Forces and Their Effects: 10th Grade Physics Worksheet

Forces are pushes or pulls that can change the motion, shape, or direction of an object. The unit of force is the newton (N). Forces can be classified as contact forces (which require physical touch, like friction or tension) or non-contact forces (which act at a distance, like gravity or magnetism). Forces are vectors, meaning they have both magnitude (size) and direction, while scalars have only magnitude. When multiple forces act on an object, they can be added using vector addition. If forces act along the same line, they are called parallel or anti-parallel, depending on whether they point in the same or opposite directions. The parallelogram law is a graphical way to find the resultant of two vectors. Weight is the force of gravity acting on a mass and can be calculated using $W = mg$, where m is mass in kilograms and g is acceleration due to gravity $9.8 m/s^2$.

Fill in the Blank

Fill in the blank with the correct words:

1. A force is a _____ or a _____ that can change an object's motion.
2. The SI unit of force is the _____.
3. Gravity and magnetism are examples of _____ forces.
4. A quantity that has both magnitude and direction is called a _____.
5. The parallelogram law is used to add two _____.

Word bank: vector, contact, push, non-contact, newton, pull, vectors

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Multiple Choice Questions

Choose the correct answer from the choices for each question:

1. Which of the following is a contact force?
   - o a) Gravity
   - o b) Friction
   - o c) Magnetism
   - o d) Electric force
2. Which formula is used to calculate weight?
   - o a) F = ma
   - o b) P = F/A
   - o c) W = mg
   - o d) V = IR
3. If two forces act in opposite directions along the same line, they are called:
   - o a) Parallel forces
   - o b) Balanced forces

- o c) Anti-parallel forces
- o d) Perpendicular forces
4. Which statement about scalars is TRUE?
    - o a) Scalars have only magnitude
    - o b) Scalars have only direction
    - o c) Scalars have both magnitude and direction
    - o d) Scalars are always negative
5. The resultant of two vectors at an angle can be found using:
    - o a) The parallelogram law
    - o b) The law of conservation of energy
    - o c) The law of inertia
    - o d) The law of reflection

Open-Ended Questions

Answer the following questions in complete sentences:

1. Explain the difference between contact and non-contact forces. Give one example of each.
2. Describe the steps to calculate the weight of a 5 kg object on Earth.

3. A student pushes a box with a force of 10 N to the right, while another student pushes the same box with a force of 6 N.