1. Which of the following describes unidirectional rectilinear motion?
   A. A ball spinning in place
   B. A train traveling in a straight line
   C. A pendulum swinging back and forth
   D. A bicycle wheel rotating

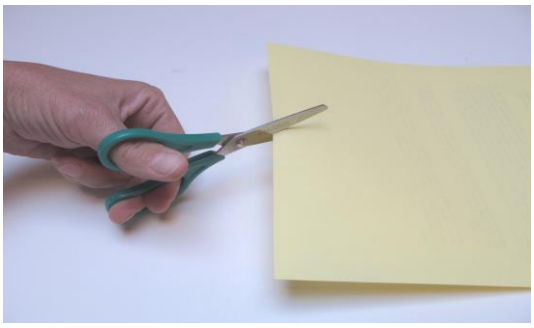
2. A machine that changes the direction of a force but does not increase the force is:
   A. Lever
   B. Pulley
   C. Inclined Plane
   D. Wedge

3. Match the type of movement with its example:

Unidirectional rotation	A fan blade
Bidirectional rectilinear translation	A seesaw
Spiral motion	A screw being turned
Bidirectional rotation	A swing in motion

4. Describe Newton's first law of motion and explain how it applies when a hockey puck slides on ice.

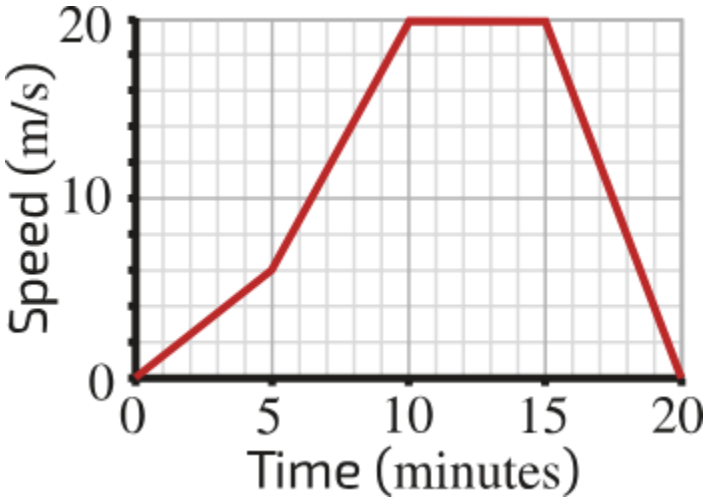
5. The diagram below shows a lever with a fulcrum. Label the effort, load, and fulcrum. Identify what type of lever it is (Class 1, 2, or 3).



6. A force of 15 N is applied to move a 3 kg object. Calculate the acceleration using Newton's second law.

7. **Fill-in-the-Blank**:
   Friction acts in the _____ direction of motion and depends on _____ and _____.

8. **True or False**:
    - Increasing the surface area of contact always increases friction.
    - A pulley system increases the distance over which force is applied, reducing the force needed.
9. Explain how a seatbelt demonstrates Newton's first and third laws of motion during a car crash.
10. If the friction on a roller coaster track was reduced to nearly zero, what would happen to the motion of the coaster? Why?
11. A soccer ball is kicked and rolls to a stop. Identify and explain the forces acting on the ball while it is moving and after it stops.
12. Below is a graph showing the speed of a cyclist over time. Determine if the forces acting on the cyclist are balanced or unbalanced and justify your answer.



13. Rank the following simple machines in order of increasing mechanical advantage:

- Ramp with a steep incline
- Lever with a long handle
- Pulley system with two pulleys