



## Learning Observation Through Phenology by Sabrina Carlson

On August 29, 2017, 65 students from Kinsey Inquiry and Discovery School set out on a 1.5-mile hike from their school along the Flagstaff Urban Trail toward Sinclair Wash and the Arizona Trail Flagstaff Resupply Route.

Before leaving the classroom we learned what phenology is, and why it is important. Phenology is the study of the seasonal changes that occur in nature throughout the year like the breaking of new leaf buds in the spring, the arrival of pollinators, or the timing of fall colors that paint deciduous forests around the country. The USA National Phenology Network provides a database for collecting citizen science data on the timing of these events to help track trends in how this timing is changing.

This data is critical to scientists seeking to understand how changes to climate might be affecting the ecology of different areas and looking for ways to mitigate the effects of these seasonal shifts on both the natural systems and local economies. Data collection at this scale simply must be done by citizen scientists. The scale of this type of data collection is incredibly huge.



Enter a school project to collect data from three specific plants, in walking distance to the classroom intended to track the phenological data throughout the school year and report on their findings. To focus our study, we selected a Ponderosa Pine, a Gambel Oak, and a Coyote Willow. We then examined what phenophases we would be looking for and how to tell the difference between them. Making these observations accurately isn't difficult, but does require a high level of concentration and keen observation. Given a set of specific tasks to tackle these students quickly focused on every minute detail of the plants we selected. They exclaimed and remarked about things they had never noticed about these common Flagstaff plants before. What are those fuzzy things hanging from the willow? Why are some of the pine needles lighter green? The male cones on the pine trees caused a particular stir of excitement as most of the students had no idea that

ponderosas had male and female cones. It was inspiring to watch them realize how much more there was to learn about trees they see so often they barely notice them anymore. Even more exciting was watching them take these new found observation skills and apply them to everything around them. Suddenly everyone was finding lizards, insects, galls, and egg sacks in the grasses and bushes all around. Conversations about all these newly discovered treasures erupted all around.

To collect and collate data students practiced math skills like grouping, estimation and percentages to determine the level that each phenophase would be at. Studies consistently show that providing real world, engaging work for students to complete teaches and reinforces standardized skill sets much more effectively than worksheets and book work. I have no doubt that Kinsey 5th graders will ace the percentage and estimation sections on their tests this year.



Environmental Education is most meaningful and effective when we don't just talk abstract concepts of what is happening "out there." What connects is to see the wildlife in our own backyards and observe firsthand how our human behavior impacts the very grassy fields and stream beds that we know and love. This is meaningful education.

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