Lesson Outline   **LESSON 3**

Simple Machines

A. What is a simple machine?

   1. A(n) _____ is a machine that does work using only one movement.

   2. These machines do work in a(n) _____ motion.

B. Levers

   1. A(n) _____ is a simple machine made of a bar that pivots or rotates about a fixed point.

   2. The point that a lever pivots on is called a(n) _____.

   3. The distance from the fulcrum to the input force is the

   _____; the distance from the fulcrum to the output

   force is the _____.

   4. With a first-class lever, the fulcrum is _____ the input force and the output force.

   5. With a second-class lever, the _____ force is between the

   _____ force and the fulcrum.

   6. With a third-class lever, the _____ force is between the

   _____ force and the fulcrum.

   7. The ideal _____ of a lever equals the length of the input arm divided by the length of the output arm.

     a. The mechanical advantage of a(n) _____-class lever can vary, depending on the location of the fulcrum.

     b. In a second-class lever, the _____ arm is always longer than

     the _____ arm.

     c. In a third-class lever, the _____ arm is always shorter than

     the _____ arm.

   8. In the human body, _____ provide force for the levers.

     a. The neck is a(n) _____-class lever, with the neck muscles

     providing the _____ force.

     b. The foot is a(n) _____-class lever, and the arm is a(n)

     _____-class lever.

Lesson Outline continued

C. Wheel and Axle

1. A(n) _____ is an axle attached to the center of a wheel and both rotate together.

2. For a wheel and axle, the length of the input arm is the _____ of the wheel; the length of the output arm is the _____ of the axle.

D. Inclined Planes

1. A(n) _____ is a flat, sloped surface.

2. The ideal mechanical advantage of an inclined plane is the

_____ of the inclined plane divided by

its _____.

3. A sloped surface that moves is called a(n) _____.

4. A(n) _____ is an inclined plane wrapped around a cylinder.

5. A(n) _____ is a simple machine that is a grooved wheel with a rope or cable wrapped around it.

6. A(n) _____ pulley only changes the direction of the force.

7. A(n) _____ pulley decreases the force but increases the distance over which the force acts.

8. The ideal mechanical advantage of a pulley is equal to the number of

_____ of rope pulling up on the object.

E. What is a compound machine?

1. Two or more simple machines that operate together form a(n)

_____ machine.

2. A(n) _____ is a wheel and axle that has teeth around the wheel.

3. When the teeth of two or more gears _____, the turning of one gear makes the other(s) turn.

4. The speed and force of gears is affected by the _____ of the gears.

5. The efficiency of a compound machine is determined by

_____ the efficiency of each component machine together.