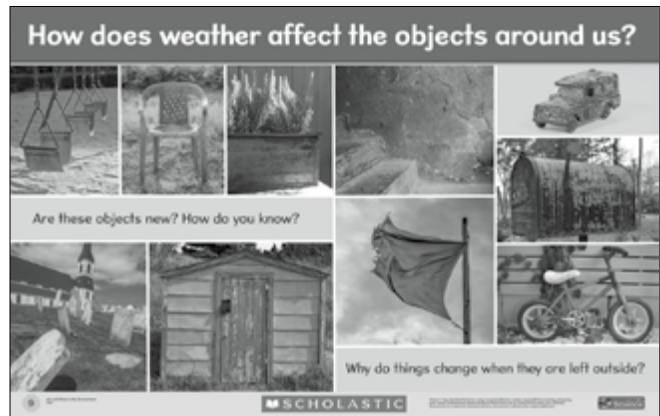


Protection from Different Weather Conditions



Focus: Students will explore and describe how weather affects objects and materials, and investigate ways to protect objects and materials under different weather conditions.

Specific Curriculum Outcomes

Students will be expected to:

- 17.0 explore the effects of weather on objects and materials [GCO 1/3]
- 18.0 investigate ways to protect objects and materials under different conditions [GCO 1/3]
- 19.0 select and use materials to carry out their own explorations and investigations [GCO 2]

Performance Indicators

Students who achieve these outcomes will be able to:

- describe and explain the changes that occur in objects and materials left outside
- suggest ways to protect objects and materials from particular weather conditions

NOTES:

Attitude Outcome Statements

Encourage students to:

- consider their observations and their own ideas when drawing a conclusion [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- speak and listen to explore, extend, clarify, and reflect on their thoughts, ideas, feelings, and experiences [GCO 1]
- interpret, select, and combine information using a variety of strategies, resources, and technologies [GCO 5]

Getting Organized

Components	Materials	Before You Begin	Vocabulary
• Science Card 8 • <i>The Little Knight Who Battled the Rain</i> (Read Aloud) • Science Card 7 (optional) • Science Card 9	• coloured construction paper (sheets) • common and galvanized nails • rust protection coatings • craft sticks • paint and/or wood stain • leather swatches • plain fabric and waxed fabric • protective spray, such as Armor All • students' Science Folders • small squares of dark- and light-coloured construction paper • digital camera (optional)	• Survey an area around your school to find weathered human-made and natural objects and materials (e.g., rust, peeling paint, rotted wood, cracked concrete, or tattered fabrics). You may wish to add some weathered objects for students to find. • Create a list of clues describing objects and materials for the Scavenger Hunt. Alternatively, prepare copies of a numbered map identifying a material or object at each stop. • Gather pictures or articles about a recent extreme weather event in your region and invite someone from the community who remembers the event or an expert, such as a meteorologist, to add insight.	• weathering • rust • waterproof

Science Background

- Weathering is the changes that occur in materials and objects exposed to changes in moisture, air movement, and air temperature (weather). Eventually, weathering results in the breakdown of materials either into smaller parts (e.g., when paint breaks down) or changes to another chemical substance (e.g., the oxidation of metals such as iron).
- The rate of weathering can be decreased by reducing the contact of materials and objects with weather changes. For example, paints and stains keep moisture from penetrating wood, synthetic coatings are added to fabrics to make them wind- or moisture-resistant, and objects may be wrapped in waterproof substances such as plastic sheeting to protect against both wind and moisture.
- Weathering due to acid rain can be (and in many areas has been) reduced by eliminating or reducing the sources of pollution that contribute to making rain acidic.

Possible Misconceptions

- Students may think weathered objects are dirty, and imagine they can be restored by washing. They may explain weathering of objects as the result of not taking care of the object. Explain to students that weathering is a natural process when objects and materials are left outside under different weather conditions.

