

Nature's Changes

A Closer Look at How Plants, Animals, and the Environment Change

From the weather to the seasons, nature is changing all around us. Some of these important changes provide food and water for plants and animals. Other changes, such as global warming, endanger all forms of life. The *Nature's Changes* series documents these important natural events, while the *Nature's Changes* Teacher Guide fuels further exploration of the ways plants, animals, and the environment change. By using this guide, you have an opportunity to tap into high student interest while exposing students to broader scientific concepts.

By participating in these lessons, students will become aware of some of the changes that take place in nature. These lessons will lead students to understand higher-level concepts, such as life cycles, photosynthesis, and global warming.

The lesson plans in this guide are tailored for grades 2-3 and address various subjects including language arts, mathematics, science and social studies. Each lesson plan is designed to stand alone. As such, they do not need to be presented in sequential order. Helpful reproducible worksheets and rubrics appear at the end of the guide. The titles in the series include:

Animal Life Cycles: Growing and Changing

Camouflage: Changing to Hide

Changing Seasons

Changing Weather: Storms

Metamorphosis: Changing Bodies

Photosynthesis: Changing Sunlight into Food

Plants in Different Habitats

The Water Cycle

All lesson plans included in this guide may be used with one or more of the *Nature's Changes* books.

As students investigate the topics addressed in the guide and become more aware of nature's changes, they will sharpen their critical thinking skills and work towards understanding our ever-changing environment. We invite you to jump in and ask questions with your class as you have fun learning more about nature.

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National Standards Correlation

Lesson Plan Title	Correlation to National Standards
<p>From Sunlight to Food</p>	<p>Science Students should develop the abilities necessary to do scientific inquiry. Students should develop an understanding of organisms and environments. Students should develop an understanding of changes in environments.</p>
<p>Terrarium Time!</p>	<p>Science Students should develop an understanding of organisms and environments. Students should develop an understanding about scientific inquiry.</p>
<p>Saving Our Planet</p>	<p>Science Students should develop an understanding of changes in environments.</p> <p>Social Studies The learner can explore causes, consequences, and possible solutions to persistent, contemporary, and emerging global issues, such as pollution and endangered species. The learner can consider existing uses and propose and evaluate alternative uses of resources and land in home, school, community, the region, and beyond.</p>
<p>Growing and Changing</p>	<p>Language Arts Students conduct research on issues and interests by generating ideas. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, and people) to communicate their discoveries in ways that suit their purpose and audience. Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, and video) to gather and synthesize information and to create and communicate knowledge.</p> <p>Science Students should develop an understanding of life cycles of organisms. Students should develop an understanding of the characteristics of organisms.</p>

Lesson Plan Title	Correlation to National Standards
Butterflies Abound	<p>Science Students should develop an understanding of life cycles of organisms. Students should develop an understanding of the characteristics of organisms.</p>
Adapting to the Climate	<p>Science Students should develop an understanding of organisms and environments. Students should develop an understanding of the characteristics of organisms. Students should develop an understanding about scientific inquiry.</p>
Measured Weather	<p>Mathematics Students should understand attributes, units, and systems of measurement. Students should apply a variety of techniques, tools, and formulas for determining measurements.</p> <p>Science Students should develop abilities necessary to do scientific inquiry. Students should develop an understanding about scientific inquiry.</p>
Animals in Hiding	<p>Language Arts Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).</p> <p>Science Students should develop an understanding of organisms and environments.</p>

For state specific educational standards, please visit <http://www.crabtreebooks.com/>.

Overview and Scope of Lesson Plan Activities

Lesson Plan Title	Subject Areas	Major Concepts
From Sunlight to Food	Science	<ul style="list-style-type: none"> • photosynthesis • parts of a plant • plant survival • predicting outcomes
Terrarium Time!	Science	<ul style="list-style-type: none"> • water cycle • plant survival • making terrariums
Saving Our Planet	Art Science Social Studies	<ul style="list-style-type: none"> • global warming • conservation • weather
Growing and Changing	Art Language Arts Science	<ul style="list-style-type: none"> • life cycles • scientific research • writing a report
Butterflies Abound	Science	<ul style="list-style-type: none"> • metamorphosis • life cycles • insect observation
Adapting to the Climate	Art Science	<ul style="list-style-type: none"> • plant habitats • adaptation • designing a poster
Measured Weather	Mathematics Science	<ul style="list-style-type: none"> • weather instruments • taking measurements • predicting outcomes
Animals in Hiding	Language Arts Science	<ul style="list-style-type: none"> • defense mechanisms • writing a story

Pacing Chart and Vocabulary

One class period is approximately 40 minutes.

