Petrified Forest National Park

Student Phenology for Outdoor Citizens - 4th Grade Program

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Teacher's Introduction

Dear Educator,

We are very happy that you chose this citizen science program for your students. The National Park Service strives to create curriculum based education programs that engage students while getting them active in their outdoor classrooms.

The Student Phenology for Outdoor Citizens program, or S.P.O.C, is intended to give students background knowledge on the ecology and environment of Petrified Forest National Park while teaching them the importance of continued research on environmental changes and populations of plants and animals.

This program takes a hands-on approach to learning where students make real time observations, collecting data that contributes to the long term ecological research of the park. As the climate continues to change it is becoming increasingly important for resource managers to learn how these changes are affecting the plants and animals that live in our national parks. This is important not only for the future of the organisms being studied but for future park planning and visitor experience. Citizen science programs with students encourage the next generation of park stewards to take an active role in preserving their shared heritage and expose students to the scientific approaches that are being used today.

What is Citizen Science? Citizen science projects are conducted by members of the public who volunteer to be a part of research projects, often in collaboration with professional scientists. Volunteers can participate in data collection, analysis, or reporting. Participants do not need to have a science background to be involved. This type of partnership often gives scientists a way to collect a large amount of data in a short amount of time, increasing the information that can be used to draw conclusions in the research project. Since national parks are owned by everyone, they have become a perfect setting for the citizen science approach. Bio blitzes, making as many natural history observations of plants and animals as possible in one area in a day, are just one way that parks have included the public in scientific research on public lands.

It is our hope that the S.P.O.C program will be a positive outdoor experience for students that inspires them to continue learning about the natural environment while helping to preserve their national parks. Thank you for giving your students that first step into the future.

Overall S.P.O.C. Lesson Objectives:

Students will be able to:

- Describe the environment of Petrified Forest National Park and recall at least two species of plants and two species of animals that are found there.
- Explain the importance of scientific research as it relates to learning about the effects of ongoing climate change.
- Explain the importance of ongoing scientific research in national parks and list at least two ways everyone can contribute to the preservation of public lands.
- Identify one type of scientific career field related to the natural world.
- Independently make natural history observations of plants and animals and record data such as the basic type of plant or animal (tree vs shrub, and amphibian, mammal, or reptile) and its observed characteristics (color, size).
- Identify and describe at least two phenological stages of plants or animals and the possible relationship between these stages and other organisms.
- Independently use digital and written resources to help identify the species names of plants and animals that they observe.
- Independently use digital tablet applications to record observations and create nature journals in the field.
- Safely and independently use tools such as binoculars, magnifying glasses, and rulers to make observations of plants and animals in the field.

Overall Standards Addressed

AZCCR Standards (based off of National CC standards):

(4.RI.1) Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.

(4.RI.4) Determine the meaning of general academic and domain-specific words or phrases in a text relevant to a *grade 4 topic or subject area.*

(4.RI.10) By the end of year, read and comprehend informational texts, including history/social studies, science, and technical texts, in the grades 4–5 text complexity band proficiently, with scaffolding as needed at the high end of the range.

(4.RF.3) Know and apply grade-level phonics and word analysis skills in decoding words. Use combined knowledge of all letter-sound correspondences, syllabication patterns, and morphology (e.g., roots and affixes) to read accurately unfamiliar multisyllabic words in context and out of context.

(4.RF.4) Read with sufficient accuracy and fluency to support comprehension.

a. Read on-level text with purpose and understanding.
c. Use context to confirm or self-correct word recognition and understanding, rereading as necessary.

(4.W.4) Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)

a) Produce clear and coherent functional writing (e.g., friendly and formal letters, recipes, experiments, notes/messages, labels, graphs/tables, procedures, invitations, envelopes) in which the development and organization are appropriate to task and purpose. **(AZ.4.W.4)**

(4.W.10) Write routinely over extended time frames (time for research, reflection, and revision) and shorter time frames (a single sitting or a day or two) for a range of discipline-specific tasks, purposes, and audiences.

(4.SL.1) Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on *grade 4 topics and texts,* building on others' ideas and expressing their own clearly.

a. Come to discussions prepared having read or studied required material; explicitly draw on that preparation and other information known about the topic to explore ideas under discussion.
b. Follow agreed-upon rules for discussions and carry out assigned roles.
c. Pose and respond to specific questions to clarify or follow up on information, and make comments that contribute to the discussion and link to the remarks of others.
d. Review the key ideas expressed and explain their own ideas and understanding in light of the discussion. **(4.SL.1)**

(4.SL.4) Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

(4.SL.5) Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

(AZ.4.L.1) Demonstrate command of the conventions of Standard English grammar and usage when writing or speaking.

a. Use relative pronouns (*who, whose, whom, which, that*) and relative adverbs (*where, when, why*).
b. Form and use the progressive (e.g., *I was walking; I am walking; I will be walking*) verb tenses.
c. Use modal auxiliaries (e.g., *can, may, must*) to convey various conditions.
d. Order adjectives within sentences according to conventional patterns (e.g., *a small red bag* rather than *a red small bag*).
e. Form and use prepositional phrases.
f. Produce complete sentences, recognizing and correcting inappropriate fragments and run-ons.
g. Correctly use frequently confused words (e.g., *to, too, two; there, their*). **(4.L.1)**

h. Write and organize one or more paragraphs about a topic.

(4.L.3) Use knowledge of language and its conventions when writing, speaking, reading, or listening.

a. Choose words and phrases to convey ideas precisely.
b. Choose punctuation for effect.*

Differentiate between contexts that call for formal English (e.g., presenting ideas) and situations where informal discourse is appropriate (e.g., small-group discussion).

AZ State Science Standards:

SC04-S1C1.	Observations, Questions, and Hypotheses: Observe, ask questions, and make predictions.
SC04-S1C1-01.	Differentiate inferences from observations.
SC04-S1C1-02.	Formulate a relevant question through observations that can be tested by an investigation (See M04-S2C1-01).
SC04-S1C1-04.	Locate information (e.g., book, article, website) related to an investigation. (See W04-S3C6-01 and R04-S3C1-05).
SC04-S1C2-01.	Demonstrate safe behavior and appropriate procedures (e.g., use and care of technology, materials, organisms) in all science inquiry.
SC04-S1C2-04.	Measure using appropriate tools (e.g., ruler, scale, balance) and units of measure (i.e., metric, U.S. customary) (See M04-S4C4-03 and M04-S4C4-07).
SC04-S1C3-04.	Determine whether the data supports the prediction for an investigation.
SC04-S1C4-01.	Communicate verbally or in writing the results of an inquiry. (See W04-S3C3-01).
SC04-S1C4-03.	Communicate with other groups or individuals to compare the results of a common investigation.
SC04-S2C1-02.	Describe science-related career opportunities.
SC04-S2C2.	Nature of Scientific Knowledge: Understand how science is a process for generating knowledge.
SC04-S3C1-01.	Describe how natural events and human activities have positive and negative impacts on environments (e.g., fire, floods, pollution, dams).
SC04-S4C1-	Classify animals by identifiable group characteristics: vertebrates - mammals,

02.	birds, fish, reptiles, amphibians; invertebrates - insects, arachnids.
SC04-S4C2.	Life Cycles: Understand the life cycles of plants and animals.
SC04-S6C3-01.	Identify the sources of water within an environment (e.g., ground water, surface water, atmospheric water, glaciers).
SC04-S6C3-03.	Differentiate between weather and climate as they relate to the southwestern United States.

NM State Science Standards

K-4 Benchmark I: Use scientific methods to observe, collect, record, analyze, predict, interpret, and determine reasonableness of
data.

1. Use instruments to perform investigations (e.g., timers, balances) and communicate findings.
2. Differentiate observation from interpretation

K-4 Benchmark II: Use scientific thinking and knowledge and communicate findings.

1. Communicate ideas and present findings about scientific investigations that are open to
   critique from others.
2. Describe how scientific investigations may differ from one another (e.g., observations
   of nature, measurements of things changing over time).

K-4 Benchmark I: Know that living things have diverse forms, structures, functions, and habitats.

1. Explain that different living organisms have distinctive structures and body systems that serve specific functions (e.g., walking, flying, swimming).
2. Know that humans and other living things have senses to help them detect stimuli, and that sensations (e.g., hunger) and stimuli (e.g., changes in the environment) influence the behavior of organisms.
3. Describe how roots are associated with the intake of water and soil nutrients and green leaves are associated with making food from sunlight (photosynthesis).
4. Describe the components of and relationships among organisms in a food chain (e.g., plants are the primary source of energy for living systems).

K-4 Benchmark II: Know that living things have similarities and differences and that living things change over time.

1. Know that in any particular environment some kinds of plants and animals survive well, some survive less well, and others cannot survive at all.
2. Know that a change in physical structure or behavior can improve an organism's
3. chance of survival (e.g., a chameleon changes color, a turtle pulls its head into its shell, a plant grows toward the light).

4. Describe how some living organisms have developed characteristics from generation to generation to improve chances of survival (e.g., spines on cacti, long beaks on hummingbirds, good eyesight on hawks).

