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## Enhancing Science Notebooks with Scientific Sketching and Nature Journaling

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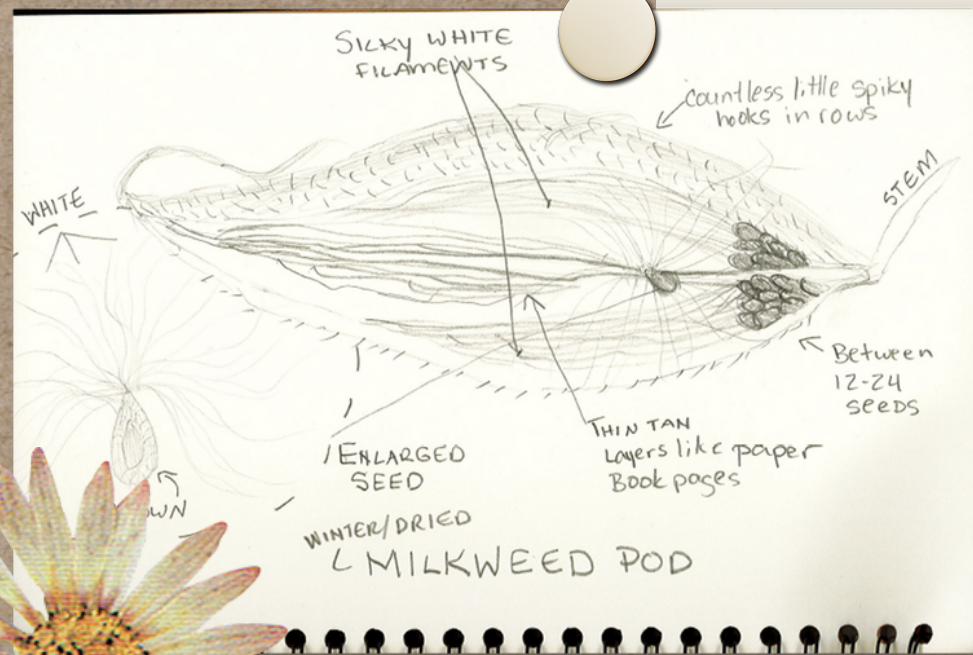
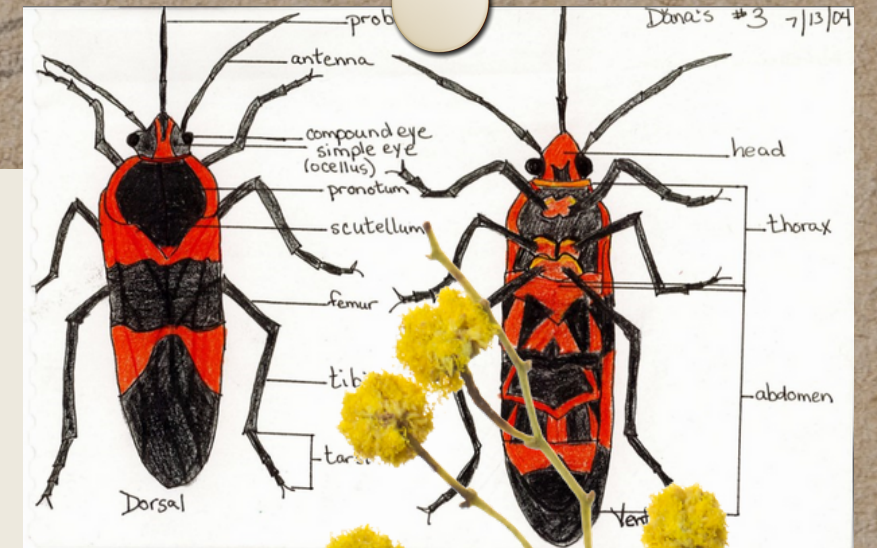
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Enhancing Science  
Notebooks with  
Scientific Sketching  
and  
Nature Journaling

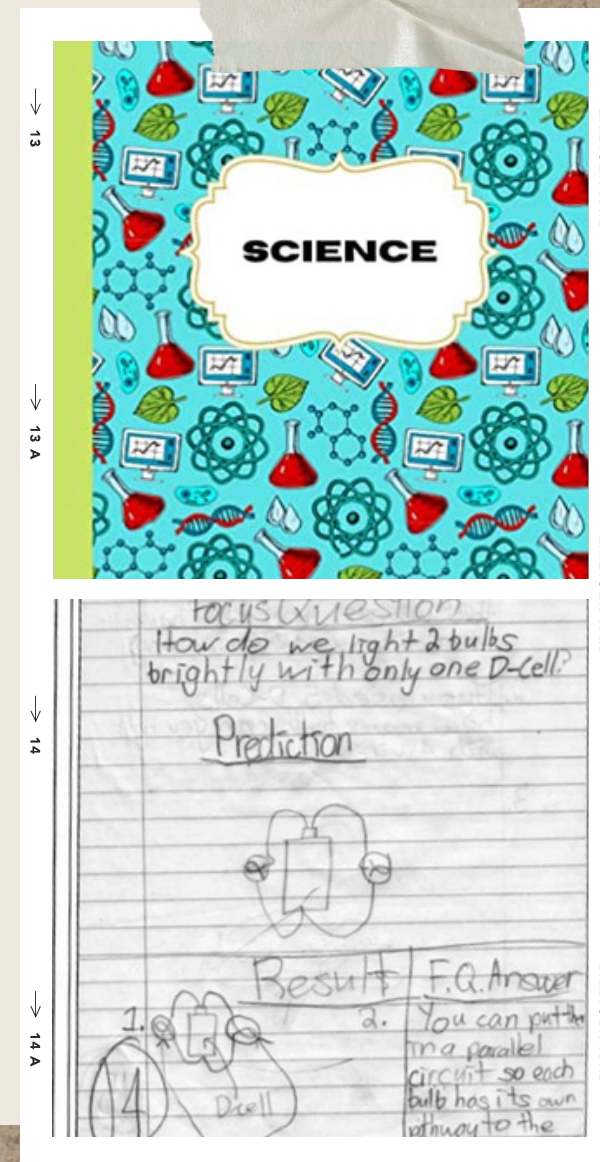


# Science Notebooks

## FOSS Notebooks

### WHO IS YOUR EXPERIENCE WITH SCIENCE NOTEBOOKS?

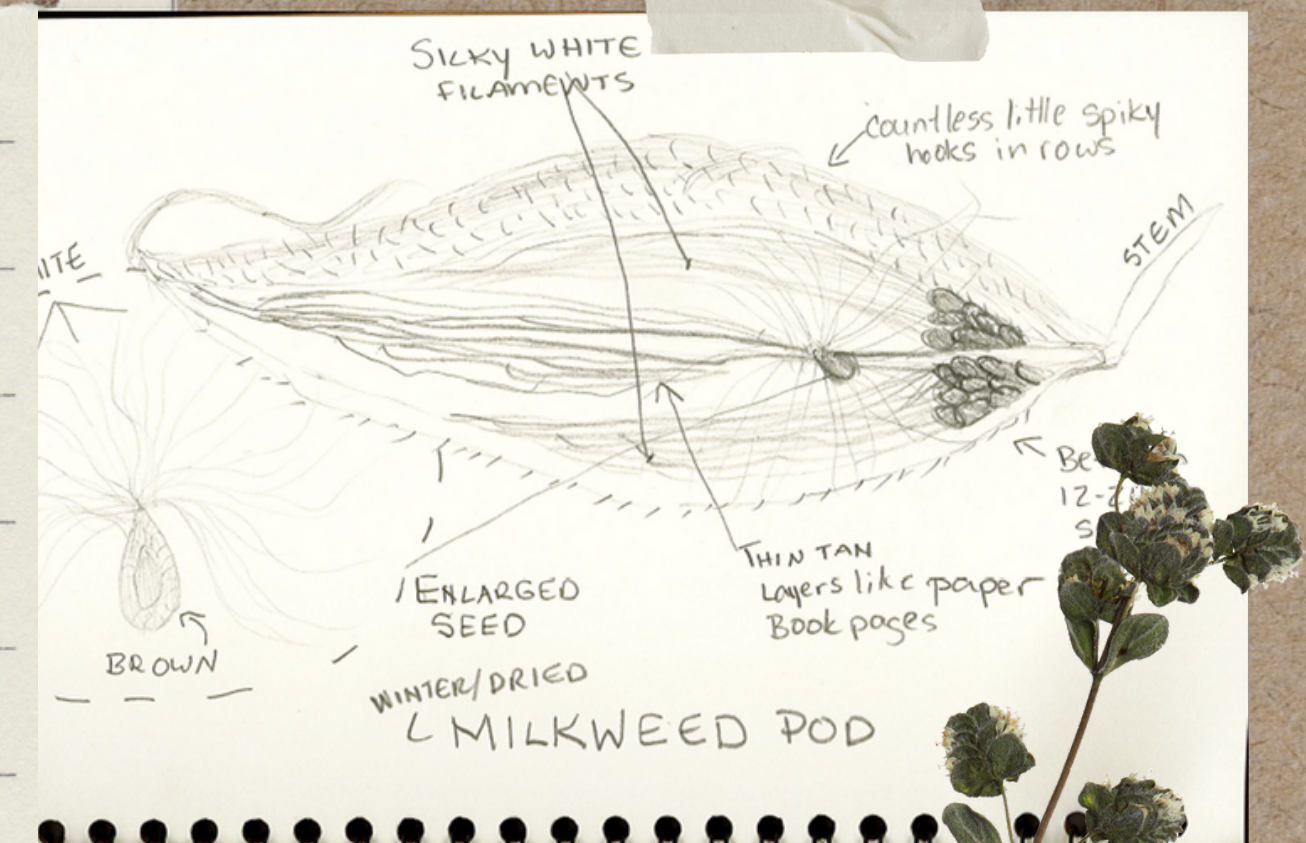
- Who uses science notebooks already?
- How do you use science notebooks with your students?
- What have been the benefits?
- What have been the challenges?
- What's the difference between a Science Notebook and a Nature Journal?