ACTIVATE



Dressing for Weather Conditions

Remind students that when weather conditions change, it can affect us. It can get warmer or cooler, drier or wetter, more still or windy. Share Science Card 8 with the students, and have them answer the questions: *What kind of weather is the clothing designed for? How does each item protect you?* You might also invite students to show to their classmates any items of clothing they wore today that offer protection from the air conditions (weather). Ask:

- **What would you wear on a hot, sunny day?**
- **What would you wear on a cold, snowy day?**
- **What would you wear on a warm, windy day?**
- **What would you wear on a cool, rainy day?**
- **Why is it important to wear clothing that protects you from the weather conditions?**

CONNECT

Read Aloud: *The Little Knight Who Battled the Rain*



Summary

The little knight isn't afraid of anything, except rain! Rain makes his armour rust. But when a tremendous rain storm with violent winds lasts for 39 days and strands the villagers in their treetop homes, the little knight must overcome his fear to save his village.

Before Reading

Ask students to think of a time that the weather interrupted their plans for something special (e.g., rain during an outdoor party or strong wind on a picnic). If student have difficulty thinking of anything, share a story about changing air conditions (temperature, wind conditions, moisture or precipitation) that you weren't prepared for, such as low temperature on a hike or having clothes on the clothesline when it started to rain.

Tell students that you will be reading a story about a huge rain storm in a special village. Ask them to listen as you read aloud to discover what effects the storm had on the village and to think about how the people could protect themselves from these air conditions in the future.

During Reading

As you read the story to students, pause frequently to discuss the text and illustrations. Alternate between asking students to respond in a whole group or with a partner. Prompts for discussion could include:

After viewing the first page of small illustrations:

- **Why do you think the little knight wears armour?**
- **What is armour made of?**

After reading and viewing the next two pages:

- **What is the only thing that the little knight is afraid of?** (rain)
- **What affect does the rain have on his armour?** (makes it rust)
- **Why might rusty armour be a problem?**

After looking closely at the illustration of the village in the treetops:

- **What is special about the little knight's village? How is it different from other places people live?**
- **What would it feel like to live in a village built in the treetops? How might the air feel?** (If necessary, remind students of the imagination walks they took for the scenarios on Science Card 7 and how the air felt in each scenario.)
- **Why are ladders important to a village in the treetops?**
- **What other ways might the people get to their homes from the ground? What do you think would be the best way to reach their homes?**



After reading about and viewing the image of the storm:

- **What would the air feel like during the storm?**

After reading the next two pages:

- **What does the little knight do when he is afraid?**
- **Why do you think eating chocolate cake makes him feel better?**

After reading the next two pages about the ladders:

- **What affect do the strong winds have on the village?** (breaks and blows the ladders away) **Why is this a problem?**

After reading and viewing the next four pages, ending when the little knight promises a solution:

- **What does the air feel like after the storm ends and the light rain is falling?**
- **What new problem do the villagers have?**

After reading and viewing the next six pages, ending when the little knight bakes chocolate cakes:

- **What idea does the little knight have to save the village?**
- **How do you think the cats and birds can help him?**

After reading about the delivery of the chocolate cake to the villagers:

- **How do you think the villagers will solve the problem of being stranded at the top of the trees?**

After reading and viewing the next two pages:

- **What did the villagers do? Was this one of the ideas we had for reaching the houses?**
- **How else might they protect their homes from strong winds?**

After reading the rest of the text:

- **Why do you think the little knight is no longer afraid of the rain?**

After Reading

Ask students to think about the effects of the wind and the rain in the story. Discuss how the villagers could protect themselves from these conditions in the future. Provide prompts such as:

- **What should the little knight do when he goes out in the rain?** (protect his armour)
- **How could the little knight protect his armour from rusting?**
- **How can the villagers keep their ladders from being blown away again?**
- **Are some materials better than others for being made into ladders? Why do you think so?**
- **Do you think it is a good idea to build a village in the treetops? Why or why not?**



Scavenger Hunt

Hold a class discussion to engage students' previous knowledge of weather. Hold a brief discussion to find out how students think weather affects objects and materials. Introduce the term "weathering" and add it to the Word Wall.