K-4 Benchmark I: Describe how science influences decisions made by individuals and societies.

a. Know that both men and women of all races and social backgrounds choose science as a career.

Pre-visit Lesson #1 – Petrified Forest Ecology

Petrified Forest Focus: – Ecology, Biology, Climate Change

School Subjects: Natural Sciences, Language Arts

Grades: 4th

Lesson Overview: This lesson is designed to provide students with background knowledge of the ecology and environment that exists in Petrified Forest National Park. The activities include a reading assignment that focuses on vocabulary and a hands-on activity focusing on identification of lizards.

Time required: 90 minutes - One 45 minute class session for each activity

Materials Needed:

- Activity #1
  - "Petrified Forest Ecology and Environment" background text either as a handout or projected on a screen.
  - Vocabulary worksheet handout
- Activity #2
  - Lizard description hand-outs for each student group

Procedure:

- Activity #1 (45 minutes)
  - Students read the background text "Petrified Forest Ecology and Environment" and complete the vocabulary exercise while they read.
  - The reading can be done individually with hand-outs or as a class with the text displayed in large format on a screen.
  - Once the reading and vocabulary worksheet are completed the teacher can go through the words with the class.
  - If the reading is done as a class, the vocabulary words can be written on a board and defined as the reading is done.

- Activity #2 (up to 45 minutes depending on class size)
  - Students break up into groups of 3-4 and study one of the lizard description pages. (10 minutes)
    - There might be more description pages than groups of students. In this case only use the descriptions of the most common lizards or the activity can be done more than once.

        - Students should take notes about their lizard to help them remember its characteristics.
    - Each group then presents the characteristics of their lizard species to the class without giving away its name.
        - After each group's presentation, the rest of the students use the 'Lizard Decision Tree' to try identifying which lizard was just described.

Related Vocabulary (not all words will be used in the activity):

Abiotic – the non-living factors of an ecosystem, including sunlight, temperature, wind patterns, and precipitation

Adaptation - an alteration or adjustment by a species that enables it to improve its condition in relation to its environment

Amphibian - an animal (such as a frog or toad) that can live both on land and in water. Amphibians are born under water and start to breathe with gills but then develop lungs as they get older.

Annual plant – a plant that completes its life cycle in one year; from germination to making seeds

Biology - the study of living organisms (divided into many specialized fields that cover the morphology, physiology, anatomy, behavior, origin, and distribution or organisms)

Biotic – the living factors of an ecosystem, including the relationships between organisms

Carnivore – an animal that typically eats only meat

Climate - the average conditions of the weather in a particular place over a period of more than 10 years as shown by temperature, wind velocity, and precipitation.

Crepuscular – used to describe an animal that is most active during twilight hours

Ecology - the branch of biology that studies the relationships of organisms to each other and to their physical surroundings

Desert - arid land usually with sparse vegetation; especially such land having a very warm climate and receiving less than 25 centimeters (10 inches) of rainfall annually

Diurnal – used to describe an animal that is active during the day and sleeps at night

Dormant - having normal physical functions suspended or slowed down for a period of time; in or as if in a deep sleep.

Ecosystem - a biological community of interacting organisms and their physical environment.

Environment - the complex of physical, chemical, and biotic factors (as climate, soil, and living things) that act upon an organism or an ecological community and ultimately determine its form and survival.

Evaporation - the process of a substance in a liquid state changing to a gaseous state due to an increase in temperature and/or pressure.

Germination - the process by which a plant grows from a seed; also the growth of a spore-ling from a spore for fungi

Grassland - an area, such as a prairie, in which the natural vegetation consists largely of perennial grasses, characteristic of semiarid climates

Habitat - the place where a plant or animal usually lives or grows

Herbivore – an animal that eats only plants, typically has flat teeth for grinding

Hibernate – the act of being dormant (inactive) during the winter (animal or plant); a partial hibernation for animals is called torpor.

Mammal – an animal with a spine that is able to regulate its own temperature and is in a group of animals that has hair or fur, provides milk for the nourishment of young (females), and (typically) gives birth to live young.

Nocturnal – used to describe an animal that is active at night and sleeps during the day

Observation - the act of watching, listening, and paying close attention to something in order to gather information

Omnivore – an animal that eats both meat and plants; often depending on what food is available.

Organism - an individual animal, plant, or single-celled life form

Perennial plant – a plant whose lifespan is more than two years; often going through multiple life cycles

Photosynthesis – The process by which green plants, and some other organisms, use sunlight to make food from carbon dioxide and water. This process creates oxygen as a byproduct.

Predator – an animal that hunts and kills other animals for food.

Prey - an animal that is hunted and killed by another animals for food

Species - a group of living organisms with similar characteristics that are able to breed with each other.

Reptile - an animal (such as a snake, lizard, turtle, or alligator) that cannot regulate its own temperature, lays eggs, and that has a body covered with scales or hard parts

Riparian – relating to or located on the banks of a river or in a wetland. 'riparian habitat'

Petrified Forest Ecology and Environment

(Vocabulary words are underlined; sometimes followed by how to say the word in *italics.*)

Petrified Forest National Park is part of a grassland environment. Different habitats also exist as smaller areas within the grassland. The animals and plants that live in each kind of habitat change with different natural conditions. These natural conditions can include different types of soil, if drinking water is available, and how high the land is above sea level.

Land that is next to rivers, streams, and washes (streams that only have water after rain or snow) is called a riparian habitat (*rye-pair-eyan*). These areas have more plants growing in them than land not next to water. Most of the land in Petrified Forest is either shortgrass prairie where more grass grows or steppe grassland where more shrubs grow.

There are also human made habitats in the park. The picnic area at the Painted Desert Visitor Center has lots of bushes, trees, and a water fountain. These things were added by humans when the buildings were made.

Animal life at Petrified Forest includes amphibians (*am-fib-eyans*), birds, insects, spiders, mammals, and reptiles. Birds, lizards, and rabbits are the animals people see most often. Different animals can be seen during different times of day, seasons, and in different weather.

Many animals are more active within a specific range of temperatures. Crepuscular (*kreh-puss-q-lar*) animals are active at dawn and dusk (also called twilight). These are the times of day when the coolest temperatures occur. The half-darkness of twilight also makes prey animals less visible which helps keep them safe from predators. The visibility during twilight is still good enough for prey animals to find their own food though.

An animal's activity level can also change with the seasons. Snakes and lizards are diurnal (*die-urn-al*) in late spring and early fall, becoming more active during the day, but they become crepuscular during the heat of summer.

Many animals in the park are nocturnal (active at night). This is an adaptation that helps them avoid high summer temperatures as well as certain predators.

Meet the Animals of Petrified Forest

Amphibians: Can you imagine living under the ground for nine months of the year, not eating, drinking, or using the bathroom? Amphibians are amazing animals that do just that!

It is hard to imagine how animals that need to be wet all the time can survive in the dry climate of Petrified Forest, but they do. How?

Amphibians have survived and adapted in many different environments around the world by absorbing water through their skin instead of drinking it.

One kind of amphibian living in Petrified Forest is the Spadefoot toad. They are named spadefoots because of a black spade shaped spot that they have under their back feet. They, and other toads, survive by absorbing water from the soil where they hibernate for most of the year. Having skin that absorbs water also means that they lose water through their skin. This water evaporation causes toads to get cold and is why you often see them sitting on warm pavement at night.

The time to spot these slippery little guys is in the summer when afternoon thunderstorms provide the rain they need to safely come out of their burrows.

Let's meet some other amphibians living in the park.

I am a Tiger Salamander - *Ambystoma tigrinum*

I am a Great Plains Toad - *Anaxyrus (Bufo) cognatus*

I am a Red-spotted Toad - *Anaxyrus Bufo* punctatus

I am a Woodhouse's Toad - *Anaxyrus*

I am a Couch's Spadefoot Toad - *Scaphiopus*

Birds:

Like many national park areas, Petrified Forest National Park gives birds a place of protection where they can find food and shelter that they might not find in other places. Petrified Forest National Park is like a natural highway dotted with bird hotels and restaurants that birds can use when they travel between habitats.

Petrified Forest has many different kinds of habitats for birds. Raptors, songbirds, and ground birds can be found in the grassland areas. Riparian areas provide food and shelter for warblers, vireos, avocets, killdeer, and others. The exotic and native plants around the Visitor Center and Rainbow Forest Museum provide homes for western tanagers, hermit warblers, and house finches.

Birds also help us learn about the health and safety of our environment. By watching birds, making observations of different species and their patterns of movement, we can better understand the changes in our environment.

