects. Extending field experiences into the classroom and referencing the journals adds greater value to the journal and the discoveries they contain. Gaps in data or aspects of nature that were not carefully observed in the field become apparent when students use the journals as reference when removed from the observed objects. This reinforces the importance of taking thorough field notes.

FIELD GUIDE DESCRIPTIONS

OVERVIEW

Students will use their field guide illustrations and notes from "Make a Field Guide or Collection" to create written descriptions for a complete field guide. Through this exercise, they will practice writing descriptive paragraphs containing information about the organism, such as where it can be found, what it looks like, how you might identify it, etc. In the "Make a Field Guide or Collection" activity, students practice using their observational skills to identify members of different species. In this exercise, they will turn their visual observations into written descriptions intended to accompany their illustrations in a field guide. As in a field guide, these descriptions will consist of verbal descriptions of the species, as well as details about its life cycle, habitat, predator/prey relationship, etc. Students may also make field guides to non-living aspects of the environment, such as minerals and rocks, streams, soils, etc.

Age level: 8 years-adult
Suggested time: 45 min.
Location: The writing activity can be done in the field immediately after the "Making a Field Guide or Collection" activity, or in the classroom using the journal entries as a foundation.

ADDITIONAL MATERIALS

Journal entries from "Make a Field Guide or Collection" activity
Field guide written descriptions for examples (optional)

PROCEDURE

Complete the "Make a Field Guide or Collection" activity in the field.

Ask students what information they might want to find in a field guide. Suggestions to get them started might include details about life cycles, seasonal habitats, migration, germination, formation, what a species looks, tastes, smells, feels, sounds like, or other species likely to be seen nearby.

If available, show students examples from different field guides.

Direct their attention to the field guides that they started in the "Make a Field Guide or Collection" activity. Explain to students that they will write a description for each species. The description will include items such as physical description and other identifying details (such as smell, feel, etc), and any additional information that a reader might find interesting as they use the guide to explore their surroundings, such as where the subject species can be found, seasonal variation, behaviors, etc..

Have students use graphic organizers as they brainstorm important details. They can use their journals and the observations and sketches that they have made, along with any physical specimens that might be of use. If desired, this can be done in pairs, small groups, or even as an entire class.

Having brainstormed, students write their descriptions. Depending on their literacy level, other scaffolding may be needed. One possible scaffold is to ask students to notice what they perceived about the subject with each of their senses and write one sentence per sense, creating, where possible, a five-sense paragraph. . If additional scaffolding is needed, have students write up specific number of extra details, e.g., where the organism can be found, other species nearby, etc..

Have students read each other's work and follow any other revision process that you use in your classroom. Have them type or neatly write the final draft to go with the corresponding illustration in their field guide or collection.

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Research suggests that ELL students respond better to writing activities when they can feel a personal connection with the content. To foster these connections, you can ask questions like, "where have you seen this before, what does this remind you of, or how does this make you feel?"

Give students positive feedback and encouragement by reading their sentences using proper grammar. Their first drafts will contain a lot of mistakes but this should not be the focus of attention. What is important is the content of their writing and to praise their effort. If they are at a beginning level, ask them to choose an object they like from the field guide and have them write about it in simple sentences. The idea is to slowly help them feel more comfortable with writing in English.

EXTENSION

This activity is designed so that students only need their journals and personal observations to write about each organism. Try extending it with a research session in which students spend some time learning about their organism from different resources, and add newly discovered information. Be collaborative. Have each student contribute one description and illustration to compile a class field guide as described in the next section.

STATE OF CALIFORNIA STANDARDS

Science Standards

3rd Grade 3.b, 5.a, 5.b, 5.c, 5.e

4th Grade 6.a

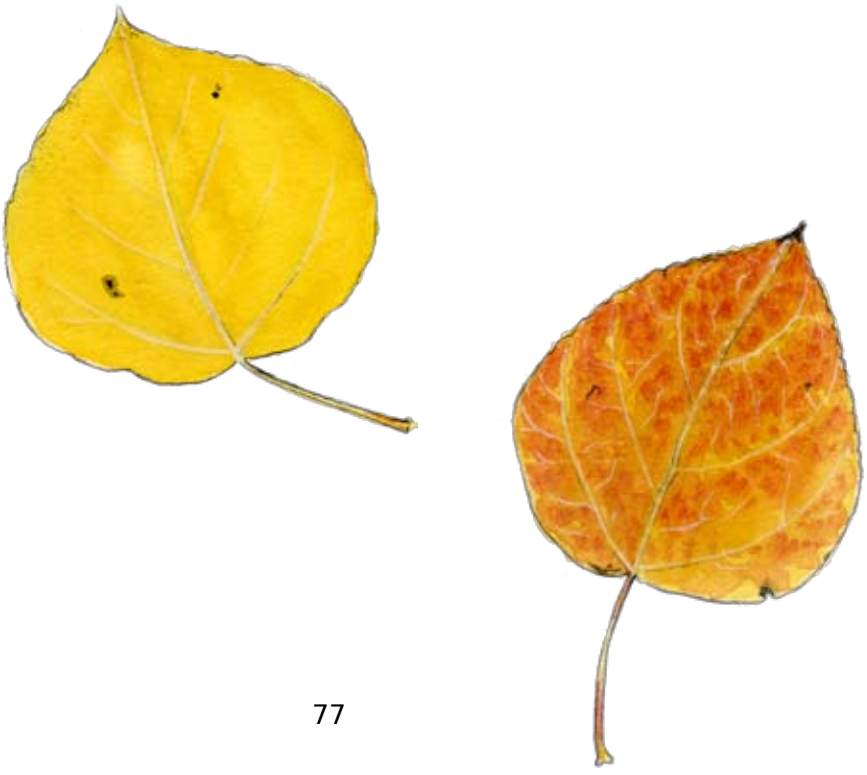
5th Grade 6.a

English, Language Arts

3rd Grade Reading: Word Analysis, Fluency, and Systematic Vocabulary Development: 1.0, 1.5, Writing Strategies: 1.1, 1.2, 1.4, Writing Applications: 2.2, Writing Applications: 2.2

