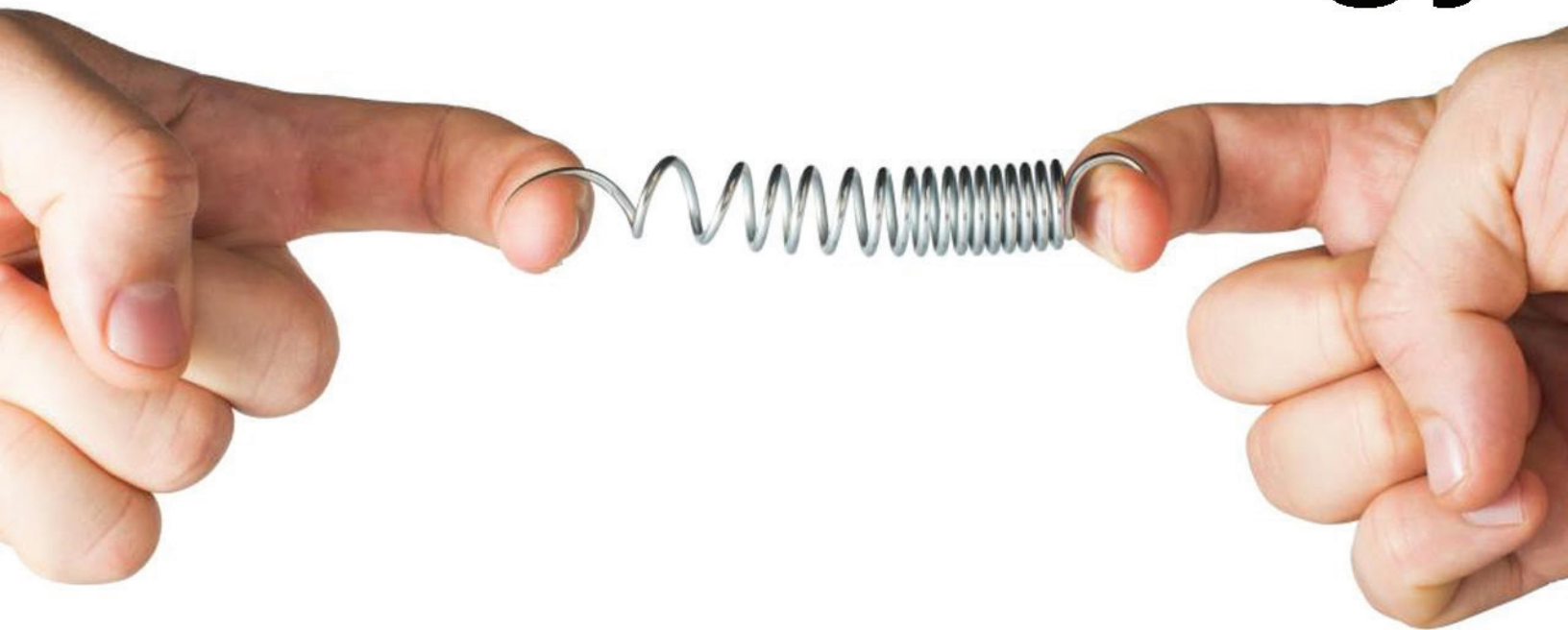


# ***TO MOVE OR NOT TO MOVE***

Introduction to Potential and Kinetic Energy

James Swart, Extension Graduate Assistant, 4-H Youth Development

# **Potential Energy**



# Tennessee 4-H Youth Development

## *To Move or Not to Move: That is the Question*

### *Introduction to Potential and Kinetic Energy*

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#### **Skill Level**

Intermediate

#### **Learner Outcomes**

*The learner will be able to:*

- Compare and contrast potential and kinetic energy.
- Model energy transfer using everyday objects.
- Analyze data collected in the learning event.

#### **Educational Standard(s) Supported**

- 6.PS3.1: Analyze the properties and compare sources of kinetic, elastic potential, gravitational potential, electric potential, chemical, and thermal energy.
- 6.PS3.2: Construct a scientific explanation of the transformations between potential and kinetic energy.

#### **Success Indicator**

*Learners will be successful if they:*

- Describe the difference between potential and kinetic energy.
- Complete the data collection portion of the learning event.
- Draw conclusions on energy transfer based on data collected in the learning event.

#### **Time Needed**

30-45 Minutes

#### **Materials List**

Two tennis balls, two meter sticks, tape, copies of student handouts, flip chart paper

#### **Introduction to Content**

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This lesson serves as an introduction to potential and kinetic energy and the differences between them. It uses both scientific inquiry and mathematical skills to increase learners' knowledge of these types of energy and energy transfer.