Let's meet some common birds of the park:

I am a Horned lark - *Eremophila*

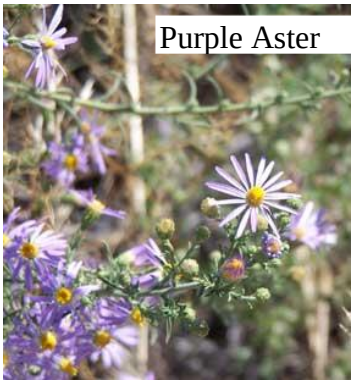
I am a Western Tanager- *Piranga*

I am a Say's Phoebe - *Sayornis*

I am a Common Raven - *Corvus*

Plants: Not all plants at Petrified Forest National Park are fossils like the petrified wood. Living plants are very important pieces to the grassland ecosystem of the park. Plants capture particulate dust in the air, filter pollution out of the air, change carbon dioxide to oxygen so animals can breathe, provide habitat for animals, and supply raw materials for humans to eat and make things.

Plants that grow in areas without a lot of rain or snow have adaptations to help them survive. There are two main families of plant adaptations. Some plants are called *drought escapers* and some are called *drought resistors*.


Purple Aster

Plants such as the Purple Aster are drought escapers and can escape low water conditions by becoming dormant when water isn't available. Drought escaping plants are usually annuals, growing only when enough water is available during their year-long life cycle. Seeds from these kinds of plants can stay dormant in soil for years if there isn't enough water for germination. Most grasses and wildflowers are drought escapers.


Prickly Pear Cactus

Drought resistors are usually perennials and can grow for many years. They have adaptations that help them live through times without water. For example, some will drop their leaves if water is unavailable so the plant has less material to keep healthy. Many drought resisting plants have small hairy leaves which reduce the amount of water lost to evaporation. Cacti, yuccas, and mosses are examples of drought resistors. Yuccas have long taproots which can reach water deep in the ground. Mosses can live in complete dehydration but instantly wake up and become green when rain falls.

Watch this in action here:

https://www.facebook.com/PetrifiedForestNPS/videos/vb.290844680951415/804071072962104/?type=2&theater

Grasses are one of the most important plants within the grassland ecosystem in the park. Individual grasses sprout almost anywhere they can find soil, even in potholes filled with dirt. Because of this they help prevent erosion of the land by holding the soil together. Most grasses fit into two basic groups, *bunch grass* and *sod-forming grass*. Bunch grass grows in scattered clumps. Examples of bunch grass include rice grass and needle-and-thread grass. Both of these grasses are perennial and become dormant during droughts. Rice grass plants

have been known to live over 100 years, through wet and dry times. Sod-forming grass is what most people have in their yards. Galleta and blue grama are sod-forming perennials in Petrified Forest National Park that usually grow together.

Lichens: In many areas of Petrified Forest National Park, large areas of exposed rock surfaces are covered by lichens. Lichen is actually a simple community of at least two organisms: fungi and green algae. When both organisms depend on the other for survival, they are called symbiotic *(sim- bye-ott-ick)*. Green algae use the photosynthesis process to make food for the fungus, and the fungus protects the algae from the elements while taking nutrients from soil and rock. Lichens are stronger than either fungus or algae alone.

Lichens are well adapted to dry climates. They can continue making food at any temperature above freezing. Lichens can also absorb more than their own weight of water. Because lichens take everything they need from the air, they depend on clean air. Scientists use lichens to study the quality of the air by looking at how healthy the lichens are in an area.

Here's a fun story to help you remember what lichens are made of.

Alice Algae and Freddie Fungus became friends
Alice cooked the food with photosynthesis
Freddie built a house from dirt
they took a'lichen' to each other
and their friendship stays strong on the rocks.

Wildflowers:
Wildflowers have adapted to the dry climate at Petrified Forest National Park in many different ways. Thick, waxy coverings on leaves and stems reduce evaporation. Their small leaves have less surface to catch the sun which reduces water loss. Deep taproots reach far into the soil to find water and wide reaching shallow roots catch surface water quickly. Wildflowers can also avoid drought and heat by hiding in the soil as seeds or bulbs for many years. Germination of seeds only occurs after enough rain has fallen.

April and May, following winter snow and rain, are usually the best months to see wildflowers throughout the Southwest. Starting in late August, if the summer has brought enough rain, different species of wildflowers bloom and the landscape is colorful once again.

Trees and Shrubs:

There are very few trees in the grasslands of northern Arizona. Piñon and juniper trees can be seen on high land formations like mesa tops. These trees have also adapted to survive in high winds and low water conditions. Once these plants are established they are very tough and strong. Their roots will split rocks in search of nutrients, and many can live for over 100 years. Large cottonwood and willow trees are common in riparian areas.

The juniper tree is the classic arid-land tree. When water is low, a juniper tree can stop the flow of fluids to some outer branches so it has a better chance for survival. Scale-covered leaves and bluish, waxy-coated seeds help the tree keep water inside itself.

Piñon pines often grow in the same areas as junipers. Like juniper, piñon pines grow very slowly. Some trees with 4-6 inch diameter trunks that are only ten feet tall may actually be 80 to 100 years old. Their root systems are sometimes as wide as the tree is tall. Piñons produce compact cones that contain tasty, protein-rich seeds called pine nuts. Native people still rely on this tree as an important source of food. One pound of piñon nuts has more than 3,000 calories. Many animals, such as ground squirrels, also like the seeds as a tasty and nutritious food.

Shrubs are also important members of the grassland community. Both shrubs and trees provide shelter and food for many species of animals.

The most common shrubs in the park are saltbush and sagebrush. They both have grayish green leaves and can grow relatively large.

One of the largest shrubs in the park is the cliffrose which has sweet smelling pale yellow flowers in the spring and summer.

Rabbitbrush also has pretty yellow flowers.

Vocabulary Exercise

Directions: Fill in the definitions of the following vocabulary words as you read the background information about plants and animals at Petrified Forest. Use the context clues from the reading to help you. This exercise is to help you learn what these words mean. It's ok if your definition is a little different than the one your teacher has. Do the best you can!

Adaptation -

Amphibian -

Annual plant -

Carnivore -

Climate -

Crepuscular -

Diurnal -

Dormant -

Evaporation -

Habitat –

Observation -

Photosynthesis -

Predator -

Prey -

Reptile -

Riparian -

‘Who Am I?’ Reptile ID Game

Materials Needed:

- Lizard description hand-outs for each student group
- Lizard Decision Tree; can be made into a hand out or displayed digitally on a screen for the whole class at once.

Time Required: up to 45 minutes depending on class size

Procedure:

- Students break up into groups of 3-4 and study one of the following lizard description pages. (10 minutes)
  - There might be more description pages than groups of students. In this case only use the descriptions of the most common lizards or the activity can be done more than once.
  - Students should take notes about their lizard to help them remember its characteristics.
- Each group then presents the characteristics of their lizard species to the class without giving away its name.
  - After each group’s presentation, the rest of the students use the ‘Lizard Decision Tree’ to try identifying which lizard was just described.

Greater Short-horned Lizard

Scientific Name - *Phrynosoma hernandesi*

WHAT DO I LOOK LIKE?
I have *a wide flat body* with pointed scales around the edge of my belly. I have a large heart-shaped head with small horns in the back. My body color matches the soil and most of my friend's and I have large dark spots on our backs. My female friends are bigger than my male friends.

WHAT DO I EAT? Mostly insects (ants, and beetles), but larger lizards, with larger mouths, can eat grasshoppers and crickets.

HOW LONG DO WE LIVE? Females live about 5 years in the wild; humans don't really know how long males live yet.

WHAT ABOUT OUR BABIES? We are one of the few lizards in the park that give birth to live babies. Each baby weighs about 1 gram (the same weight as a paperclip) and is born in early August.

WHERE AM I? Look for us on the roads or in open grasslands on the East side of hills. We can be in clumps of grass early in the morning with our backs facing the sun. We are most active between April and September.

Common Lesser Earless Lizard

Scientific Name - *Holbrookia maculata*

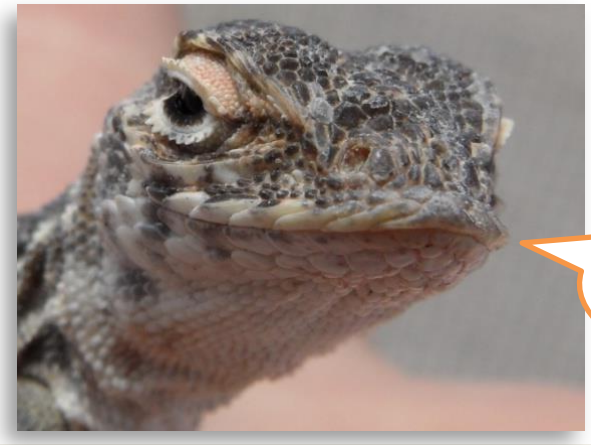
WHAT DO I LOOK LIKE?
I am a small lizard and my body color usually matches the color of the soil. I have small lighter colored spots on my back and *two dark bars or blotches on each side* in the middle of my body. My tail is about as long as my body and I have *no external ear openings*.

WHAT DO I EAT? Insects and spiders but sometimes other small lizards.

HOW LONG DO I LIVE? Up to 4 years in the wild.

