

Facilitation Guide



Exploring Kinetic and Potential Energy through Body Percussion

SABES Lesson 3

EXPERIENCE OVERVIEW

Students will be able to explore the concepts of kinetic and potential energy through various body percussion experiments and games.

Standards

SCIENCE

- Science & Engineering Practices- SEP 3: Planning and Carrying Out Investigations- ES3: Make observations and/or measurements to produce data to serve as the basis for evidence for an explanation of a phenomenon or test a design solution.
- Disciplinary Core Ideas- PS3.A: Definitions of Energy- ES2: Energy can be moved from place to place by moving objects or through sound, light, or electric currents.
- Crosscutting Concepts- CCC 5: Energy & Matter- ES1: Energy can be transferred in various ways between objects.

MARYLAND STATE ARTS STANDARDS

- I:3-5:I: Conceptualize and generate musical ideas for an artistic purpose and context, using appropriate technology as available.

Getting Ready

SABES LEARNING OBJECTIVES:

- Lesson 3- Types of Energy: Students will be able to design and conduct an investigation to examine two types of energy: kinetic energy (energy of motion) and potential energy (stored energy).

MATERIALS

- Science notebooks, index cards labeled with "Kinetic" and "Potential," Driving Question Board (DQB), 0401 It's Electric PowerPoint

TEACHER BACKGROUND

- Teachers should have an understanding of what body percussion is and how to keep a consistent beat. We suggest viewing the following example as well as short (and fun!) videos to practice your body percussion skills before facilitating these activities with your students:
 - [Body Percussion Sample Lesson](#)
 - ["September" by Earth, Wind & Fire Body Percussion](#)
 - ["Can't Stop the Feeling" by Justin Timberlake Body Percussion](#)

ACCESSIBILITY NOTES:

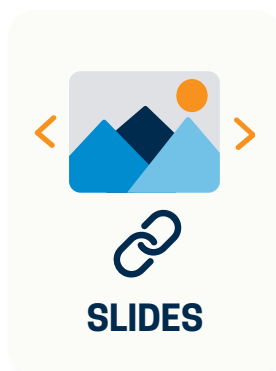
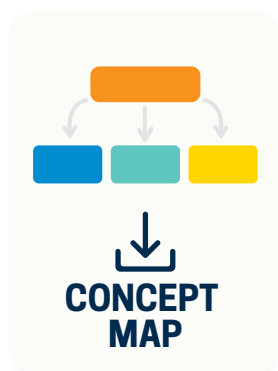
- Feel welcome to customize body percussion movements to fit all ability needs
- Use noise-cancelling headphones if students have sensitivity to auditory stimulation.

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ARTS INTEGRATION MATERIALS



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TEACH

Engage

Activate prior knowledge by asking students: What is energy?

- *Energy is the ability to do work.*

Explain that today they will explore different types of energy since not all energy is the same.

To demonstrate this idea through embodied cognition, facilitate a game of percussion follow-the-leader.

- a. Invite students to stand up, explaining that we will now play a game of follow the leader. Begin as the leader, clapping your hands at a steady beat and invite students to join in.
- b. Then, stop clapping, holding your hands about six inches apart. Pause here for several seconds.
- c. Next, begin stomping your feet at a steady beat of your choice. Again, invite students to join you.
- d. Then, stop stamping, holding one foot (if possible) several inches off the ground.
- e. Invite students to put their foot down.

Ask students what they noticed or wondered about the game.

Explain that both our hands and feet displayed two types of energy: **kinetic and potential**.

- Name that when our hands or feet are **in motion** while **clapping** or **stomping**, they have **kinetic energy**. When our hands or feet **freeze**, making no more sound, they have **potential energy**. Point out that the word potential means it “could” or “will.”
- Share the curriculum definitions with students (see the SABES slides):
 - Kinetic energy is the energy an object has in motion.
 - Potential energy is stored energy an object has because of its position (not in motion).



VIDEO TUTORIAL



SLIDES

Explore (Note: Talk with your class about safely moving their bodies throughout the classroom before engaging with the following exploratory prompts):

Show students the "[Explore Body Percussion](#)" slide.

- Invite students to explore ideas of speed and pitch with kinetic energy with divergent thinking questions like:
 - *How fast can you clap your hands? How slow?*
 - *What other ways can you show kinetic energy with your body? Can you rock back and forth? Spin in a circle? Jump up and down?*
 - *How can you show potential energy with each of these movements? Can you freeze midspin? Where is the potential energy when you are jumping?*
- Have students explore these movements individually and then in pairs, discussing the differences in feeling between kinetic and potential energy.

Apply: Kinetic and Potential Energy Percussion Game

Set up: Divide the class into small groups or pairs. One student will perform the body percussion movements, while the other will determine if each movement represents kinetic or potential energy.

Execution: The performing student will execute body percussion movements, and the observing student will either say aloud or whether the movement represents kinetic or potential energy.

a. Option for differentiation: Use index cards to create small signs that read "Kinetic" or "Potential" for students to hold up instead of saying the terms aloud.

- **Option for Variations:** Use materials like a scarf or a balloon: Hold the object up in the air, and ask students to name when the object is experiencing kinetic energy, and when potential energy can be observed.
- **Option for Extension:** Challenge students to write a song about kinetic and potential energy and incorporate it into a hand-clapping game.



SLIDE

Reflect/Self-Assessment: Guide students in a closing discussion or provide time for students to respond to the reflection questions below in their science notebooks.

- What did you learn about kinetic and potential energy?
- How did the body percussion activities help you understand these concepts?
- What was challenging about identifying kinetic and potential energy?
- Where else do you notice kinetic and potential energy?
 - *This final question serves as a bridge into the content to be explored in Lesson 4.*

Assess: To evaluate if students have learned the ideas of kinetic and potential energy from this lesson, we suggest:

- Formative Assessment: During the lesson, observe students' engagement and participation in the activities. Listen to their explanations of kinetic and potential energy concepts during discussions. Observe their ability to correctly identify kinetic and potential energy in the games and exploration sessions, and provide corrections when needed.