Share Science Card 9 with the class. Have students share their ideas about how weather affects the objects and materials shown. Ask:

- **Are these objects new? How do you know?**
- **Why do things change when they are left outside?**
- **How does paint change on things that are left outside?**

Tell the class that they are going to go on a scavenger hunt to find objects and materials that have been out in the weather (e.g., rusted metals, peeling paint, rotted wood, cracked concrete, tattered or faded fabric). The scavenger hunt should be confined to a particular area around the school. Give each student or small group a list of clues about items to find. The clues should describe how the object/material has been affected by weather. For example, the clue for fabric might be "The wind and rain have worn me out." Alternatively, provide a numbered map, and have students find the weathered object/material at each stop on the map. Students may take a picture or make a drawing of the weathered objects and materials they find. Ask students to explain what conditions caused the weathering of each of the objects and materials.

Fading Away

Hold up a piece of coloured construction paper and wonder aloud if the weather can affect paper. Allow students to respond and record their predictions on a chart. Ask:

- **How can we test these predictions? What should we do to the paper?**

Allow students to come up with suggestions, and follow up on any that are reasonable. For example, students might tape a piece of construction paper in a sunny window, or sprinkle water on a piece to model rainfall. Students can sketch or take pictures of the results of their investigations. Invite students to share their results and make conclusions about how weather can affect paper. Remind students to store the pictures in their Science Folders.



Protection From the Weather

Now that students have observed how various weather conditions can affect objects and materials, invite them to generate questions about how they could protect these items. Provide prompts such as:

- **How can objects be protected from rust?**
- **How can we keep objects and materials dry?**
- **How can we protect against sun damage?**

Gather a variety of materials for students to investigate different ways to protect objects and materials from the effects of particular weather

conditions (moisture and sun/heat damage). Small groups of students can choose objects or materials to investigate and make a plan for testing their items. If students need more assistance, the investigations could be completed for one test at a time with the whole group.

Moisture:

- **Rust** – Students can test common versus galvanized nails in water. Encourage students to investigate various coatings to reduce or prevent rusting of the nails.
- **Warping and rotting** – Students can compare untreated craft sticks with sticks that have been painted, stained, or treated.
- **Water repellant** – Students can test how water repellant untreated leather is vs leather that has been treated with a protective spray. Or, students may choose to test plain fabric vs fabric that has been treated with a wax coating.

Sun or heat damage:

- **Sun damage** – Students can test to compare dark- vs light-coloured construction paper to model degrees of plastic and fabric colour fading.
- **Sun and heat damage** – Students can test untreated leather and plastic vs pieces treated with Armor All or another protectant to model damage to cars.



While students are investigating, encourage them to think about new questions they have about protecting objects and materials from the weather. These questions can be recorded on sticky notes or cards and attached to the I Wonder Wall. Invite each group to share with the class what they learned about protecting objects and materials from different weather conditions.

CONSOLIDATE

Weathered Objects

Revisit the small objects that have been kept outside since the beginning of the unit. Ask:

- **Do any of the objects show signs of weathering?**
- **What weather conditions may have caused the changes?**

Bring the objects back to the classroom several more times over the course of the school year and invite students to examine them for change. You may wish to have students take digital pictures to show the progression of weathering. Discuss what could have been done to protect the objects from the weather.

EXPLORE MORE

Extreme Weather Conditions

Share with students pictures or articles about a recent extreme weather event in your region (e.g., an ice storm, severe thunderstorm, hurricane, or flooding). If you experienced the event personally, share your memories of it. If not, you might invite someone from the community who remembers the event or have an expert, such as a meteorologist, visit the classroom to add insight. Ask class members if they have ever had experiences with a really big storm. Give students the opportunity to share. Start and keep a KWLN chart on the topic of extreme weather.

After the discussion and/or class visit, ask students what else they would like to know about extreme weather events. Record suggestions on the KWLN chart. Divide the class into groups of three to four students. Direct each group to choose one question from the KWLN chart they would like to research. Provide access to relevant books and Websites. Allow students to choose how they will present their findings to the rest of the class; for example, as an oral presentation, a poster, or a dramatic skit. After each group has made their presentation, add any new information or make revisions to the KWLN chart. Encourage students to add any new questions to the I Wonder Wall.