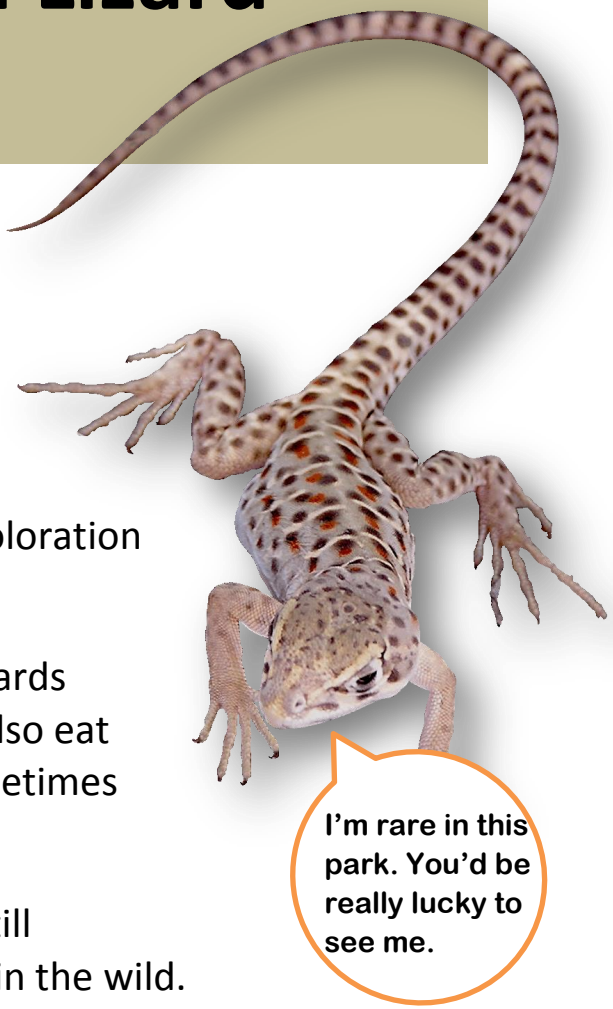
WHAT ABOUT OUR BABIES? Each year a female can lay 1-2 groups of 1-10 eggs each that will hatch in the spring and summer.

WHERE AM I? I am active during the daytime (diurnal), often seen on flat grasslands, and seen running between clumps of grass and shrubs in mid-spring to early fall. I am most active in the morning.



Long-nosed Leopard Lizard

Scientific Name - *Gambelia wislizenii*



WHAT DO I LOOK LIKE? I am a large lizard, with a large head and *long snout.* My tail is over twice the length of my body. I am a creamy yellow color with *dark spots* on my body and tail. Juveniles (like me in the photo) have red spots and breeding females have a red coloration on their sides and stomach.

WHAT DO I EAT? I mostly eat other lizards (even lizards as big as myself), but I will also eat insects, snakes, small mammals, and sometimes plants.

HOW LONG DO I LIVE? Humans are still trying to figure out how long we can live in the wild.

WHAT ABOUT OUR BABIES? We breed in June and the females lay a single group of 5-7 eggs which hatch after 2 months. The adults get kind of lazy around the time babies are born. (Hey, we're tired!)

WHERE AM I? I was discovered in the park in September of 2012. Only I and one other like me have been identified so far. At the moment we are considered the most rare lizard species in the park.

Eastern Collared Lizard

Scientific Name - *Crotaphytus collaris*

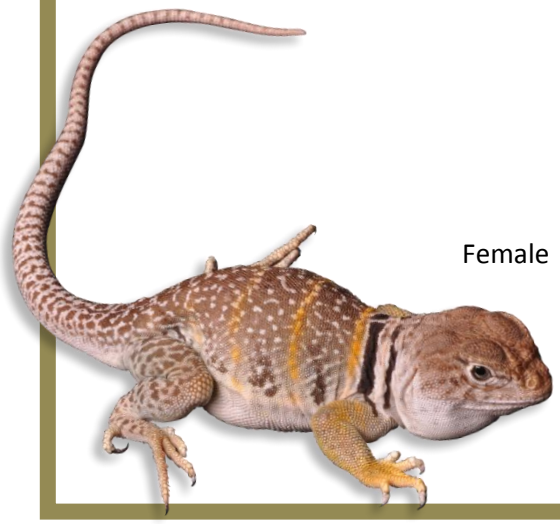
Male

WHAT DO I LOOK LIKE?
I am a *large and very colorful lizard* with a *very large head, long thick tail, and powerful hind limbs.* I and my female friends have two black collars around our neck. Males are *bright blue/green* and females are less bright with orange bands and blotches. Males are larger than females.

WHAT DO I EAT? Insects, small lizards, birds, and small mammals.

HOW LONG DO I LIVE? In captivity up to 10-12 years but probably less in the wild.

WHAT ABOUT OUR BABIES? Females lay 1-14 eggs once or twice in spring and summer which hatch 1½ to 3 months later.



Female

WHERE AM I? I am most active during the daytime (diurnal). I am often seen from trails and roads perched on small to medium-sized boulders (or petrified logs) on warm sunny days from late spring to early fall. We like to get up on our hind limbs when we run.

Common Sagebrush Lizard

(*Sceloporus graciosus*)

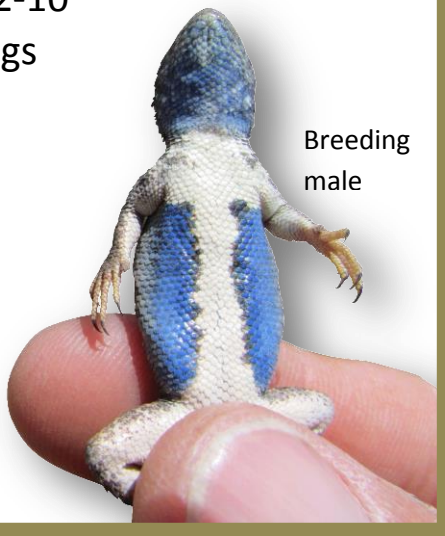
WHAT DO I LOOK LIKE? I am a small grayish-brown lizard. I have a *wide gray stripe down the center of my back* with alternating brown and lighter gray stripes on my sides. I have a single dark bar on each shoulder and a *rusty orange spot in each armpit*. My tail is about as long as my body.

WHAT DO I EAT? Ants, flies, beetles, and spiders.

HOW LONG DO I LIVE? Up to 2 years in the wild, maybe 3-4 years in captivity.

WHAT ABOUT OUR BABIES? We Sagebrush lizards mate in June and July. In June – August females lay 1–2 groups of 2-10 eggs each in loose soil at the bases of shrubs. The eggs hatch 1½ - 2½ months later.

WHERE AM I? I am often seen basking on the ground near hiding spots like boulders, burrows, and debris piles from spring through late autumn. We are all over the park!



Breeding male

Plateau Fence Lizard

Scientific Name - *Sceloporus tristichus*

WHAT DO I LOOK LIKE?

I am a small to medium sized, light brown lizard with dark chevron markings on my back. I have *two blue throat patches* which are more obvious because I'm male. Some older lizards can be very dark brown so it might be hard to see the pattern on their backs. The scales on my back are pointed and overlapping and my tail is about half the length of my body.

WHAT DO I EAT? I am a sit-and-wait predator; I eat insects, spiders, snails, and small lizards that get to close to me.

HOW LONG DO I LIVE? No more than 4 years in the wild.

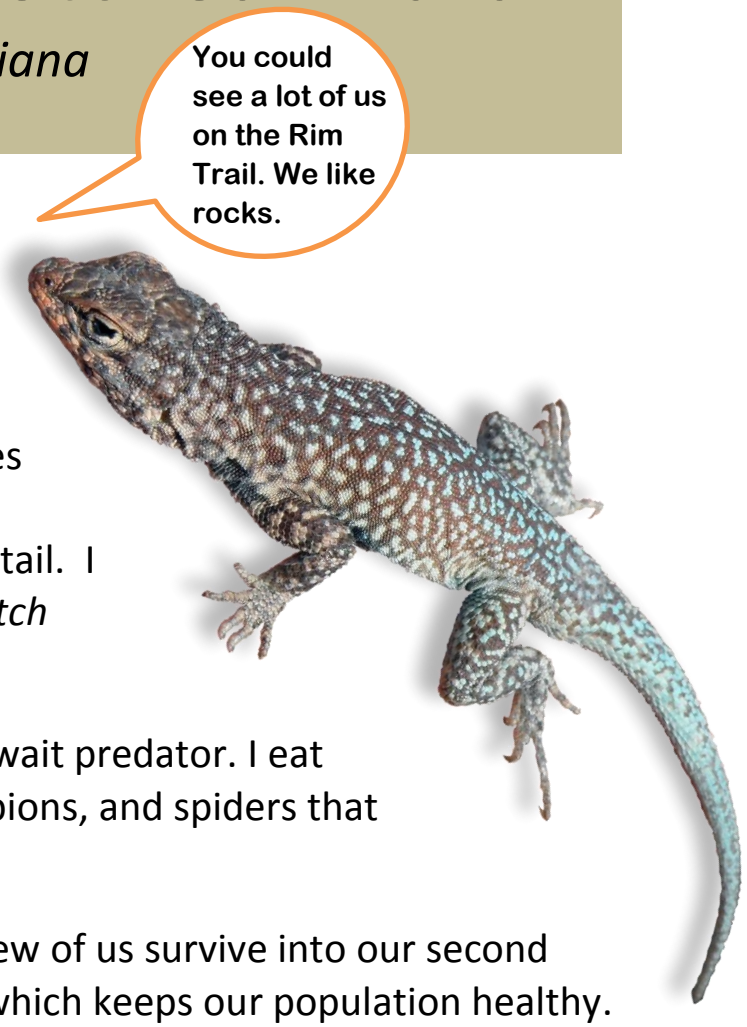
WHAT ABOUT OUR BABIES? We breed in spring and summer. Females lay 1-3 groups of 7-10 eggs each year in May, June, or July. The eggs hatch after about 2 months.

