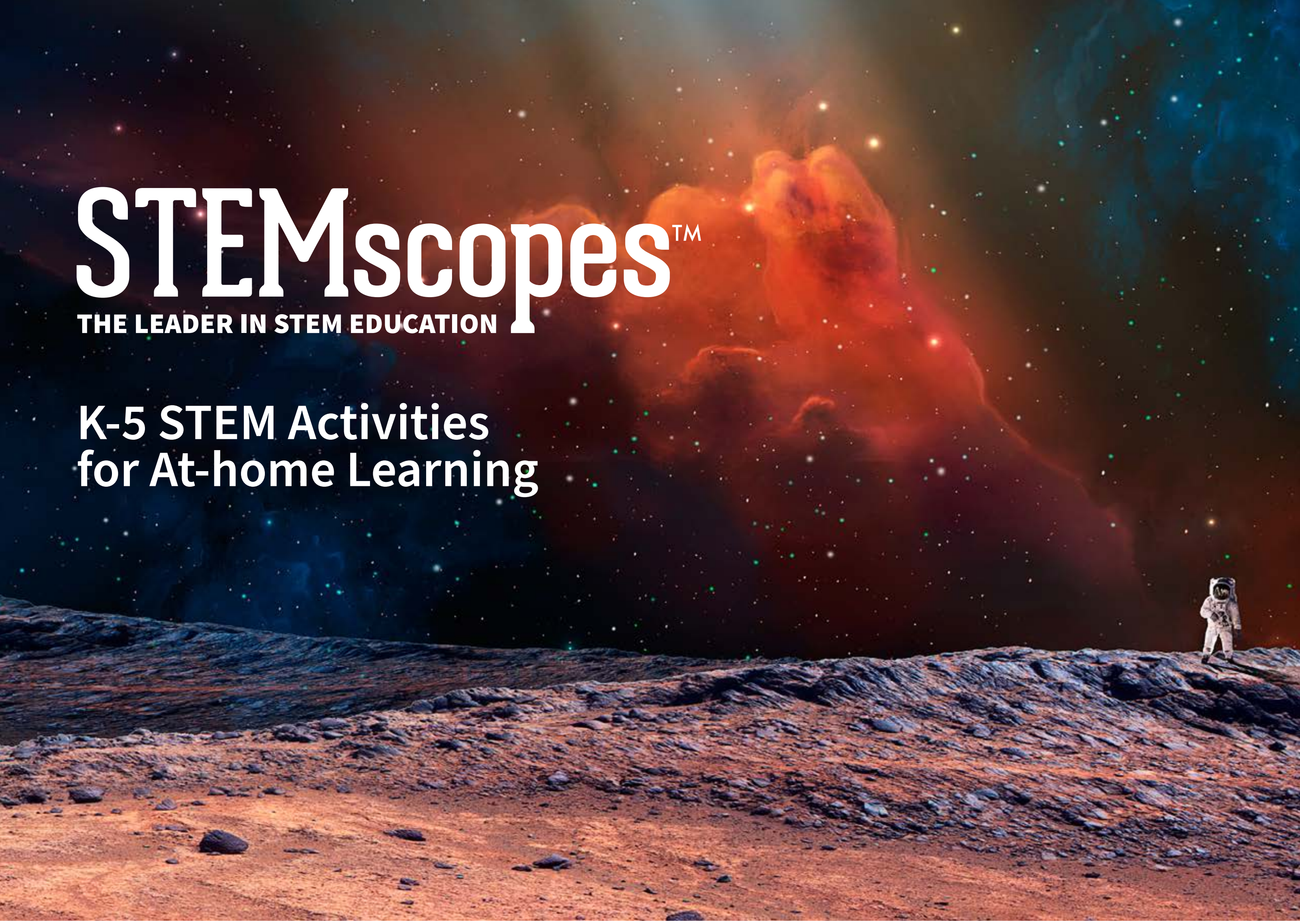


STEMscopes™
THE LEADER IN STEM EDUCATION

K-5 STEM Activities for At-home Learning

Distance learning can present unique challenges, but parents everywhere are gearing up to keep their at-home students actively engaged in hands-on activities to avoid any learning loss. Continuity of learning is especially important for science, which builds upon previous knowledge as students are introduced to new scientific concepts.

