Force Pair Detectives

Read closely to trace equal and opposite forces between objects.

6.7.C "identify simultaneous force pairs that are equal in magnitude and opposite in direction that result from the interactions between objects using Newton's Third Law of Motion."

NAME _____ DATE _____

1 READ AND MARK

Read it twice

YOUR JOB Underline each force statement or clause that names two interacting objects. Then write the same number beside the two clauses that form each simultaneous force pair, so you can match forces that are equal in magnitude and opposite in direction.

Forces in Action

(1) Newton's Third Law describes what happens whenever two objects interact. Each object pushes or pulls on the other at the same time. The two forces are equal in magnitude, which means they have the same strength, and opposite in direction. They act on different objects, so they do not cancel each other on one object. To identify a force pair, name both objects and state what each object does to the other. This careful wording keeps the forces connected.

(2) At a launchpad, a rocket engine forces hot gas downward. At that same moment, the hot gas forces the rocket engine upward with equal strength. These are a force pair because the forces come from one interaction between the gas and engine. The downward force acts on the gas, while the upward force acts on the engine. As the rocket rises, other forces, such as gravity and air resistance, may also act, but they are not the partner force described here.

(3) During a skateboard jump, the rider's feet push the board downward. Simultaneously, the board pushes the rider's feet upward with equal magnitude. The rider and board move in response because each force acts on a different object. Later, when the board's wheels touch the ground, the wheels push backward on the ground. The ground pushes forward on the wheels with equal magnitude. This second pair is separate from the first pair because it comes from a different interaction.

2 ANSWER WITH EVIDENCE

Use the passage

1. In the rocket interaction, which object receives the downward force, and which object receives the upward force?

2. Why are the rocket engine's force on the gas and the gas's force on the engine a simultaneous force pair?

3. Identify the two forces in the interaction between the skateboard wheels and the ground. Include the direction and the object each force acts on.

4. Why is the force pair between the rider's feet and the board separate from the force pair between the wheels and the ground?

3 YOUR TURN

Your own words

Choose an interaction not named in the passage. Write exactly two sentences that state both forces in its simultaneous force pair, including the objects and opposite directions.

ANSWER KEY

Force Pair Detectives

GRADE 6 · TEKS 6.7.C

PART 1 · READ AND MARK

Underline each force statement or clause that names two interacting objects. Then write the same number beside the two clauses that form each simultaneous force pair, so you can match forces that are equal in magnitude and opposite in direction. Accept any marking that follows this job and points at the right text.

PART 2 · ANSWERS

#	QUESTION	ANSWER
1	In the rocket interaction, which object receives the downward force, and which object receives the upward force?	**The hot gas receives the downward force, and the rocket engine receives the upward force.**
2	Why are the rocket engine's force on the gas and the gas's force on the engine a simultaneous force pair?	**They come from one interaction between the gas and engine, happen at the same time, have equal strength, point in opposite directions, and act on different objects.**
3	Identify the two forces in the interaction between the skateboard wheels and the ground. Include the direction and the object each force acts on.	**The wheels push backward on the ground, and the ground pushes forward on the wheels.**
4	Why is the force pair between the rider's feet and the board separate from the force pair between the wheels and the ground?	**They are separate because they come from different interactions between different pairs of objects.**

PART 3 · YOUR TURN (SAMPLE ANSWER)

A swimmer's hands push water backward. At the same time, the water pushes the swimmer's hands forward with equal magnitude.

Accept any real interaction not named in the passage if both force statements describe the same interaction. Each response must show forces acting at the same time on different objects, with equal magnitude and opposite directions.