WHERE AM I? I am most active during the daytime (diurnal) and can be seen looking for food on the ground. I am often found basking on boulders, trees, fence posts, and structures at any time of the day from March to late October.

Breeding male

Common Side-blotched Lizard

Scientific Name - *Uta stansburiana*



WHAT DO I LOOK LIKE?
I am a small orange/brown to grey/brown lizard. I can either have a soft chevron pattern or speckling on my back. Adult males like me have bright blue speckles especially on the lower body and tail. I am identified by *a single dark blotch behind each forelimb*.

WHAT DO I EAT? I am sit-and-wait predator. I eat grasshoppers, beetles, ants, scorpions, and spiders that come near me.

HOW LONG DO I LIVE? Very few of us survive into our second year, but we have lots of babies which keeps our population healthy.

WHAT ABOUT OUR BABIES? We mate in the late winter. Females have 1-7 groups of 1-8 eggs from March to August which hatch after 2 to 2½ months.

WHERE AM I? I am most active in the morning and late afternoon (crepuscular). I can be seen under bushes near the edges of washes and around boulder piles and rocky hillsides. I am common in rocky areas throughout the park.

New Mexico Whiptail (NON-NATIVE)

Scientific Name - *Aspidoscelis neomexicana*

WHAT DO I LOOK LIKE?

I am a medium sized, *slender lizard with a pointy snout.* I have a dark brown body with seven stripes that are off-white to yellow in color. The stripes closer to my belly have light spots in between them. *The stripe in the middle of my back is wavy* and my *tail is usually twice the length of my body*.

WHAT DO I EAT? I am often out looking for food. I am an insectivore and eat moths, butterflies, beetles, grasshoppers, and ants.

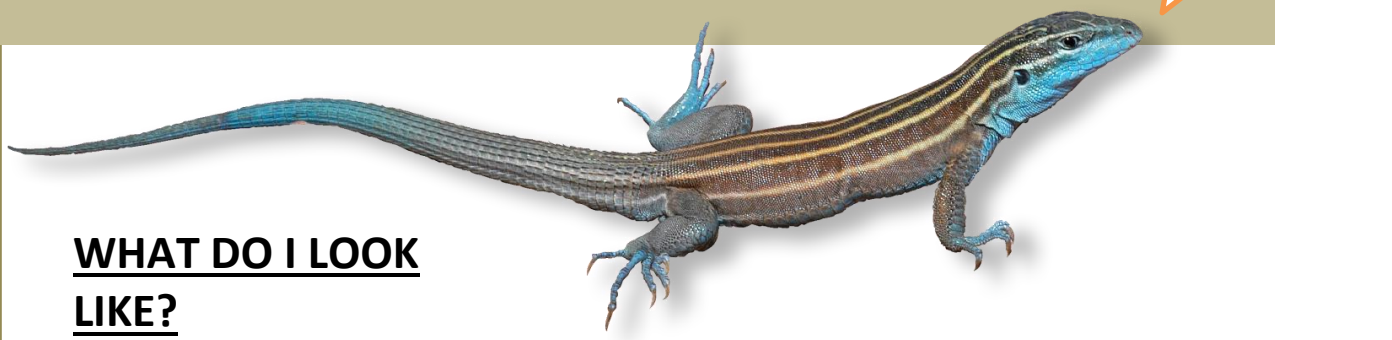
HOW LONG DO I LIVE?
Probably between 3 and 5 years in the wild.

WHAT ABOUT OUR BABIES? We are all girls! Each baby is a clone of its mother. A female will lay 2 groups of 2 eggs each in a season which hatch in July and early August. These eggs develop without fertilization.

WHERE AM I? I am often out looking for food in open sandy areas next to grasses and brush. I am most active in the early morning and late afternoon from April through October.

Pai Striped Whiptail

Scientific Name - *Aspidoscelis pai*



WHAT DO I LOOK LIKE?

I am a small *slender lizard with a pointy snout.* I have a dark brown to reddish brown body with six yellow stripes and a *bright blue tail, throat, and limbs*. My tail is at least twice the length of my body.

WHAT DO I EAT? I love insects and eat moths, butterflies, beetles, grasshoppers, ants, centipedes, and often smaller lizards.

HOW LONG DO I LIVE? Probably between 3 and 5 years.

WHAT ABOUT OUR BABIES? We mate in late spring and females lay 1-2 groups of 1-3 eggs in the summer. Hatchlings appear in August and early September.

WHERE AM I? I am often looking for food in open sandy areas around grasses, brush, and leaf litter. I am active in the early morning from April through October, especially in May and early June. A super-fast runner, usually disappears quickly into a hole of vegetation.

Plateau Striped Whiptail

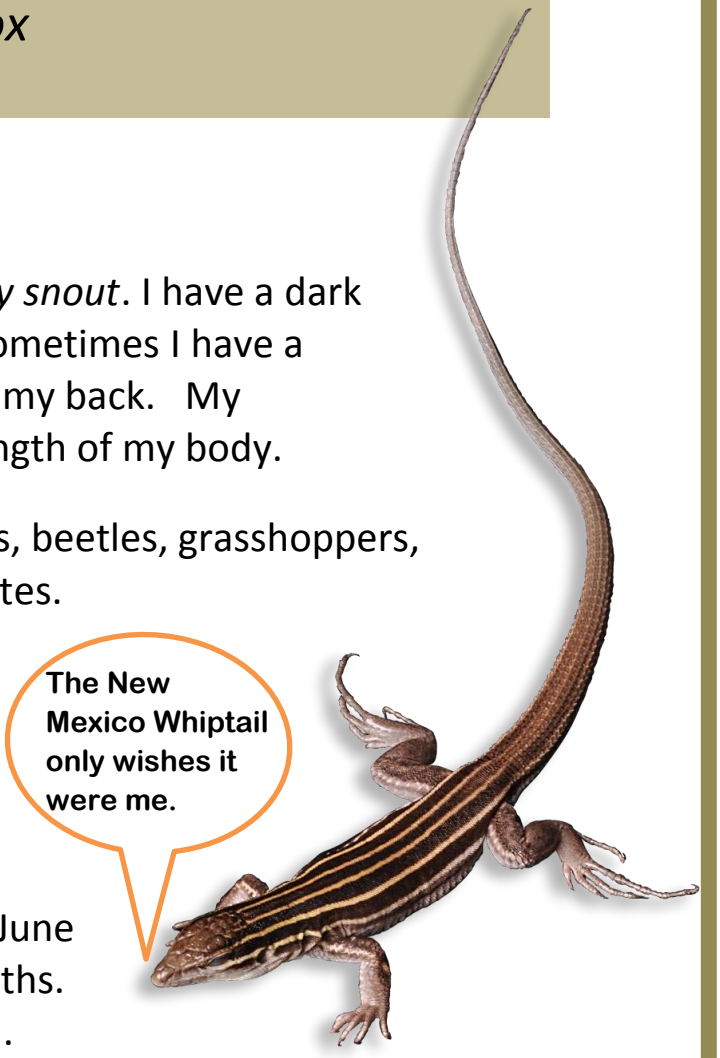
Scientific Name - *Aspidoscelis velox*

WHAT DO I LOOK LIKE?

I am a *long slender lizard with a pointy snout*. I have a dark brown body with six yellow stripes. Sometimes I have a partial seventh stripe in the center of my back. My blue/green tail is at least twice the length of my body.

WHAT DO I EAT? moths, butterflies, beetles, grasshoppers, ants, centipedes, and especially termites.

HOW LONG DO I LIVE? Probably between 3 and 5 years in the wild.



WHAT ABOUT OUR BABIES? We are all girls! Each baby is a clone of its mother. A female will lay 3-5 eggs in June and hatchlings emerge after two months. The eggs develop without fertilization.

WHERE AM I? I am often looking for food in open sandy areas around grasses, brush, and leaf litter. I am active most of the day, except when it is very hot, from April through October.

Ornate Tree Lizard

Scientific Name - *Urosaurus ornatus*

WHAT DO I LOOK LIKE?

I am a small, slim lizard with a gray, brown or tan body. I have a slender tail that can be up to twice my body length. I am marked by contrasting dark brown or black irregular blotches. Adult males like me have two metallic blue patches on the sides of my belly.