Lesson Plan Title	Pacing	Vocabulary	Assessment
From Sunlight to Food	3 partial class periods	carbon dioxide nutrients photosynthesis	Evaluate reproducibles for understanding.
Terrarium Time!	2 partial class periods	nutrients terrarium water cycle water vapor	Review terrariums and evaluate reproducibles for understanding.
Saving Our Planet	1–2 class period(s)	conservation global warming pollution resources	Students exchange posters and assess each other's work.
Growing and Changing	1–2 class period(s)	amphibian juvenile mammal marsupial reptile	Evaluate student reports for accuracy, understanding, and ability to conduct research.
Butterflies Abound	3 partial class periods	caterpillar chrysalis host metamorphosis	Check reproducibles for accuracy.
Adapting to the Climate	1–2 class period(s)	habitat Polar Regions tundra wetlands	Observe student participation. Assess posters for accuracy.
Measured Weather	5 partial class periods	barometer hygrometer meteorologist rain gauge thermometer weather vane	Review reproducibles for accuracy.
Animals in Hiding	1–2 class period(s)	camouflage defense mechanism disguise habitat	Have students use the rubric to check each other's work.

From Sunlight to Food

A Lesson on Photosynthesis

Content

Students will perform an experiment to gain a better understanding of what plants need to survive.

National Standards

The following standards will be addressed in the lesson:

Science

Students should develop the abilities necessary to do scientific inquiry.

Students should develop an understanding of organisms and environments.

Students should develop an understanding of changes in environments.

Multiple Intelligences

The following intelligences will be activated throughout the lesson:



Bodily-Kinesthetic



Logical-Mathematical



Naturalist



Visual-Spatial

Prerequisites

Have students read books from the *Nature's Changes* series, such as *Changing Seasons*, *Photosynthesis: Changing Sunlight into Food*, or *Plants in Different Habitats*, before proceeding with the lesson. Particular attention should be paid to the sections that discuss photosynthesis. Before class begins, set up a station in the classroom where students can fill their cups with soil.

Materials

- *Photosynthesis: Changing Sunlight into Food* books
- chalkboard and chalk or whiteboard and markers
- potting soil
- three paper cups per student
- three bean or other fast-growing seeds per student
- water
- student copies of the *From Sunlight to Food* reproducible

Instructional Procedure

Anticipatory Set

Have students review page 6 of *Photosynthesis: Changing Sunlight into Food*. Ask students to identify the parts of a plant, including roots, leaves, stems, and flowers. Remind students that all living things need food to stay alive.

Class Discussion

Write the term *photosynthesis* on the board. Explain to students that photosynthesis is the process by which plants use sunlight to make food. Then ask students to name the other things plants need for photosynthesis. (water, carbon dioxide, and nutrients from soil) List student responses on the board. Invite students to think about what might happen if a plant can not get all these things. Review the steps of photosynthesis with students.

Objectives

The student will be able to...

- define *photosynthesis*
- identify the stages of photosynthesis
- work in small groups to conduct an experiment

Activity

Part I

Distribute three seeds, three paper cups, and a copy of the *From Sunlight to Food* reproducible to each student. Students should write their names on each cup. Have small groups of students go to the soil station to fill their cups with soil. After returning to their seats, have students plant one seed approximately one-inch deep in each cup. Students should gently pat the soil over the seeds. Then have students carefully water their seeds until the soil is completely damp. Place two of each student's cups in a sunny location in the classroom, and place the other cup in a dark area of the classroom. Have students predict what will happen to each seed. Instruct them to write their predictions on the reproducible.