"A scientist sketches  
to communicate  
information, not to  
make art."

CALIFORNIA  
ACADEMY OF  
SCIENCES, SCIENCE  
NOTEBOOK CORNER



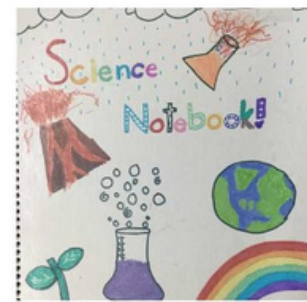
# Organizing Your Science Notebook

## Table of Contents

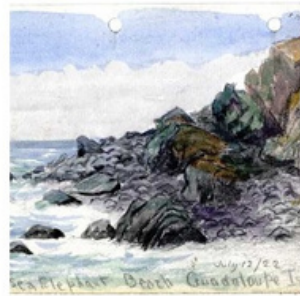
Date	Entry Title	Symbol	Page #
10/17/13	Scrumd Bowls <i>Investigation &amp; Notebook introduction</i>	★	3
10/16/13	Notebooks - prep talk	▲	3
10/16/13	8 min class post lesson terrarium	●	4
		●	5
		★	6
		●	7
		●	8

# Introductory Science Notebooking Activities

Browse these lessons to learn the basics of setting up science notebooks with your students. Once routines are in place, explore our other sections to learn more strategies for deepening your students' learning.



**Decorate Your Science Notebook**  
Students receive their science notebooks and take the time to make them their own.



**Science Notebooks Across Time**  
Students peruse sample page from the notebooks of many different scientists.



**Draw a Scientist**

**You Are Here: Introductory Activities**



# Strategies for Notetaking

Taking notes in science doesn't mean just copying what's on the board. Learn how students can make their own meaning, from drawing concept maps to unpacking complex vocabulary. These strategies will support your students before, after, and in-between hands-on investigations.



**Brainstorming**  
Brainstorming is a great first step to many investigations.

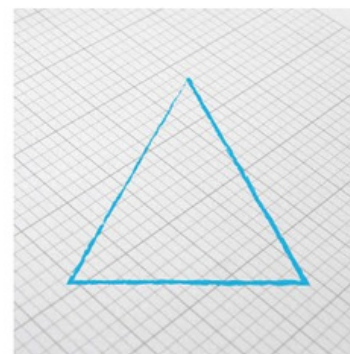


**Active Reading Strategies**  
Have you used notebooks to help your students understand science texts?



**Scaffolds for Field Trips**  
Use notebooks to help students learn actively during field trips.

**You are Here: Notes**

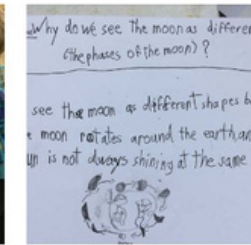


# Strategies for Investigations

Learn how science notebooks can help your students plan and carry out hands-on investigations. From collecting data to constructing explanations, using notebooks can solicit and deepen your students' thinking.



