

GRADE 4

# Energy Conversions

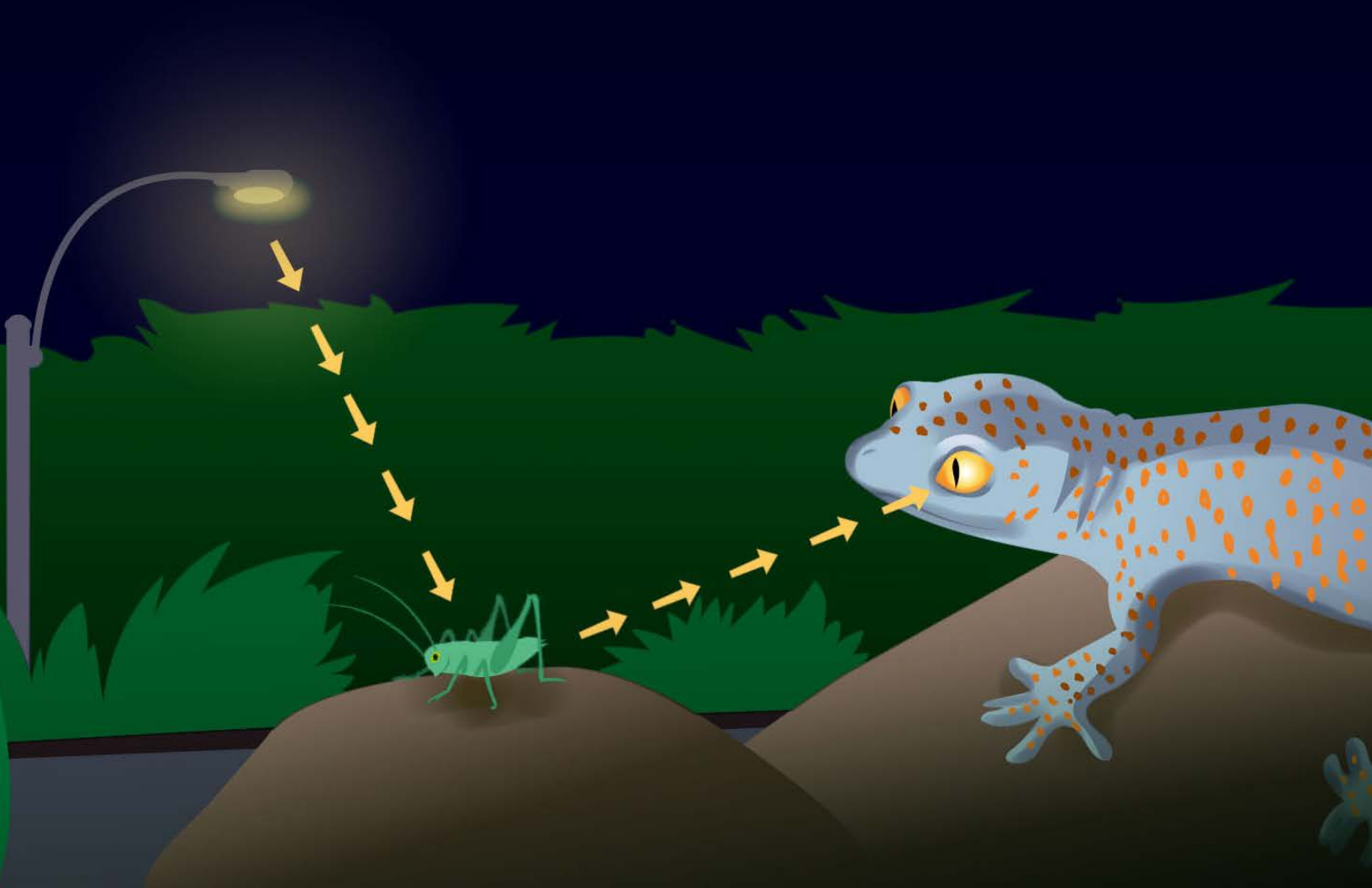
## Unit storyline

Students take on the roles of systems engineers for Ergstown, a fictional town that experiences frequent blackouts, and explore the reasons why an electrical system can fail. Students apply what they learn to choosing new energy sources and energy converters for the town, and then they prepare arguments for why their design choices will make the town's electrical system more reliable.

## Featured activity: Designing Wind Turbines (Lesson 3.4)

In Lesson 3.4 students are introduced to their first hands-on design challenge: to design and build a wind turbine. Students receive two proposed solutions to the blackout problem in Ergstown, both of which are intended to bring more energy to the electrical system: installing solar panels or installing wind turbines. In order to make an informed choice between the two proposed solutions, students are given a design challenge: to build a wind turbine that meets certain design criteria. Students then engage in the design cycle as they explore the available materials and plan, make, and test their wind turbine designs.





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# Vision and Light

## Unit storyline

Working as conservation biologists, students figure out why a population of Tokay geckos has decreased since the installation of new highway lights in the rainforest. Students use their understanding of vision, light, and information processing to figure out why an increase in light in the geckos' habitat is affecting the population. Then students turn their attention to humans by designing their own investigations in order to learn more about how our senses help us survive.



