BLAST OFF!

TEACHER GUIDE

PLANNING

Here's a suggested schedule for this kit! The activities should be completed in order, but you can choose when the lessons take place over time.

ACTIVITY INFORMATION	SECTION (S)	TIME REQUIRED	DAY/ LESSON
ACTIVITY 1: TRAVELING TEA BAG Light a tea bag on fire, and watch it float up, up, and away! Time required: 30 min	☐ We Have Lift Off!	30 minutes	Day 1
ACTIVITY 2: FIZZ, POP, AND PUSH Make another mini rocket, this time using pressure to push it up. Time required: 1 h 30 min	☐ Find Out About Force	30 minutes	Day 2
	☐ The Pressure Is On	30 minutes	Day 3
	☐ Show What You Know	30 minutes	Day 4
ACTIVITY 3: SUPER STOMP Make a stomp rocket to learn about distance, speed, and direction. Time required: 2 h	☐ Sto[illegible]		

Question 5: How fast were you moving?
Answer: Answers will vary.
How to Help:
• There are many ways to describe how fast they were moving, including relative terms like "fast" and "slow," as well as more precise labels like "45 miles per hour."
• Speed will be covered in Activity 3, so there's no need for you to explain it here.

3

FORCE FACTS

• Force is explained, and several examples of how force changes motion are shown.
• Force is intuitive; students may not have used the word this way, but they have seen its effects. Discuss their personal experiences to anchor the content in daily life.
• The following terms are defined: force and direction.
• Force is defined as a push or pull at this level even though the higher-level definition is an interaction between two objects.

THINK ABOUT IT!

Question 1: A kickball is resting on the ground. You kick it from left to right.
a. Before you kick the ball, does it have motion?
b. If it has motion, which direction is it?
c. After you kick the ball, does it have motion?
d. If it has motion, which direction is it?
Answer:
a. No, the ball is not in motion before it is kicked.
b. The ball doesn't have motion.
c. Yes, the ball has motion after it is kicked.
d. The ball goes to the right.
How to Help: *Review the definition of motion as the movement of an object.*

Question 2: You are riding in a car, going straight ahead north. The driver turns the steering wheel to make a left turn (to the west).
a. Before the turn, does the car have motion?
b. If it has motion, which direction is it?
c. After the turn, does the car have motion?
d. If it has motion, which direction is it?
Answer:
a. Yes, the car is in motion before the turn.
b. The car's motion is straight ahead, or north.
c. Yes, the car has motion after the turn.
d. The direction of the car's motion is left or west.
How to Help: *Review the definition of direction if needed.*

4

ROCKETS ROCK!

• This sub-section introduces rockets, the central theme of the kit.
– The tea bag is not technically a rocket, but it is an object that moves upward as the result of a force (which is what most rockets do).
• The following vocabulary words are defined: rocket and pressure.
• Your student will write and draw what they already know about rockets and compare it to the facts listed in a table (along with pictures of different types of rockets).
• An explanation is given for how a rocket is propelled.
– At this age/grade level, your student is likely not ready to discuss Isaac Newton's laws of motion, including action/reaction forces. If they were introduced to it previously, you can add this to the rocket explanation: The gases rushing backward is an action, and the rocket moving forward is the reaction.

THINK ABOUT IT!

Question 1: What happened to the height of the rocket when you made it heavier?
Answer: The rocket didn't go up as high.

Question 2: What do you think are some ways that space rockets are kept light, not heavy?
Answer: Answers will vary.
How to Help: *Ask your student to tell you more about their ideas as they suggest them.*
• Rockets are made from low-density materials like aluminum, and they only carry the fuel they need. They also don't carry any more cargo or supplies than are absolutely required.

13

MASS AND MOTION

IT'S GETTING HEAVY!

• This section summarizes the effect of mass on motion, and it explains how force and mass are related.
• Acceleration in terms of F=ma is not discussed at this level, but you might bring up more examples from everyday life that show how objects are harder to move if they have more mass.
  – For example, a box that is full takes more force to move than an empty box.
• The following vocabulary words are introduced: mass and matter,

THINK ABOUT IT!

Question: Think about a time when you had to use more force to move something with a lot of mass, and think about a time when you had to use less force to move something with a smaller mass. Write about what you did in each situation, or draw two pictures that show what you did.
Answer: Answers will vary.
How to Help:
• Check that your student is using their new vocabulary, including mass, motion, and force, in their explanation.
• If they aren't using the new vocabulary, encourage them to take their explanation one step further by asking them what they mean by certain phrases or words. For example, if they say it "moved easier," ask them what they had to do it ("use more _____" with the blank being force).
• They should say it was harder to move the object with more mass, and that they had to use more force to put it into motion (or to get it to stop if it was already in motion, or to change its motion in some other way).

activity 5

SPACE ROVER

Rockets are built to travel great distances. Some space rockets go all the way to other planets. In this activity, your student will imagine that a rocket made it to a new planet and landed a space rover of their own design.

WONDER

SCIENCE UNLOCKED

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Instructions	IN-BLSTOFT
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