Now that many school campuses are closed and implementing distance learning, parents have become an important factor in preventing learning loss. Through at-home activities, parents can help their children reinforce and retain the content that they've learned in school so that they're ready to return in full force. And best of all, science activities are fun! We encourage you to treat this unprecedented situation as an opportunity to bond with your child through immersive experiences that will serve them in more ways than one.

We can all agree that at-home activities are beneficial to students, but putting them into action can be tough, overwhelming, and often leaves teachers and parents at a loss for where to start. That's why we created this packet of activities for students to explore at home with their families. The packet includes three activities, each focusing on an exciting elementary school scientific concept: sound (K-1st grade), electric and magnetic forces (2nd-3rd grade), and the motion of waves (4th-5th grade). Paired with each segment is a link to the STEMscopedia, a brief online explanation that parents can read to help their students understand the science behind each activity.

Help your child get the most out of their time spent at home with fun, educational activities that incorporate scientific literacy and hands-on exploration. You may find that you're enjoying yourself, too!

K / 1ST GRADE

SOUNDS FROM A VIBRATING STRING

Exploring Sound

All sounds come from something that is vibrating. In this activity, you and your child will use a stretched rubber band as a vibrating string. Begin by brainstorming about different types of sounds.

For this activity, you will need:

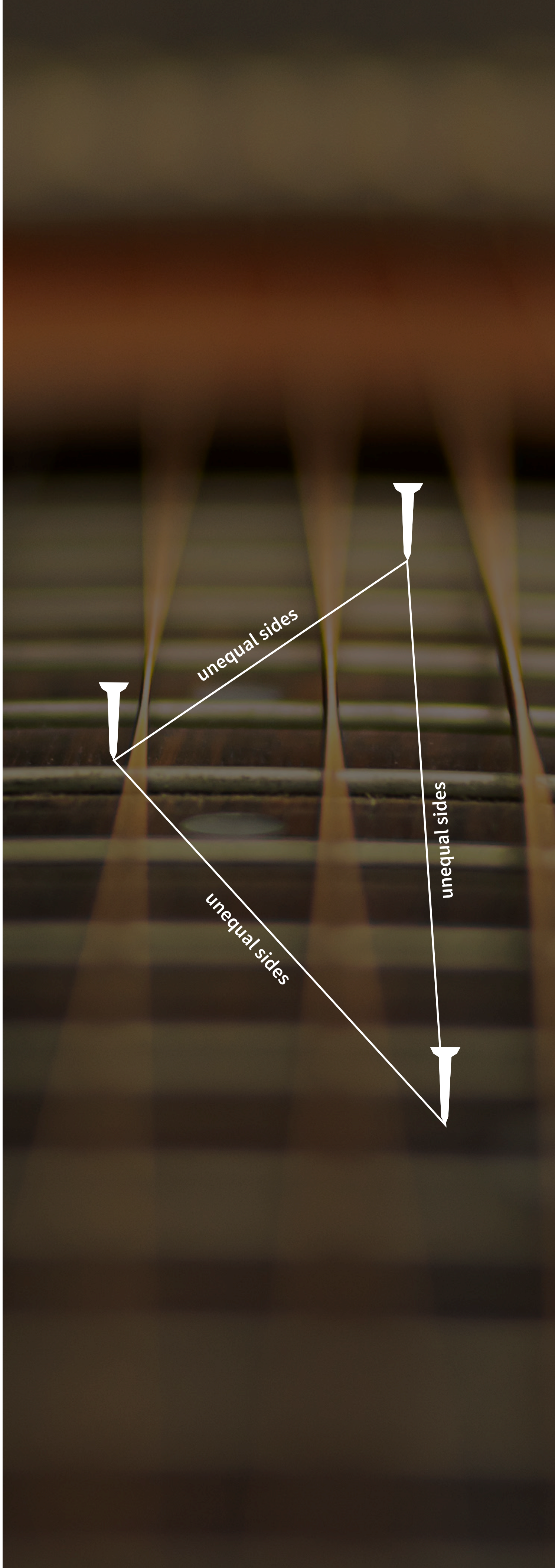
- A hammer and three nails
- A short, wide board
- A large, strong rubber band

