

## Unit 8 (Work & Energy): Power-Full Things

**Concept** Work can cause things to move; some systems can do more work than others; systems that can do the same work faster than other systems have more power.

**Content** Student teams identify and label examples of work.

**Objectives** Students differentiate systems that can do more work than others and systems that amplify input work.

**Language Objectives** Students discuss a labor-saving device using the word “power.”

Students use the following words as part of oral discussions: “input”, “mechanism”, and “output.”

### Standards

- **NGSS**
  - **K-2-ETS1-1.** Ask questions, make observations, and gather information about a situation people want to change to define problem that can be solved with a new or improved object or tool.
  - **K-2-ETS1-3.** Analyze data from tests of two objects designed to solve the same problem to compare the strengths and weaknesses.
  
- **TEKS**
  - **3C** Represent the natural world using models and identify their limitations, including size, properties, and materials.
  - **3D** Connect grade-level appropriate science concepts with the history of science.
  - **6A** Explore different forms of energy, including mechanical, light, sound, and heat/thermal in everyday life.
  
- **ELPS**
  - **3D** Speak using grade-level content area vocabulary in context to internalize new English words and build academic language proficiency [Application for Acquisition]
  - **2E** Use visual, contextual, and linguistic support to enhance and confirm understanding of increasingly complex and elaborated spoken language [Context Clues]
  - **3E** Share information in cooperative learning interactions [Communicative Competence]

**Tools**  
**Materials**

Bean-launching devices from last lesson

**Literature**  
**Connections**

*Tractors, Diggers and Dozers A Picture Book for Kids* by Lilley  
*Lights Construction Trucks What Would We do without Them?* by Maura Kempa  
*Katy and the Big Snow* by Virginia Lee Burton  
*Clevor Trevor* by Gregory Lay  
*B is for Bulldozer: A Construction ABC* by June Sobel



**Day 2: Explore/ Explain**

Teacher Says/Does	Student Says/Does	Language requirements
<ol style="list-style-type: none"> <li>1. Make large labels using the information in the Explore/explain section in handout <b>3.8.3</b>. Place the three labels in separate parts of the classroom.</li> <li>2. Give each student one card <b>3.8.4</b>. It should be either an input, a mechanism, or an output. Ask students to raise their hands if they are an input, then if they are a mechanism, then if they are an output.</li> <li>3. Then, have students move to their corresponding location in the classroom, labeled: "input", "mechanism", or "output"</li> <li>4. Have students who are "inputs" talk about what the other two components that goes with them: the mechanism, and the output.</li> <li>5. Have students keep their labels and use them to form groups made up of three students: one input, one mechanism and one output. Have each group think of other examples of input, mechanisms and output from their home or school experiences. Or use the six cards provided for students to categorize. Have them write down the information on the table provided in handout <b>3.8.5</b>. If appropriate, once all groups are done, discuss the following questions as a whole group:               <ul style="list-style-type: none"> <li>• What system uses a microphone/amplifier/megaphone as a mechanism?</li> <li>• What mechanism can change small amounts of movement to larger amounts of movement?</li> <li>• What does a lever do?</li> <li>• How can we define mechanisms?</li> </ul> </li> </ol>	<p>Students share their understanding of the concepts of: input, mechanism, output</p>	<p>Input Mechanism Output Lever Mechanism</p> <p>Mechanical advantage</p>

Teacher Says/Does	Student Says/Does	Language requirements
<p>6. Tell students you will read a paragraph, and they have to guess whether the missing word is increase or input:</p> <p>7. Mechanisms let us _____the power of _____ work, so we can do tasks that would ordinarily be difficult.</p> <p>8. Tell them that the relationship between the amount of input work and output work in a system is called “mechanical advantage,” and this tells us how powerful a machine-system is.</p> <p>9. Have them share examples of mechanical advantage</p>		



The \_\_\_\_\_ is more powerful than the  
\_\_\_\_\_ because \_\_\_\_\_  
\_\_\_\_\_

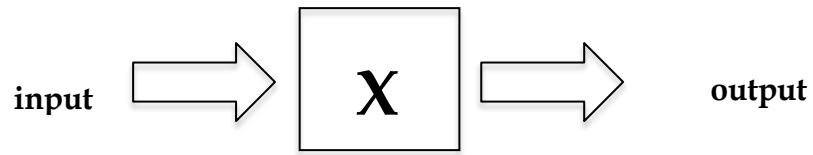
One labor-saving device I saw in the video about the pyramids  
was \_\_\_\_\_

One labor device we have today is  
\_\_\_\_\_

A device in my house that saves labor is  
\_\_\_\_\_

It saves labor because \_\_\_\_\_  
\_\_\_\_\_

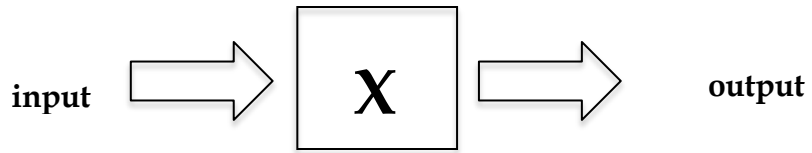
SYSTEM 1:



**Ball is  
thrown**

**The ball flies  
100 feet in  
ten seconds.**

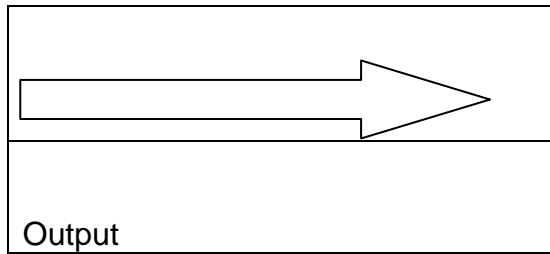
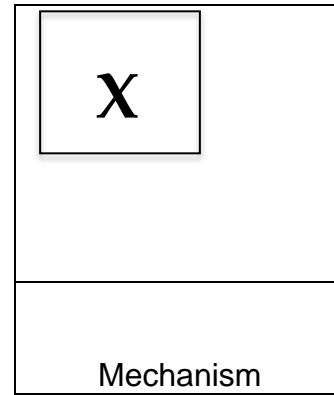
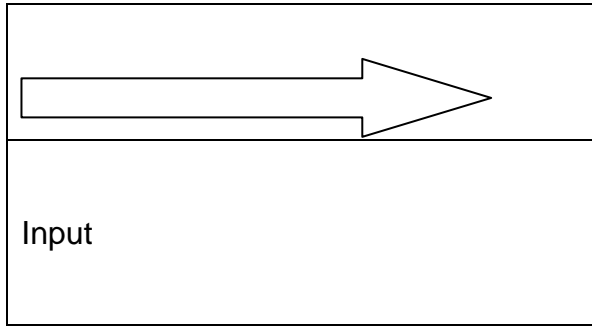
SYSTEM 2:



**Ball is  
thrown**

**The ball flies  
100 feet in  
five seconds.**





DTEEL 3.8.3 Power-Full Things

Engage/Explore

Quiet sound	Megaphone	Loud noise
Bean goes in	A bean-launching device	Bean lands 5m away

