Science- Grade K

Unit 1 Title: Plant & Animal Needs

Unit Overview

In this unit, students learn about and explore the basic needs of all living things, including animals and plants. Students investigate how humans help meet the basic needs of pets. They then analyze the needs of all kinds of animals, from pets to familiar animals found in their local environments to more exotic animals that live far away. They also make observations about how animals' habitats meet their needs and how animals live in places that can meet each of their needs. Students uncover the basic needs of plants as they investigate the cause of a droopy plant. They think about and discover what plants need to survive, how the environments in which they live meet their needs, and what happens when basic needs are not met. Finally, students design a habitat that meets the needs of specific living things.

PA Academic Standards Science:

3.1.K.A1 Identify the similarities and differences of living and non-living things.
3.1.K.A3 Observe, compare, and describe stages of life cycles for plants and/or animals.
3.1.K.A5 Observe and describe structures and behaviors of a variety of common animals.
3.1.K.B1 Observe and describe how young animals resemble their parents and other animals of the same kind.

NGSS Disciplinary Core Ideas:

K-LS1.C All animals need food in order to live and grow. They obtain their food from plants or from other animals. Plants need water and light to live and grow.
K-ESS3.A 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.

Core Standards Literacy

SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood.

Content:

- Animal needs
  - pets
  - local animals
  - habitats
- Plant needs
  - needs of different types of plants
  - how plants meet needs
  - plant habitats
- Keeping plants healthy

Skills:

- Use observations to describe patterns of what plants and animals (including humans) need to survive.
- Use a model to represent the relationship between the needs of different plants or animals (including humans) and the places they live.

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- Ask and answer questions about living things.

Inquiry Questions: (*include factual, conceptual, debatable)*

- **Factual:**
  What things do animals need to live and grow? What things do plants need to live and grow? Why are some plants not healthy? What causes leaves on a plant to droop? What do plants need? Where are the best places for plants to live?
- **Conceptual:**
  Do all living things need the same things to live and grow? How are plants' needs met by the place in which they live? How does the place where something lives give it what it needs? How do an animal's needs affect where it lives? How are animals' needs met by the place in which they live?
- **Debatable:**
  In what ways do plants and animals differ in how they meet their needs?

Resources:

"Unit 1: Plant and Animal Needs" *Discovery Education Grade K Science Techbook*, Discovery Education, https://app.discoveryeducation.com/learn/techbook/units/e834cd1b-904f-4555-8889-6c99a190fa69.

"Plant and Animal Secrets." *Mystery Science*, Mystery.org, https://mysteryscience.com/secrets/.

Unit 2 Title: Organisms and the Environment

Unit Overview

In this unit, students explore how living things, including humans, change the environment when they use resources to meet their needs. They discover how such changes affect other living things in the environment and explore how humans can protect the environment. Students begin by exploring how plants, animals, and humans use resources. They investigate what natural resources are renewable, and those that are not. Throughout the unit, they use their observational skills to analyze the causes and effects of living things changing their environment to meet their needs and build on their understanding by reading about real-life problems and solutions and how they are handled. Hands-on investigations model resource use by animals and humans and develop solutions to reduce the human component and at the conclusion of the unit, students conduct a hands-on engineering activity and design a solution to reduce plastic bottle waste.They also decide how to test their design and analyze how well it worked and consider ways to improve their design.

PA Academic Standards Science:

3.1.K.C2 Describe changes animals and plants undergo throughout the seasons.

3.1.K.C3 Describe changes that occur as a result of climate.

NGSS Disciplinary Core Ideas:

K-ESS2.E Plants and animals can change their environment.

K-ESS3.C Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things.

K-ETS1.B Designs 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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Core Standards: Literacy

W.K.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.

Content:

- How Living things affect their environment
  - Plants affect the environment
  - Animals affect the environment
  - Humans affect the environment
- Using Natural resources
  - Natural and human-made resources meet human needs.
  - Natural resources are changed for human use.
  - Using natural resources affects the environment.
- Helping the environment by using resources wisely.
  - Limited resources
  - Reducing the use of natural resources
  - Different ways to reuse and recycle

Skills:

- Gather information from provided sources to explain how living thing affect their environment
- Construct an argument supported by evidence for how plants and animals (including humans) can change the environment to meet their needs.
- Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment.