**Planning Investigations**  
Use science notebooks to make your classroom experiments both hands-on and minds-on.

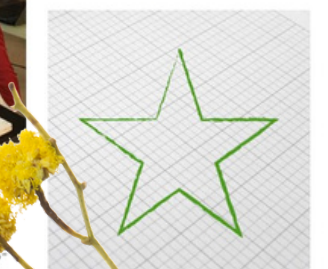


**Framing With a Focus Question**  
Make the most of investigations with clear and specific focus questions.



**Carrying Out Investigations**  
How can notebooks enhance student learning during hands-on investigations?

**You Are Here: Investigations**



# Science Notebook Resources

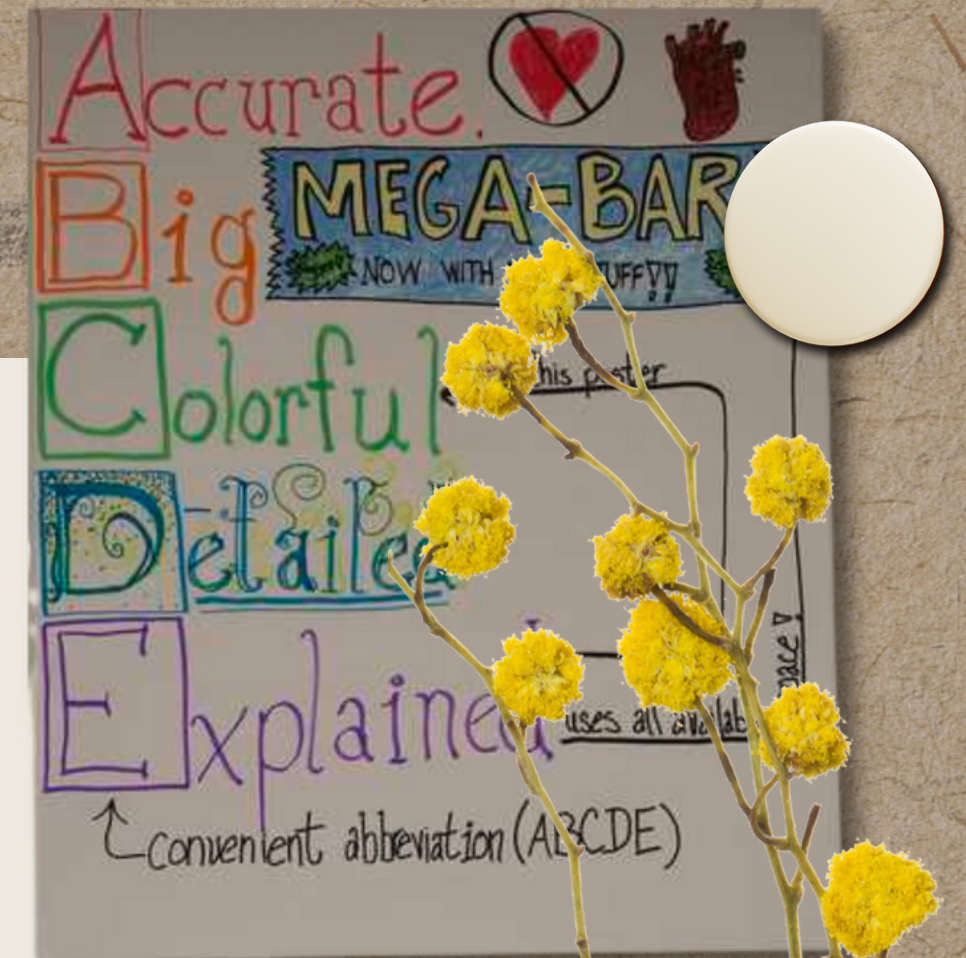


**CALIFORNIA ACADEMY OF SCIENCES**

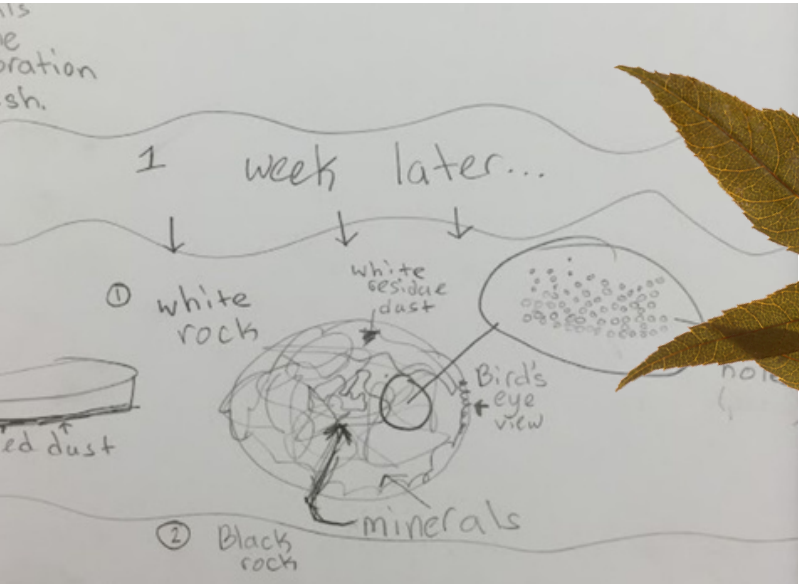
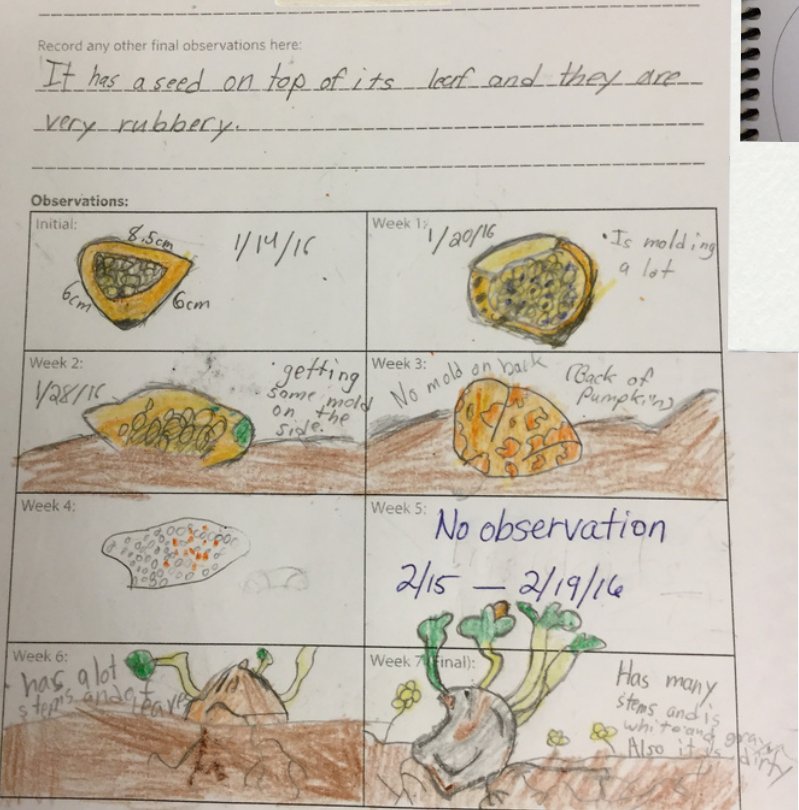
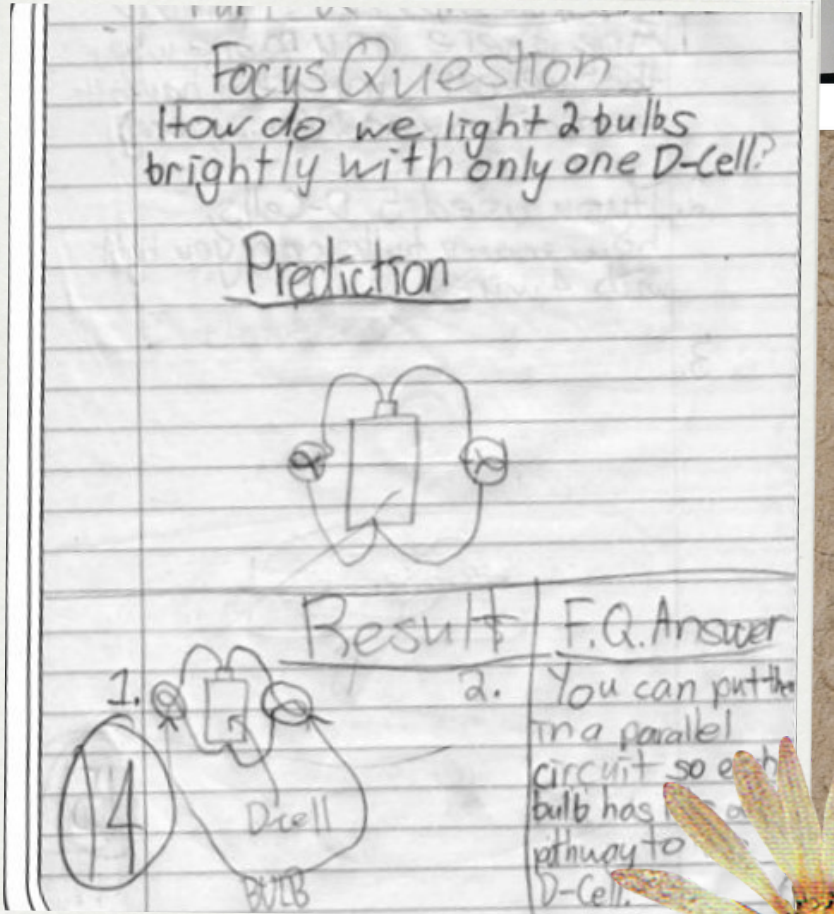
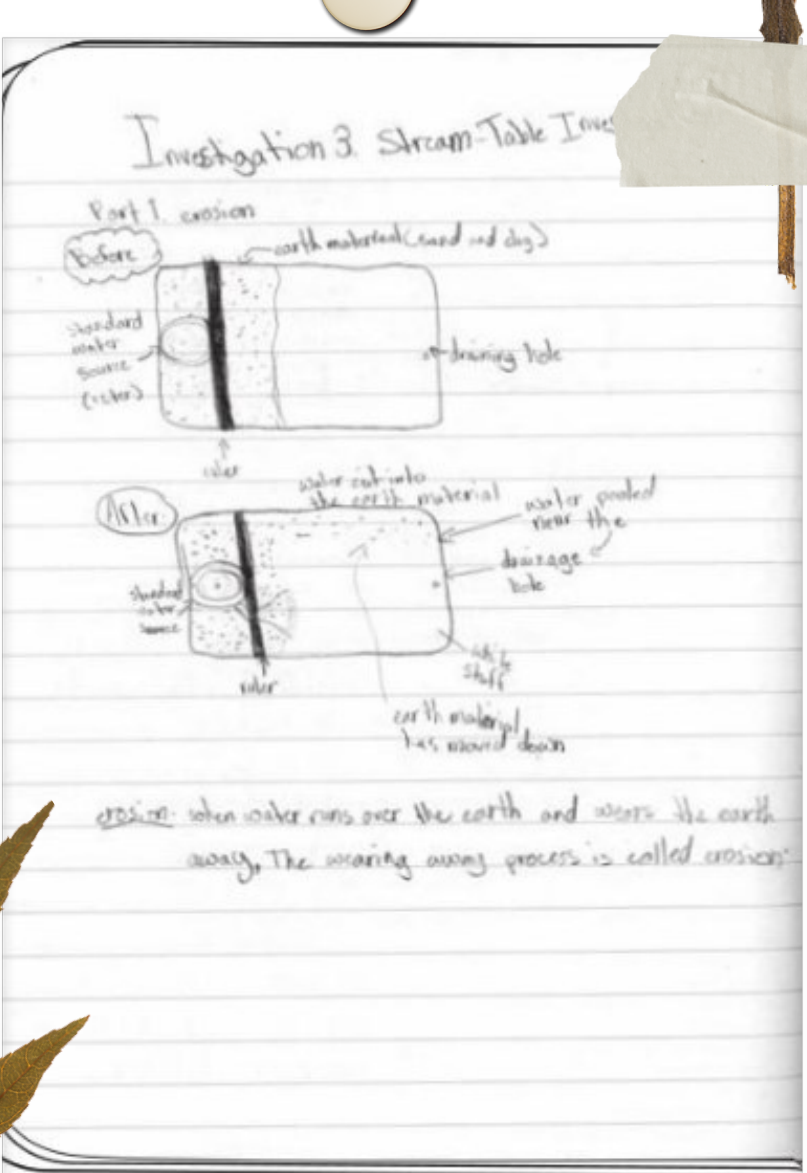
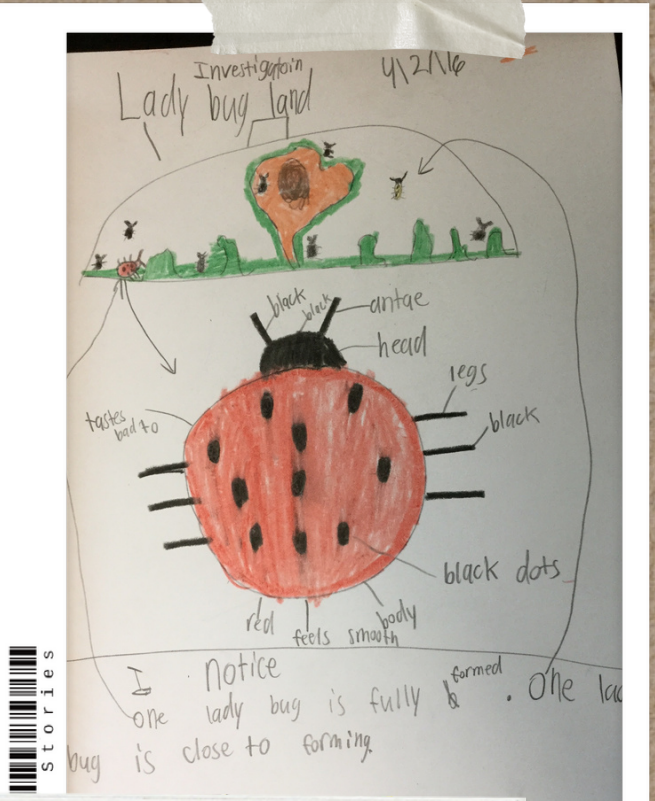
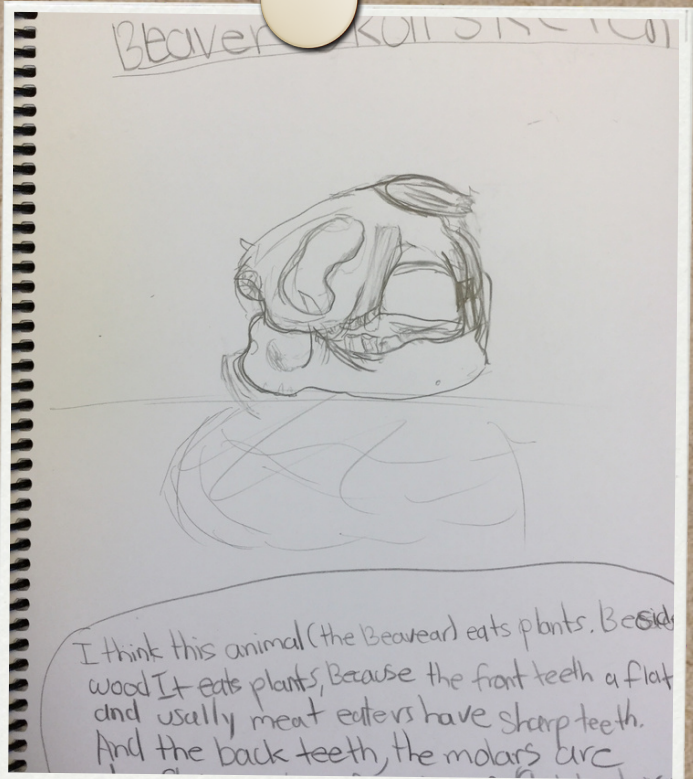
# *Introduction to Scientific Sketching*

