Content Spotlight:
Integrating Crosscutting Concepts

Britannica Expedition:LEARN!

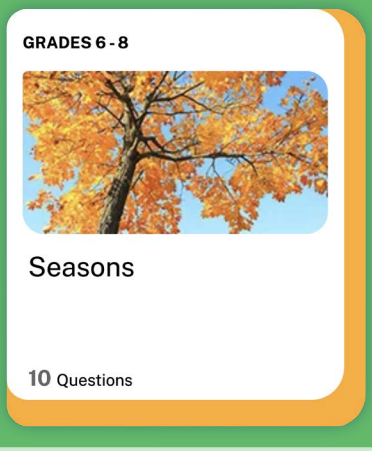
What does fall make you think of? Back to school? Cooler temperatures? Pumpkin spice? The progression from summer to fall is a familiar pattern, whether you welcome the change or wish summer could hold on just a little bit longer.

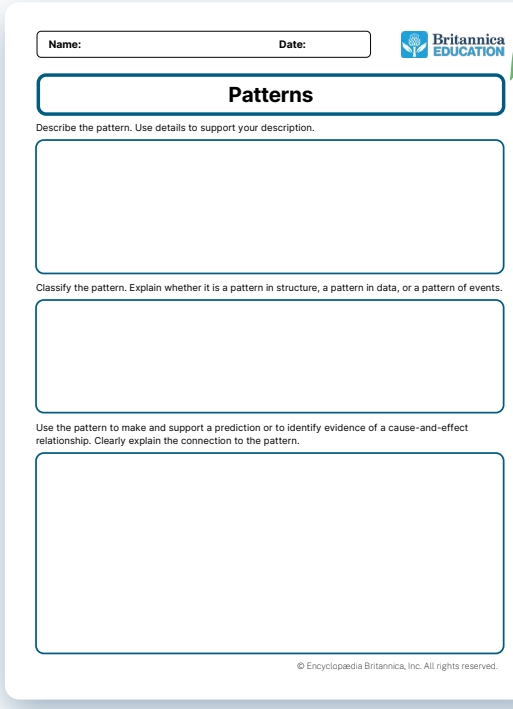
Seasonal changes also provide an accessible and observable entry point to the concept of patterns. In middle school science, students are expected to recognize and analyze patterns in seasonal changes, molecular structures, waves, embryological development, and plate motion—just to name a few. They're expected to utilize patterns to make predictions and recognize cause-and-effect relationships.

That might sound daunting, but pairing Expedition: Learn! lessons with Teach Britannica resources provide a ready-to-use solution for promoting understanding of crosscutting concepts, such as patterns.

Check out how Britannica experts teach the featured lesson!

Expedition: Learn! is an instructional platform with standards-aligned, interdisciplinary lessons that build content knowledge, reading comprehension, and critical thinking skills. Explore how our experts utilize the *Seasons* lesson to help students identify and analyze patterns.





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Patterns

Describe the pattern. Use details to support your description.

Classify the pattern. Explain whether it is a pattern in structure, a pattern in data, or a pattern of events.

Use the pattern to make and support a prediction or to identify evidence of a cause-and-effect relationship. Clearly explain the connection to the pattern.

In Practice
Identify and Analyze Patterns

Dig in on p. 4!

Use our **Patterns graphic organizer** to help students identify and analyze patterns described in the featured lesson, or one of the related lessons linked on page 3. Each of the linked lessons focuses on patterns.

- As students read the lesson, have them identify a pattern described in the text or shown in an image, diagram, or graph. Have them describe the pattern in detail in the first section of the graphic organizer.
- Explain that patterns in science fall into three main groups: patterns in structure, patterns in data, or patterns in events. Have students classify the pattern they've described.
- Then have students use the pattern they've identified as evidence of a cause-and-effect relationship or to make a prediction.
- Check out how our experts use it with the featured lesson in the Classroom Guide!

Learn more:
britannicaeducation.com/expedition-learn

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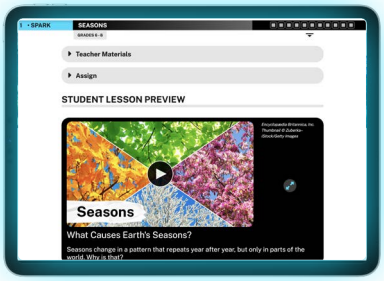
Classroom Guide
Integrating Crosscutting Concepts

Britannica Expedition:LEARN!

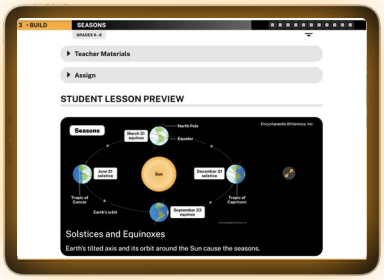
Spark

- Play the **Spark** video and allow students time to answer the question. Ask students to share and discuss their responses with a small group.
- Use the Teach Britannica **Linked Words** instructional strategy to help students connect new vocabulary with familiar words. Provide students with the graphic organizer and have pairs work together to complete the activity. Then have volunteers share their finished organizers with a small group or as part of a whole class discussion.



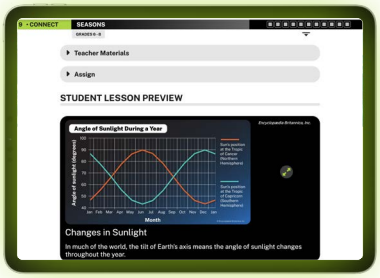
Build

- Encourage students to make notes on patterns they observe as they read. Distribute the **Patterns graphic organizer**. Invite students to select one pattern described in the lesson as the focus of their graphic organizer.
- After students complete each **Build** page, pause to allow students to complete the assessment questions. Note that the skill tags shown on the assessment items in the teacher view will help you identify questions specifically focused on patterns throughout the lesson.
- Assess comprehension with a class discussion by asking students:
  - Why can people predict what season happens next?
  - What causes seasonal patterns of change?
  - How are patterns of change in the angle of sunlight related to seasons?
- Invite students to complete the second part of the Patterns graphic organizer.



