Work and Simple Machines
Section 2 Using Machines

Predict three things that might be discussed in Section 2 after reading the headings in this section.

1. __________________________________________________________________________

2. __________________________________________________________________________

3. __________________________________________________________________________

Review Vocabulary

Define friction to show its scientific meaning.

friction

___________________________________________________________________________

___________________________________________________________________________

New Vocabulary

Write the correct vocabulary word next to each definition.

output work divided by input work

___________________________________________________________________________

force exerted on a machine

___________________________________________________________________________

number of times that a machine increases the input force; equal to the output force divided by the input force

___________________________________________________________________________

force exerted by a machine

___________________________________________________________________________

Academic Vocabulary

Use a dictionary to define device to show its scientific meaning.

device

___________________________________________________________________________

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What is a machine? and Mechanical Advantage

I found this information on page ___________.

Organize information by listing the three ways a machine can make work easier.

A machine makes work easier by changing

1. ____________________________________________________________________
2. ____________________________________________________________________
3. ____________________________________________________________________

Summarize mechanical advantage. Then write the formula for calculating it.

Mechanical advantage is ______________________________

The equation for calculating mechanical advantage is

\[ \text{mechanical advantage} = \] ____________________________________________________________________

Analyze the diagrams in your book that show the three ways machines make work easier. Complete the chart by describing the effect of the machine on the output force.

<table>
<thead>
<tr>
<th>What Machine Does</th>
<th>How Force Is Changed</th>
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<tbody>
<tr>
<td>Increases force</td>
<td></td>
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<tr>
<td>Increases distance</td>
<td></td>
</tr>
<tr>
<td>Changes direction of force</td>
<td></td>
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</tbody>
</table>
## Efficiency

*I found this information on page ________.*

**Summarize** the relationship between efficiency and friction by completing the paragraph.

The _________ of a machine is the ratio of the _________ work to the _________ work. _________ is a force that _________ the motion of one object sliding over another. This _________ a machine's _________.

**Complete** the mathematical equation that describes how efficiency is calculated.

\[
\text{efficiency (in percent) } = \frac{\text{_______}}{\text{_______}} \times 100\%
\]

**Model** how oil reduces the friction between two surfaces. Sketch a cross-section view of two horizontal surfaces sliding past each other. Indicate contact points on the upper and lower surfaces and a layer of oil between them.

![Diagram](image)

## Connect It

Think of some machines that you use. List the machines and the parts that may be affected by friction.

<table>
<thead>
<tr>
<th>Machine</th>
<th>Affected Parts</th>
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<tbody>
<tr>
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