Harrison Township Grade 3 Science Unit 3: Power of Flowers

Instructional Days:
25 instructional days

Unit Summary
What kinds of traits are passed on from parent to offspring? **What environmental factors might influence the traits of a specific organism?** In this unit of study, students acquire an understanding that organisms have different inherited traits and that the environment can also affect the traits that an organism develops. The crosscutting concepts of patterns and cause and effect are called out as organizing concepts for these disciplinary core ideas. Students are expected to demonstrate grade-appropriate proficiency in analyzing and interpreting data, constructing explanations, and designing solutions. Students are also expected to use these practices to demonstrate understanding of the core ideas. This unit develops the idea that by studying how plants reproduce and pass on their traits, we human beings have figured out how to make food plants even more useful to us. Students first discover how plants reproduce by exploring the process of pollination and fruiting. Then students are introduced to the process of plant domestication (selection of traits based on inheritance and variation). This unit is based on 3-LS3-1 and 3-LS3-2. **# Designates Climate Change throughout the unit**
Student Learning Objectives
Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms. [Clarification Statement: Patterns are the similarities and differences in traits shared between offspring and their parents, or among siblings. Emphasis is on organisms other than humans.] [Assessment Boundary: Assessment does not include genetic mechanisms of inheritance and prediction of traits. Assessment is limited to non-human examples.] (3-LS3-1)
Use evidence to support the explanation that traits can be influenced by the environment. [Clarification Statement: Examples of the environment affecting a trait could include normally tall plants grown with insufficient water are stunted; and, a pet dog that is given too much food and little exercise may become overweight.] (3-LS3-2)

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3rd Grade Life Science	Performance Expectations	Topics	Disciplinary Core Ideas (DCIs) (Mystery Conceptual Flow)	Scientific & Engineering Practices (SEPs)	Crosscutting Concepts (CCC)	Resources
Mystery 1 Why do plants grow flowers?	3-LS1-1	Flowering & Reproduction	All plants grow from a seed, which is a baby plant. Just like animals, *some* plants--all flowering plants--need two parent plants to create a seed. Flowering plants make seeds through a process called pollination. Pollination happens when pollen from one flower gets transferred to a special part of another flower - the stigma. Flowers make seeds! These plants have a unique life cycle that starts with pollination. **DCIs:** ***Foundational LS1.B***	Students **develop a model** of a flower and bee to simulate pollination. With a partner, they **carry out an investigation** to determine how bees fly between flowers and cause pollination. Students an**alyze their data** and **construct an explanation** for if their flower will produce seeds or not.	Students explore the **pattern** of similarities in life cycles among organisms. Students observe that a plant's stigma (**structure**) is sticky to 'catch' pollen (**function**).	Mystery 1 Lesson Plan Mystery 1 assessment Mystery 1 assessment answer key Online Activity Lesson Student Link Make a Flower Printout - 1 per student Extension Activities: • Reading-Flowers Go Bats • Photos • More Paper Flowers • Lily Dissection • A Bouquet of Flower Parts • Garden Observation

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Mystery 2 Why do plants give us fruit?	3-LS1-1	Reproduction	We learned in the last Mystery that pollen travels to the stigma of a flower to make a seed. But it isn't that simple - the pollen travels down the stigma, and into the flower's ovary. Then a seed is made! Some plants grow fruit next. Fruit, a yummy 'container' for seeds, is eaten by animals! They swallow the seeds and excrete them away from the parent plant. This helps the seeds spread to new places and grow new plants. A lot of vegetables have seeds, but to plant scientists they are actually fruits! **DCIs: LS1.B**	Students **carry out an investigation** to determine if a food is a science fruit or vegetable. They cut open each food to determine if there are seeds. Students **analyze this data** to determine if the food is a fruit or vegetable.	Students use **patterns** to sort food as a science fruit or a science vegetable. Students learn that fruit (**structure**) contains seeds and helps them spread (**function**).	Mystery 2 Lesson Plan Mystery 2 assessment Mystery 2 assessment answer key Online Activity Lesson Student Link Science Fruit or Vegetable Printout - 1 per student Science Fruit or Vegetable Answer Key Extension Activities: • Mystery Science Fruit Salad • Bee Free Barbecue Student Link & Teacher's Instructions
# Mystery 3 Why are some apples red and some green?	#3-LS3-1 # 3-LS3-2	Inheritance, Traits, & Selection	Apples, like all living things, inherit their characteristics from their parents. Sweet apples grow from the seeds of sweet apples, and sour apples grow from the seeds of sour apples. While offspring have similar traits as their parents and siblings, they are not *exactly* the same. There are over 2,000 varieties of apples, each	Students **carry out an investigation** to determine the sweetness of different apple varieties.	Students identify the similarities and differences shared between offspring and their parents, or among siblings as a **pattern**.	Mystery 3 Lesson Plan Mystery 3 assessment Mystery 3 assessment answer key Online Activity Lesson Student Link Apple Taste Test Printout - 1 per student Extension Activities: • Math - Graphing the Apple Taste Test