WHAT DO I EAT? I enjoy a varied diet of insects and small arthropods.

WHAT ABOUT OUR BABIES? Females lay eggs and are capable of producing groups of 2-16 eggs from spring to summer. Eggs hatch, and hatchlings can be observed from May to September.

WHERE AM I? I live in arid to semi-arid habitats including rocky slopes, canyons and cliffs. I prefer trees, fallen branches or rocks. I am most active during the morning or afternoon.

Petrified Forest Lizard Decision Tree

START HERE
Follow the path that best* describes the lizard

Horns behind head?

YES → Greater Short-horned Lizard

NO → Scales on back keeled or "spiky"?

YES → Rust-colored spot behind front legs?

YES → Common Sagebrush Lizard

NO → Plateau Lizard

NO → Large head, colorful body, black neck rings?

YES → Eastern Collared Lizard

NO → Pointy snout, long tail, & stripes on back?

YES → 7 stripes with a wavy center stripe and spots low on body?

YES → New Mexico Whiptail (Non-native)

NO → 6 stripes & cobalt blue tail, belly, chin, & feet ?

NO → Plateau Striped Whiptail

YES → Pai Striped Whiptail

NO → Ear holes and one spot behind front leg?

YES → Common Lesser Earless Lizard

NO → Common Side-blotched Lizard

Pre-visit Lesson #2 – Timing is Everything

Petrified Forest Focus: – Phenology, climate change

School Subjects: natural sciences

Grades: 4th

Lesson Overview: This lesson is designed to provide students with background knowledge of the science of Phenology and how making observations is key to studying changes in climate and the environment.

Time required: 90 minutes - One 45 minute class session for each activity

Materials Needed:

- Computer or smartboard to play YouTube videos
- Large poster board and markers, or smartboard

Procedure:

Activity #1 –

- Read the background text about phenology and watch the following two videos
- Students complete the activity questions (fill in the blank and T/F) based on the information from the videos.

Video 1 – What is Phenology? :
https://www.youtube.com/watch?v=EfAcoDO5u4Y

Video 2 – Phenology and Climate Change:
https://www.youtube.com/watch?v=Kpp9NE1i2zM

Activity#2 – Birthday Phenology Game

Related Vocabulary:
Phenology - the observation and study of natural events and cycles in a place, timed in relation to seasonal and climate changes. (ex. The time of year that flowers bloom).
Phenophase - An observable stage or phase in the annual life cycle of a plant or animal that can be defined by a start and end point.
Dormant - having normal physical functions suspended or slowed down for a period of time; in or as if in a deep sleep.

What is Phenology?

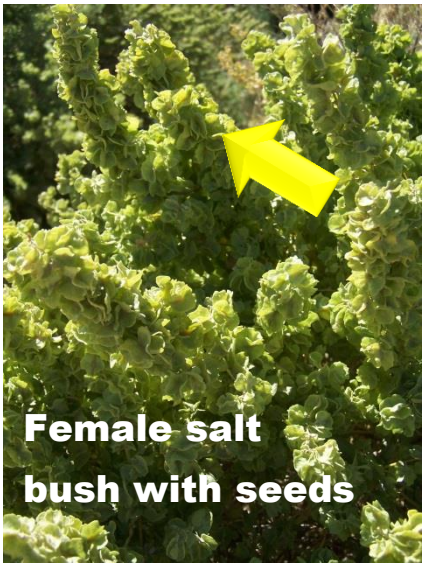
"Phenology is the observation and study of natural events and cycles in a place, timed in relation to seasonal and climate changes." Phenological knowledge comes from careful observations of the yearly life cycles of plants and animals. These cycles are also called a phenophase. Scientists that study the climate today know that phenology is one important tool for learning about recent climate change. Phenological awareness, or knowing the timing of phenophases, has been around since the earliest humans.

Our ancestors survived by carefully observing the world around them. Knowing when natural events occur helps humans know when to gather food, hunt certain animals, and harvest certain plants. Learning about phenology is also a fun way to follow the seasons as the plants and animals change throughout the year. For example it's exciting to know that once wildflowers start blooming you will likely see more butterflies soon. Or knowing that when animals start gathering food in the fall it's a sign that winter is on its way. Is it just a coincidence that there are more insects in the warmer months of the year when more plants are in bloom? Or, does the timing of these events need to match up for the ecosystem to be healthy? These are the questions that phenology tries to answer.

(Source: http://uwarboretum.org/eps/research_act_classroom/Wheels/Birthday%20Phenology%20Game.pdf)

The observations made in phenology allow people to gather data on a plant or animal's Phenophase. A phenophase is a stage in the organism's yearly life cycle. For a plant this could be when the plant germinates, grows its first leaves, grows buds, blooms flowers, or becomes dormant for the winter. In an animal a phenophase could be when it mates, hibernates, migrates, collects food, or sheds its winter fur.

Here are some examples of plant phenophases in Petrified Forest:




Skunk Bush with buds


Skunk Bush with fruit


Nightshade with flowers


Nightshade fruit
(very poisonous!)


Grass with flowers (the purple ends are its flowers)


Dormant Grass

Answer these questions as you watch the two videos about phenology and climate change.

Video 1

1. _____ means 'to appear' in the Latin language.

2. An example of a phenological stage of birds is _____.

3. First leaf is a phenological stage for _____.

4. Phenology can also be described as '_____'.

5. The two main environmental cues that plants use to know when to change phases are _____-_____ and _____.

Video 2

1. _____ is what you are supposed to have and _____ is what you get.

2. True or False? (circle one) As global temperatures rise, birds that migrate to feed on insects could miss their food source because birds rely on day-length, not temperature, to know when to arrive.

3. Phenological knowledge comes from collecting data and making _____.

Teacher's Answer Guide:

Video 1

1. Pheno means 'to appear' in the Latin language.

2. One phenological stage of birds is migration.

3. First leaf is a phenological stage for plants.

4. Phenology can also be described as 'understanding Nature's Clock".

5. The two main environmental cues that plants use to know when to go into their next phase are day-length and temperature.

Video 2

1. Climate is what you are supposed to have and weather is what you get.

2. True or False? As temperatures rise, birds that migrate to feed on insects could miss their food source because they rely on day-length not temperature to know when to arrive.

3. Phenological knowledge comes from collecting data and making observations.

The Birthday Phenology Game

Most children have strong feelings about their birthdays even if they don't have a lot of experience with the natural world. Recalling what was happening outdoors at the time of their birthday will be a good memory challenge but maybe they can connect the happy feelings of their birthday with what was outside. (Note: students will need to be prompted to think of something happening outdoors in the natural world. Otherwise they will choose holidays or activities, such as sledding, swimming, etc.

Also remember that local phenologies are different. A new student from another county or state may know a different set of phenology facts for the whole year. This can be a good thing; use it to spark a discussion about why phenological data will vary from place to place. For example, latitude, altitude, and/or nearness to large temperature moderating bodies of water can all affect local phenology.

How To Play: The teacher should be the first player, so that the students understand how to play this game. For example the teacher says: "My birthday happens when the yucca flowers are blooming; in what month is my birthday?" And the guessing begins.

- Each student follows this pattern by using a different natural occurrence that is in time with their birthday. Other students raise their hand to guess the answer.