4th Grade: Writing: 1.1, 1.4, 1.10, and 2.3, Written and Oral English Language Conventions: 1.1, 1.2, 1.4, 1.6, 1.7

5th Grade Writing Strategies: 1.6, Written and Oral English Language Conventions: 1.1, 1.4, 1.5



MAKE A CLASS FIELD GUIDE

OVERVIEW

Creating a field guide will help students discover and develop a deeper understanding of local species of plants and animals. Field guides collaborateively or individually. Field guides can be organized in many ways and working on them draws on and develops creativity and scientific understanding. The completed guide can be posted on the California Native Plant Society's website http://www.CNPS.org/fieldguides. You can also download and explore field guides created by groups and individuals in other parts of the state and country.

PROCEDURE

EVERYONE CAN HELP

Creating a field guide involves the whole class. Choose a topic that is broad enough for everyone to contribute at least one species. Narrow the subject. It isn't feasible to try to create a guide to everything, but your students could, for example, create a guide to the Spring Butterflies of a nearby park.

Each student should contribute at least one species and more if they complete one competently. Students can also take on the work of compiling, drawing locator maps, editing, or writing the introduction or other parts of the guide. Go to http://www.CNPS.org/fieldguides to see examples of the topics that have been selected by other classes.

You many have difficulty identifying some of the species that you find. Field guides will not contain all species and this can become frustrating especially if your classes are in a weedy area. You can consult experts when you are stumped. This is what biologists do all the time. You can find local experts though local chapters of the Audubon Society, California Native Plant Society, Xerces Society (butterflies), botanic gardens and local colleges. This way students can meet experts who might stimulate their interests or possibly introduce them to career paths.

FIELD GUIDE ELEMENTS

No single layout will work for every field guide. Adapt the layout and content to fit the abilities and interests of your students. Facilitate a classroom discussion about how to organize a class guide. What elements should be included for each species? What other elements should be in the field guide (regional maps etc.)? There are several common elements that can be included in the field guide. Pick and choose what you and your class feel are the most important things to show and tell. View other guides at http://www.CNPS.org/fieldguides to see examples of how to construct your own.

There are several ways to organize the guide. Your class could put species in taxonomic order (this is the order of scientific understanding of the evolution of species). This helps students learn and use the scientific classification system: kingdom, phylum, class, order, family, genus, and species. This approach works well for users with a science background and puts related species near each other. The class could sort the species by habitat so that things that live on or near the water might be grouped together. Students can also arrange the guide so that similar looking species are near each other. This approach is intuitive and accessible for users who may not have a scientific background. All of these methods can produce a useful guide. Which is the most appropriate to the needs of your class?

Title Think of a catchy and informative title. Your class may want to use both a title and a more descriptive subtitle. Examples: A Field Guide to the Plants of San Lorenzo Elementary School Playground, Mammals of Kettle Creek, Our Back Yard: Plants and Animals of the Sears Vacant Lot in Oakland, CA.

Authors Who helped create the guide including students and teachers or group leaders? Will students include their full names or only their first names? Will there be a class photo? For child safety, do not print names with photos on public documents that will appear on the web.

School or organization What group created this guide? Examples: Boy Scout Troop 14, San Francisco, CA or Ms. Dement's 8th Grade Class, Davis Elementary School, Los Angles, CA.

Table of Contents Not necessary but helpful in a larger guide.

Introduction to the Field Guide Give a short narrative introduction to the area covered by the book. Why is this area special? Why would someone want to explore there? Are there any special things that someone might want to keep an eye open for? Is it a trail, park, or schoolyard, or campground etc.? Is it in an urban or rural setting? Is it mostly natural or planted? Is there water nearby for animals? Are there places nearby for animals to live and feed? Do people use this area? How? Is there a lot of trash? Are there any safety concerns that visitors should keep in mind? Could this place use some help to make it a better habitat for humans and other animals? If so, what kind of help could it use?

Map A locator map is a small map that shows the location of the area covered in the guide and the surrounding geographic area. This can help a user find the area and supply a larger geographic context to the guide. Hand-drawn maps look great. Be sure to include a scale and a north arrow. If the locator map is not sufficient to help people find the location, your class may also want to include a written description of how to get there. Also consider GPS coordinates of the entry point of the area.

Your class can also draw a detailed map of the area described in the guide. This can show highlights, trails, landmarks, restrooms and other things that visitors should know about.

The story behind the guide Write one or more paragraphs detailing how the group decided to choose the area and scope of the guide. Share some adventures or exciting observations and what everyone learned from the experience while working on the project.

Acknowledgments Who, beside field guide creators and group leader, contributed to the Field Guide? What experts or resources were consulted to confirm identification? Did anyone else help? Funders? Parents?

Distribution of Information How will this group share what it learned? Are there any plans for its authors to lead walks for other students, campers, parents, or the public to teach them about what lives in the area? Will the guide be printed and distributed to others? Please share your field guide at the CNPS website www.cnps.org/fieldguides/.

ITEMS YOU MAY INCLUDE FOR EACH SPECIES

Name Include both the common name and scientific name. Sometimes there is an interesting story behind the name of a species. What does the scientific name mean? Does this organism have other names in other languages? Consider common names in Spanish or other languages. This helps students see the value of scientific names (each organism has a unique scientific name). Decide whether to include the full scientific classification of each organism (starting with kingdom and working your way down).

Drawing Drawings give life and richness to field guides and are essential tools to help people identify what they see. Discuss what views or angles of the organism will be the most helpful. Flowers may be drawn from both the side and the top. Some birds can be shown both perched and flying overhead. Students may draw trees with both a distance view and a close up of branches or cones. A scale indicator is helpful as well. This can be a small silhouette of a human standing next to a tree or a ruler next to a flower showing how high it is.

