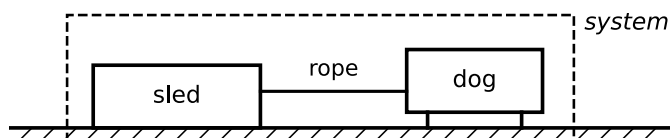


Part A: Inertia, Systems, and Laws

Answer each question in one to three complete sentences.

1. A 0.060 kg tennis ball rolls across the gym at 5.0 m/s. A 4.0 kg medicine ball sits still on the floor. Which one has more inertia? Explain how you know.
2. Tasha is standing in the aisle of a city bus. Use inertia to explain what happens to her in each case.
 - a. The bus suddenly speeds up from a stop.
 - b. The bus makes a sharp turn to the left.
3. Devin says, "Newton's first law is just a theory that has been tested so many times it became a law." Explain what is wrong with Devin's statement.
4. A dog pulls a sled across the snow with a rope. Marco chooses the dog and the sled together as his system, shown by the dashed box. For each force, say whether it is an inside or an outside force, and whether it can change the motion of the whole system.

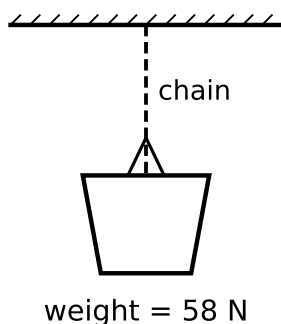


- a. The rope pulling forward on the sled.
- b. The ground pushing forward on the dog's paws.
- c. Friction from the snow pushing backward on the sled.

Part B: Balanced Forces and Equilibrium

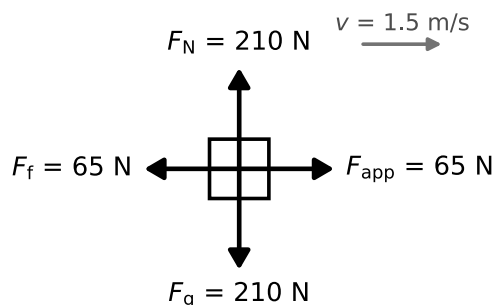
Show your work. Give each force a size and a direction.

5. A potted plant hangs at rest from a single chain, as shown. What force does the chain exert on the pot?



6. Priya pulls her rolling suitcase east through the airport with a steady horizontal pull of 42 N. The suitcase moves at a constant velocity. The suitcase weighs 180 N. Find the friction force and the normal force on the suitcase.

7. The diagram shows all of the forces on a crate that is sliding to the right across a floor at 1.5 m/s.



- Are the forces on the crate balanced? Is the crate in equilibrium?
- Describe the crate's motion 5 seconds later if the forces stay the same.
- Jaylen says the crate must be slowing down because the push is not bigger than friction. Explain why Jaylen is wrong.