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HMH Ed Online

PocketLab

Assign an enhanced, collaborative version.

Student Interactive Lesson (SIL): Exploration 1

Lab Worksheet

Student Activity Guide (SAG) pp. XX–XX

HANDS-ON LAB

Model Two Types of Waves

TIME 25 minutes

TEKS 6.8.C

Scientific and Engineering Practices

Develop and Use Models (6.1.G)
Develop Explanations (6.3.A)

Recurring Themes and Concepts

Matter and Energy (6.5.E)

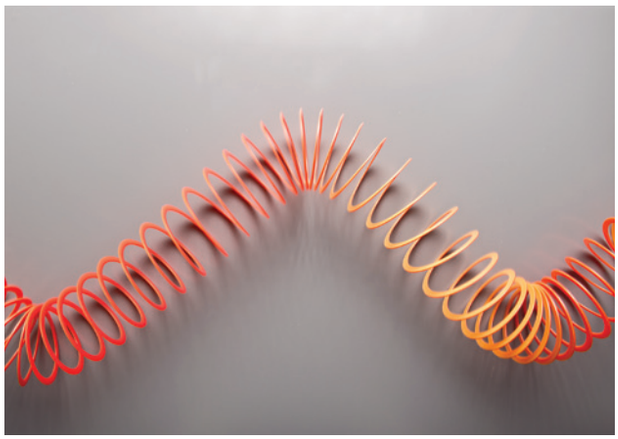
Materials (per pair)

- toy, spring

Safety Information

SAFETY GOGGLES

Remind students to review all safety cautions and icons before beginning this lab.



(SIL) DIGITAL PP. XX (SAG) PRINT PP. X–X

Lab Facilitation

STEPS 1–3: Have students decide which roles they will take on for the investigation. **Manage small group work** by encouraging student groups to repeat the wave movements several times to observe and understand them. Suggest having each student take turns making the waves.

STEP 5: Elicit Student Thinking about why it is important to use evidence and reasoning to support a claim in science. Invite students to give examples of different types of evidence, like data or photographs.

Support for Student Answers

STEP 2: Move one end of the spring side to side in a direction perpendicular to the length of the toy. This is Wave 1. Record your observations for Wave 1. *Sample answer:* The side-to-side motion continues through the rest of the spring.

STEP 3: Reset the spring to the rest position. Move one end of the spring back and forth in a direction parallel to the length of the toy. This is Wave 2. Record your observations for Wave 2. *Sample answer:* The back-and-forth motion of the spring's coils continues throughout the rest of the spring.

STEP 4: When you move one end of the coil, you add energy to the spring toy system. How does this energy move through the system in Wave 1? How does this energy move through the system in Wave 2? *Sample answer:* The energy moves the toy side to side in Wave 1. The energy moves the toy back-and-forth in Wave 2. In both cases, the energy moves from one end to the other.

STEP 5: Explain whether either type of wave transfers matter. Support your claim with evidence and reasoning. *Sample answer:* The matter may move up and down or back and forth, but it does not move to another place and stay there. The toy returns to its normal/rest state after I stopped moving the end.

Differentiation: Extra Support

Give students extra practice differentiating parallel and perpendicular lines. Show students different types of parallel lines. Then show them different types of perpendicular lines. You can draw them on the board and invite students to the board to circle an example of parallel lines or perpendicular lines. One helpful reminder is that the double ls in the word parallel are parallel like train tracks.

Lab Scoring Criteria

Rate how students or groups participate in and understand the lab on a proficiency scale of 1 to 3 (1-Emerging, 2-Expanding, 3-Leading).

- gathered and analyzed data from multiple trials of making waves
- differentiated parallel and perpendicular waves
- identified factors that affect how energy moves in a system
- supported a claim with evidence and reasoning

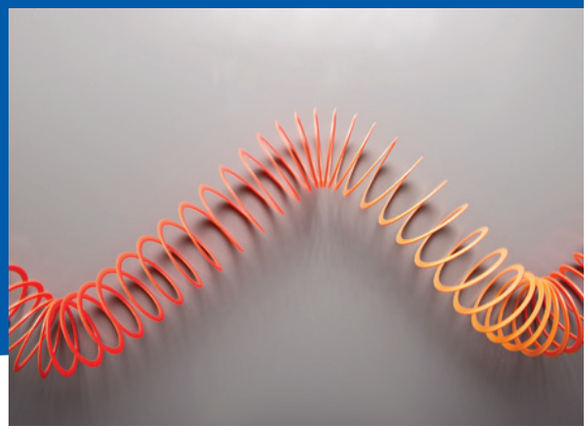
Name _____ Date _____

EXPLORATION 1

HANDS-ON LAB

Model Two Types of Waves

Model two different types of waves and analyze how energy moves through the system.