Students should water their plants as necessary throughout the remainder of the project.

Part II

After the seeds have sprouted, have students examine their plants. Have students compare their predictions to what actually happened. Then have students place one of their plants in a dark area of the classroom. They should place the other in a sunny location. Have students make predictions about what will happen to each plant.

Part III

After several days, have students examine their plants once again. Have students compare their predictions to what happened to the plants. Then have them complete the reproducible.

Accommodations and Extensions

If students have difficulty predicting what will happen to the plants placed in darkness, have them review how photosynthesis works by reading page 9 of *Photosynthesis: Changing Sunlight into Food*. Explain that most plants cannot make food without sunlight.

As an extension, have students remove one of their bean plants from its cup and label its parts.

Closure

Have students discuss why they believe the plant could not thrive without sunlight. Review the steps that take place during photosynthesis.

Assessment

Evaluate reproducibles for understanding. Students may not have been able to predict outcomes correctly, but explanations should reflect an accurate understanding of photosynthesis.

Terrarium Time!

A Lesson on the Water Cycle

Content

Students will reinforce their understanding of the water cycle by creating a terrarium.

National Standards

The following standards will be addressed in the lesson:

Science

Students should develop an understanding of organisms and environments.

Students should develop an understanding about scientific inquiry.

Social Studies

The learner can work independently and cooperatively to accomplish goals.

Multiple Intelligences

The following intelligences will be activated throughout the lesson:



Bodily-Kinesthetic



Naturalist



Visual-Spatial

Prerequisites

Have students read *Changing Weather: Storms* or *The Water Cycle* before proceeding with the lesson. Particular attention should be paid to the sections that discuss the water cycle.

Punch small holes in the lid of each jar for students.

Materials

- chalkboard and chalk or whiteboard and markers
- sample terrarium
- glass jars with lids for each student
- small rocks
- soil
- small shade-loving plants, such as ferns or moss
- spoons
- water
- permanent marker
- masking tape
- student copies of the *Terrarium Time!* reproducible

Instructional Procedure

Anticipatory Set

Before class begins, prepare a sample terrarium following the instructions listed in *Activity Part I*. Hold up the terrarium for students to see. Ask if students can identify what you are holding. Explain that a terrarium is an enclosed environment that provides everything the plants inside of it need to survive.

Class Discussion

Create a flow chart on the board showing the steps of the water cycle.

Heat from the sun changes water into water vapor.



Water vapor in the air forms clouds.



Water in the clouds cools and falls back to Earth as rain or snow.



Water from rain falls into lakes, oceans, and rivers. Heat from the sun will then change the water into water vapor again.

Discuss each step of the water cycle with students.

Objectives

The student will be able to...

- identify steps in the water cycle
- create a terrarium

Activity

Part I

Distribute a glass jar with lid, rocks, soil, small plants, and a spoon to each student. Have students fill the bottoms of their jars with one inch of small rocks. Then have them add in two to three inches of soil. Students should dig small holes with the spoon and secure the plants in place, patting the soil on top of the roots. Then water the plants until the soil is damp. Have students place the lids on their jars. Give each student a piece of masking tape on which to write his or her name. Place the tape on the bottom of the terrarium. Terrariums should then be placed in an area of the classroom that receives partial sunlight. Distribute the *Terrarium Time!* reproducible and have students complete the first section.

Part II

After several days, have students retrieve their terrariums. Have students observe the changes that have taken place and complete the second section of the reproducible.

Accommodations and Extensions

As an accommodation, have students work in small groups to create the terrarium and complete the reproducible.

As an extension, students can research how different terrain, such as mountains or deserts, affects the water cycle. Have students write an article discussing their findings.

Closure

Explain how the terrarium demonstrates the water cycle in action. Then have students discuss the effectiveness of their terrariums. Ask, *Is there anything you could have done to make the terrarium better? Why is it important to select small plants that need a lot of water?* (The terrarium is a very small and moist environment.) *What type of environment did we create?* (a rainforest environment) *What materials could we use to create a desert terrarium?* (rocks, sand, a cactus)

Assessment

View student terrariums to make sure directions were followed accurately. Evaluate student answers on the reproducible for understanding of the water cycle.