Help your child complete the following procedure (visual on right):

1. Hammer the nails into the board to form a triangle with unequal sides. The triangle should stretch the rubber band out completely, so it's tight.
2. Stretch the rubber band over the nails with equal tension on each side.
3. Pluck each side of the rubber band and observe the differences in pitch.
4. Pull hard on one side of the rubber band to increase the tension on the other two sides; observe the change in pitch of the two sides with increased tension.
5. Use a finger to hold the middle of the long side of the rubber band to the board; this will create two "new," shorter sections of rubber band on either side of your finger. Pluck each "new" section and observe its pitch.
6. Vary the distance you pull back on one of the sides of the rubber band when plucking. Observe the differences in loudness.

Here are some questions to discuss with your child:

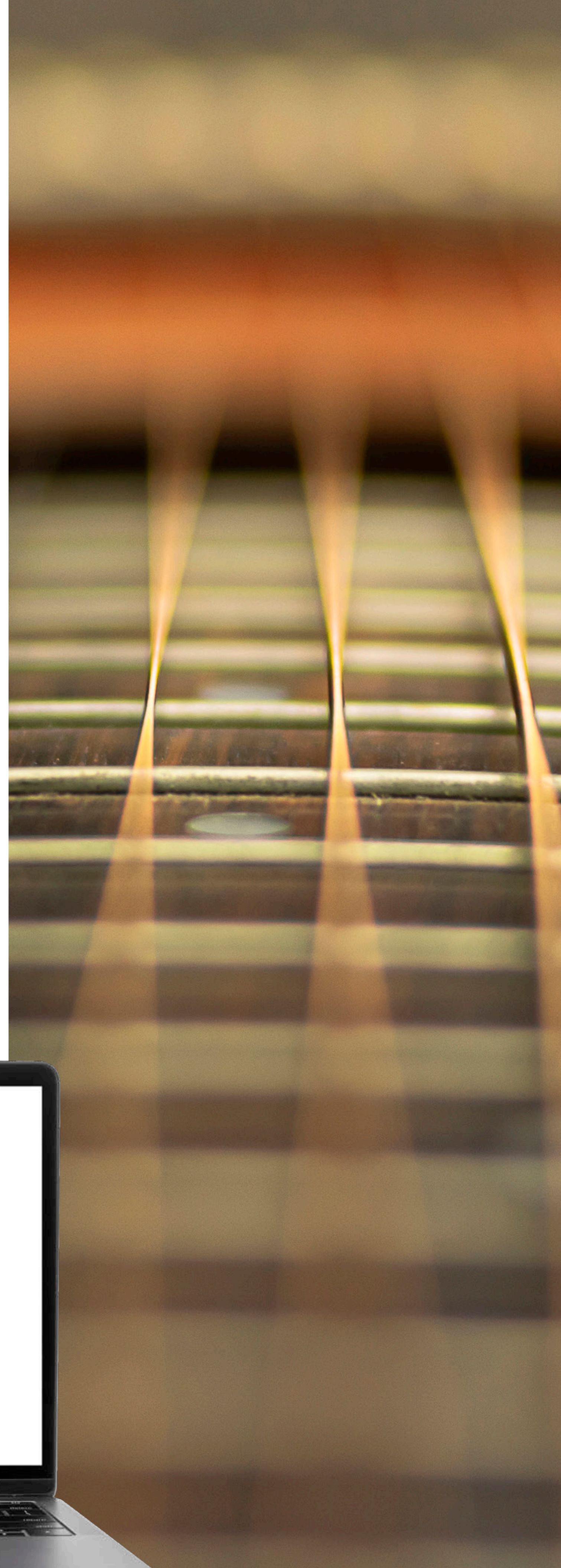
1. Were you able to see differences in how the rubber band moved?
2. When was there a high or low sound?
3. Did it make a difference how far each rubber band moved?
4. What do you think affected how loud the sound was? Try plucking hard and then gently to find out.