MATERIALS (PER PAIR)

- toy spring

SAFETY

SAFETY GOGGLES

Procedure

STEP 1 Hold a coiled spring toy on the floor between you and a lab partner so that the spring is straight. This is the rest position of the spring. As you do this lab, be sure to keep the spring on the floor as you move it. Another lab partner will document each step.

STEP 2 Move one end of the spring side to side in a direction *perpendicular* to the length of the toy. This is Wave 1. Record your observations for Wave 1 in the table.

STEP 3 Reset the spring to the rest position. Move one end of the spring back and forth in a direction *parallel* to the length of the toy. This is Wave 2. Record your observations for Wave 2 in the table.

Observations for Wave 1	Observations for Wave 2

TIP **PARALLEL AND PERPENDICULAR**

Parallel lines will never intersect, like railroad tracks. Perpendicular lines make a 90° angle when they intersect. In the capital letter "H," the two vertical lines are parallel to each other. The horizontal line is perpendicular to each of the vertical lines.

Analysis

STEP 4 When you move one end of the coil, you add energy to the spring toy system. How does this energy move through the system in Wave 1? How does this energy move through the system in Wave 2?

STEP 5 Explain whether either type of wave transfers matter. Support your claim with evidence and reasoning.

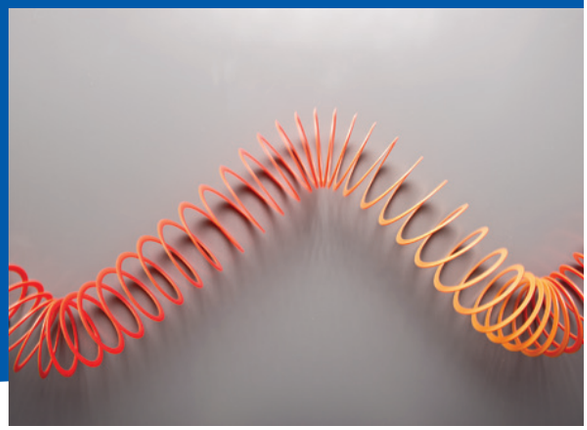
Nombre _____ Fecha _____

EXPLORACIÓN 1

PRÁCTICA DE LABORATORIO

Haz un modelo de dos tipos de ondas

Haz un modelo de dos tipos diferentes de ondas y analiza cómo se mueve la energía a través del sistema.



MATERIALES (POR PAREJA)

- resorte de juguete

SEGURIDAD

PROTECCIÓN

Procedimiento

PASO 1 Con un compañero de laboratorio, sujeten cada uno un extremo de un resorte de juguete apoyado en el suelo para que quede recto. Esa es la posición de reposo del resorte. Cuando realices esta actividad, asegúrate de mantener el resorte en el suelo mientras lo mueves. Otro compañero de laboratorio documentará cada paso.

PASO 2 Mueve un extremo del resorte de lado a lado en dirección *perpendicular* al largo del juguete. Esa será la Onda 1. Anota tus observaciones sobre la Onda 1.

PASO 3 Vuelve a colocar el resorte en la posición de reposo. Mueve un extremo del resorte hacia adelante y hacia atrás en dirección *paralela* al largo del juguete. Esa será la Onda 2. Anota tus observaciones sobre la Onda 2.

Observaciones sobre la Onda 1	Observaciones sobre la Onda 2

SUGERENCIA **RECTAS PARALELAS Y PERPENDICULARES**

Las rectas paralelas nunca se cruzan, como las vías del tren. Las rectas perpendiculares forman un ángulo de 90º cuando se cruzan. En la letra mayúscula "H", las dos rectas verticales son paralelas. La recta horizontal es perpendicular a cada una de las líneas verticales.

Análisis

PASO 4 Cuando mueves un extremo del resorte, añades energía al sistema. ¿Cómo se mueve esa energía a través del sistema en la Onda 1? ¿Cómo se mueve esa energía a través del sistema en la Onda 2?

PASO 5 Explica si alguno de los dos tipos de ondas transfiere materia. Usa las evidencias y el razonamiento para justificar tu afirmación.