**Unit Title: Phenology of California poppy Grade level: 3-5**

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| **Lesson # 5 Title: Observation: the foundation of science** | **Number of Minutes: 30-60** |
| Mathematical purpose (if applicable): | Scientific Purpose: Learn to observe the phenological stages of California poppy and record the data on a datasheet and through scientific sketches. Improving sketching skills improves observation skills. |
| Materials needed: 3 different kinds of leaves, big leaves for each child to draw, leaf drawing booklet, pencils and erasers. | Academic vocabulary: drawing for art vs. drawing for science, data, datasheet, leaf tip, leaf base, leaf margin or edge, veins, citizen scientists |
| Common Core Standards (copy and paste): Michael will do | Next Generation Science Standards (copy and paste): Michael will do |
| When students are finished they will understand:* How to visually break a leaf down into its different parts: tip, base, edges, veins
* Drawing for art vs. drawing for science. In drawing for science we record what is there, the shape, texture, how many petals etc.
* Drawing for science will make them better citizen scientists and will improve their powers of observation.
 | What are teacher questions or prompts?* Do all leaves look alike? Have examples of at least 3 big leaves that can be held up in front of the class to have the differences discussed.
* What parts of the leaves are different? Look at the tip, the base, the edges, the veins.
* What is one difference between drawing for creativity vs. drawing for science?
* Why is observation the foundation of science? (scientists have to be good at noticing things so they can record good data and ask good questions)
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| What are questions you anticipate students will have? Ashley | What are misconceptions students might have? Ashley |
| General outline of the lesson:Ashley, can you take the drawing exercise my mom and I created and separate the 4 drawings and the blank page into 5 separate pages? It would become a little book a teacher could photocopy and cut out. This was our most successful exercise of the whole year. The HSU students suggested having it on the separate pages to keep the kids eyes on the subject vs. on the other drawings from the page. I’m sure you’ll do an even better drawing. We decided on calla lily because of the distinct tip, base, margins and beautiful venation, plus I had it growing in the yard. It was a great subject and readily available locally and kind of invasive so I don’t feel bad picking the crap out of it. Local sources could be mentioned to teachers. Isn’t there a bunch of it growing along the roadsides near the Bayside Grange?The vague outline of how I ran the exercise:* Have 3 big leaves from 3 different plants (I used sunflower, pumpkin and calla lily)
* Do you think all leaves look alike? Have the same shape? Point out the differences.
* Take the calla lily and tell the kids they get to look at it for 30 seconds.
* Then put the calla lily leaf behind your back and ask them to describe the shape of the leaf tip.
* Repeat this 30 second period for observation with putting the leaf behind your back for the base, the edges and the margins
* Hand each child a leaf and their 5 page leaf drawing booklet
* Page 1, everything is filled in but the tip; have them draw the tip while looking at their leaf
* Page, 2, the base is missing, have them draw the base
* Page 3, the margins are missing, have them draw the margins
* Page 4, the veins are missing, have them draw the veins.
* Page 5, leave them time to make their own drawing of the whole leaf.
* For second graders, the results were amazing!

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Supplemental files/resources will follow