Written Description Write a careful description of the organism. Include the overall appearance including size and average size of key parts (body and tail length; leaves; trunk etc, color(s); description of fruit, flowers, plumage, fur, or wings. Count important body parts or structures such as petals, wings or legs. What details are the most important features that will positively identify this organism?

Habitat and Range Where does this species live? Does it thrive in wet or dry areas? Is it found in creeks, grassland, scrublands, forests, schoolyards, vacant lots, or city streets? Does it like sun or shade?

Seasonality When is the organism found in the area? If it migrates, where does it go? If it is a flower, when does it bloom? Is it annual or perennial?

Interesting Observations and Field Notes What things make it different from other like organisms? Can students find interesting tidbits, facts, and observations such as plant/animal interactions? Consult with local tribe(s) about Native American uses or relationship with plants or animals.

HOW TO ASSEMBLE THE FIELD GUIDE

Before you begin, decide what size your guide is going to be. A guide printed on 8.5"x11" paper is easy to create and leaves students lots of room to draw and write. However, this size can be awkward to use and hold. If you turn an 8.5"x 11" sheet on its side you have two facing 5.5"x 8.5" pages. This trim size is easier to hold and can be fastened with a center stapler. This is also the preferred size for upload into the California Native Plant Society website (though the system will also accept field guides that are 8.5"x 11").

If you have easy access to a scanner, you can scan individual pictures and assemble them into a finished guide using word processing or desktop publishing software. Make sure that the total number of pages, including both sides of the front and back cover is a multiple of four. Save the guide as a PDF and submit it to the CNPS website. The site will save your guide and automatically convert your 5.5"x8.5" guide with pages ordered 1, 2, 3, 4, 5... to a paginated version with pages transposed for printing. Now all you have to do is print these new pages back to back on 11"x 8.5" paper (landscape view), fold them in half, and staple them in the center. Presto- completed journals.

If you do not have easy access to a scanner and desktop publishing software, you can do most of this by hand. When you have assembled your journal, with pages ordered 1, 2, 3, 4, 5..., scan the finished pages and convert these to a PDF (some photocopiers also have this function). You can also mail a high quality copy of your journal to CNPS. We will scan it and post it for you. More details can be found on the CNPS website.

If you will be doing it by hand and not uploading to the CNPS website, you will have to do your own pagination. It may be very difficult to get the pages in the right order. Facing pages on the unstapled sheets will not be facing pages in the compiled booklet. As you work out the layout, it helps to make a little model of your guide with sheets of folded paper, number the pages, and then disassemble it so you can figure out which pages will face each other.

UPLOADING YOUR FIELD GUIDE TO SHARE ON THE CNPS SERVER

Once you have created your field guide you can share it with classrooms around the world. You can also view and explore other field guides that have been made by classes or individuals in other regions. Go to http://www.cnps.org/fieldguides. You will find instructions to upload a PDF version of your guide. Send out invitations to your students' families to see their children's work. If you cannot create a PDF version of your guide, you can mail a copy of your guide and an information page (printed from the website) to CNPS. They will convert your guide to a PDF, post it to the site, and notify you when you can see your work online.

STATE OF CALIFORNIA STANDARDS

Creating a field guide conforms to the State of California's standards for both Science and Language Arts. By working on a field guide, students improve their understanding of science and how to communicate science to others. The process develops language arts skills and motivates students to create quality work of which they can be proud.

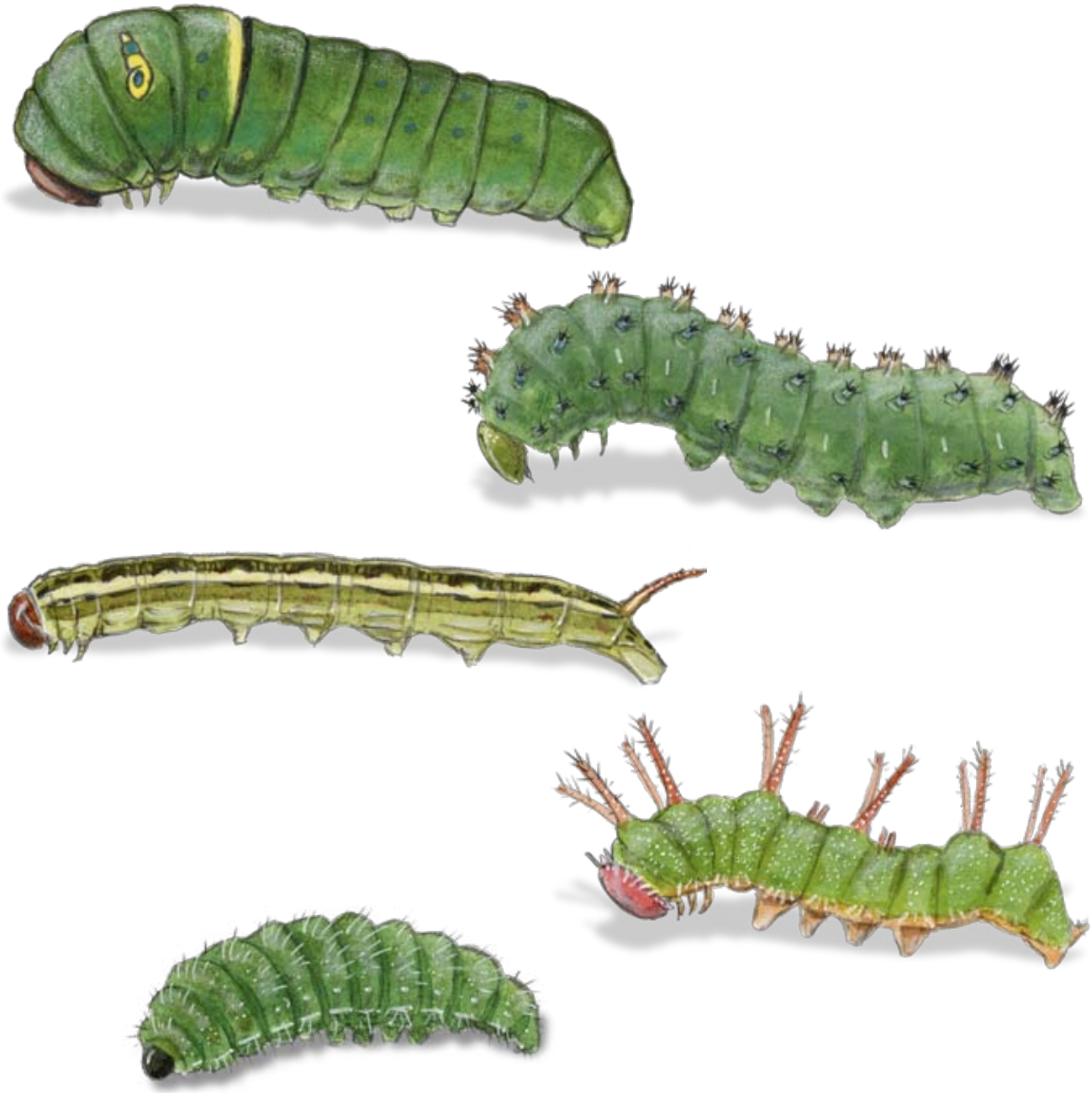
Science Standards
- 3rd Grade 3.b, 5.a, 5.b, 5.c, 5.e
- 4th Grade 6.a
- 5th Grade 6.a

