



LESSON PLAN

Subject: Grade 7 Science

Lesson: Energy and Simple Machines

Standards Addressed:

- 7.P.2 Understanding forms of energy, energy, transfer and transformation and conservation in mechanical systems

Objectives:

- Students will understand the potential and kinetic energy.
- Students will recognize that energy can be transferred from one system to another through push or pull.
- Students will be able to identify simple machines and understand how they are used to create mechanical advantage.

Materials Needed:

- Device for showing *Riving and Turning* video
- “Energy and Simple Machines” activity

Outline:

- Prior to this lesson students should have some understanding of simple machines and forces and motion.
- Show the video.
- Discuss the activity prompt.
- Students finish the activity independently or with a partner.

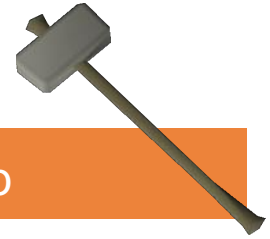
Take It Further: Students can identify simple machines in their home or classroom that they use every day that make simple tasks more efficient.

Cross-Curriculum Connection:

Students can research and write a brief description of how the spring pole lathe in the video and a modern, electric lathe are mechanically similar. What forms of energy do they utilize?

Or, pick a different mechanical system you know about, and tell us in what ways has it stayed the same and in what ways has it evolved.





Energy Transfer in the Joiner's Shop

Grade 7 Science

Name: _____

Date: _____

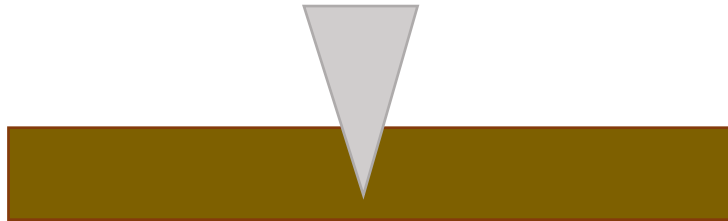
Activity 1: In the video the joiner used a maul and froe to split a piece of wood into quarters. *Answer the following questions about this activity.*

1. How did the joiner create more potential energy for the maul?

2. What force created the kinetic energy of the maul?

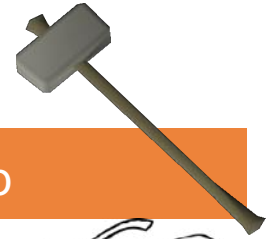
3. The energy possessed by the maul due to its motion or its stored energy is what kind of energy?

4. Using arrows, draw the directions of energy transfer caused by the wedge-shaped froe moving through the wood.

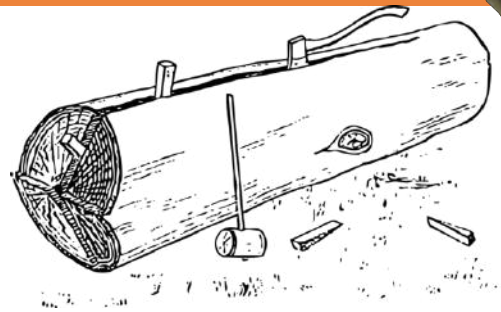


Activity 2: Energy was transferred at various points in the process of splitting wood. *Beginning with the maul and ending with split wood, draw and describe how energy was transferred at each point of the process.*



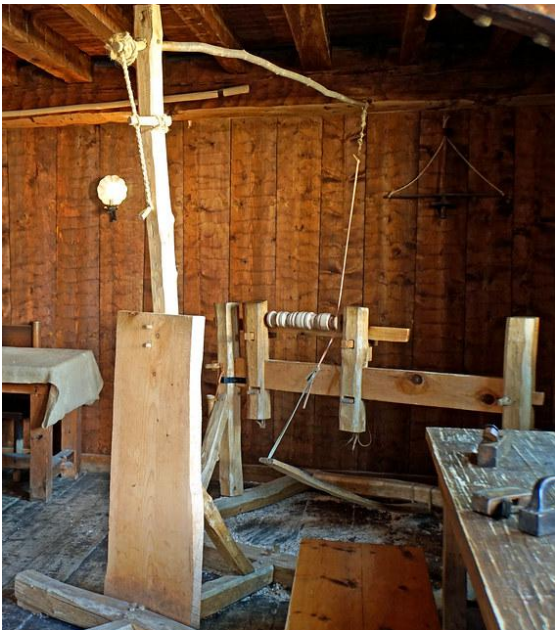


Energy Transfer in the Joiner's Shop



Activity 3:

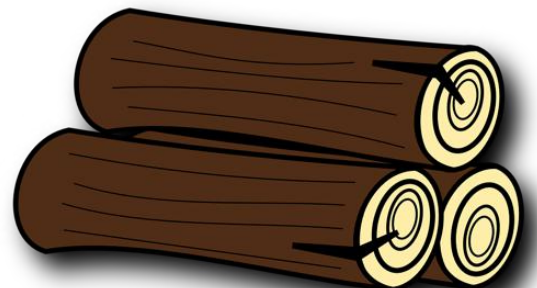
The lathe used by the joiner in the video is a compound machine. *Answer the following questions about this machine.*



1. What are all of the simple machines that create this compound machine?

2. How does the lathe use potential energy to create kinetic energy?

3. What force is creating heat and loss of mechanical efficiency on the lathe?





Energy Transfer in the Joiner's Shop

ANSWER KEY

Name: _____

Date: _____

Activity 1:

In the video the joiner used a maul and froe to split a piece of wood into quarters. *Answer the following questions about this activity.*

1. How did the joiner create more potential energy for the maul?

By lifting it to a higher position.

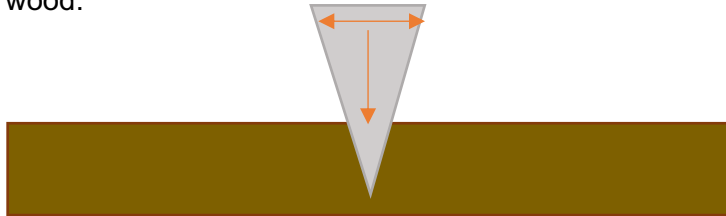
2. What force created the kinetic energy of the maul?

Gravity.

3. The energy possessed by the maul due to its motion or its stored energy is what kind of energy?

Mechanical energy.

4. Using arrows, draw the directions of energy transfer caused by the wedge-shaped froe moving through the wood.



Activity 2:

Energy was transferred at various points in the process of splitting wood. *Beginning with the maul and ending with split wood, draw and describe how energy was transferred at each point of the process.*





Energy Transfer in the Joiner's Shop

ANSWER KEY

Activity 3:

The lathe used by the joiner in the video is a compound machine. *Answer the following questions about this machine.*

1. What are all of the simple machines that create this compound machine?

Lever, wedge, screw, rope and pulley

2. How does the lathe use potential energy to create kinetic energy?

The wooden bows were flexed creating potential energy, and when they were released they sprung back, rotating the piece of wood being worked on back to its starting point.

3. What force is creating heat and loss of mechanical efficiency on the lathe?

Friction