Inquiry Questions: (*include factual, conceptual, debatable)*

- **Factual**:
  How do different animals change the grasslands? How does taking a resource from a habitat affect the things that live there? What happens when I use materials from the environment? How do plants and animals change their habitat? How do people change the environment they live in?
- **Conceptual**:
  What are the many ways an environment can be changed? How do people change the environment they live in? What can people do to not damage the environment they live in? How do plants, animals, and humans change the environment? Why do animals change their environments? Do plants change the environment in the same way that animals do? How can we protect the environment?
- **Debatable**:
  How can I use environmental resources wisely?

Resources:

"Unit 2: Living Things and the Environment," *Discovery Education Grade K Science Techbook*, Discovery Education, https://app.discoveryeducation.com/learn/techbook/units/8d87d644-c606-4ea0-822c-53fc17661d68.

"Plant and Animal Secrets." *Mystery Science*, Mystery.org, https://mysteryscience.com/secrets/.

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Unit 3 Title: Weather and Shelter

Unit Overview

In this unit, students explore weather patterns and learn about what weather changes they can observe in everyday life. Students begin by thinking about how weather can change over time. They observe children playing outside and make predictions about the type of weather and investigate how the sun warms the earth and how shade helps protect objects in the sun. Throughout the unit, they hone their analysis skills by conducting hands-on investigations where they learn to measure temperatures with a thermometer and compare them. Students begin to think about the effect of sunlight on Earth and collect weather data over time. In addition, students conduct a hands-on engineering activity and design a solution that protects a camper from both the hot sun and stormy weather and analyze how well their designs do this and think of ways to improve their ideas.

PA Academic Standards Science:

3.2.K.B3 Describe how temperature can affect the body.

3.2.K.B6 Recognize that light from the sun is an important source of energy for living and nonliving systems and some source of energy is needed for all organisms to stay alive and grow.

3.3.K.A5 Record daily weather conditions using simple charts and graphs Identify seasonal changes in the environment. Distinguish between types of precipitation.

3.3.K.A4 Identify sources of water for human consumption and use.

NGSS Disciplinary Core Ideas:

K-ESS2.D Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time.

K-ESS3.B Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events.

K-PS3.B Sunlight warms Earth's surface.

Core Standards Literacy

RI.K.1 With prompting and support, ask and answer questions about key details in a text.

SL.K.3 Ask and answer questions in order to seek help, get information, or clarify something that is not understood.

Content:

- Weather Patterns
  - Weather changes have patterns.
  - Predicting weather
- Sunshine & Shade
  - The sun's energy warms everything on Earth.
  - Change in outside temperature from day to night is caused by the sun.
  - Shelter provides protection from the sun.

Skills:

- Use and share observations of local weather conditions to describe patterns over time.
- Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

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- Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- Develop a simple sketch, drawing, or physical model to illustrate how the shape of an object helps it function as needed to solve a given problem.
- Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses of how each performs.
- Make observations to determine the effect of sunlight on Earth's surface.
- Use tools and materials to design and build a structure that will reduce the warming effect of sunlight on an area.

Inquiry Questions: (*include factual, conceptual, debatable)*

- **Factual:**
  How does the weather change? What are the many different kinds of weather? What weather changes can we observe? How does the sun affect temperature? Why can summer be so hot? How does the weather change throughout the year?
- **Conceptual:**
  How can we know when the weather will change? How can we know what the weather will be like? How does the sun affect Earth and all who live on it? What kind of shelter can protect us from sun and weather? How can I describe the weather? How should I dress for the weather? How can I determine what the weather will be like tomorrow? in a month? in two months? What causes changes in the weather? How do you keep cool in the hot sun? Why do temperatures change?
- **Debatable:**
  What can we do to be ready for weather changes?

Resources:

"Unit 3: Weather & Shelter" *Discovery Education Grade K Science Techbook*, Discovery Education, https://app.discoveryeducation.com/learn/techbook/units/5098b5f9-e28d-4e50-b81d-6fa13f5bb6ab.

"Wild Weather." *Mystery Science*, Mystery.org, https://mysteryscience.com/storms/.