Saving Our Planet

A Lesson on Global Warming

Content

Students will gain a better understanding of the causes of global warming and some of its consequences. Students will then apply conservation principles to create posters informing other students how they can help prevent global warming.

National Standards

The following standards will be addressed in the lesson:

Science

Students should develop an understanding of changes in environments.

Social Studies

The learner can explore causes, consequences, and possible solutions to persistent, contemporary, and emerging global issues, such as pollution and endangered species.

The learner can consider existing uses and propose and evaluate alternative uses of resources and land in home, school, community, the region, and beyond.

Multiple Intelligences

The following intelligences will be activated throughout the lesson:



Interpersonal



Verbal-Linguistic



Visual-Spatial

Prerequisites

Students should read *Changing Weather: Storms* to familiarize themselves with the concept of global warming.

Materials

- chalkboard and chalk or whiteboard and markers
- poster board
- markers
- student copies of the *Saving Our Planet* reproducible

Instructional Procedure

Anticipatory Set

Ask students where they have heard of global warming. Explain that today they will discuss the causes of global warming, such as the burning of fossil fuels.

Class Discussion

Ask the class: *How does burning fuel heat Earth's atmosphere?* (When fuel is burned, it creates pollution that traps heat in Earth's atmosphere.) *What are some of the dangers of global warming?* (bigger storms) Encourage students to think about examples not mentioned in *Changing Weather: Storms*, such as climate change and rising sea levels. Have students name ways in which they use fossil fuels, such as riding in their family's car or using electricity. Then have students brainstorm ways they can conserve energy. List students' responses on the board.

Objectives

The student will be able to...

- identify causes and consequences of global warming
- work in small groups to create posters
- present ideas to the class

Activity

Divide students into small groups and distribute art supplies. Have students work together to identify one way they can help conserve resources to prevent global warming. They should then design a poster to encourage other students to help. The poster should explain the dangers of global warming, explain how producing or using the resource contributes to global warming, and suggest how students can conserve the resource. Posters should be visually appealing and present information accurately. Be sure to go over expectations for the project by presenting the information on the *Saving Our Planet* reproducible.

When they have finished their posters, have volunteers present their posters to the class. Allow students to ask questions as ideas are being presented. Display posters throughout the school.

Accommodations and Extensions

If students are unfamiliar with activities that contribute to global warming, review specific examples with them. Suggest ways in which they might conserve resources to prevent global warming.

As an extension, have students research specific activities in their area that contribute to global warming, or organizations that work to correct it. Students can then present their findings to the class.

Closure

List the ideas for conservation that students presented on the board. As a class, take a vote on which policy students would like to put into action in the classroom. Have students brainstorm practical ways they can do it.

Assessment

Distribute the *Saving Our Earth* reproducible. Have students exchange posters and assess each other's work.

Growing and Changing

A Lesson on Animal Life Cycles

Content

Students will strengthen their understanding of animal life cycles by conducting research in the library.

National Standards

The following standards will be addressed in the lesson:

Language Arts

Students conduct research on issues and interests by generating ideas. They gather, evaluate, and synthesize data from a variety of sources (e.g., print and nonprint texts, artifacts, and people) to communicate their discoveries in ways that suit their purpose and audience.

Students use a variety of technological and information resources (e.g., libraries, databases, computer networks, and videos) to gather and synthesize information and to create and communicate knowledge.

Science

Students should develop an understanding of life cycles of organisms.

Students should develop an understanding of the characteristics of organisms.

Multiple Intelligences

The following intelligences will be activated throughout the lesson:



Bodily-Kinesthetic



Interpersonal



Verbal-Linguistic



Visual-Spatial

Prerequisites

Have students read *Metamorphosis: Changing Bodies* or *Animal Life Cycles: Growing and Changing* before proceeding with the lesson. Students should be familiar with how to use the library database or card catalog and how to check out a book from the library.