K / 1ST GRADE

SOUNDS FROM A VIBRATING STRING

Exploring Sound
(continued)

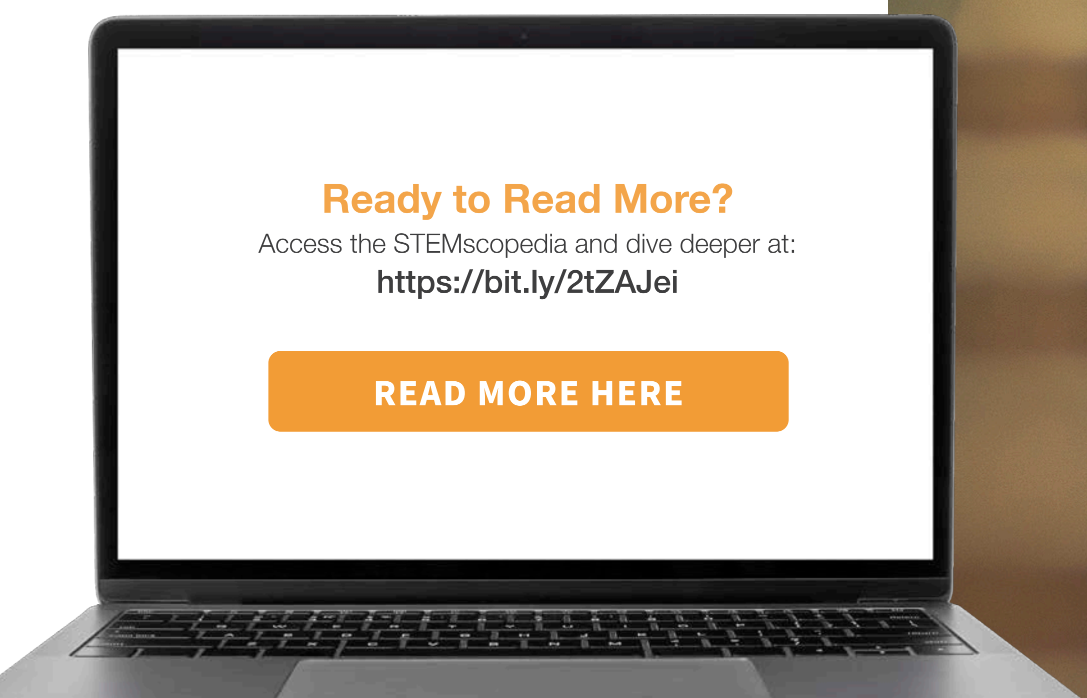


Why Is This Important?

From laughter to music, movies to the chirp of a bird, we live in a sound-filled world. Understanding this phenomenon allows students to appreciate why we hear different sounds in the first place—they are different vibrations through different mediums. Thanks to our scientific understanding of sound, we now have rock concerts that fill a venue with the strum of a guitar, medical devices that let us look at babies still in the womb, and speakers on our phone that can copy the vibrations of our voice to make phone calls sound natural.

Did You Know?

Sound is measured in decibels. A rock concert generally measures around 110dB, whereas the songs of a blue whale, the largest animal on Earth, can reach 188dB. What do decibels measure? Decibels measure the power of a sound's vibration—the higher the decibel range, the more vibration can be expected from that sound. How do you think humans' voices can be compared to a rock concert or blue whale?



