Name _____ Date _____ Class _____

Lesson Outline **LESSON 2**

Using Machines

A. What is a machine?

1. A(n) _____ is any device that makes doing something easier.

2. Although a machine makes doing work easier, it does not _____ the amount of work required.

3. A machine _____ the way in which work is done.

4. To use a machine, you must apply a(n) _____ to it.

a. The machine changes the _____ force to a(n) _____ force.

b. When a hammer removes a nail, the _____ comes from pulling on the hammer's handle; the hammer changes this to a(n) _____ that pulls the nail from the board.

5. When you use a machine, the input force makes part of the machine _____.

a. _____ is done because the input force causes movement.

b. Machines convert _____ work to _____ work.

B. How do machines make work easier to do?

1. A machine can make work easier in _____ different ways.

2. A machine can make it easier to do work by changing the size of the _____.

a. A machine can change a(n) _____ force into a(n) large _____ force.

b. The output force acts over a(n) _____ distance than the input force does.

3. A machine can make it easier to do work by changing the _____ over which the force acts.

a. With a rake, your hands move through a(n) _____ distance, but the other end of the rake moves through a(n) _____ distance.

Lesson Outline continued

b. As the output force exerted by any machine _____, the output distance _____.

4. A machine can make it easier to do work by changing the _____ of the input force.

C. What is mechanical advantage?

1. A machine's _____ is the ratio of the output force produced to the input force applied.

2. A mechanical advantage _____ than 1 means the output force is greater than the input force.

3. A mechanical advantage _____ than 1 means the output force is less than the input force.

4. A mechanical advantage equal to 1 means the input force and the output force are _____, but the direction of the input force _____.

D. What is efficiency?

1. The output work done by a machine never exceeds the input _____ of the machine.

2. The _____ of a machine is the ratio of the output work to the input work.

3. Because the output work is always _____ than the input work, the efficiency of a machine is always _____ than 100 percent.