English, Language Arts

3rd Grade Reading: Word Analysis, Fluency, and Systematic Vocabulary Development: 1.0, 1.5, Writing Strategies: 1.1, 1.2, 1.4, Writing Applications: 2.2, Writing Applications: 2.2

4th Grade: Writing: 1.1, 1.4, 1.10, and 2.3, Written and Oral English Language Conventions: 1.1, 1.2, 1.4, 1.6, 1.7

5th Grade Writing Strategies: 1.6, Written and Oral English Language Conventions: 1.1, 1.4, 1.5Templates



DRAWING PICTURES FROM WORDS

OVERVIEW

Students use their field guide descriptions as instructions for another student's illustration. The goal is to create text that describes the drawing—and allows for reproduction—as accurately as possible, thereby practicing writing and observational skills. Accurate scientific writing is an important skill, and this activity is designed to develop it. They will write descriptions of their own journal sketches for the "Make a Field Guide or Collection" activity which will be used as instructions for a fellow student's own illustration. Students often find that this kind of "test" of their written descriptions helps them to make their own writing more accurate and specific.

Age level: 8 years-adult
Suggested time: 45 min.
Location: This activity may be done in the in the classroom using journal entries as a foundation.

ADDITIONAL MATERIALS

Journal entries from "Make a Field Guide or Collection" activity
Blank paper for student partner to create the second illustration

PROCEDURE

Complete the "Make a Field Guide or Collection" activity in the field.

Writing a Descriptive Paragraph Tell students that they are going to write a descriptive paragraph about one of their field guide illustrations, and that it is very important that they are as descriptive and accurate as possible. Do not tell students beforehand that their paragraphs will be used as illustration instructions. Ask the class for some characteristics of a good scientific description. Characteristics might include measurements, details, or sense impressions e.g., what an organism looks, smells, feels, or tastes like, use of color.

Give students ample time to choose one of their field guide/collection illustrations to describe.

Have students write a descriptive paragraph on a separate piece of lined paper, encouraging them to use as many good details to describe their illustration as possible.

After the paragraphs are completed, collect them and distribute them to a second student. It is more effective if students are not paired with those who sit nearby. Hand out sheets of blank paper, or have students use another page of their journals. Tell students that they are going to use the description that they have received to make an illustration. Instruct them to follow the description as closely as possible and not to add anything extra.

Have the paired students meet and see how well the written descriptions helped their partner create an accurate illustration. Where was the description accurate? How was it misleading? What did it include? What did it leave out? Praise students for details that were accurately conveyed and ask them if they see a way to make more accurate descriptions.

An optional next step is to have students rewrite their paragraph and switch again to see if they can help another partner to be more accurate in his or her illustration than the first partner.

Writing Detailed Instructions In this variation, students will create a step-by-step list, based on their journal sketches, to help a partner reproduce their drawings. Instruct the students that they will be creating a set of instructions to help a classmate across the room to reproduce a favorite sketch. Tell them that it is extremely important to pay attention to the details that they include. Have them brainstorm important details that they might want to put in their step-by-step descriptions.

Allow students to write their step-by-step procedures for reproducing their drawing.

Have them switch with a partner who isn't sitting nearby who will make a sketch in the journal based on the instructions. Re-

mind students that they are only to do what they are instructed to do, even if they recognize the species that is being described.

Allow students to meet with their partners and see what turned out accurately and what did not.

As a class, discuss what the more successful instructions looked like. What kinds of details were most helpful? Were there any surprises? What kinds of details didn't actually explain much or misled?

If desired, have students make a second procedure list and exchange them with a different partner to see if they can improve their accuracy.