			with unique traits. Farmers choose people's favorites, plant that type of seed over and over, and grow more of them. This is called selection. **DCIs: LS3.A, LS3.B**			• ELA - Once Upon an Apple • Reading: "Weird Sunflowers, Wonderful New Traits" • Reading: "Giant pumpkins grow fast!" •
# Mystery 4 How could you make the biggest fruit in the world?	#3-LS3-1 # 3-LS3-2	Fruiting, Reproduction	No two individual offspring are exactly alike! Organisms inherit their traits from their parents which is why they are similar but not identical. Selection is when a desired trait is chosen to reproduce. It is used to change any trait of a plant. Plant-growers watch closely for changes in traits so that they can create new varieties of plants. Many fruits and vegetables we eat today were created through selection. **DCIs: LS3.A, LS3.B**	Students **engage in arguments from evidence** about which plants and fruits are related to one another. Students **obtain, evaluate, and communicate information** by sorting plant cards into groups based on similar traits. They determine which plants share wild parents and are varieties of each other.	Students recognize similarities and differences among the traits of different plants as a **pattern**.	**Mystery 4 Lesson Plan** Mystery 4 assessment Mystery 4 assessment answer key Online Activity Lesson scissors Fruit card Printout - 1 per pair Odd One Out Printout - 1 per student Odd and Out Answer Key Printout - 1 per student Extensions: Readworks.org Website - • Growing Melons, Kinds of Melons, Fun with Melons — A set of three readings describing how melons grow, kinds of melons, and contests involving watermelons. (Grades 2 & 3) • Magic Tomatoes — In this story, a farm boy learns what you need to grow tomatoes. (Grade 3) • Pumpkin Time! — A short, illustrated reading

						describing the life cycle of a pumpkin. (Grade 2)

Connecting with English Language Arts/Literacy and Mathematics
English Language Arts Students need opportunities to use informational text and other resources to gather information about organisms and the environments in which they live. Students should be able to ask and answer questions to demonstrate understanding of content-specific text and be able to cite evidence from the text to support their thinking. For example, after reading an article about wolves, students ask and answer questions such as: How does being a member of a pack help wolves survive? What characteristics do wolves have that enable them to survive in their environment? What characteristics and resources does the environment have that allow wolves to survive and reproduce in that environment? Students should be able to refer specifically to the text when answering questions, articulating the main idea and describing key details in their explanations. Students also need opportunities to write informative/explanatory texts and opinion pieces with supporting evidence to convey their ideas and understanding of cause-and-effect relationships between the environment and an organism's ability to survive and reproduce. For example, after reading text about a given animal, students should be expected to use key details and appropriate facts about that animal to compose an informative piece of writing that describes the animal's characteristics and behaviors that aid in its survival. Students should also have the opportunity to orally report on a given topic, sharing relevant facts and details while speaking clearly and at a reasonable pace. Mathematics Students can model with mathematics by graphing the average number of organisms that make up a group among a variety of species. For example, some species live in small groups of six to eight members, while others live in groups that include thousands of organisms. Students will also reason abstractly and quantitatively as they describe and compare these groups and their ability to survive and reproduce in a given environment.

Modifications
(Note: Teachers identify the modifications that they will use in the unit. See NGSS Appendix D: All Standards, All Students/Case Studies for vignettes and explanations of the modifications.) • Structure lessons around questions that are authentic, relate to students' interests, social/family background and knowledge of their community. • Provide students with multiple choices for how they can represent their understandings (e.g. multisensory techniques-auditory/visual aids; pictures, illustrations, graphs, charts, data tables, multimedia, modeling). • Provide opportunities for students to connect with people of similar backgrounds (e.g. conversations via digital tool such as SKYPE, experts from the community helping with a project, journal articles, and biographies). • Provide multiple grouping opportunities for students to share their ideas and to encourage work among various backgrounds and cultures (e.g. multiple Grade 3 Model Science Unit 6: Organisms and the Environment (draft 2.10.16) Instructional Days: 15 4 representation and multimodal experiences). • Engage students with a variety of Science and Engineering practices to provide students with multiple entry points and multiple ways to demonstrate their understandings. • Use project-based science learning to connect science with observable phenomena. • Structure the learning around explaining or solving a social or community-based issue. • Provide ELL students with multiple literacy strategies. • Collaborate with after-school programs or clubs to extend learning opportunities. • Restructure lesson using UDL principals (http://www.cast.org/our-work/about-udl.html#.VXmoXcfD_UA)

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Prior Learning

Kindergarten: Basic Needs of Living Things

Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do.