Materials

- chalkboard and chalk or whiteboard and markers
- student copies of the *Growing and Changing* reproducible
- paper and pencils

Instructional Procedure

Anticipatory Set

Have students list the many different types of animals they have read about, such as mammals, reptiles, marsupials, marine mammals, birds, and amphibians. Write their animals on the board. Explain that today, the class will study those animals' life cycles.

Class Discussion

On the board, write the steps of the life cycle for one of the animals students suggested. Follow this example for earthworms.

An adult earthworm lays eggs in a cocoon in the soil.



Tiny, white earthworm hatchlings crawl out of cocoon to find food.



Hatchlings grow into juveniles.



Juveniles grow and develop into adults.

Discuss with students the ways in which the life cycles of these different types of animals differ. Now, explain to students that scientists often do research to help them learn more about a topic such as life cycles. Tell students that they will be writing a research report on the life cycle of an animal. Review the major components of a research report with students.

Objectives

The student will be able to...

- identify stages in the life cycles of different types of animals
- work in small groups to conduct research in the library

Activity

In the classroom, have students select an animal about which to research. They may select an animal featured in the *Nature's Changes* series, or they may select a different organism. Then take students to the library to search for books pertaining to their animals. Remind students of the rules they should follow when using the library. Once students have collected enough information, return to the classroom.

Have students write their reports using the *Growing and Changing* reproducible as a guide. Reports should include a description of the animal students chose, along with a detailed description of its life cycle. When each student has completed his or her report, have volunteers present their findings to the class.

Accommodations and Extensions

As an accommodation, place students in mixed-ability groups. Some students may benefit from illustrating and labeling their animal's life cycle rather than writing a report.

As an extension, have students illustrate their report to show what the animal they have chosen looks like at each stage of its development. Give students the option of using a word processing or art program to create their reports.

Closure

Review some of the life cycles students wrote about. Ask, *How are these life cycles the same?* (All animals change as they grow into adults.) *How are they different?* (Some animals lay eggs while others have live births.)

Assessment

Evaluate each student's report for accuracy, understanding of content, and ability to conduct research.

Butterflies Abound

A Lesson on How Butterflies Change

Content

Students will practice scientific inquiry while observing the different stages of a butterfly's life cycle.

National Standards

The following standards will be addressed in the lesson:

Science

Students should develop an understanding of life cycles of organisms.

Students should develop an understanding of the characteristics of organisms.

Multiple Intelligences

The following intelligences will be activated throughout the lesson:



Bodily-Kinesthetic



Interpersonal



Naturalist

Prerequisites

Students should read *Metamorphosis: Changing Bodies* to familiarize themselves with how a butterfly grows and changes before proceeding with the lesson. Before class begins, purchase a monarch butterfly rearing kit, or have students search with adult supervision for a caterpillar to bring to school. Remind students that they need to search for the butterfly's host plant, the milkweed, in order to find a caterpillar. Also, make sure you have a supply of fresh, uncontaminated milkweeds to feed the caterpillar for the length of the project.

Materials

- chalkboard and chalk or whiteboard and markers
- monarch butterfly caterpillar
- large glass jar with lid
- milkweed leaves
- paper towel
- twigs
- student copies of the *Butterflies Abound* reproducible

Instructional Procedure

Anticipatory Set

Write the term *metamorphosis* on the board. Explain its definition. (changing form or shape) Have students think about how a butterfly's body changes shape as it changes from a caterpillar to a cocoon to an adult butterfly.

Class Discussion

Prepare students for the activity by discussing the following questions:

What do monarch caterpillars look like? (They have a long, thin body with black, white, and yellow stripes.)

What do monarch caterpillars eat? (milkweed leaves)

What is a chrysalis? (the hard case that forms around a caterpillar's body)

What does a monarch butterfly look like? (It has orange wings with black lines and white spots.)

(If you choose to use a different type of caterpillar for this project, you should review information relevant to that type of butterfly.)

Objectives

The student will be able to...