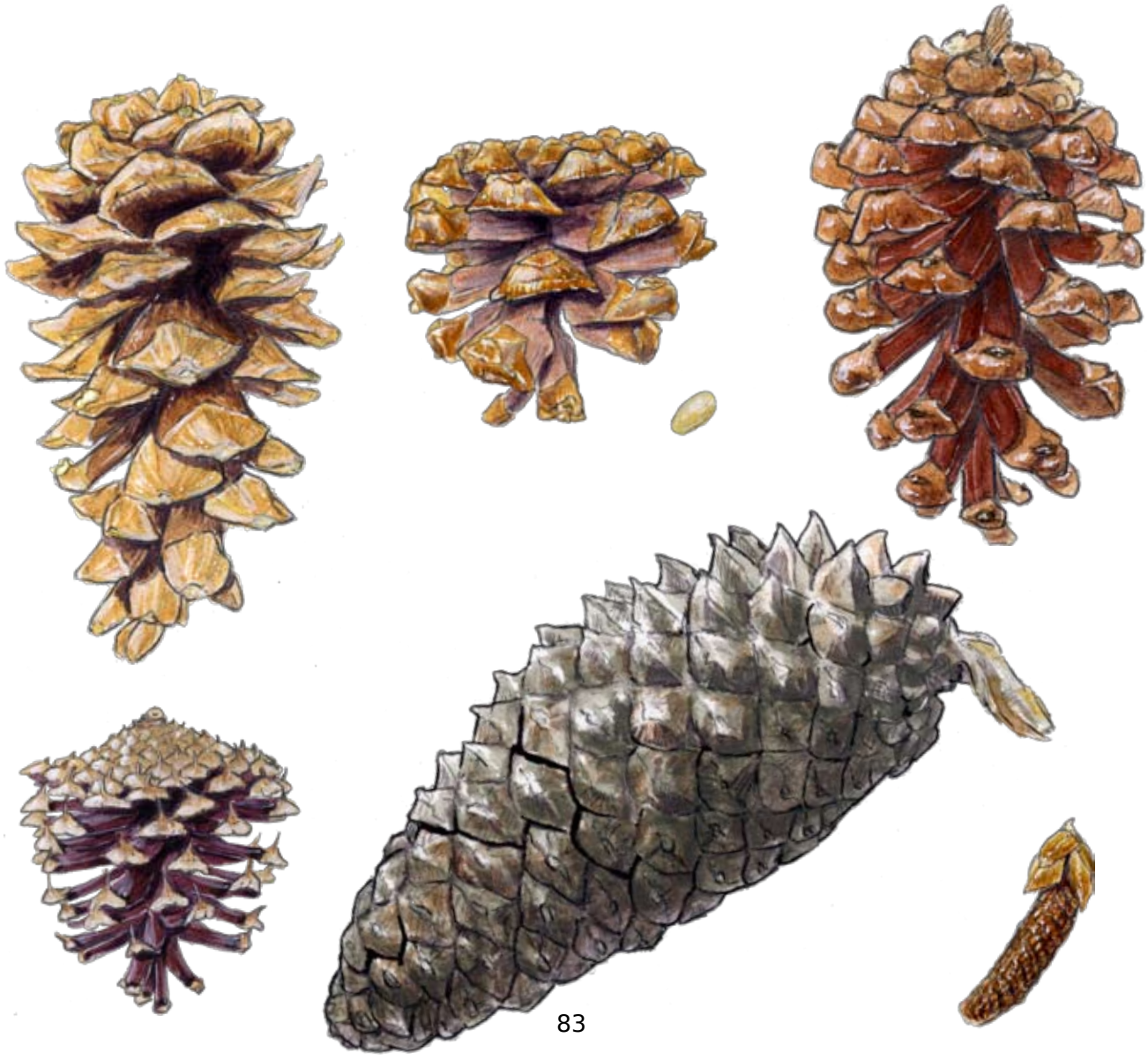
STATE OF CALIFORNIA STANDARDS

English, Language Arts

3rd Grade Writing Strategies: 1.2, Writing Applications (Genres and their Characteristics): 2.2, Written and Oral English Language Conventions: 1.1, 1.2

4th Grade Writing Strategies: 1.1, 1.4, 1.10, Written and Oral English Language Conventions: 1.1, 1.2

5th Grade Written and Oral English Language Conventions: 1.1



WRITING PERSUASIVE PARAGRAPHS

OVERVIEW

After completing the Comparisons activity, students use their notes to write a persuasive paragraph or short essay about why individual members of the same species are not identical. Often, students spend a lot of time identifying plant and animal species based on stylized images or single photographs rather than real life examples. While this builds a base of knowledge that can be taken into the field, it tends to de-emphasize the huge amount of variation that exists between members of the same species.

Age level: 8 years-adult
Suggested time: 45 min.
Location: This writing activity can be done in the field immediately after the "Comparisons" activity, or it can be done in the classroom using the journal entries as a foundation.

ADDITIONAL MATERIALS

Journal Entries from "Comparisons" activity
Original plants for further observation (optional)

PROCEDURE

Complete the Comparisons activity in the field or in the classroom using two or more specimens of the same species. This writing activity can be done in the field immediately after the corresponding journaling exercise while continuing to observe the plants, or it can be done in the classroom with the journal entries as a foundation. Explain to students that they are going to use their illustrations and notes from their Comparisons journaling activity to help others understand the wide variety of differences that can exist between members of the same species. Have students organize their observed similarities and differences into an appropriate chart. Using this chart, tell students that their job is going to be to write a persuasive essay or paragraph to explain to other students why individuals of the same species are not the same, even though we might think that they are. Possible out-of-class audiences here might be a younger class, another grade-level classroom, a school newspaper, etc. Encourage students to cite their own observations as evidence e.g., "On June 24th, I observed two daisies in Mariposa Grove, which had different numbers of petals".

EXTENSIONS

Ask the students: "If these individuals are so different, what's the point of learning about species in the first place? What does that do for us as scientists and observers?"
Ask the students (shifting the focus to similarities): "Why are these individuals, despite their differences, members of the same species? Make a checklist or a description of what they have in common that might help someone identify another unique individual as a member of that same species."
Have students consider familiar species, such as dogs, cats, or even humans. "Do we make the mistake of thinking that all members of these species are the same? Why not? And what are the characteristics that all dogs, for example, share that help to categorize them all as members of *Canis lupus familiaris*?"
Have the students make a verbal argument or presentation about why individual members of one species are not identical. Again, use observations as evidence, and instruct students to cite their own observations e.g., "On June 24th, I observed two daisies in Mariposa Grove, and they had different numbers of petals."

