

Pre-Lab: Forces and Newton's Laws

To help prepare you for the first Activity in this course, first watch this video that introduces forces and Newton's first two laws:

<https://youtu.be/OdG9133Dq24>

Then answer the questions below.

1. Box A feels a force of 3 Newtons (N) pushing it to the right and another force of 3N pushing it to the left. What is the magnitude (absolute value) of the net force on box A?
2. Box B feels a force of 2 N pushing it to the left and another force of 5 N pushing it to the right. What is the magnitude (absolute value) of the net force on box B?
3. In the previous question, what is the direction of the net force acting on box B?
 - a) Right
 - b) Left
 - c) The net force is zero
4. Suppose box A from question 1 starts at rest. Will it experience a change in speed (i.e., start speeding up)?
 - a) Yes
 - b) No
 - c) Not enough information
5. Suppose box B from question 2 starts at rest. Will it experience a change in speed (i.e., start speeding up)?
 - a) Yes
 - b) No
 - c) Not enough information

6. A car is traveling south on the highway at a steady speed of 55 mph.

The driver presses on the gas pedal, making the car speed up (while still traveling south).

What is the direction of the net force while the car is speeding up?

- a) North
- b) East
- c) South
- d) West
- e) The net force is zero

7. A car is traveling east on the highway at 65 mph.

The driver steps on the brake to slow the car down.

What is the direction of the net force while the car is slowing down?

- a) North
- b) East
- c) South
- d) West
- e) The net force is zero

8. Continuing from the previous question, the driver lets up on the brake when the car has slowed to a speed of 55 mph.

Now the car is traveling at a constant speed of 55 mph to the east.

What is the direction of the net force on the car now?

- a) North
- b) East
- c) South
- d) West
- e) The net force is zero

9. Suppose there are two forces acting on an object. If the object is sitting at rest and stays at rest, what is the net force (zero or nonzero)? And therefore, what must be true about the two forces that are acting on the object?
- a) Zero net force; the forces are unbalanced
 - b) Nonzero net force; the forces are unbalanced
 - c) Zero net force; the forces are balanced
 - d) Nonzero net force; the forces are balanced
10. Suppose there are two forces acting on an object. If the object is falling at a constant speed, what is the net force (zero or nonzero)? And therefore what must be true about the two forces that are acting on the object?
- a) Zero net force; the forces are unbalanced
 - b) Nonzero net force; the forces are unbalanced
 - c) Zero net force; the forces are balanced
 - d) Nonzero net force; the forces are balanced
11. Suppose you kick a soccer ball with a force of 100N, and then you kick a bowling ball with the same force of 100N (ouch!).

The soccer ball will accelerate to a higher speed than the bowling ball.
Therefore, the soccer ball has...

- a) more inertia than the bowling ball
- b) less inertia than the bowling ball
- c) the same inertia as the bowling ball, but the forces are acting on the two balls are different