2ND / 3RD GRADE

ELECTRIC AND MAGNETIC FORCES AT HOME

Exploring Electromagnetism

Several simple home activities can help students understand electromagnetism:

Use a hole punch to make a small pile of paper circles. Rub a screwdriver or iron rod with a wool sweater or piece of fabric. You are building an electrical charge in the metal. After about 30 seconds of rubbing, hold the metal rod near the paper circles. **Observe with your child what happens, and ask the following questions:**

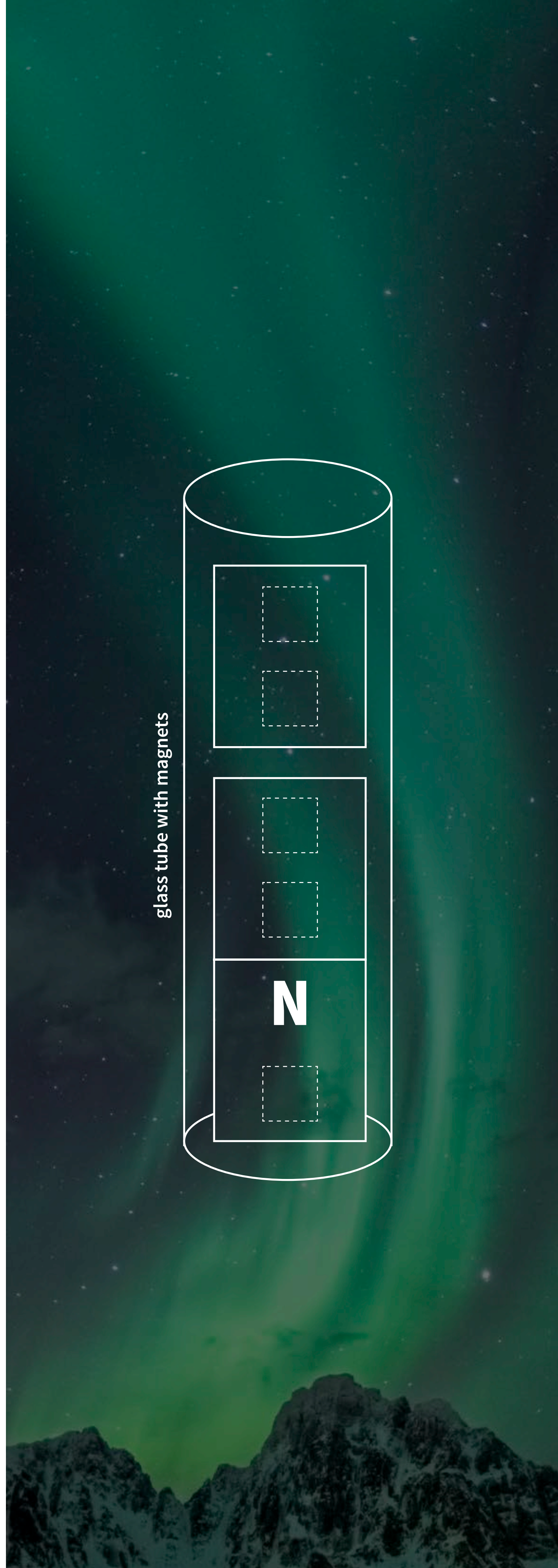
- What happened when the metal rod was rubbed?
- What happened when the rod was near the paper circles?
- How can you make the electrical charge stronger?
- Do different kinds of paper react the same?

Even water can be affected by static electricity. Turn on a faucet to run a steady, thin stream of water. Using the metal rod and fabric from the first activity, build up a charge in the metal rod for about 30 seconds. Hold the rod near the stream of water. You might have to adjust the placement. **Observe with your child what happens, and ask the following questions:**

- Why do you think the water reacted to the metal rod?
- What would happen if the stream of water were faster?
- What other objects around the house react to the charged rod?