"Circle of Seasons." *Mystery Science*, Mystery.org, https://mysteryscience.com/seasons/.

"Sunny Skies." *Mystery Science*, Mystery.org, https://mysteryscience.com/sunlight/.

Unit 4 Title: Motion and Change

Unit Overview

In this unit, students explore pushes and pulls in order to understand how forces cause and change the motion of objects. Students begin by thinking about what causes motion of cars, trains, and boats. They learn that some things have internal energy to move themselves, while others—such as a skateboard travelling downhill—need a push or pull from an outside source of energy. Throughout the unit, they learn about how forces cause objects to move faster and slower, to stop, and to fall down. They build on their understanding by reading about how living and nonliving things move, how gravity affects how things move, and how other forces can change the motion of objects. Students view videos and images to understand what kinds of forces

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cause the motion of a bowling ball and bowling pins. They conduct hands-on investigations to observe how forces such as gravity and friction can change motion. At the conclusion of the unit, students conduct a hands-on engineering activity and design a solution to move a heavy box up from a low place to a higher place. They analyze how well their design made moving the box easier and think about ways they can improve their design.

PA Academic Standards Science:

3.2.PK.B1 Explore and describe motion of toys and objects.

3.2.K.A6 Distinguish between scientific fact and opinion.

- Ask questions about objects, organisms, and events.
- Understand that all scientific investigations involve asking and answering questions and comparing the answer with what is already known.
- Plan and conduct a simple investigation and understand that different questions require different kinds of investigations.
- Use simple equipment (tools and other technologies) to gather data and understand that this allows scientists to collect more information than relying only on their senses to gather information.
- Use data/evidence to construct explanations and understand that scientists develop explanations based on their evidence and compare them with their current scientific knowledge.
- Communicate procedures and explanations giving priority to evidence and understanding that scientists make their results public, describe their investigations so they can be reproduced, and review and ask questions about the work of other scientists.

NGSS Disciplinary Core Ideas:

K-PS2.A Pushes and pulls can have different strengths and directions.Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.

K-PS2.B When objects touch or collide, they push on one another and can change motion.

K-PS3.C A bigger push or pull makes things speed up or slow down more quickly

K-ETS1.A A situation that people want to change or create can be approached as a problem to be solved through engineering. Asking questions, making observations, and gathering information are helpful in thinking about problems. Before beginning to design a solution, it is important to clearly understand the problem.

Core Standards Literacy

RI.K.1 With prompting and support, ask and answer questions about key details in a text.

W.K.6 With guidance and support from adults, explore a variety of digital tools to produce and publish writing, including in collaboration with peers.

Content:

- Forces & Motion
  - Motion is caused by a push or a pull.
  - The stronger the push or pull, the faster an object moves.
- Controlling motion
  - To change the motion of an object, you have to push or pull it in a different direction.
  - Force can be used to stop an object.

Skills:

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- Plan and conduct an investigation to compare the effects of different strengths or different directions of pushes and pulls on the motion of an object.
- Ask questions, make observations, and gather information about a situation people want to change to define a simple problem that can be solved through the development of a new or improved object or tool.
- Analyze data to determine if a design solution works as intended to change the speed or direction of an object with a push or a pull.
- With guidance and support from adults, write about designing something that will help them move objects..

Inquiry Questions: (*include factual, conceptual, debatable)*

- **Factual**:
  What causes a skateboard to move? How does a skateboard work? How do you get the skateboard to start moving? What are different ways you can make a skateboard move? How do you make the skateboard move faster?
- **Conceptual**:
  How can you get an object to start moving? What are all of the different ways you can travel? What causes motion? What forms of transportation are faster or slower than others? How can you make an object stop moving? How can we change the speed and direction of a moving object? How can you make a marble move without touching it with your hands?
- **Debatable**:
  To what extent can motion be controlled to meet needs?

Resources:

"Unit 4: Motion & Change" *Discovery Education Grade K Science Techbook*, Discovery Education, https://app.discoveryeducation.com/learn/techbook/units/19c3156c-7d95-4fb8-92e2-f2153c775bdf.

"Force Olympics." *Mystery Science*, Mystery.org, https://mysteryscience.com/pushes/.