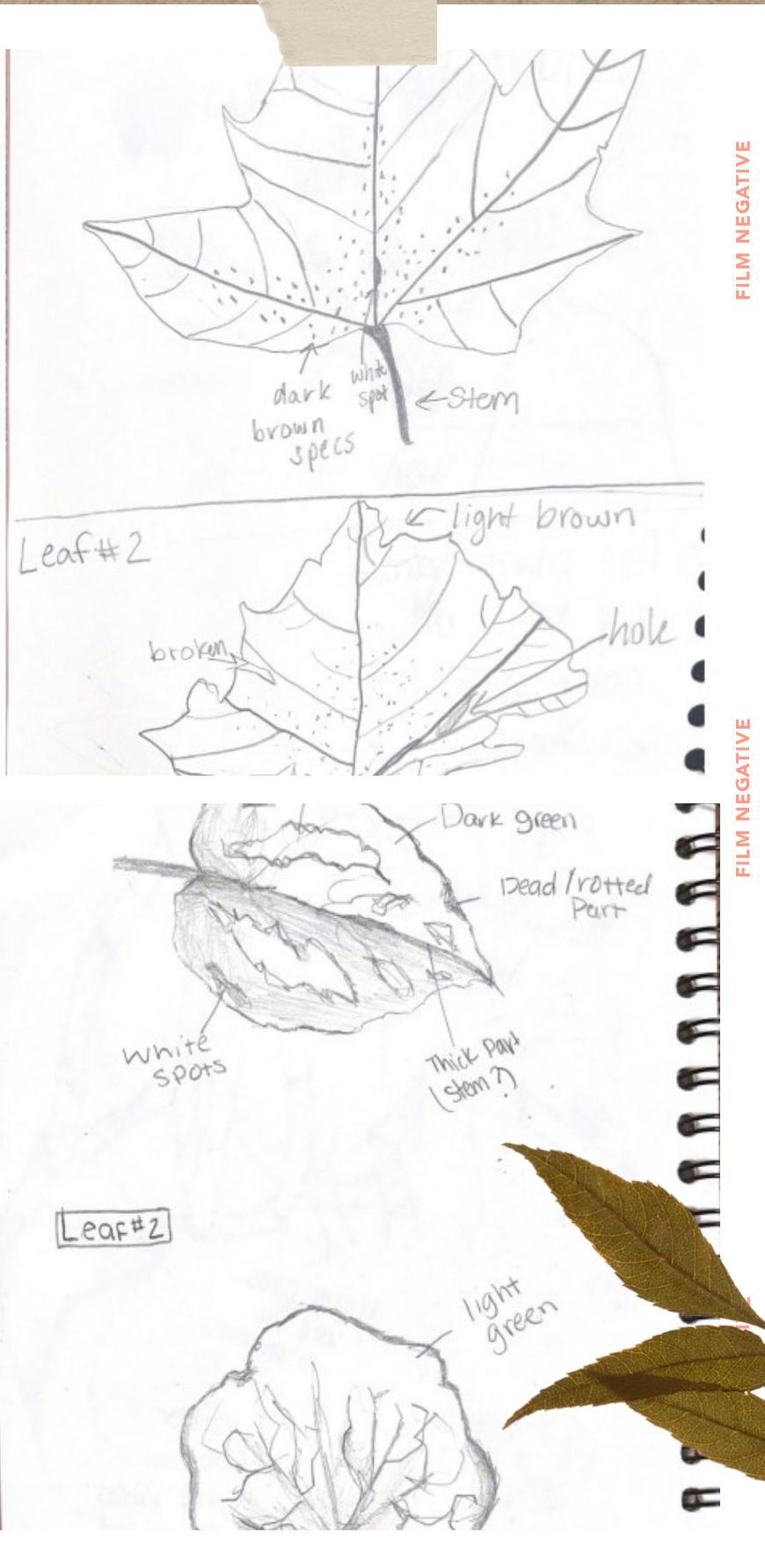
## Four quick introductory activities:

- Exercise #1: Blind contour drawing
- Exercise #2: Breaking into Shapes
- Exercise #3: Disappearing Images
- Exercise #4: Quadrant Drawings



# Student Scientific Sketching Examples





FILM NEGATIVE

FILM NEGATIVE

Ate the strawberry on Tuesday, March 21<sup>st</sup>  
 @ 10:00 a.m. in Cedar Falls.  
 Activity: Inside Out pg. 180  
 Fruit: Strawberry

Outside view  
 white spot (less ripe)  
 seeds  
 actual size of Strawberry

Inside view  
 Stem  
 Dark red outer skin

Zoomed in (center of Strawberry)  
 Fuzzy inside  
 red ripe center

Strawberry tasted sweet + watery inside,

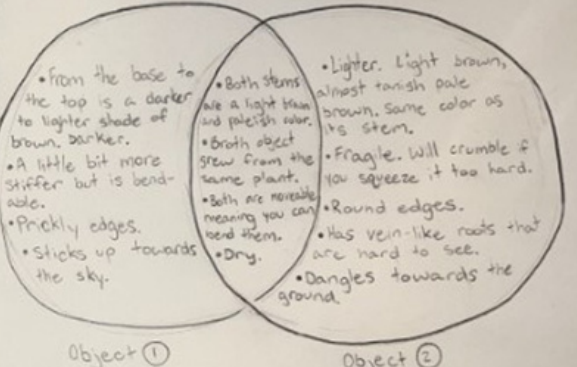


# Student Nature Journaling Examples

2/26/23 1:2  
 Raspberry

Blackberry

2/28/2023  
 Questions:  
 Is this a type of pine-cone? Was this first a leaf?  
 What is its purpose?  
 Why is this leaf outnumbered by the other objects growing  
 on the plant? What is its purpose?  
 Other = what type of plant is this? Is this a baby tree? Why  
 was it growing near a creek (water source)?



CCC: to make sense of the objects being compared.

Using the CCC of "Stability and Change," I will try to understand the 2 objects' reality and differences. Over time a system might stay the same or become different depending on a variety of factors. In this case, I assume ① is a type of pine, whereas ② is a leaf. We know both are growing from and can be found on the same twig-like plant. Using "Stability and Change," I think the leaf eventually falls off, making room for a pine-like object to grow in its place so it could...