Grade 1: Characteristics of Living Things

Adult plants and animals can have young. In many kinds of animals, parents and the offspring themselves engage in behaviors that help the offspring to survive.

Grade 2: Relationships in Habitats

Plants depend on water and light to grow.

Plants depend on animals for pollination or to move their seeds around.

There are many different kinds of living things in any area, and they exist in different places on land and in water.

Future Learning

Grade 6: Matter and Energy in Organisms and Ecosystems

Organisms, and populations of organisms, are dependent on their environmental interactions both with other living things and with nonliving factors.

In any ecosystem, organisms and populations with similar requirements for food, water, oxygen, or other resources may compete with each other for limited resources, access to which consequently constrains their growth and reproduction.

Growth of organisms and population increases are limited by access to resources.

Similarly, predatory interactions may reduce the number of organisms or eliminate whole populations of organisms. Mutually beneficial interactions, in contrast, may become so interdependent that each organism requires the other for survival. Although the species involved in these competitive, predatory, and mutually beneficial interactions vary across ecosystems, the patterns of interactions of organisms with their environments, both living and nonliving, are shared.

Grade 7: Earth systems

The geologic time scale interpreted from rock strata provides a way to organize Earth's history. Analyses of rock strata and the fossil record provide only relative dates, not an absolute scale.

Grade 8: Selection and Adaptation

Natural selection leads to the predominance of certain traits in a population, and the suppression of others.

In *artificial* selection, humans have the capacity to influence certain characteristics of organisms by selective breeding. One can choose desired parental traits determined by genes, which are then passed on to offspring.

Adaptation by natural selection acting over generations is one important process by which species change over time in response to changes in environmental conditions. Traits that support successful survival and reproduction in the new environment become more common; those that do not become less common. Thus, the distribution of traits in a population changes.

Additional Open Education Resources
. [Muskox Maneuvers] In this activity, students create a physical model showing how muskoxen work together as a group to protect their young from predators (wolves). [Musk Ox Save Calf from Wolves Video] In this short video, Arctic wolves attack a musk ox calf on Canada's Ellesmere Island, but the herd rushes to its defense by forming a defensive circle around the calves. [Insects That Work Together] This nonfiction book summarizes how some insects work together to increase their chances of survival. Details are provided on four types of insects: honeybees, hive wasps (hornets, yellow jackets, and paper wasps), termites, and ants. A short section on insect migration and

building a hive model are also included.

Battle at Kruger: Water Buffalo Save Calf from Lions Video

This short video captures student imagination and elicits ideas about how groups of organisms work together for survival. The video contains real footage of a pack of lions attack on a water buffalo calf. The footage filmed by amateur tourists features a surprising plot twist (featuring a crocodile), and exciting finale with the water buffalo herd rescues the calf and chases off the lions.

A Walk in the Desert (Biomes of North America)

This nonfiction text describes the climate, soil, plants and animals of the North American deserts. It provides detailed information on how plants and animals adapt and survive there.

A Walk in the Deciduous Forest (Biomes of North America)

This nonfiction text describes the climate, soil, plants and animals of the North American deciduous forests. It provides detailed information on how plants and animals adapt and survive there.

A Walk in the Rain Forest (Biomes of North America)

This nonfiction text describes the climate, soil, plants and animals of the North American rain forests. It provides detailed information on how plants and animals adapt and survive there.

A Walk in the Prairie (Biomes of North America)

This nonfiction text describes the climate, soil, plants and animals of the North American prairies. It provides detailed information on how plants and animals adapt and survive there.

A Walk in the Tundra (Biomes of North America)

This nonfiction text describes the climate, soil, plants and animals of the North American tundra. It provides detailed information on how plants and animals adapt and survive there.

A Walk in the Boreal Forest (Biomes of North America)

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Grade 3 Model Science Unit 6: Organisms and the Environment (draft 2.10.16) **Instructional Days: 15**

This nonfiction text describes the climate, soil, plants and animals of the North American boreal forests. It provides detailed information on how plants and animals adapt and survive there.

A Journey into the Ocean (Biomes of North America)

This nonfiction text describes the organisms and features of the ocean environment. It provides detailed information on how plants and animals adapt and survive there.

Journey Into an Estuary (Biomes of North America)

This nonfiction text describes the features and plants and animals of North American estuaries. It provides detailed information on how plants and animals adapt and survive there.

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English Language Arts	Mathematics
Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect. (3-LS2-1),(3-LS4-3) **RI.3.3** Write opinion pieces on topics or texts, supporting a point of view with reasons. (3-LS2-1), (3-LS4-3) **W.3.1** Write informative/explanatory texts to examine a topic and convey ideas and information clearly. (3-LS4-3) **W.3.2** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. (3-LS4-3) **SL.3.4**	Model with mathematics. (3-LS2-1),(3-LS4-3) **MP.4** Number and Operations in Base Ten. (3-LS2-1) **3.NBT**