Phenology: Plant Diversity

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| **Stage 1- Desired Results** |
| **Transfer**The Students will be able to independently use their learning to:* Recognize that gathering information can lead to an idea not previously thought.
* Discover how they interact with the environment and how the environment affects them; Cause and effect.
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| **Content Standards:** NYS Elementary Science Core Curriculum K-4Standard 1- Analysis, Inquiry & Design* Key Idea 1 -Scientific Inquiry

Standard 2- Information Systems* Key Idea 1- technology is used to retrieve, process and communicate information

Standard 3 –System’s Thinking* Key Idea 1-Recognize commonalities

Standard 4 - Science* Key Idea 1- Patterns of daily, monthly and seasonal changes
* Key Idea 1 – Living Environment
	+ Characteristics of and variations between living and non- living things
	+ Life process common to all living things
* Key Idea 2- observe and describe how plants grow and change in predictable ways
* Key Idea 3- organisms and species change over time
	+ Each plant has different structures that serve different functions
	+ In order to survive plants and animals adapt
* Key Idea 4 – Continuity of Life is sustained through reproduction and development
* Key Idea 5 – Basic life functions of common living specimens
	+ Survival behaviors of common living specimens
* Key Idea 6- Plants and animals depend on each other and their physical environment
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| NYS learning standards **STEM** – Standard 4- Science – students will understand and apply scientific concepts, principles and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.**Intermediate Level Science Core Curriculum**- Grades 5-8Standard 1- Analysis, Inquiry & Design* Key Idea1: Scientific inquiry
	+ 1.1 Formulate questions independently with the aid of references appropriate for guiding the search for explanations of everyday observations
		- 1.1a formulate questions about natural phenomena
		- 1.1b identify appropriate references to investigate a question
	+ 1.2 Construct explanations independently for natural phenomena by proposing preliminary visual models of phenomena
		- 1.2a formulate a hypothesis
		- 1.2b propose a model of natural phenomenon

Standard 2 – Information systems* Key Idea 1: Technology is used to retrieve, process, and communicate information
	+ 1.1 Use a range of equipment and software to integrate several forms of information in order to create good- quality audio, video, graphic, and text based presentation

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| 2-LS2-1 Plan and conduct an investigation to determine if plants need sunlight and water to growLS2.A Interdependent Relationships in EcosystemsPlants depend on water and light to grow. (2-LS2-1)Plants depend on animals for pollination or to move their seeds around. (2-LS2-2)ETS1.B: Developing Possible SolutionsDesigns can be conveyed through sketches, drawings, or physical models. These representations are useful in communicating ideas for a problem’s solutions to other people. |

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| **Understandings:*** Students will understand that plants and trees undergo physical changes in response to seasonal changes.
* Students will be able to identify various phenophases (stages in the life cycle) in deciduous and evergreen trees.
* Students will understand the difference between deciduous and evergreen trees and how different plants utilize different adaptations to cope with seasonal changes in the availability of resources.
 | **Essential Questions:*** How do trees adapt to environmental change?
* Why do we have seasons?
* How are trees alike and different?
* How do scientists gather and share information?
* How are plants and animals well-suited to live in their environments?
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| The **performance** will demonstrate grade appropriate proficiency in:* developing and using models,
* planning and carrying out investigations
* analyzing and interpreting data
* constructing explanations & designing solutions
* engaging in argument from evidence
* Obtaining, evaluating, and communicating information
* Students will be able to identify and compare the physical structures of a variety of plant parts.
* Students will be able to describe the basic needs of plants.
 | * Students will be able to describe how living things grow, take in nutrients, breathe, reproduce and eliminate waste.
* Students will be able to record what they see and observe.
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| **Stage 2- Assessment Evidence** |
| **Performance Tasks:*** Students will observe (in the park or at school) how deciduous and evergreen trees change throughout the year in response to seasonal changes by keeping a log.
* Students will identify the different observed phenophases (leaves, flowers, fruit, and seeds) of deciduous and coniferous trees, and note what phases are present and absent during each season.
* Students will sketch and record observations in a nature journal and make predictions based on their observations.

  | * Students will contact Project Budburst and enter data
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| **Self-Assessments****KWL OR KLEW**What do we think we **K-**NOW?What are we **L-**EARNING?What is our **E-**VIDENCE?What are we **W-**ONDERING? |  |
| **Stage 3 Learning Plan** |
| . **Learning Activities:****Pre-visit:*** Review parts of plants/trees and their functions; seasons and their respective characteristics; review what plants need to grow and reproduce; learn the scientific method and vocabulary; learn the difference between deciduous and evergreen trees.

Activity 1* Seasons- students make a class collage of each season using magazine or newspaper pictures and drawings. As each season is finished, talk about why they chose the pictures they did and how each season is different from the others. Include in discussions the temperature and hours of daylight and precipitation.
* Plant parts and their functions – Have students work with partners to draw a tree. Include and label roots, leaves, flowers and fruits. Have them also remember the function of each part and share with the group their ideas.
* Needs of plants
	+ Ask students to remember what plants need to grow. On a piece of chart paper divided into fourths with a tree drawn in the middle, label each quadrant as they give you the correct answer. Ask them what would happen if one of these resources was limited or missing? How would they know? How could they test their ideas?
	+ Tell them that two resources that plants need that change through the seasons are the amount of sun and water a plant receives. Refer to their season collages and ask them if they can figure out how these two resources change through the seasons.
	+ For experiment see teachers guide

**On-site activities:*** Introduction to NPS/Arrowhead/Rangers
* Introduction to Eco Village, JBWR, SH, etc.
* Science in the park/Phenology (seasons in the park, deciduous vs. evergreen)
* How to monitor (include quiet observation)
* Monitor, record, predict.
* Observe saplings.
* Compare and contrast deciduous/evergreen trees.
* Reflect; observe species that utilize trees as habitat; are they the same through the seasons?

**Post-visit activities:** * Find trees to monitor at school, home etc.
* Visit park 3 more times to make and record observations.
* Identify phenophases of target species.
* Identify phenophases of different deciduous and evergreen trees.
* Compare/contrast Black Cherry with Red Cedar.
* Match deciduous parts with evergreen parts.
* “Tree Journal”
* Monitor the observed trees on line.
* Go to Project Budburst at budburst.org and utilize the apps for citizen scientists
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