SPECIAL CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Some ELL students may be too embarrassed or afraid to write; they could feel bad for not knowing how to do it correctly. Encourage those students to write even if it's in their native language. Depending on the student's English level, it is a good idea to motivate them to write in English as much as they can. At this point it is not necessary to correct every mistake because constant correction of errors can discourage ELL students from using language to communicate. Instead, indirectly model what you want by rephrasing what the student wrote or said in the correct grammatical structure. Also, do not put ELL students in the spotlight. If the student prefers to just listen to his or her peers that is fine. If they want to participate in front of the class, make sure they get your full attention by asking them questions and praising their success.

STATE OF CALIFORNIA STANDARDS

English, Language Arts

- 3rd Grade Writing 1.1, 2.2
- 4th Grade Writing 1.1, 1.2, 1.3
- 5th Grade Writing 1.2, 2.4
- 6th Grade Writing 2.2, 2.5

WRITING SHORT STORIES

OVERVIEW

Using the treasure map made in the "Nature's Treasure Map" activity, students write a story based on it and on what they observed. For students who do not have a lot of experience writing stories or have a hard time getting started, a little bit of scaffolding can help get the creative juices flowing.

Age level: 8 years-adult
Suggested time: 45 min.
Location: This writing activity can be done in the field immediately after the "Nature's Treasure Map" activity, or it can be done in the classroom using journal entries as a foundation.

ADDITIONAL MATERIALS

Journal entries from Nature's Treasure Map activity

PROCEDURE

Complete the "Nature's Treasure Map" activity. Instruct the students to open their journals to the treasure map created during that activity

Explain that they are going to write a story about their own treasure map. The characters in the story might be following the map, they might find the map, they might be guarding the map; the only rule is that the treasure map should be in the story. What kind of treasure does it lead to? Who might have made it? Who might find it? What adventures might happen to them as they follow the path?

Review the elements of a story: setting, plot, conflict, resolution, characters, etc. Give students time to think or talk about what these elements might look like in their own treasure map story. Remind students that a good story has lots of sensory details. What words could they use to describe what they sensed while they were making their map?

Let students write. Remind them to use their treasure map for ideas and details about the setting and the plot. Share stories. Have students share their stories and the maps that go along with them in pairs or groups.

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

After the "Nature's Treasure Map" activity, let your ELL students know that in the next few days they will write a short story about what they found and drew in their map. Giving them extra time will help ELL students prepare and not feel overwhelmed by the task. ELL students are more likely to be willing to write when they can make a connection between the writing topic and a personal experience. To foster this connection, ask questions like: "What does this object remind you of? Have you seen anything like this before? Where?"

EXTENSION

To take this activity further, have students write non-fiction accounts of their treasure map's path. Students can then present their stories orally to the class. If your class works in collaborative groups, they can get together in pairs or small groups, to use all of their maps to create a more detailed story. Short stories can also be created from the "Nature's Comic Book" activity.

STATE OF CALIFORNIA STANDARDS

English, Language Arts

2nd Grade Writing Strategies: 1.1, 1.2, Writing Applications (Genres and their Characteristics): 2.1, Listening and Speaking: 1.0, 1.8, 2.0, 2.1

3rd Grade Writing Applications (Genres and their Characteristics): 2.1 a, b, c; 2.2. Listening and Speaking: 2.1 a, b, c; 2.2; 2.3

4th Grade Writing Applications (Genres and their Characteristics): 2.1 a, b, c, d, Listening and Speaking: 2.1 a, b, c

5th Grade Writing Applications (Genres and their Characteristics):2.1 a, b

6th Grade Writing Applications (Genres and their Characteristics): 2.1 a, b, c, Listening and Speaking: 2.1 a, b, c

PLANT, THIS IS YOUR LIFE!

OBJECTIVES

Students use the observations and journal entries made in the activity "Plant Time Line" to write the life story of a plant. Students will have recorded the dramatic changes in plants as they pass through their life cycle. These changes can be observed by watching one plant over time or by finding plants in different stages of the life cycle at a single location. Students will use these observations to construct a story around the life of a plant.

Age level: 8 years-adult
Suggested time: 45 min.
Location: This writing activity can be done in the field immediately after the "Plant Time Line" activity, or it can be done in the classroom with the journal entries as a foundation.

ADDITIONAL MATERIALS

Journal entries from "Plant Time Line"

PROCEDURE

As a group, write out the major events in a plant's life cycle e.g., seed being buried, watered, sprouting, emerging from the ground, growing leaves and shoots, flowering or producing cones, dropping seeds, wilting, dormancy or death. You can include decomposition and what happens during this period. As necessary, brainstorm or list the major stages for younger students.

Next, think about significant events in a plant's lifetime. Could a plant have an encounter with an insect or animal? What kinds? What might they do to the plant? What about other plants in the same area? What else can students think of that might be important to them if they were plants

Have students make a list of the unique features of their plant based either on observing the plant in combination with the journal entry, or based on the journal entry. Ask them to think about what may have caused these unique features to exist. In the example of an insect bite, what kind of insect do they think bit the leaf, and why? If a stem is crooked, could that be related to water or to the sun? When in the plant's life cycle do they think that these features may have appeared?

Now, using their scientific journals and observations, have students write their plant's life story. Remember to use both facts and imagination. For example, does their plant have a name? Any nearby friends? Students may choose to write this story in the first person, from the plant's point of view, or as a separate narrator.

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

This activity will help you to get to know your ELL students on a more personal level. Ask them to write in the language that they feel most comfortable with. The activity can be a social one if you brainstorm with the student. Ask the student questions like: Why is the tree alone? Do you think squirrels would like to live around this area? If possible, write and read with your student; this will allow you to give tips and model good reading strategies, correct punctuation, and proper grammar. Also it will help you make a connection with the student. At the end of the lesson you can ask some students to share their story with the group; ELL students learn a lot from hearing from their peers as well.

