Name _____

Elastic Potential Energy

Elastic Potential Energy (EPE): "The potential energy stored in an elastic material by either being stretched, twisted, or pulled."

What is Gravitational Potential Energy (GPE)?

_____

What is Kinetic Energy (KE)?

_____

Demonstration: Rubber Band

Experiment 1: Spool Racers

From your teacher's instructions, build your own spool racer.

Based on what you know of Elastic Kinetic Energy, write a hypothesis on what will happen with the racer is wound up tight and then let go.

Hypothesis

IF … the elastic spool racer is wound up tight and let go

THEN … _____

BECAUSE … _____

Discuss what you think will happen to the spools when they are released if one spool gets 5 winds, one 10 winds, and one 15 winds? Why?

Perform each of these scenarios, and place your data in table.

Number of winds	**Distance spool travelled**

Experiment 2: Falling Markers

Discuss how energy is changing forms in this demonstration.

Review:

- ✓ What is elastic potential energy?
- ✓ Which spool racer has the most EPE: the one wound up 5x or the one wound up 10x?
- ✓ Is bending a ruler a way to store EPE?
- ✓ What other objects could be used to store EPE?

TEACHER NOTES

Name _____

Elastic Potential Energy

Elastic Potential Energy (EPE): "The potential energy stored in an elastic material by either being stretched, twisted, or pulled."

What is Gravitational Potential Energy (GPE)?

_____

What is Kinetic Energy (KE)?

_____

Demonstration

Set some markers up on the table. Then use a rubber band, pull it back, and let it knock down the markers. This is a simple demonstration that clearly shows elastic potential energy at work. When you pull back the rubber band, energy is stored in the elastic material. Make sure to convey this to your students. Explain that the elastic energy was converted into KE (as the rubber band flew through the air) which was then converted to sound and heat energy (ever so slight!) when the markers fell down.

Experiment 1: Spool Racers

Have students build their own spool racers! You will need wooden spools, elastic bands, tape, a pencil, a washer, and scissors. For instructions on how to make the spool racer please see the Elastic Potential Energy video.

Hypothesis

IF … the elastic spool racer is wound up tight and let go

THEN … the spool will race across the floor

BECAUSE … the EPE is converted into KE

What do you think will happen to the spools when they are released if one spool gets 5 winds, one 10 winds, and one 15 winds? Why?

The spool that has been wound up the tightest will travel farther because it has more EPE that was converted into KE

Teach

EPE is another form of 'potential energy.' It is 'potential' because it is 'stored' in the elastic object, in this case a rubber band. The more that the rubber band is stretched, pulled, or twisted, the more EPE will be stored. This EPE is then converted into KE when the spool is released.

One of the fun aspects of this experiment is to let the students race their spools against each other. After the students have built their spool racer, let them try this a few times. Make sure that they all wind up the spool using the same number of pencil turns.

Now have the students wind up the spools to different tensions. Record this tension difference in terms of number of winds. Have the students discuss what will happen before starting the experiment. The spool with the most tension (the greatest number of winds) will travel the farthest while the spool with the least tension (the least number of winds) will not travel as far. Have them record this data in the table.

Perform each of these scenarios, and place your data in table.

Number of winds	**Distance spool travelled**

Experiment 2: Falling Markers

Place some markers on their ends (3 or 4) so that they are standing up like bowling pins. Have the students wind up their spools and let them crash into the 'pins.'

Teach

This is just for fun and some review. Energy cannot be created or destroyed (first law of thermodynamics); it can only change form. This is what happens in this demonstration. The EPE is turned into KE which, when it hits the pins, is turned into sound energy (SE) and heat energy (although undetectable). (Something called "work" is also done on the pins but that is for another lesson!)

Review:

- ✓ What is elastic potential energy?
- ✓ Which spool racer has the most EPE: the one wound up 5x or the one wound up 10x?
- ✓ Is bending a ruler a way to store EPE?
- ✓ What other objects could be used to store EPE?