 *Why Use Scientific Sketching or Nature Journaling w/ Students?* 

To encourage close observation and increase learning

To build transferrable thinking skills

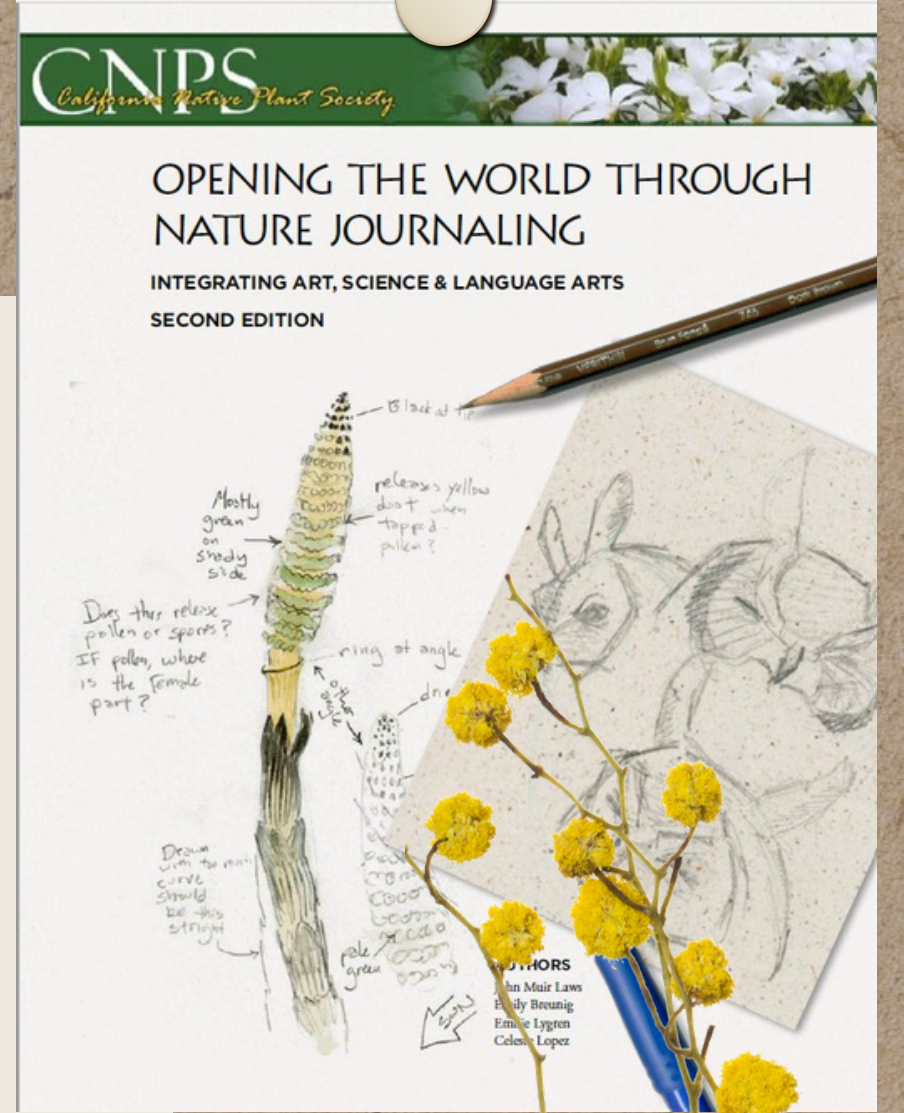
To build scientific skills and thinking

To connect with nature

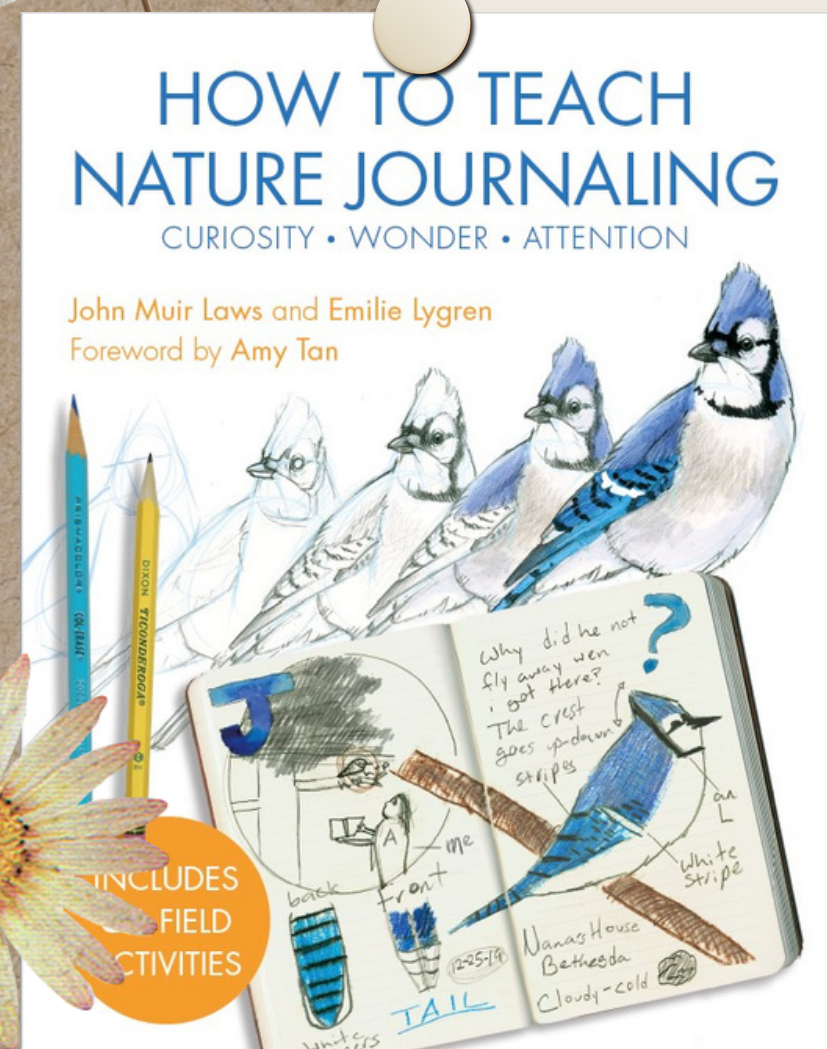
To practice mindfulness

To experience awe and wonder





# Nature Journaling



## Pictures

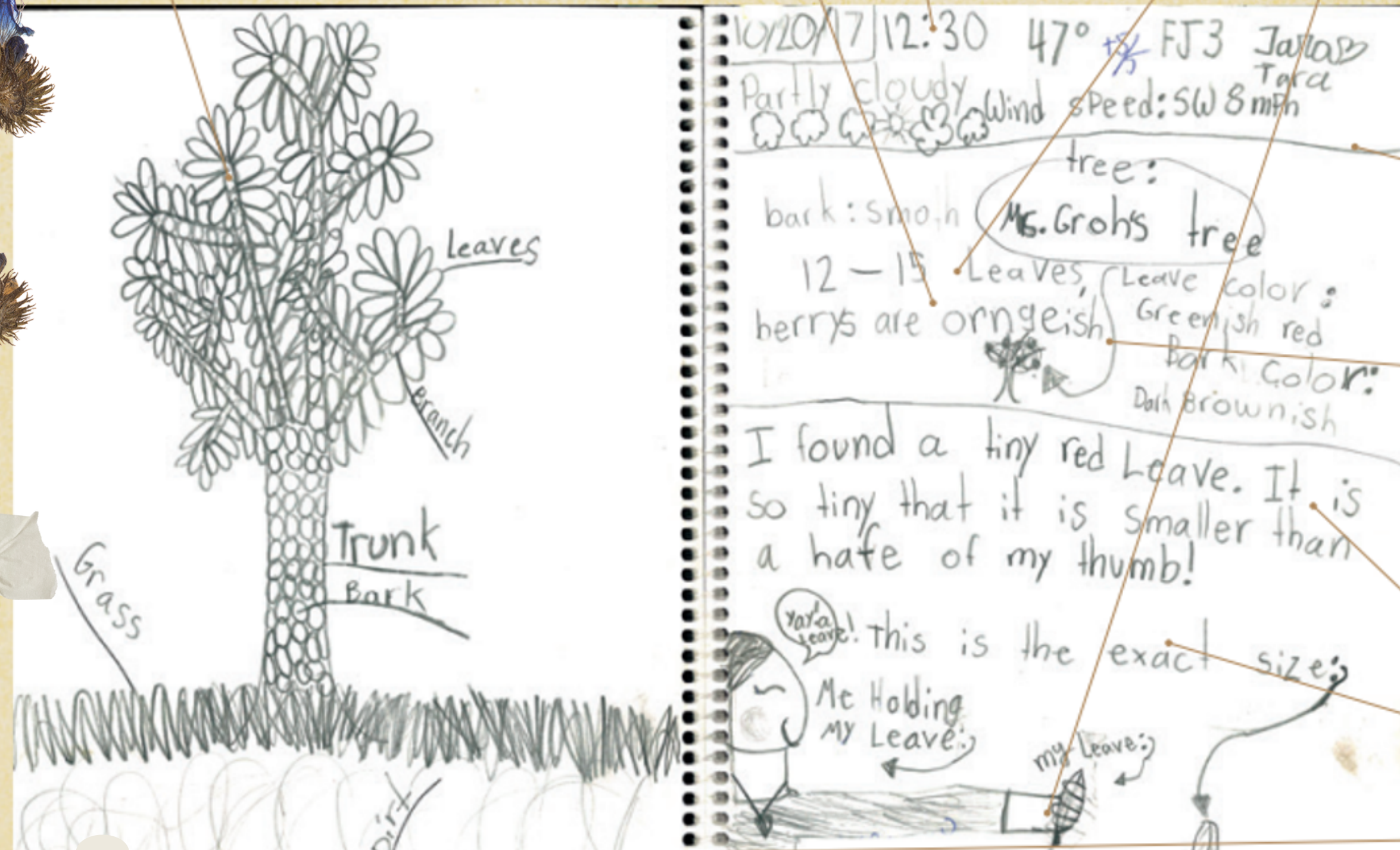
- Icons to show weather
- Drawings at different scales