STATE OF CALIFORNIA STANDARDS

English, Language Arts
- 3rd Grade Writing: 2.1 (Write narratives) a, b, c
- 4th Grade Writing 2.1 (Write narratives) a, b, c, d
- 5th Grade Writing 1.1 (Create multiple-paragraph narrative compositions) a, b, c

Science
- 2nd Grade 2c, d, e
- 3rd Grade 3 a, c
- 4th Grade 2b, c; 3a

DON'T MISS THE FOREST OR THE TREES!

OBJECTIVES

Many students tend to use the same scale on all drawings. When doing observational nature journaling, this can limit their observations. the "Zoom In, Zoom Out" activity is intended to encourage them to see and work in different scales, first by drawing what they observe at its actual size, then zooming in and out to examine it close-up and further away. In doing this, students often notice details that they would otherwise miss. In this writing exercise, students reflect on what they noticed as they zoomed in and out. Were there details of a flower or leaf that they never before noticed? When they zoomed out, did they observe something new as they examined a natural feature as part of the larger landscape? This activity transfers to other situations, avoiding their missing the forest for the trees.

Age level: 8 years-adult
Suggested time: 45 min.
Location: This writing activity can be done in the field immediately after the "Zoom In, Zoom Out" activity, or it can be done in the classroom using journal entries as a foundation.

ADDITIONAL MATERIALS

Journal entries from "Zoom In, Zoom Out" activity.

PROCEDURE

Have students complete the "Zoom In, Zoom Out" exercise. Discuss the phrase "miss the forest for the trees," or brainstorm meanings, or simply provide a definition appropriate to the group. Explain how, by observing at the wrong scale, important details can be missed.

Have students examine their journals "Zoom In, Zoom Out" notes, and drawings and write down the details that they noticed while zooming in and out. One way of organizing these details is to have students make a T-chart and putting zoom in details on one side and zoom out details on the other. Using these notes, have students write several sentences to a paragraph about what they noticed zooming in and zooming out, and why they think that they noticed so many new things. Depending on their age and writing proficiency, the length of the finished product will vary.

Instruct students to think about what sorts of things it might best be examined on a small or large scale. When would students want to zoom in? When would they want to zoom out? When would it be a good idea to do both? What sorts of things could they learn by using each technique? What kinds of questions could they answer? Based on their answers, have students write a recommendation for other student scientists and observers. What are some general rules about when you might want to zoom in and out?

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

T-charts are very helpful organizers for ELL students. Suggest to them to use words written in their vocabulary lists.

STATE OF CALIFORNIA STANDARDS

English, Language Arts
- 3rd Grade Writing: 1.1, 2.2
- 4th Grade Writing: 1.1, 1.2, 1.3, 2.3
- 5th Grade Writing: 1.2

RESPONDING TO POETRY

OBJECTIVES

The objective of this lesson is for students to emotionally connect to poetry using both images and words. Just as many children, after a certain age, are no longer comfortable drawing because they aren't "good artists," others can find themselves drifting from literature, thinking that they are "bad readers or writers." As their education progresses, emphasis may be placed on literary interpretation, and the power of an emotional response to poetry or literature can become lost in the shuffle. Ironically, it's this emotional connection that can lead to the most insightful and vibrant interpretation. This exercise aims to help students respond to nature poetry as they responded to nature: through close observation and with wonder. By incorporating the visual and physical aspects of nature sketching, students can approach and engage with poetry in a way that is physical, mental, and visual.

Age level: 8 years-adult
Suggested time: 45 min.
Location: Outdoors (preferred) or in the classroom.

ADDITIONAL MATERIALS

Selected poetry for reading to students
Copies of poems for students (optional)

PROCEDURE

Ideally, this activity will take place in a relatively quiet outdoor space. If such a place can be found, scout it out in advance and assess its capacity to hold the group comfortably. If an outdoor location is not available, a quiet indoor location with minimal distractions (and an open window!) can substitute.

Choose a poem that reflects on the natural world. If this can be aligned with your particular outdoor setting in any way, all the better. Encourage poems that mix visual descriptions with feelings and emotions. Be aware of the linguistic abilities of the group; some challenging diction and vocabulary can be a positive, but keep in mind that in most cases, students won't be looking at a copy of the text themselves. The emphasis on this activity is hearing poetry and responding to it, rather than reading or analysis. Thus the grammar, diction, and vocabulary should be accessible. Possibilities include: Mary Oliver, Wallace Stegner, Gary Snyder, Emily Dickenson, Pablo Neruda (in Spanish and translated to English), Wendell Berry, and Walt Whitman.

Take the group to the previously selected location for this activity. Students should take their nature journals and any required drawing equipment. Tell them that they will be listening to a poem about their surroundings. If they are in an outdoor location, prior to reading the selected poem, have them first take a few moments to notice and observe the world around them. Tell them to record in their journal, using pictures, words, or a combination of both, anything that catches their interest, whether it's a small plant nearby or an insect or a stream. Encourage students to use their senses to find what inspires them.

Tell students that the first time they hear the poem, they should just listen. Have them close their journals and put their pens down. Closing their eyes can also be helpful. Read the poem clearly and slowly. If helpful, read it through as many times as needed. Let students remain seated, eyes closed. Pause after each reading. Have students pick up their journals again. Tell them to sketch the images or thoughts that came into their minds when they heard this poem. Read the poem through once more. Give students ample time to journal their responses. When this is completed, have students share, either as partners, small groups, or as a large group, some of what they heard in the poem and their responses to it.

POSSIBLE GUIDED GROUP DISCUSSION POINTS

What did you picture in your mind as you heard this poem? Was it images or colors? Did you picture anything at all, or did you think of other sense perceptions, like smells or sounds or feelings?
What sounds did you hear in the poem's words? Did they remind you of anything?
What was your favorite word in the poem? Why did you like it so much?
Did this poem remind you of anything?

