Simple Machines

This section describes the six kinds of simple machines. It also explains how to calculate the advantage of using simple machines.

Use Target Reading Skills

Before you read the section, preview Figure 17. Record two questions about the diagram in the graphic organizer. As you read the section, look for the answers to your questions in the text and the figure captions. Record the answers to your questions in the graphic organizer.

Three Classes of Levers

Q. What are the three classes of levers?

A.

Q.

A.

1. What are the six basic kinds of simple machines?
   a. ______________________
   b. ______________________
   c. ______________________
   d. ______________________
   e. ______________________
   f. ______________________
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Simple Machines (continued)

Inclined Plane

2. What is an inclined plane?

________________________________________________________________________
________________________________________________________________________

3. What formula do you use to determine the ideal mechanical advantage of an inclined plane?

________________________________________________________________________

4. Circle the letter of each sentence that is true about inclined planes.
   a. The necessary input force is less than the output force.
   b. A ramp is an example of an inclined plane.
   c. The necessary input force is more than the output force.
   d. An inclined plane allows you to exert your force over a longer distance.

5. The longer the inclined plane, the less________________________ you need to push or pull an object.

Wedge

6. What is a wedge?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

7. Is the following sentence true or false? In a wedge, the inclined plane itself moves. ________________

8. Is the following sentence true or false? The longer and thinner a wedge is, the greater its mechanical advantage. ________________

Screws

9. What is a screw?

________________________________________________________________________
________________________________________________________________________

10. A spiral inclined plane forms the ________________________ of a screw.

11. When twisting a screw into a piece of wood, where is the input force applied and where is the output force exerted?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
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Levers

12. What is a lever?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

13. The fixed point that a lever pivots around is called the _________________.

14. Circle the letter of each sentence that is true about levers.
   a. A lever increases your input force.
   b. There are three different types of levers.
   c. A lever changes the direction of your input force.
   d. The fulcrum is always located at the same place on a lever.

15. On each diagram below, draw a triangle below the lever to show where the fulcrum is located on each class of lever.

16. Complete the following table about levers.

<table>
<thead>
<tr>
<th>Levers</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Class of Lever</td>
<td>Examples</td>
</tr>
<tr>
<td></td>
<td>Door, wheel barrow, bottle opener</td>
</tr>
<tr>
<td></td>
<td>Seesaw, scissors, pliers</td>
</tr>
<tr>
<td></td>
<td>Baseball bat, shovel, fishing pole</td>
</tr>
</tbody>
</table>

17. What formula do you use to calculate the ideal mechanical advantage of a lever?

________________________________________________________________________
________________________________________________________________________
Simple Machines (continued)

Wheel and Axle
18. What is a wheel and axle?
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

19. What formula do you use to calculate the ideal mechanical advantage of a wheel and axle?
________________________________________________________________________
________________________________________________________________________

Pulley
20. What is a pulley?
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

21. What kind of pulley changes the direction of the input force but does not change the amount of force you apply? ________________________

22. What kind of pulley has an ideal mechanical advantage of 2?
________________________________________________________________________

Simple Machines in the Body
23. What do most of the levers in your body consist of?
________________________________________________________________________
________________________________________________________________________

24. Your muscles are attached to your bones by tough connective tissue called ________________________.

25. In a living lever in your body, what acts as the lever’s fulcrum?
________________________________________________________________________

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26. On the illustration of a living lever, label each arrow to show where the input force and the output force are located. Also show where the fulcrum is located.

27. What simple machines do your incisors resemble?

________________________

28. Explain how your front teeth are like an ax.

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

Compound Machines

29. What is a compound machine?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

30. What do you need to know to calculate the mechanical advantage of a compound machine?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________