## Observations, Ideas, and Thinking

- Comprehensive metadata
- Notes about colors

## Numbers

- Objects are counted
- Scale is shown with relative size



## Structure and Layout

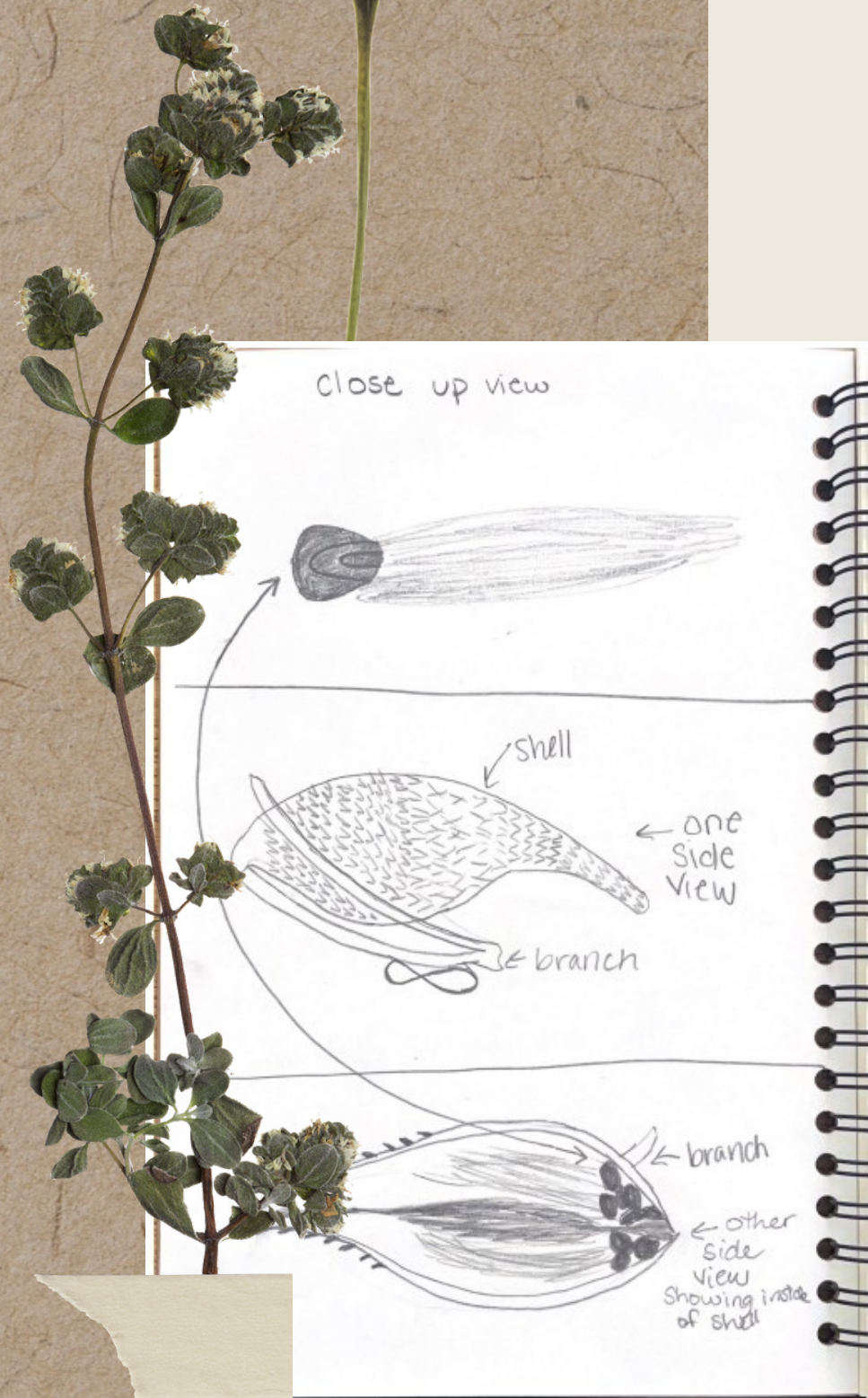
- Lines separate the page into sections
- Arrows connect words and text

## Words

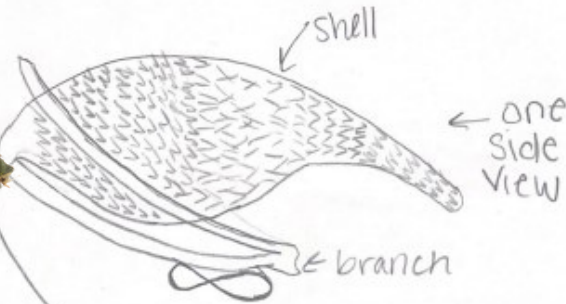
Observations are recorded in

- Full paragraphs
- Short sentences or fragments
- Labels

*Elements of a Nature Journal*

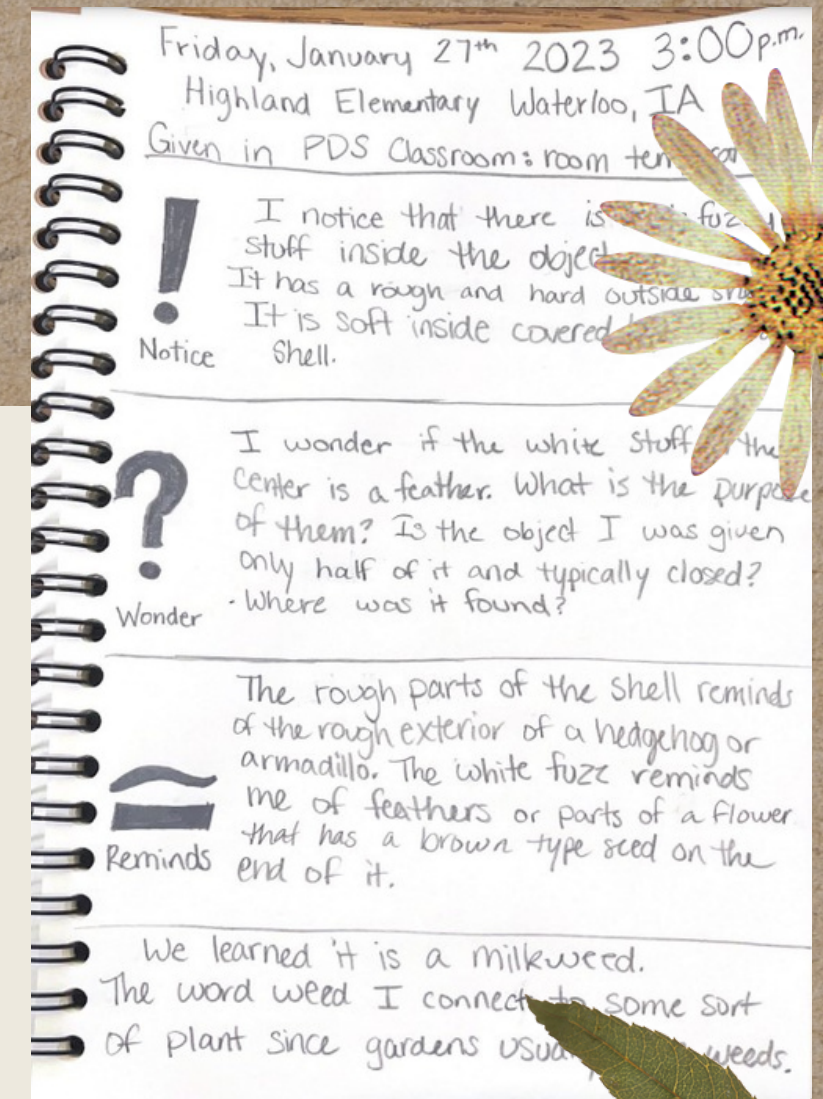
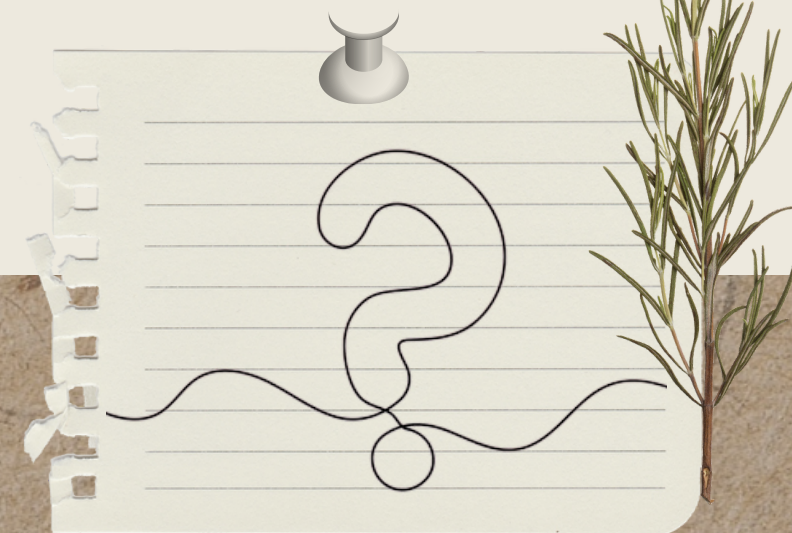


close up view



## Activity #1:

# I Notice, I wonder, It Reminds Me Of Using the SEPs of Asking Questions and Conducting (a Descriptive) Investigation



Friday, January 27<sup>th</sup> 2023 3:00p.m.  
Highland Elementary Waterloo, IA  
Given in PDS Classroom: room ten