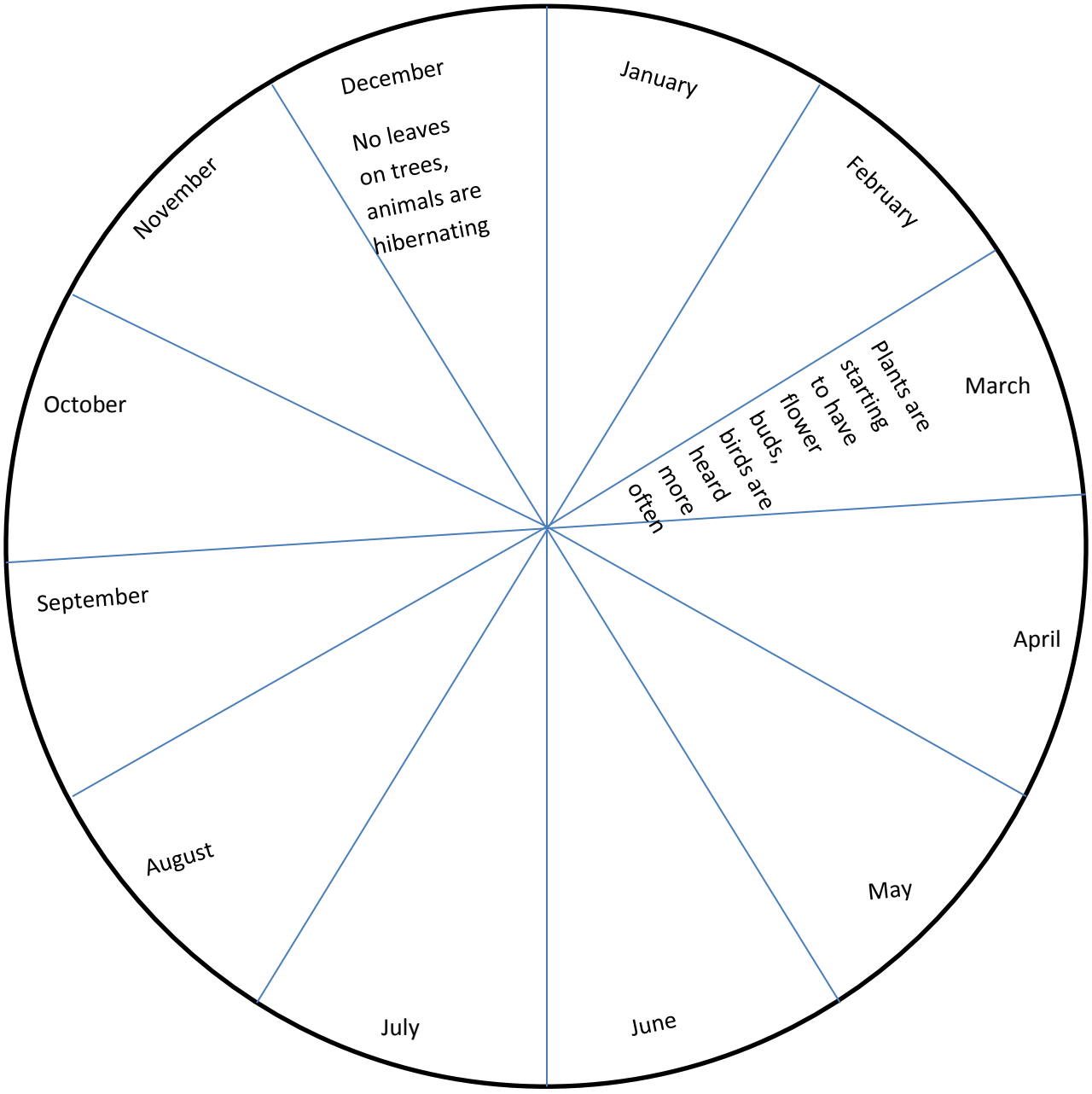
Extension: Make a Phenology Birthday Wheel

Materials: Use a large piece of poster board or draw a 24" or 32" wheel on a chalk or white board.

- Make sure there are 12 wedges in the wheel; one for each month.
- Go around the room and ask the students to describe what is usually occurring with nature during the time of their birthday. These are your 'phenology facts'.

Questions to ponder: Do some of the phenology facts interact in interesting ways? What facts happen at the same time of year? Do some phenology facts depend on each other to happen? What other phenology facts might the class want to learn, inspired by the birthday phenology facts?

Birthday Phenology Wheel Example



Lesson #3 - Making Observations

Petrified Forest Focus: – Natural history observations, Citizen Science

School Subjects: Natural Sciences

Grades: 4th

Lesson Overview: This lesson is designed to introduce students to the idea of making observations and inferences as it relates to scientific research and phenology.

Time required: 60 minutes - One 30 minute class session for each activity

Materials Needed:

- 'Making Observations' background text and questions handout
- Computer or smartboard with internet connection to play YouTube videos
- 'All About My Plant' and 'Plant Phenology Report' hand-outs for each student

Procedure:

Activity #1

- Students read the text on the "Making Observations" sheet
- Students watch the following videos on observations vs inferences as a class
    - #1 https://youtu.be/fBlR7taW9jk
    - #2 https://www.youtube.com/watch?v=D-5HCOUGDdg
- Students practice making observations and inferences by filling out the bottom of the "Making Observations" sheet.

Activity #2

- Using the 'All About My Plant' and 'Plant Phenology Report' hand-outs to go outside and practice making observations of plants around your school.

Related Vocabulary:

Observation - the act of watching, listening, and paying close attention to something in order to gather information
Data - facts and statistics collected for reference or analysis
Research - careful study that is done to find and report new knowledge about something; the activity of getting information about a subject.

Making Observations

We make observations all the time in our daily lives. We use our senses (smell, touch, taste, sight, & sound) to answer questions about everything around us, although we may not always know we are doing it. Making observations is very important to scientific research. The difference is that scientific observations are written down and recorded as data. This data is then used to answer research questions and to make inferences.

In the science of phenology, data collected from observations over a long period of time helps us know if the natural environment is changing. For example people can observe what time of year a certain wildflower blooms. If this observation is made and recorded every year for many years then we would know if the wildflower always bloomed at the same time during the year. If the data shows that the wildflower blooms at different times each year then we can make more observations to find out why.

Observation Practice (Do Now Sheet):

Write 3 observations of the picture at the end of the second video:

1.

2.

3.

Write two inferences based on the observations above:

1.

2.

All About My Plant

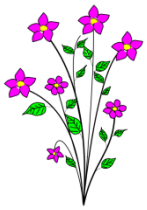
(adapted from Bud Burst Buddies)

I found a plant outside my school!

My Plant is (check one):

A tree ☐ a shrub ☐ a grass ☐ a wildflower ☐



How big is my plant (check one)?

- ☐ It's so tall I have to look up to see the whole thing.
- ☐ About as tall as I am
- ☐ About half as tall as I am
- ☐ Lower than my knee
- ☐ Smaller than my hand

Plants can be found in all kinds of places.
My plant is (check all that apply):

- ☐ Next to a building
- ☐ By itself
- ☐ Next to other plants
- ☐ Next to pavement (street or sidewalk)

Name _____

Plant Phenology Report

These are observations about my plant on this date _____
Month Day Year

This is what my plant looks like today

Draw a picture of your plant.

Today, my plant has…
(check all that apply)

- ☐ No Leaves 
- ☐ Little Buds 
- ☐ Flowers 
- ☐ Leaves 
- ☐ Seeds or Fruit 

Other observations about my plant:

_____
_____
_____
_____
_____
_____
_____
_____

Preparing for Your Visit to Petrified Forest

You and your students will be participating in a ranger guided program along the Rim Trail overlooking the Painted Desert. During the program students will be making observations of plants and animals using several applications on I-Pads. All materials will be provided by the park. (I-pads have parental controls enabled.)

Students will be paired up during the program. Please have students paired up prior to your visit to help make the program go smoothly. Each pair of students will be given a citizen science backpack filled with all the tools they will need along the trail.

Tools inside the backpack are:

- An I-pad in a tough case
- Rulers
- Binoculars
- Magnifying glasses
- Hand Mirrors
- Mammal and Plant ID guides

Please instruct the students to handle these materials with care and respect. Other students will be using these materials in the park for many years to come.

The applications that the students will be using during the program are I-Naturalist, National Geographic Birds, Record the Earth (to record soundscapes), and a journaling app. called Wonderful Days.

The I-naturalist observations made by students during their visit will be uploaded to the PEFO Education account on that site.

Please watch the following tutorials with your students about I-Naturalist: Students will need to know how to add an observation.

http://www.inaturalist.org/pages/video%2Btutorials

1. "iPhone app tutorial – Start at 2min 37 sec mark.

The school or individual students can also create their own accounts to make observations at home or at school. The following video tutorial will show you how to do this.

"Creating an Account & Changing Account Settings"
http://www.inaturalist.org/pages/video%2Btutorials

The project that student observations will be added to is called "Petrified Forest National Park Natural History Observations". You can take a look at the observations that have already been made by visitors and employees as examples for the students.

http://www.inaturalist.org/projects/petrified-forest-national-park-natural-history-observations

Please watch the following tutorial with your students:

Introduction to the National Geographic Birds App-
https://www.youtube.com/watch?v=-qCHc3LROkg

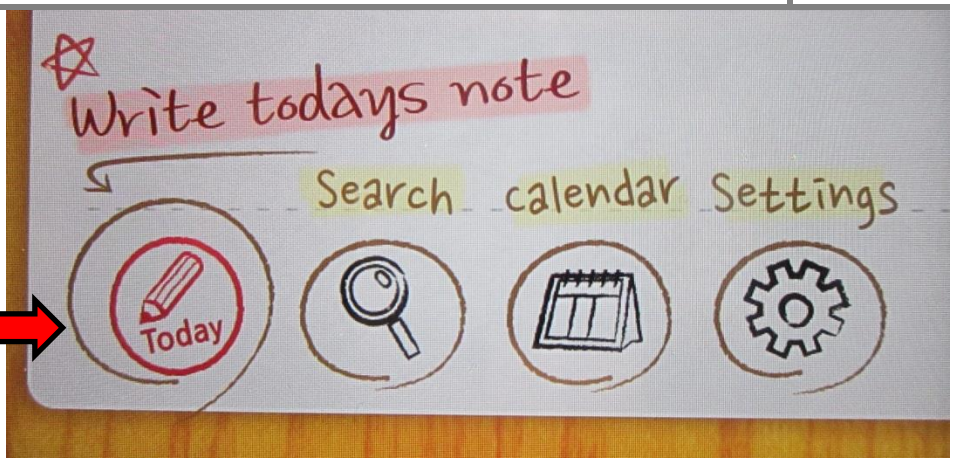
This application will be a resource for students who want to identify a bird on the trail. There will also be a specific activity during the program when we will use this app. as a group.

