



LESSON PLAN

Subject: Grade 7 Science

Lesson: Riving and Turning with Simple Machines

Standard Addressed:

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

Objectives:

- Students will be able to explain how potential and kinetic energy contribute to the mechanical energy of an object.
- Students will be able to 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 with Simple Machines* video
- “*Riving and Turning with Simple Machines*” activity

Outline:

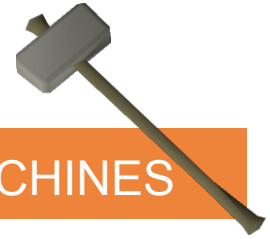
- Prior to this lesson students should have some understanding of simple machines and forces and motion.
- Show the 8:47 minute video, *Riving and Turning with Simple Machines*.
https://youtu.be/6nM3_CMD3JQ
- Discuss the activity prompt.
- Students finish the activity independently or with a partner.

Take It Further: Students identify simple machines in their home or classroom that make simple tasks more efficient.

Cross-Curriculum Connection:

Students investigate how the spring pole lathe in the video and a modern, electric lathe are mechanically similar. Synthesize this information in a short comparison essay.





RIVING AND TURNING WITH SIMPLE MACHINES

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Name: _____

Date: _____

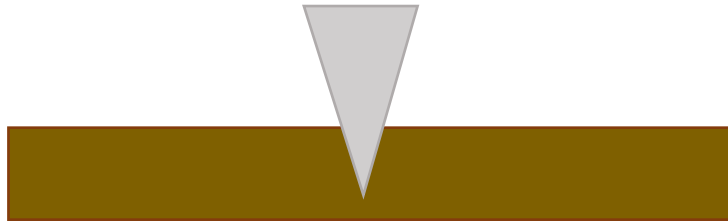
Activity 1: In the video the joiner used a maul and froe to split a piece of wood into quarters. *Answer the following questions about this activity.*

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.*

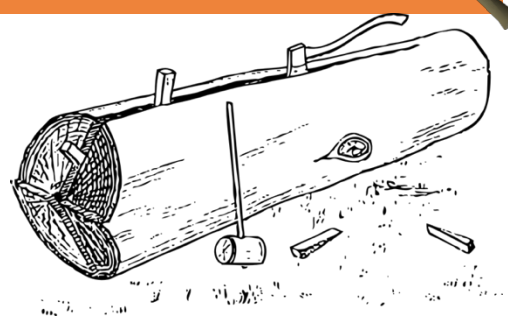




DRIVING AND TURNING WITH SIMPLE MACHINES

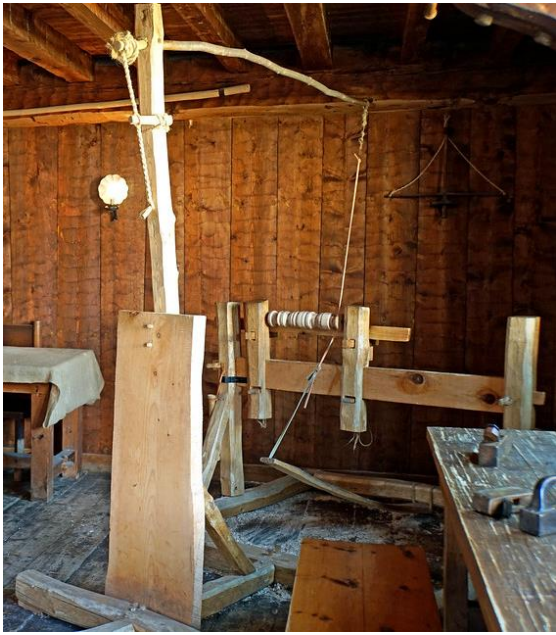


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Activity 3:

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

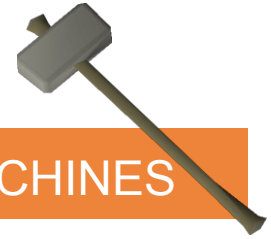


1. What are all of the simple machines that create this compound machine?

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?





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ANSWER KEY

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

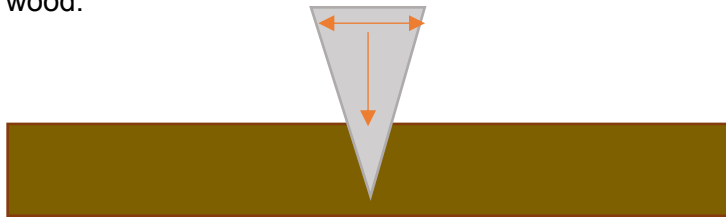
2. What force created the kinetic energy of the maul?

Gravity

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

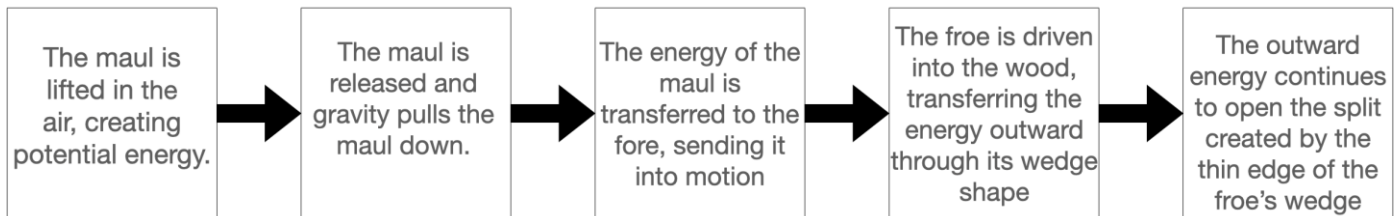
Mechanical energy

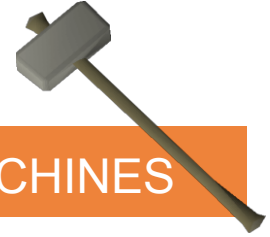
4. Using arrows, draw the directions of energy transfer caused by the wedge-shaped froe moving through the wood.



Activity 2:

Energy was transferred at various points in the process of splitting wood. *Draw a diagram showing the transference of energy, beginning with the maul and ending with split wood. Describe how energy was transferred at each point of the process.*





RIVING AND TURNING WITH SIMPLE MACHINES

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