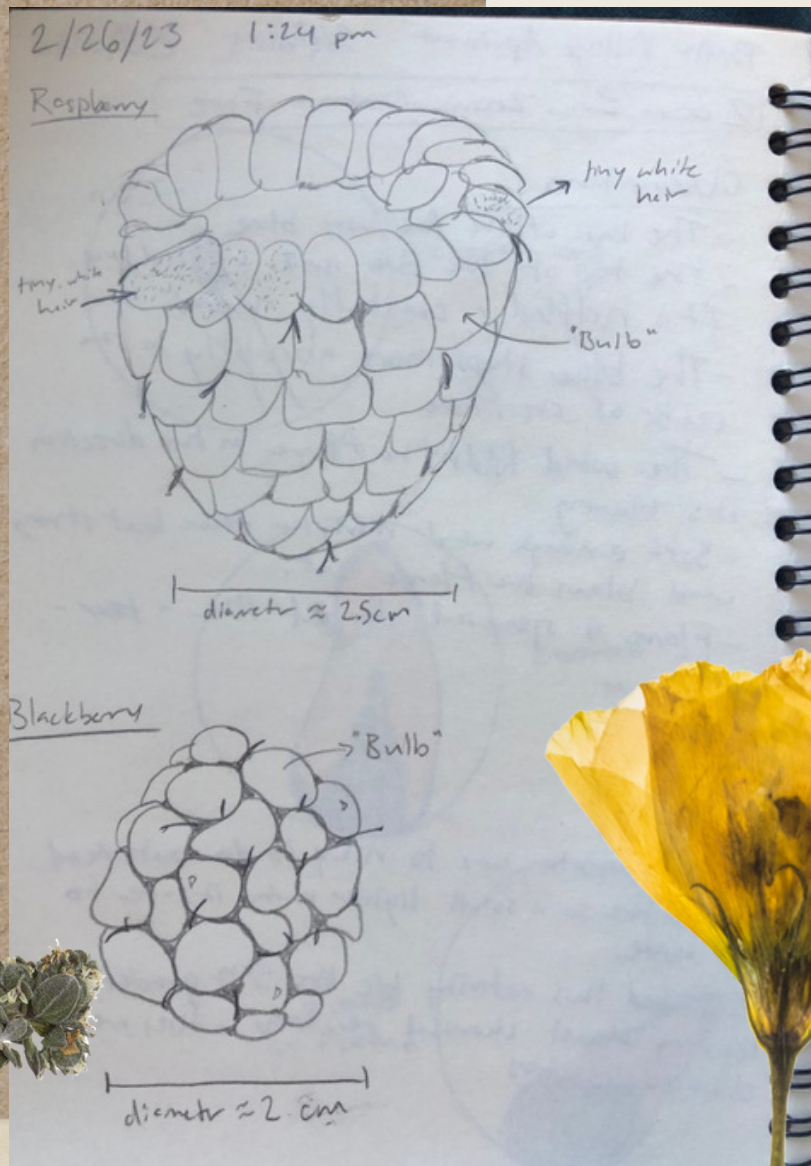
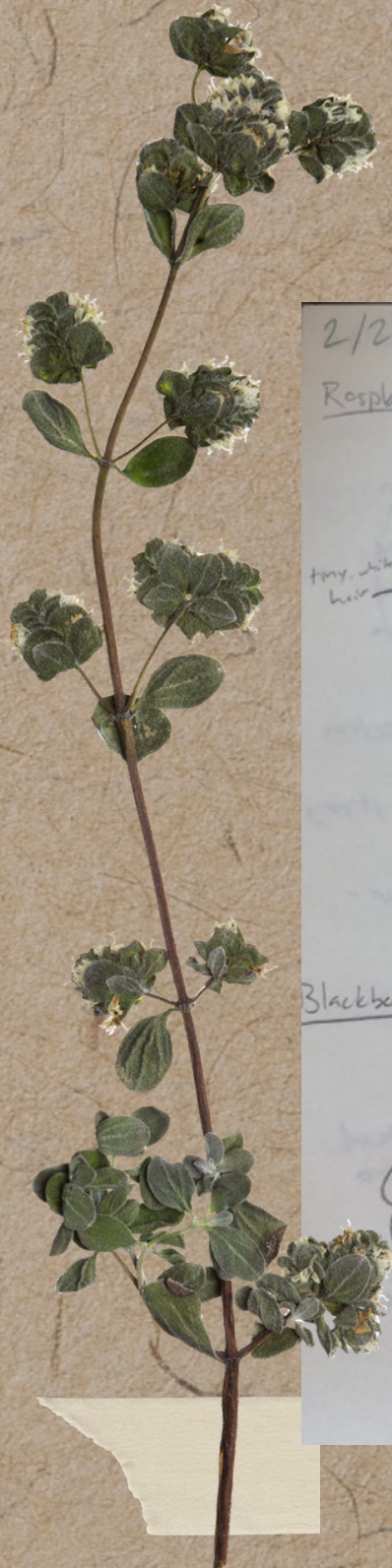
**!** I notice that there is some fuzzy stuff inside the object. It has a rough and hard outside shell. It is soft inside covered by the shell.  
Notice

**?** I wonder if the white stuff in the center is a feather. What is the purpose of them? Is the object I was given only half of it and typically closed? Where was it found?  
Wonder

**Reminds** The rough parts of the shell reminds of the rough exterior of a hedgehog or armadillo. The white fuzz reminds me of feathers or parts of a flower that has a brown type seed on the end of it.

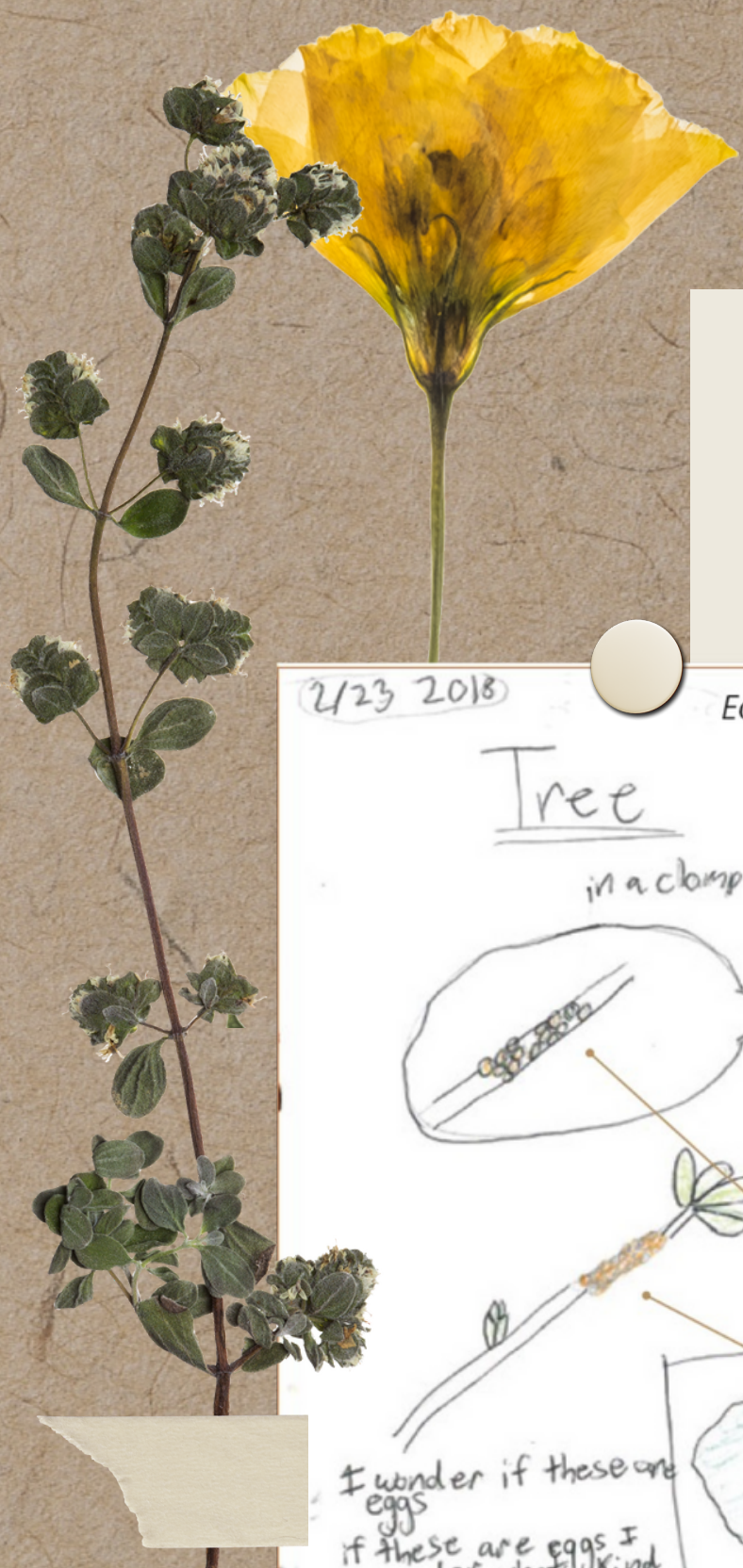
We learned it is a milkweed. The word weed I connect to some sort of plant since gardens usually have weeds.