- define *metamorphosis* and *chrysalis*
- identify stages in the life cycle of a butterfly

Activity

As a class, prepare the living environment for the caterpillar. Place the caterpillar, a damp paper towel, and several milkweed leaves in a large, wide-mouth jar. Punch several small holes in the lid and place it securely on the jar. Replace the milkweed leaves as necessary, when the leaves have been eaten or become dry. Also, clean the jar frequently to remove caterpillar droppings. You may wish to assign these tasks to groups of students as a special reward. As the caterpillar begins to pupate, place several small twigs in the jar for the caterpillar to climb.

Give students frequent opportunities to observe the caterpillar as it transforms into a butterfly. Then have students complete the appropriate section of the reproducible.

Accommodations and Extensions

As an accommodation, place students in mixed-ability groups to complete the reproducible.

As an extension, monitor students as they use a student-friendly search engine to research the life cycles of different butterflies. Have students create posters to share their findings with the class.

Closure

After the adult butterfly emerges from its chrysalis, have the class release the butterfly outdoors. (You might take the opportunity to reward good class behavior with a “butterfly birthday party” for this event.) Have students discuss what they learned from observing the butterfly as it changed.

Assessment

Check reproducibles for accuracy.

Adapting to the Climate

A Lesson on Different Plant Habitats

Content

Students will practice their researching skills while learning about the different habitats in which plants live. They will also learn how each type of plant has adapted to thrive in its environment.

National Standards

The following standards will be addressed in the lesson:

Science

Students should develop an understanding of organisms and environments.

Students should develop an understanding of the characteristics of organisms.

Students should develop an understanding about scientific inquiry.

Multiple Intelligences

The following intelligences will be activated throughout the lesson:



Bodily-Kinesthetic



Interpersonal



Naturalist



Visual-Spatial

Prerequisites

Have students read *Plants in Different Habitats* before proceeding with the lesson. Students should be familiar with the different types of plants that grow in different habitats.

Materials

- *Plants in Different Habitats* books
- student copies of the *Adapting to the Climate* reproducible
- poster board and art supplies for student groups

Instructional Procedure

Anticipatory Set

Review the book *Plants in Different Habitats* with students. Identify each habitat discussed, and ask students to think about why plants need to adapt to the different environments.

Class Discussion

Prepare students for the activity by discussing the following questions:

What types of plants live in the tundra? (saxifrage, grasses, mosses, and shrubs)

How have these plants adapted to the frozen climate of the Polar regions? (They have shallow roots and grow quickly in the short summers.)

What types of plants live in wetlands? (reeds and sedges)

How can these plants live in water? (They have hollow tubes in their stems that carry air from the parts of the plant that are above water to the parts that are below water.)

Continue reviewing the types of plants that live in different habitats with students. Have them discuss how these plants have adapted to the conditions of their environments.

Objectives

The student will be able to...

- identify different kinds of habitats
- identify the types of plants that live in each habitat
- identify how plants adapt to their environments
- work in small groups to design a poster

Activity

Divide students into small groups. Distribute poster board and art supplies. Assign each group a different plant habitat. Distribute copies of the *Adapting to the Climate* reproducible. Have students complete the reproducible to help them gather and organize their information. Then, have students work together to design posters to display in appropriate areas of the school.

The poster should name and describe the habitat, list plants that grow in the habitat, and describe how these plants have adapted to the habitat. Students should include drawings of the habitat and plants. The posters should be visually appealing and informative.

Accommodations and Extensions

As an accommodation, allow students to list only one type of plant on their poster. Some students may benefit from using a computer to create their posters.

As an extension, have students draw a diagram of one of the plants on their group's poster, correctly labeling all of the parts and pointing out which parts allow for adaptation.

Closure

Compare and contrast the types of plants on student posters in a class discussion. Discuss which plants would grow well in your area and which plants would struggle to survive. Mention to students that some plants, such as houseplants, can survive in more than one habitat.

Assessment

Observe students as they work in groups. Make sure each student is responsible for a portion of the project. Assess posters for neatness, accuracy, and creativity.

Measured Weather

A Lesson on Using Science to Predict the Weather

Content

Students will strengthen their understanding of the weather while learning how to measure temperature, air pressure, humidity, and precipitation levels.