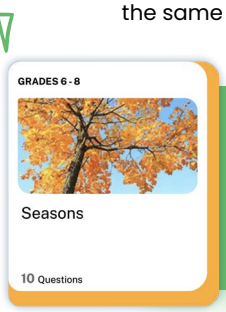
Connect

- **Model:** Display **Connect question 7** and model how to apply the information from the articles to interpret the model on the page. Talk through each answer choice, sharing your thinking as you eliminate incorrect responses and identify correct responses.
- **Guided Practice:** Display **Connect question 8** and explain that patterns can be used to identify cause-and-effect relationships. Have students turn and talk to a partner to apply the information about patterns from the articles to determine the effects that would occur if Earth's axis was not tilted. Invite students to share their responses.
- **Independent Practice:** Allow students time to complete **Connect questions 9 and 10** independently. After responses are submitted, have students complete the last part of the Patterns graphic organizer.



Learn More

- In the final section of the lesson, students are invited to explore additional Britannica resources related to the lesson content. For example, from the article "Season," students learn about the cyclic pattern and characteristics of the seasons and the apparent change in the Sun's position due to Earth's tilt and motion.
- After students have completed the reading, use the following questions in a whole-class discussion:
  - How would you describe each season?
  - How do seasons affect living things?
  - Do the Northern and Southern Hemispheres experience the same seasons at the same time? Why or why not?



Keep the exploration going! Discover these resources and more in Expedition: Learn! on Teach Britannica.

Extend

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Write a Story from Earth's Perspective

- Have students imagine they are Earth and write a story about the patterns of seasonal change Earth undergoes. The story should be told from Earth's point of view as it moves around the Sun. Students should include information about Earth's hemispheres, rotation, revolution, axis, and tilt.

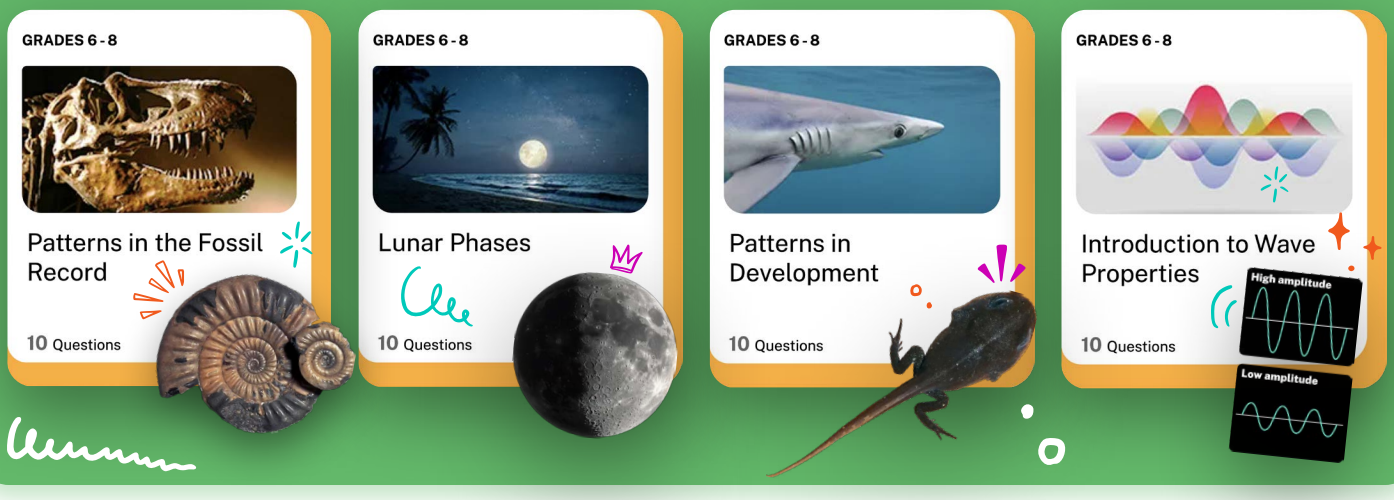
Research Other Planets

- Have students work in small groups to pick one of the other planets in our solar system and research the angle of its tilt on its axis, how long it takes to revolve around the Sun and rotate around its axis, the length of a day and the length of a year, and what the seasons are like and how long they last. Have students present their findings to the class.

Make a Model

- Have each student make a diagram or, if possible, a 3D model using small spheres to show Earth's revolution around the Sun, the tilt of Earth's axis, and Earth's rotation around its own axis. Ask students to explain how their diagram or model shows patterns of seasonal change associated with the seasons in parts of Earth away from the Equator.

Continue the *Expedition* with these related lessons!



Learn more:
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Sample Student Answers

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Patterns

Describe the pattern. Use details to support your description.

There is a pattern of change in the angle of sunlight over time. Over a year, the angle of sunlight increases from January to mid-June, then decreases from mid-June to December.

Classify the pattern. Explain whether it is a pattern in structure, a pattern in data, or a pattern of events.

The change in angle of sunlight is a pattern in data.

Use the pattern to make and support a prediction or to identify evidence of a cause-and-effect relationship. Clearly explain the connection to the pattern.

This pattern can be used to make predictions. Because the angle of sunlight affects how the energy in sunlight strikes Earth, it has a direct impact on temperatures. So, using data about the pattern in the angle of sunlight, I can make predictions about patterns of temperature. For example, I would predict that temperatures would generally increase January to mid June, then decrease from mid-June to December.