## Featured activity:

### Sense Investigation (Lessons 5.1–5.2)

In Lesson 5.1 of *Vision and Light*, students explore their own senses in order to understand how humans use their sensory structures to help gather information about their environment. Students use their sensory structures as they examine the provided materials. They then choose either hearing, touch, or smell to design an investigation about their structures and receptors that are involved in one sense. In the next lesson, they complete this investigation.



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# Earth's Features

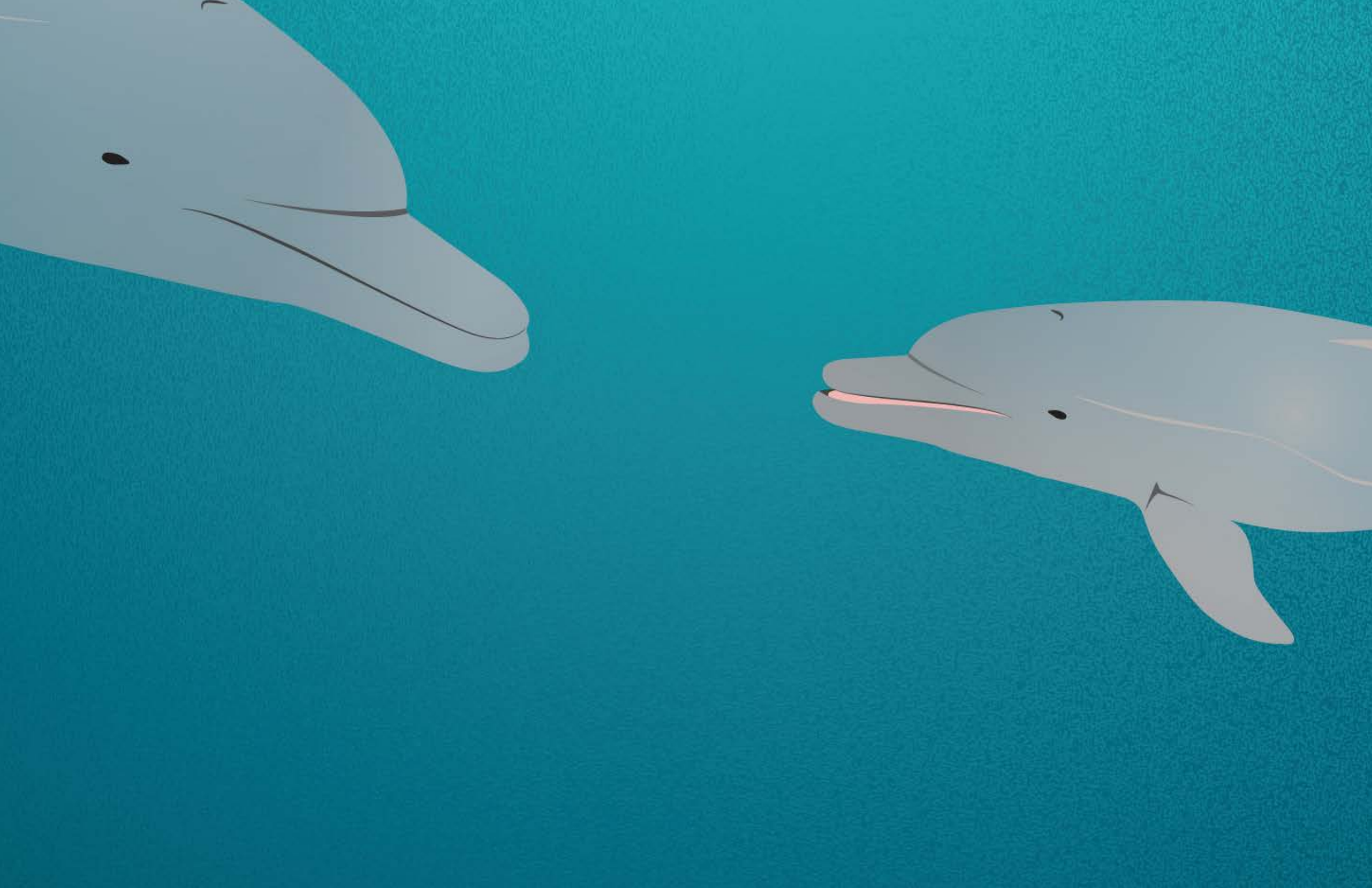
## Unit storyline

Playing the role of geologist, students help the director of Desert Rocks National Park explain how and when a particular fossil formed and how it came to be in its current location. Students figure out what the environment of the park was like in the past and why it has so many visible rock layers.

## Featured activity: Erosion Model (Lessons 4.3–4.4)

In Lesson 4.3 of *Earth's Features*, students use a stream table to investigate the question, "What affects the amount of rock that water can erode?" Students first narrow their focus to investigating one of the factors that affects erosion — the amount of time water flows over rock. Students determine how to use the Erosion Model to test how the amount of time a river flows affects erosion. The teacher prepares the model and students observe and record what happens.





FLEX

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# Waves, Energy, and Information

## Unit storyline

Students take on the roles of marine scientists investigating how bottlenose dolphin mothers and their calves in the fictional Blue Bay National Park use patterns of sound to communicate across distances, which serves as the anchor phenomenon for this unit.



## Featured activity: Designing Musical Instruments

Students design and make their own musical instruments, and then compose short songs with their instruments. They apply their understanding of the relationships between pitch and wavelength, and volume and amplitude, to draw waveforms of the sound waves produced when they play their songs.