National Standards

The following standards will be addressed in the lesson:

Mathematics

Students should understand attributes, units, and systems of measurement.

Students should apply a variety of techniques, tools, and formulas for determining measurements.

Science

Students should develop abilities necessary to do scientific inquiry.

Students should develop an understanding about scientific inquiry.

Multiple Intelligences

The following intelligences will be activated throughout the lesson:



Bodily-Kinesthetic



Interpersonal



Logical-Mathematical



Naturalist



Visual-Spatial

Prerequisites

Have students read *Changing Weather: Storms* before proceeding with the lesson. Before class begins, set up a weather station that includes some or all of the following: a clock, a thermometer, a barometer, and a hygrometer. If possible, also set up a rain gauge and a weather vane outdoors.

Materials

- chalkboard and chalk or whiteboard and markers
- clock
- thermometer, barometer, and hygrometer
- rain gauge and weather vane (if applicable)
- student copies of the *Measured Weather* reproducible

Instructional Procedure

Anticipatory Set

Write the term *meteorologist* on the board. Explain that meteorologists are scientists who study storms and other kinds of weather. Have students tell when they have seen meteorologists at work, such as on the evening news. Then have them think about what types of information meteorologists provide.

Class Discussion

Display the following for students to see: a thermometer, a barometer, a hygrometer, a rain gauge, and a weather vane. Hold up the instruments one at a time. Explain to students the name of each instrument and what it is used to measure. Then demonstrate how to use each instrument to measure an aspect of weather.

Objectives

The student will be able to...

- define *meteorologist*
- take measurements using a thermometer, barometer, hygrometer, rain gauge, and weather vane
- make predictions based on measurements

Activity

Divide students into small groups and distribute the *Measured Weather* reproducible. Have groups take turns using the instruments to measure the different aspects of weather. Students should write their results on the reproducible. Have students take measurements each day at the same time for five days. Make sure students used appropriate units of measure when writing their answers. After recording their findings on the fifth day, have students make predictions about what the weather will be like on upcoming days.

Accommodations and Extensions

As an accommodation, assist students as they take readings using each instrument at the weather station, or enlist adult volunteers to monitor the station and assist students.

As an extension, students can use the information they gathered to produce a short weather forecast for their local area. Forecasts should include a description of current weather conditions, along with students' predictions for future weather patterns. Students can work in small groups or individually to complete their forecasts.

Closure

Encourage students to continue taking measurements and keeping a daily record of the weather. Discuss with students what these measurements can tell them about the weather.

Assessment

Review reproducibles for accuracy and correct use of units of measure.

Animals in Hiding

A Lesson on Animal Defense Mechanisms

Content

Students will learn about animal defense mechanisms and write creatively to express ideas.

National Standards

The following standards will be addressed in the lesson:

Language Arts

Students use spoken, written, and visual language to accomplish their own purposes (e.g., for learning, enjoyment, persuasion, and the exchange of information).

Science

Students should develop an understanding of organisms and environments.

Multiple Intelligences

The following intelligences will be activated throughout the lesson:



Interpersonal



Naturalist



Verbal-Linguistic

Prerequisites

Students should read *Camouflage: Changing to Hide* or *Changing Seasons* to familiarize themselves with animal defense mechanisms before proceeding with the lesson. Review the major components of a short story with students, including characters, setting, and plot.

Materials

- chalkboard and chalk or whiteboard and markers
- writing paper
- student copies of the *Animals in Hiding* reproducible

Instructional Procedure

Anticipatory Set

Write the terms *predator* and *prey* on the board. Explain the definition of each term. Then have students name examples of predators and their prey. (cats and mice; birds and fish, etc.) List student responses on the board.

Classroom Discussion

Ask students to think about some of the animals described in the *Nature's Changes* series. Have students name different ways animals hide from predators, such as mimicking their surroundings or having eye spots that confuse their predators. List student responses on the board. Discuss with students how each animal uses camouflage to protect itself from predators.

Objectives

The student will be able to...