This lesson is designed to be used with sixth-grade students.

#### **Introduction to Methodology**

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This lesson uses a hands-on approach to learning. Students will explore potential and kinetic energy by completing a lab related to these concepts. They will analyze data collected during the lab by graphing, and draw conclusions based on what they have found.

#### **Author**

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Swart, James. Graduate Assistant,  
Tennessee 4-H Youth Development.

## Terms and Concepts Introduction

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Potential Energy — The energy possessed by an object based on its position relative to other objects.

Kinetic Energy — The energy an object possesses by being in motion.

Energy Transfer — The conversion from one type of energy into another.

## Setting the Stage and Opening Questions

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Begin this lesson by saying the following to the students: *“Today, we’re going to answer a very important question. To move or not to move. This question relates to objects in motion and their different types of energy. To get started, we are going to do a quick activity to see how much you already know about these types of energy. To do that, we are going to complete a quick Think-Pair-Share activity.”* Instructions on the Think-Pair-Share are found in the supplemental information portion of this lesson plan.

After students have completed this portion of the activity, cover any information on potential, kinetic or energy transfer that the students may have missed. Below are references to review prior to teaching this lesson to gain a background on these topics.

Energy Transfer

[softschools.com/examples/science/energy\\_transformations\\_examples/161](https://softschools.com/examples/science/energy_transformations_examples/161)

Kinetic Energy

[softschools.com/examples/science/kinetic\\_energy\\_examples/4](https://softschools.com/examples/science/kinetic_energy_examples/4)

Potential Energy

[softschools.com/examples/science/potential\\_energy\\_examples/3](https://softschools.com/examples/science/potential_energy_examples/3)

## Experience

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After completing the Think-Pair-Share and providing information to the students, split the class into two groups. Each group should be given a tennis ball, a roll of tape and a meter stick. Instruct the students to go to separate sides of the classroom and mark with tape on the wall a line at half a meter, three-fourths of a meter and 1 meter. Students will then drop the ball from each of these heights and observe how high the ball bounces after hitting the floor. The students should mark the height to which it bounces from each height and then measure and record the height on their lab sheet. They will complete this process three times.

After completing this portion, students will then take the data they gathered and graph it on the chart provided. Each group will then recreate the graph on a piece of flip chart paper that can be displayed to the class as you move through the concluding questions.

## Tips for Engagement

Some students may have difficulty being engaged in the activity since the groups are so large. As you rotate around and notice this, find a way for all the students to be engaged in the group.

## Share

Ask the students: *“Were you surprised to see the difference between the height from which a ball was dropped and how far it bounced?”*

Ask the students to make an observation about the connection between the height from which the ball was dropped and how much it bounced. They will record this on their handout.

## Process

Ask the students to identify when the ball had the most potential energy in the experiment. Then ask when it had the most kinetic energy. *(Most potential was before it was dropped and the most kinetic is when it made contact with the ground.)*

## Generalize

Lead students in a discussion on the differences between potential and kinetic energy in this experiment. This could include completing a quick compare and contrast chart on the board.

Ask students to describe how they were able to increase the ball’s potential energy. *(Increasing the height from which it was dropped.)*

## Apply

Ask students to think of other real-world situations where this type of energy transfer occurs.

## Life Skill(s) from TIPP(s) for 4-H

### 6th Grade

Understand the meaning of information. (Head Thinking)

Understand the methods and skills for learning. (Head Thinking)

Use the senses to gain new information or find new ways to use information. (Head Thinking)

Identify/clearly define a problem or situation. (Head Thinking)

## Reference:

*Modified From:* <http://www.cpalms.org/Public/PreviewResourceLesson/Preview/11154>

# ***Supplemental Information***

## ***Think-Pair-Share***

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### *Think-Pair-Share*

Pass out markers or colored ink pens to students. Each student should have a different color than his or her neighbor.

To begin, ask students to take out a piece of paper and write down what they think of when they hear the terms potential energy, kinetic energy and energy transfer. An example of what their blank sheet should look like before beginning is below. Students should complete a separate column for each of these terms. This should be done completely on their own.

After 2 minutes, ask students to pair off and switch markers with their partner, which should be a different color than their first marker. Ask the pairs to then share information with each other and write down any important information they missed on their individual work.

After groups have shared with each other, have students swap markers again, resulting in the students having another color. Now, ask the class to share what they listed. If students missed any important information, they should write it on their paper as the class shares.

Potential Energy	Kinetic Energy	Energy Transfer