Imagine dropping three magnets into a glass tube (image on right). The picture shows how the magnets line up in the tube. The north pole of the bottom magnet is marked with an N. Have your child mark the remaining poles of all three magnets, with the letter N on each north pole and the letter S on each south pole using the outlined boxes. **Then ask your child the following questions:**

- How did you know how to label the magnetic poles?
- Why is there a gap between two of the magnets?
- How could the magnets be arranged in another way?



2ND / 3RD GRADE

ELECTRIC AND MAGNETIC FORCES AT HOME

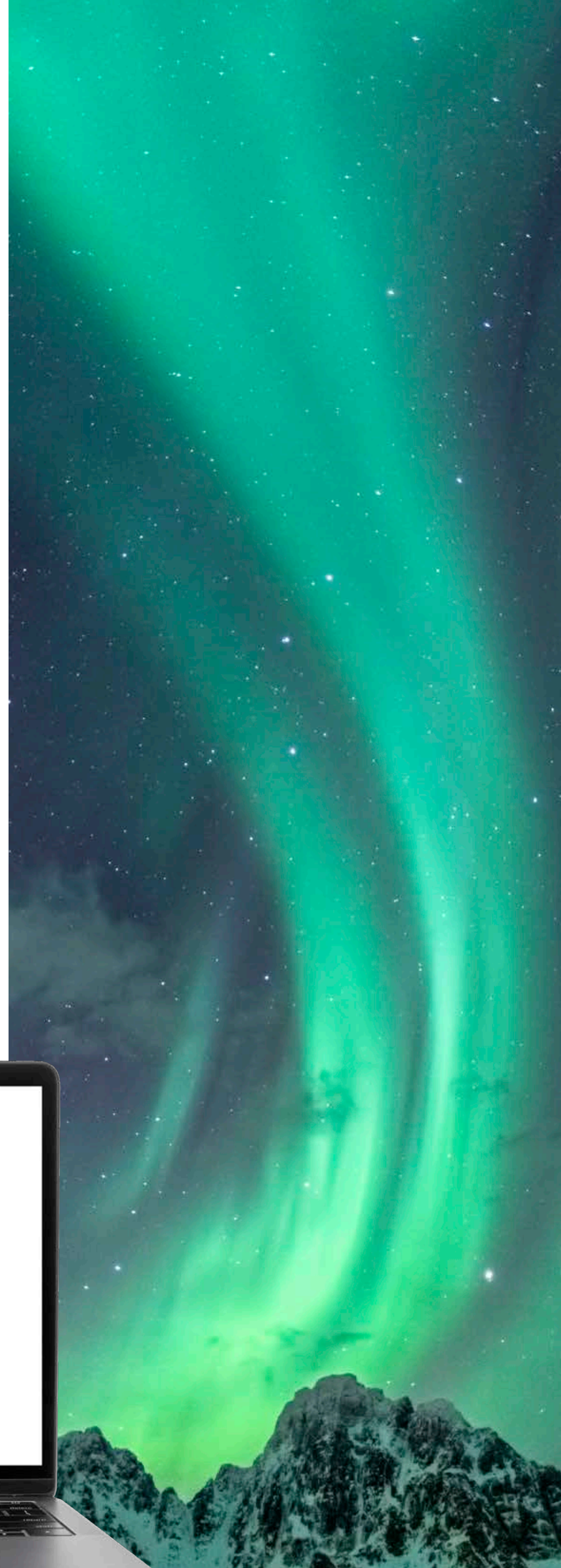
Exploring Electromagnetism (continued)

Why Is This Important?

Electric and magnetic forces are fundamental to almost all electronics. From iPhones to car engines, without these phenomena, we could not enjoy many of the modern conveniences of life. Understanding how electric and magnetic forces interact is essential to working as an engineer, a computer technician, a wind turbine designer, and many other professions. In the future, technologies based on these phenomena may create hovering cars, rockets that reach space without fossil fuels, and the next generation of computer gaming.