- define *predator* and *prey*
- identify various animals and their defense mechanisms
- work in small groups to create short stories

Activity

Place students in pairs and distribute writing paper. Tell students to imagine they are one of the animals from the book *Camouflage: Changing to Hide*. Have students work together to write a short story describing a day in the life of an animal. Stories should describe where the animal lives, what the animal eats, and how the animal protects itself and its offspring from predators. Be sure to go over expectations for the story by presenting the information on the *Animals in Hiding* reproducible.

Accommodations and Extensions

As an accommodation, have students use books from the *Nature's Changes* series as references for writing their stories. Review vocabulary terms as necessary.

As an extension, have students illustrate their stories. Animals and their habitats should be as realistic and accurate as possible. Students could also act out their stories in front of the class.

Closure

Have volunteers read their stories to the class. Have students listen carefully to identify how each animal uses camouflage to protect itself.

Assessment

Have students use the *Animals in Hiding* rubric to check each other's work.

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From Sunlight to Food

Directions: Answer the questions.

Part I

1. What do you think will happen to the seed that gets sunlight? _____

2. What do you think will happen to the seed that is in the dark? _____

Part II

1. What happened to each of the seeds? _____

2. Why do you think things happened the way they did? _____

3. What do you think will happen to the plant that is in the dark? _____

Part III

1. What happened to the plant that was in the dark? _____

2. What does this result tell you about photosynthesis? _____

Terrarium Time!

Directions: Answer the questions.

Part I

1. What does a plant need to grow? _____

2. How do you think the plant will get the water it needs if you don't water it?

Part II

1. What changes have you noticed in your terrarium?

2. How does the terrarium show the phases of the water cycle?

Saving Our Planet

Directions: Review your classmate's poster. Then read each question. Write an X in the box for your answer. Write additional comments on the bottom of the page.

Classmate's name _____

	Yes	No
Does the poster explain what the dangers of global warming are?		
Does the poster tell of a natural resource, like a fossil fuel?		
Does the poster explain how making or using that natural resource adds to global warming?		
Does the poster tell ways you can save or conserve (use less of) that resource?		
Is the poster neat and clear?		
Are all the words spelled the right way?		

Growing and Changing

Directions: Answer the following questions to help you write your report.

1. What animal are you researching? _____

2. What books you will use to research the animal's life cycle?

3. What habitat does the animal live in, and what does it eat? _____

4. Does the animal use camouflage to catch prey or to protect itself from predators?

5. What are the stages of the animal's life cycle?

Butterflies Abound

Directions: Answer the questions.

Part I

1. What does the caterpillar look like? _____

2. What does the caterpillar doing during the day? _____

Part II

1. As it forms its chrysalis, what does the caterpillar look like? _____

2. Describe the chrysalis. What's happening to the caterpillar inside it? _____

Part III

1. How did the chrysalis change before the butterfly emerged? _____

2. How has the caterpillar's body changed? _____

Adapting to the Climate

Directions: Answer the questions to help your group design your poster.

Part I

1. What is the name of your habitat? _____

2. Describe the environment of this habitat. _____

3. What types of plants live in this habitat? Name two or three. _____

4. How have the plants had to adapt to this habitat? Give at least two examples.

Measured Weather

Directions: Fill in the blanks. Then record your measurements in the table below.

1. You measure temperature by using a _____.
2. You can use a _____ to measure air pressure.
3. A _____ measures humidity.
4. An outdoor _____ _____ will help you measure precipitation.

	Day 1	Day 2	Day 3	Day 4	Day 5
Date					
Time					
Temperature					
Barometric pressure					
Humidity					
Precipitation type					
Precipitation amount					
Wind direction					

5. What do you think the weather will be like on Day 6? Why? _____

Animals in Hiding

Directions: Read your classmate's story. Then read each question below. Write an X in the box for your answer. Write additional comments at the bottom of the page.

Classmate's name _____

	Yes	No
Does the story tell about a day in the life of an animal?		
Does the story tell you where the animal lives?		
Does the story tell you what the animal eats?		
Does the story tell you how the animal uses camouflage to protect itself and its offspring (its babies)?		
Is the story fun to read?		
Are all the words spelled correctly?		