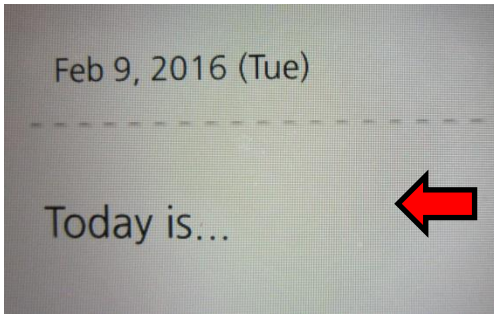
Perdue University's Record the Earth – This app will be used to record soundscapes as a group during an activity in the park. No pre-visit instruction is necessary for this app. You can check out the project website here. https://www.recordtheearth.org/

Wonderful Days – This is a diary app. that will be used with a nature journaling activity during the program.

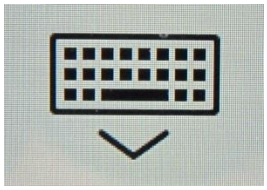
Please use the following screen shots to introduce this app to your students. The students will need to know how to type a journal entry for 'Today', choose weather icons, and take photos or videos with the application.

1. Click the "Today" icon on the bottom left to write a journal entry.



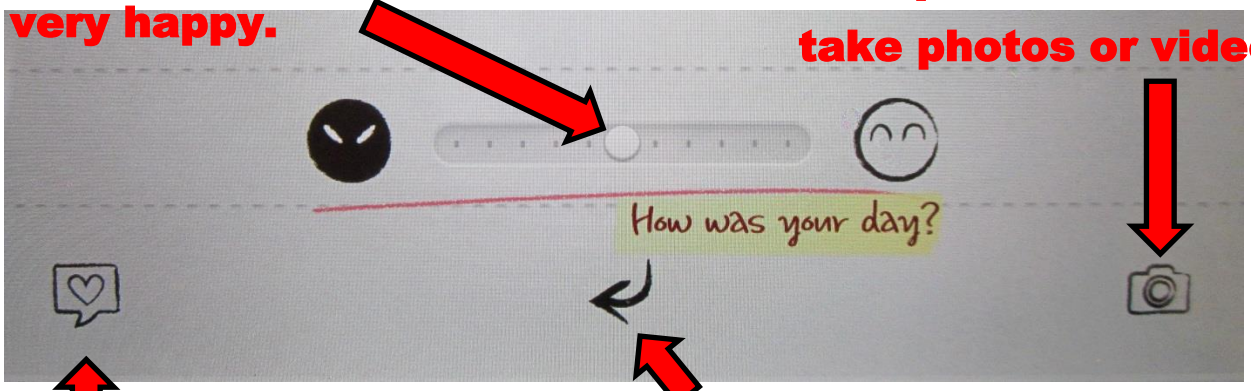


2. Tap the screen under the date to bring up your keyboard. Type your journal entry then tap the 'keyboard down' icon to make the keyboard disappear.



3. Move the indicator left or right to describe your mood. Left is very unhappy, right is very happy.

4. Tap the camera icon to take photos or videos.



Return to home screen button

5. Tap the heart icon to choose two weather icons for the day.

LOGISTICS FOR SCHOOL GROUPS

First Aid

If you have any medical problems during your program, let the park ranger know immediately. If a medical problem occurs after the park ranger has left your group, contact any park employee or, in case of an emergency call 911 (This will contact Navajo County dispatch who dispatches for our Law Enforcement/EMT Rangers). First aid supplies are located at Painted Desert Visitor Center, Painted Desert Inn, and Rainbow Forest Museum.

Restrooms

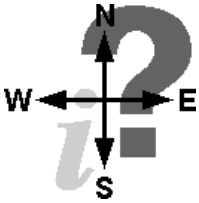
Year-round facilities are found throughout the park at the Painted Desert Visitor Center, Painted Desert Inn, Chinde Point, Puerco Pueblo, and Rainbow Forest Museum. The restrooms at Agate Bridge are now permanently closed.

Picnic Areas

Sheltered picnic areas are located at Chinde Point and Rainbow Forest. You are welcome to stop and have lunch at any of the other viewpoints, provided you remain in the developed area and do not picnic off-trail. Please help us keep the park clean and ensure that all trash is disposed of properly. Please *do not allow students to feed the animals,* including ravens.

Water Fountains

Each member of your group should carry a water bottle while in the park. Water bottle fill up stations are located at the Painted Desert Visitor Center, Painted Desert Inn, and Rainbow Forest Museum.



Lost and Found

If anyone in your group misplaces something or finds a lost item to turn in, contact the Painted Desert Visitor Center, Painted Desert Inn, or Rainbow Forest Museum as soon as possible. You may also call (928) 524-6228.

RULES, REGULATIONS, AND SAFETY POINTS FOR SCHOOL GROUPS

In order to make your trip as enjoyable and successful as possible, the following rules, regulations, and safety points must be followed by all members of your group.

- All natural and cultural resources within national parks are protected by federal law. **Collection of park resources is illegal and subject to a $325.00 minimum fine.** This includes not only petrified wood and archeological artifacts, but also rocks, plants, and animals. The park has a *zero loss* policy, so even the smallest pieces count!

- If you pick up petrified wood, rocks, sticks, etc. to have a closer look at them, be sure to put them back exactly where you found them. Moving fossils by just a few feet can displace them out of scientific context by millions of years.

- Dispose of trash properly. Most viewpoints have receptacles and recycling bins for your use. Please make sure all trash is within the receptacle and the lid is closed. Ravens can pull out an entire garbage bag if any of it is exposed! If you see trash left by someone else and want to help us out by picking it up and putting it in the trash we greatly appreciate this as well.

- **Don't feed the wildlife!** Wild animals can become dependent on humans for food and forget how to forage for themselves. When humans are not around, they may starve! Wild animals can also bite and may carry diseases. If you get a deep puncture wound, you must visit the doctor for a tetanus shot to prevent infection.

- Stay on designated trails or follow directly behind the park ranger when off-trail at field study sites. The plants in our high plateau short grass prairie environment grow by the inch and are destroyed by the foot. Don't let it be your foot! Stay with your group. It's a big place to get lost in.

- Be respectful of other visitors. Try to keep noise levels down and don't yell to each other across large areas. Quiet voices are especially appreciated inside The Painted Desert Visitor Center, The Rainbow Forest Museum, and The Painted Desert Inn. Ranger talks may be going on at different times of the day in these buildings and other visitors will be listening in. If you have a large group, please split the group up and take turns when visiting inside these buildings.
- If you are on a ranger guided program please **do not** have Ipods or headphones on for the duration of the program.

Teacher Field Trip Checklist

Use this checklist to help you make sure everything is ready for your field trip

☐ Information requested on your grant award letter has been sent to the park or discussed with the education coordinator.

☐ 1 copy of fee waiver for each school vehicle entering the park. This is found with your grant award letter.

☐ Pre-visit activities and Application tutorials completed by students.

☐ Rules and regulations for education groups within Petrified Forest National Park are understood by all students, teachers, and chaperones.

☐ Students are separated into pairs that work well together.

☐ Chaperones have been recruited and confirmed (at least 1 chaperone for every 15 students is recommended).

☐ Itinerary of visit discussed and confirmed with the park.

☐ Students understand what they need to wear/bring:

- Comfortable clothes that can get dirty
- Closed-toe shoes for walking
- Bad weather gear (prepare accordingly for the day's weather. Outdoor activities will be canceled if the weather is unsafe.)
- Water bottles (There is a water bottle fill up station at the program site)
- Hat and sunscreen

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Post Visit Activity

Petrified Forest Focus: Interpreting Your Park Experience

School Subjects: Creative Arts

Lesson Overview: After your visit to the park the ranger will send all digital photos, data, and journal entries that the students made during the program to the school. The main goal of this post visit activity is for each student, or student pair, to utilize the data generated by their observations in the park to create a presentation about the field trip for their class. This can be done in the form of a digital photo montage set to music or narration, physical poster board display, scrapbook, etc. Just be creative!

Time required: At least one 60 minute class period depending on the type of product being created.

Materials Needed:

- Digital materials from the field trip provided by the park.
- Craft supplies if making poster displays
- Computers and appropriate software if making digital products

Procedure:

- The exact product each student creates for this activity is the choice of the teacher since not all schools have the same materials or resources.
- Provide students with the choice of one of two types of products to create out of the data they generated during the field trip.
    - The finished product should include the following elements
        - The grassland environment of Petrified Forest National Park
        - At least two of the observations they made during their visit.
        - The importance of scientific research
        - The importance of protecting public lands.
        - One example of a phenological stage of plants or animals

- When the students are finished creating their product, they can present them to the entire class and/or display them in the classroom for others to look at during free times.
- This activity should give students a chance to share their observations and nature journals to their peers. They should have fun with it and be encouraged to be creative.