# Activity #2: Comparison Using the Crosscutting Concept of Patterns





# Activity #3: Zoom In, Zoom Out Using the Crosscutting Concept Lens of Structure and Function

LEAF SKETCHING 7/22/15

MONNICA BURGESS

Accurate  
Big  
Colorful  
Detailed  
Explained

Wonder, sketched, zoom in

DRAW WHAT YOU SEE!

CACOPHONY  
↳ I notice...  
I wonder...  
This reminds me of...

Multicolor leaves: green to yellow fades to yellow/brown light brown as it gets closer to the stem

3 segmented sections

I wonder why it's dried, now brown/dead closer to the stem base...

dry, brittle leaves

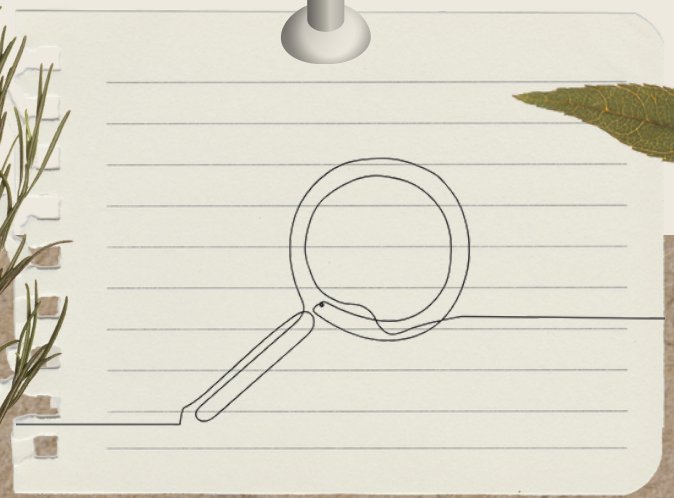
15

2/23 2018 Eden, age 11

Tree

in a clump orange ferny smelly

I wonder if these are eggs  
if these are eggs I wonder what kind of egg they are  
I wonder why they are on this tree



Mallard  
Coot  
CA Goose  
Canvasback  
West Gull


||  
|||||  
|||||  
||  
|||



# Mathematical and Computational Thinking in Nature Journals

4	7
5	3 6
6	4 5 2 7 5 8
7	8 4 9 2 1
8	5 8 7
9	
10	2



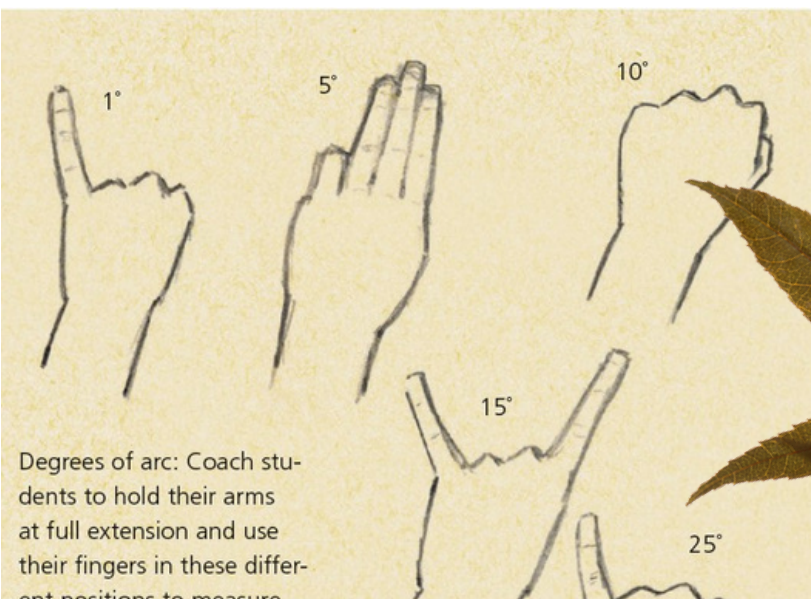
FILM NEGATIVE

FILM NEGATIVE

If you and your students find some insects on a leaf, these are examples of the kinds of quantification questions you can ask:

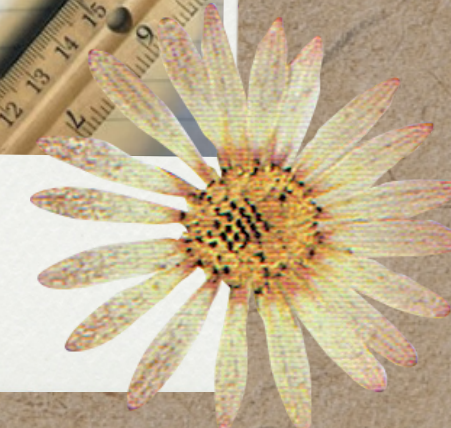
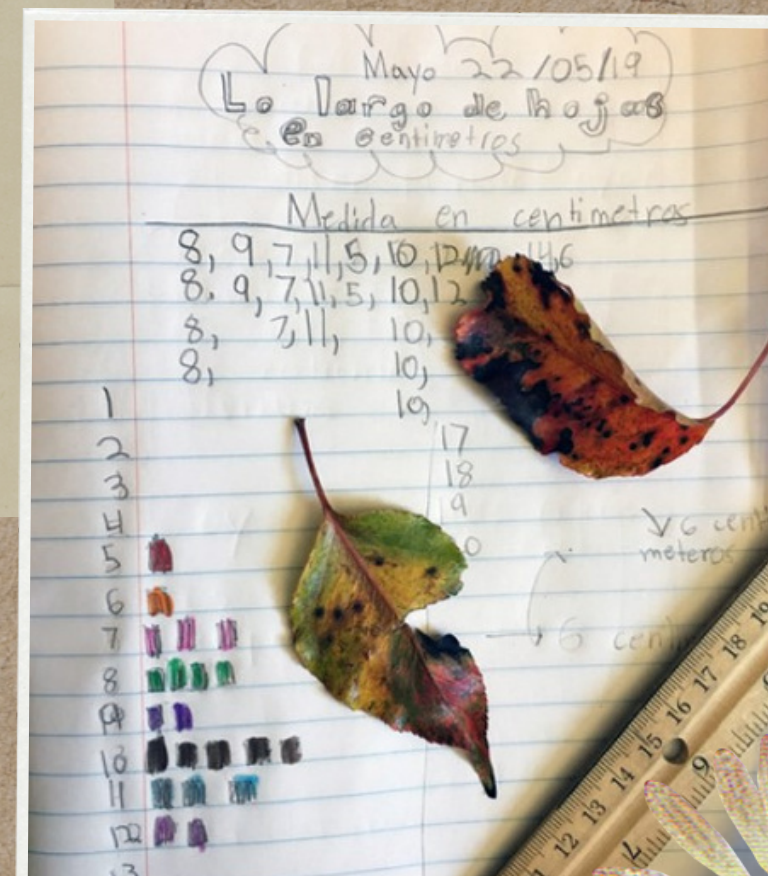
- How many bugs?
- How many instars (age/size classes)?
- How many bugs in each stage of development or life-cycle phase?
- What proportion of the plants in the area are infested with bugs?
- How many do you find insect-damaged leaves?
- Can you quantify levels of leaf damage?
- Is there a correlation between number of bugs and leaf damage?
- Can you group the bugs by color?
- How many bugs are in each color class?
- Does color correlate with size?
- Are there more bugs above or below the leaves, at the top or base of the plant, or in the shade or sun?

Then ask why...



Degrees of arc: Coach students to hold their arms at full extension and use their fingers in these different positions to measure...

FILM NEGATIVE



# Self & Peer Assessment



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: \_\_\_\_\_







# *Giving Feedback*

## **DON'T SAY:**

"That looks great!"

"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** *(for example):*

"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."



*Thank you!*



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