

## Study Guide - Forces – Direction and Magnitude – CS9

1. Two cars hit each other head on. **Circle** the pair of forces that show the **MOST net force** from the collision and **label** the cars with the vectors showing the forces as they collide:

Car A = 30 N, Car B = 20 N	Car A = 20 N, Car B = 5 N	Car A = 10 N, Car B = 7 N	Car A = 5 N, Car B = 5 N
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- Does this represent a net force of 0?
- What is the net force on the cars when you look at the forces they are applying on each other?
- Will a car move during the collision or will the two cars stop completely? Explain.

2. Draw vectors of the forces acting on the following objects to make free body diagrams:

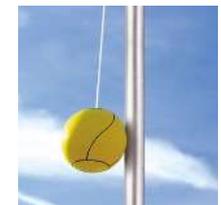
airplane going higher and faster



row boat moving to the right at a constant speed



stationary tether ball



3. What will happen to the motion of the box?

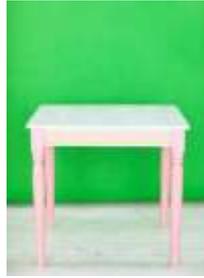


Glue this side into your notebook



4. Draw a box on top of the table.

- If the box is not moving, are the forces on it balanced or not balanced?
- **Gravity is an action force** pulling on the box. Draw a vector showing this force.
- If the force of gravity is pulling the box down with 100 N down, draw a vector representing the other force acting on the box.



5. A girl is on a scooter going a constant speed and tosses a baseball up to herself as she's moving.

- Predict where the ball will land.
- If the ball is moving at a constant speed with the girl, does the horizontal motion change where it will land? Explain your answer compared to a person jumping in place on Earth.
- Draw the forces acting on the girl that allow her to move at a **constant** speed



6. What will the motion of the tree at G look like to car B?

What will the motion of the tree at G look like to person H on the left?



7. Explain what will happen and why for the following situations:

	Situation 1	Situation 2	Situation 3	Situation 4
Image	<p>The gymnast is standing stationary waiting for the event to begin.</p>	<p>A guy turns off the engine to the motorcycle and there is only friction acting on the bike.</p>	<p>An airplane is flying at 100 mph and the force of thrust equals the force of drag.</p>	<p>A guy is going up the stairs and has more applied force than friction.</p>
What will happen to the motion of the object?			What will happen to its speed?	What will happen to his speed?
Why? (what kinds of forces are acting on it?)				

8. If you are this dog driving a car, would your motion of yourself in the car be the same as someone watching you drive down the street? Explain.



9. \_\_\_\_\_ forces cause **changes** in motion.  
 \_\_\_\_\_ forces cause **NO change in motion**, even if the object is already moving.