Did You Know?

Electric and magnetic forces are phenomena that work together to create visual spectacles such as the Aurora Borealis and Aurora Australis. Visible in the extreme northern and southern hemispheres and from space, these colorful bands of light are formed when electrically charged particles created by the Sun interact with the Earth's magnetosphere—a invisible bubble of magnetic force around our planet.



4TH / 5TH GRADE

OBSERVING WAVE CHARACTERISTICS

Creating a Wave Model

You and your child will create a wave model using household materials in order to observe characteristics of a wave.

For this activity, you will need:

- 80 straws or wooden skewers
- Masking tape

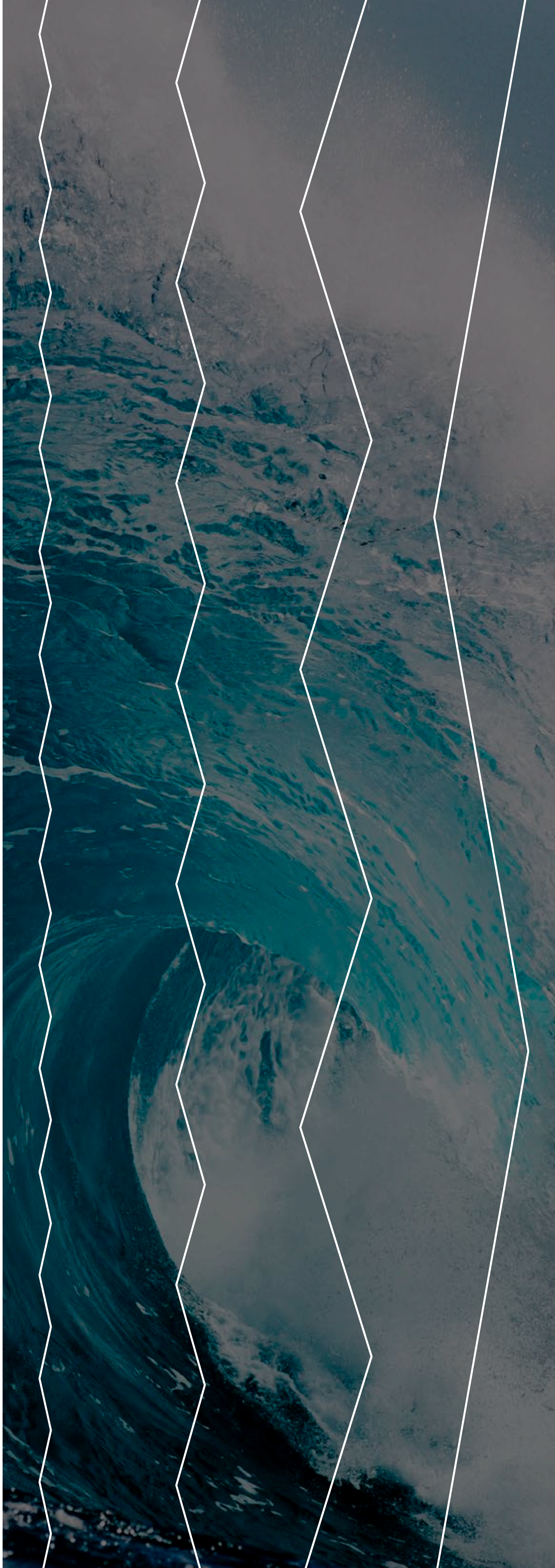
Directions:

On a flat surface, roll out approximately 10 feet (120 inches) of masking tape. The sticky side of the tape should face up. Place all the straws along the tape. The center of each straw should be placed along the length of the tape, evenly spaced 3 or 4 inches apart.