Do you see anything around you that makes you think of this poem?
What color would this poem be if you drew a picture of it? Why?
How did this poem make you feel?
Do you wonder anything about this poem or the poet?

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

Poetry offers a lot of opportunities for ELL students to practice writing, reading, speaking, and listening strategies. Prior to this activity, take the time to introduce students to the concept of a poem. Ask them if they have had any experience with them and if they know poems in their native language that they might want to share later with the group. It is a good idea to give your ELL students a copy of the poem you will use in your class before you introduce it for the first time to the group. They can underline the words that they don't understand and add them to their vocabulary list. The more they read the poem, the more familiar they will get with the words and concepts used. This will give them greater confidence at the time of the activity.

STATE OF CALIFORNIA STANDARDS

English, Language Arts

3rd Grade Literary Response and Analysis: 3.1, 3.5
4th Grade Literary Response and Analysis: 3.5, Writing: 2.2
5th Grade Literary Response and Analysis: 3.1, 3.4, 3.7, Writing: 2.2

COMPARING AND CONTRASTING

OBJECTIVES

As a follow-up to the "Group Observations" activity, this exercise helps students further analyze their observations and compare them with those of a partner. Students will take a closer look at what they saw, what they missed, and the incredible variety of things that can be observed in any given exercise. While completing the "Group Observations" activity, students will be working to be the best observers they can possibly be. However, even though all students are engaged in the same tasks, it is very unlikely that they all will notice the exactly the same set of details. This can be a wonderful opportunity to practice compare/contrast writing, as well as a chance to focus on each student's individual observation strengths. This activity is best done outdoors in the field, where the range of possible observations is unlimited. It can be done in a more controlled classroom setting with selected material for observation, such as plant or rock samples, microscope slides, classroom animals, etc..

Age level: 8 years-adult
Suggested time: 45 min.
Location: This writing activity can be done in the field immediately after the "Group Observations" activity, or it can be done in the classroom using the journal entries as a foundation.

ADDITIONAL MATERIALS

Journal entries from Group Observations" activity
Compare/Contrast Writing Scaffold (student pages)

PROCEDURE

Complete the "Group Observations" activity. Prepare a graphic organizer appropriate to the setting in which students will perform this activity. Writing can be done in the field immediately after the corresponding journaling exercise, while continuing to observe the subject, or in the classroom using journal entries as a foundation.

Explain that having completed this journaling activity, they are going to use writing to compare their observations to those of their team members. Form small student groups (pairs are ideal) and hand out one graphic organizer per pair. Have students first look for observations that they had in common and write these down in the similarities area of the graphic organizer.

Next, have students identify observations that they did NOT have in common. Designate one side of each chart for each student to record their unique observations. In pairs, have students write three basic paragraphs about what they have recorded, one each about their individual observations, and one about the common observations. The focus here will be on making generalizations. Were they both focused on big things? Small things? Was one student looking lower on a tree, while the other was focused on the top? Give evidence for the generalizations that they are making. Younger students may instead write one paragraph that can contain all of this. What did each student see? What did both see?

CONSIDERATIONS FOR ENGLISH LANGUAGE LEARNERS

A graphic organizer or a Venn diagram is a tool to develop an understanding of words visually. Pair each of your ELL students with a proficient English student. This will expose them to modeling in speaking, listening, reading and writing from a peer. You can encourage this dynamic by asking your ELL students questions to get them more involved in this activity.

EXTENSION

Have students answer the following: given the similarities and differences, if you had another observation task, what specific jobs would you give to each member of the team, and why? Use evidence from your notes to back up these job assignments.

STATE OF CALIFORNIA STANDARDS

English, Language Arts
- 3rd Grade Writing 1.1, 2.2
- 4th Grade: Writing 1.1, 1.2, 1.3
- 5th Grade Writing 1.2

Science
- 3rd Grade 5 a, c
- 4th Grade 6 a

Naturalist, educator and artist John (Jack) Muir Laws has worked as an environmental educator since 1984 in California, Wyoming, and Alaska. He is trained as a wildlife biologist and is an associate of the California Academy of Sciences. In 2009, he received the Terwilliger Environmental Award for outstanding service in Environmental Education. He is a 2010 TogetherGreen Conservation Leadership Fellow with the National Audubon Society. He was the 2011 artist for International Migratory Bird Day. Laws has written and illustrated books about art and the natural history of California including *The Laws Guide to Drawing Birds* (2012), *The Laws Pocket Guide Set to the San Francisco Bay Area* (2009), *The Laws Guide to the Sierra Nevada* (2007), and *Sierra Birds: a Hiker's Guide* (2004).

Emilie Lygren grew up on the Central Coast of California and is a graduate of Brown University with a B.A. in Geology-Biology; she also focused on coursework in English and Education. Emilie is passionate about sharing her love of the natural world and has done so through many different avenues as an educator. She has led camping and backpacking trips for all ages and has trained outdoor leaders in group facilitation and risk management. Emilie teaches poetry workshops for adults and students on themes such as nature awareness and nonviolent communication. Emilie is deepening her skills as an educator through her work as a naturalist at residential outdoor education programs, where she teaches and mentors 5th and 6th grade students in the process of discovering and learning about nature.

Emily Breunig is a writer and educator who believes firmly in the value of interdisciplinary curricula. She has worked with students of all ages, in the classroom and out in the field, helping them expand their worlds with language. Emily taught English in a Chinese elementary school before earning her MFA at St. Mary's College of California. She served as a professor of English at De Anza College and West Valley College in Silicon Valley and worked with the California Institute for Biodiversity for five years. She currently lives in Stockholm, Sweden, where she is finishing her first novel.

Celeste Lopez is a certified bilingual education specialist from Monterrey, Mexico. with a bachelors degree in Communications. She believes believe that if we want to make this world a better place, we need to start with our students. After getting her certification, she taught in Texas, where she had her own Hispanic classroom. She learned strategies to approach students whose first language was not English. She has contributed ideas and methods to help teachers use these materials with English language learners.

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