Once the straws have been placed along the length of the tape, roll out another 10 feet of tape on the top of all the straws so that each straw is secured between the two pieces of tape. Then, carefully lift the wave model from the floor or table from each end. Each of you should hold an end of the wave model and stretch it out, creating gentle tension.

Carry out the activities below and take note of the movement of energy along the length of the tape when you create a disturbance.

1. When one person gently taps one end of the wave model, what happens?
2. What happens to the wave when it gets to the other end of the tape?
3. Loosen the tension of the tape and then take note of the speed of the waves. Does the wave travel faster or slower? What happens when the tape is tightened, creating tension between the two people? Does the wave travel faster or slower?
4. Take note of the characteristics of the waves when both people slightly twist each end of the wave model. Point out the wavelengths along the wave model. How can you control your wave model to observe the amplitude of the waves?



4TH / 5TH GRADE

OBSERVING WAVE CHARACTERISTICS

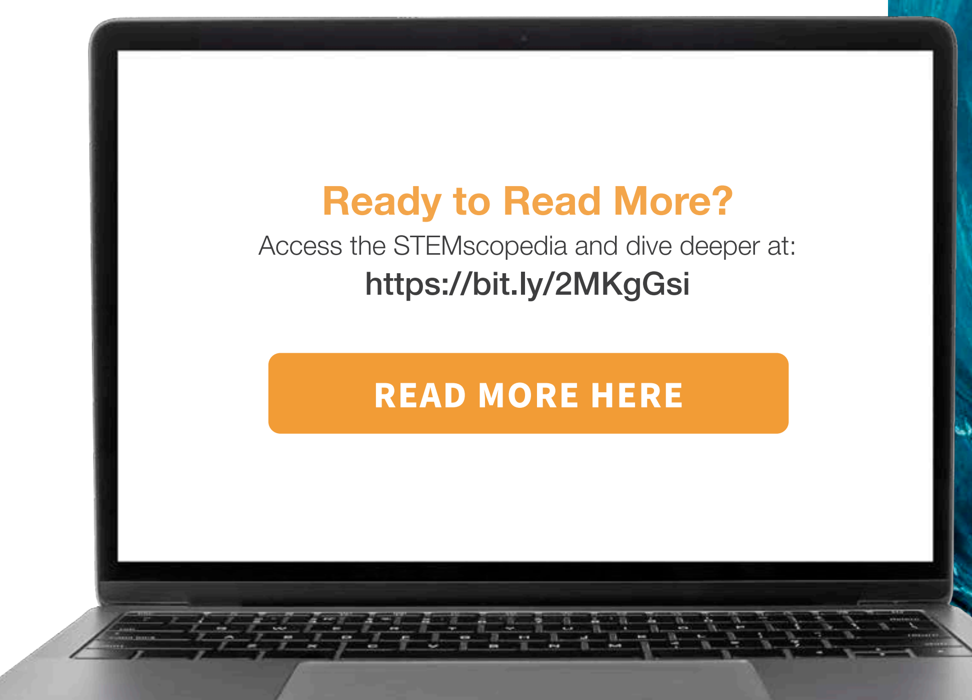
Creating a Wave Model (continued)

Why Is This Important?

Even though we tend to think of waves as something you play in at the beach, waves as a phenomenon are often used in communication technology. When using computers to manipulate waves' forms, we can transmit information across vast distances, very quickly. Waves are thus the phenomenon by which our phones work, not only to speak to one another but also to access the internet. Maybe that's why it's called "surfing" the internet!

Did You Know?

The largest wave ever successfully surfed was 24.38m (80), ridden by Rodrigo Koxa in Nazaré, Portugal on November 8, 2017. Waves this large possess an immense amount of energy and scientists have even imagined creating electricity using wave power. In fact, tsunami-driven waves caused by undersea earthquakes often carry enough energy to force water miles inland and flood coastal cities. Why do you think Koxa's wave didn't flood the town of Nazaré, despite being so big?

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