

ENERGY TO BURN



TEACHER GUIDE

ACCELERATE



PLANNING

Here's a suggested schedule for this kit! The activities are designed to be completed in order, but you can decide when to do them over time. The time required for each lesson may vary.

ACTIVITY INFORMATION	SECTION(S)	TIME REQUIRED	DAY/ LESSON
ACTIVITY 1: MEASURING MY FOODS Find out how much energy is stored in food items. Time required: 1 h	<input type="checkbox"/> Fiery Foods	60 minutes	Day 1
ACTIVITY 2: CHEMISTRY IN A CUP Use a calorimeter and understand how it works based on systems thinking. Time required: 1 h 30 min	<input type="checkbox"/> Ch-Ch-Ch-Changes...	90 minutes	Day 2
ACTIVITY 3: EAT UP! Calculate the Calories in some of your favorite foods. Time required: 1 h 45 min	<input type="checkbox"/> It's the Bomb	75 minutes	Day 3

Full schedule available with purchase

1

activity

MEASURING MY FOODS

In this activity, your student will observe two different foods as they burn to heat a beaker of water. You will need to work with your student to set up a safe place for their experiment.

FIERY FOODS

WARNING! CHOKING HAZARD - Small parts. Not for children under 3 years.

WARNING! DO NOT EAT OR DRINK anything in this kit.

WARNING! Be careful with fire and flame. Don't use in windy areas or near objects that can catch fire. Get an adult to help!

WARNING! Sharp objects can cause injury. Don't cut or poke yourself. Get an adult to help!

CONTENT

- In this activity, the student will burn an almond and two marshmallows to heat a small amount of water. They will measure the increase in temperature from the burning food.
 - The positions of the almond and marshmallows are specific to make the lighting of the foods efficient.
 - Make sure that there is a safe workspace and proper ventilation for the experiment (an open window or vent hood from a stove).
 - Do not perform this experiment in a windy area.
 - If a lit food item falls, quickly blow out the flame and restart the trial after the testing equipment has cooled.
 - Make sure that all materials have cooled down before disposal.
 - Have a small bowl of water nearby to extinguish any leftover embers from the experiments.
- This experiment is designed to use approximately the same amount (an approximate mass of 1 gram) of each food item.
 - Burning the almond releases more thermal energy than burning the marshmallows.
 - The almond may take more than one match to stay lit for the experiment. Be sure to blow out the match before it burns to close to fingers. Help your student with lighting matches, as needed.
 - Experimental results during testing showed an increase of 20 °C or more burning an almond and an increase of only 5 °C burning two marshmallows.
- In the next activity, your student will learn more about this device called a calorimeter. It is designed to measure the amount of energy released in a chemical reaction.



THINK ABOUT IT!

Question 1: Which burning food increased the temperature of the water the most? Compare this result to your prediction.

Answer:

- Burning the almond increased the temperature of the water more than burning the marshmallows.
- Comparison answers will vary based on the student's prediction.

How to Help:

- *Your student should use results from their results table in their response.*
- *Whether their prediction was correct or not, their response should include reflection on why their prediction was the same or different.*



THINK ABOUT IT!

? **Question 1: List two chemical reactions that you would like to test in a calorimeter.**

Answer: Answers will vary. The student might include a chemistry experiment from previous experience or adapt an experiment from this kit.

How to Help: *Be sure that the student is choosing a chemical reaction and not a physical change.*

? **Question 2: Choose one of your reactions listed and describe how it would need to be adapted to a closed-system or isolated-system calorimeter.**

Answer: Answers will vary. Typically, the reaction needs to be reduced in size. The student should also consider how the reaction will begin inside a bomb calorimeter.

How to Help: *Ask the student if they think their chosen experiment could be done using the lab procedures from Activity 1 or 2.*

5

JUST THE FACTS

Carbs, Proteins, and Fats! Oh, My!

- In this reading, the student will learn about the information listed on nutrition labels and the connection to food Calories.
- The vocabulary terms carbohydrates, kilocalories, lipids, and proteins are defined.
 - Additional vitamins and nutrients are listed on nutrition labels. These substances do not provide the body energy, though they help with the body's natural processes like digestion and regulating the immune system.
- In the next activity, the student will learn that fats contain more kilocalories per gram than both carbohydrates and proteins.
- For more information about the molecular structure and differences between food molecules, check out the Science Unlocked Accelerate kit, Mega Molecules.



REFLECT

? **Question 1: Explore the nutrition labels of a few food items in your house. Find one food item that is high in fat, with a single serving listing more than 10 % of your “daily value.” Find one food item that is low in fat, with a single serving listed as 0 % or 1 % of your “daily value.”**

Answer:

- Answers will vary.
- Potato chips, energy bars, or candy bars are examples of high-fat food items.
- Vegetables, fruits, and cereal are examples of low-fat food items.

How to Help:

- *Most examples found around the house will be packaged foods.*
- *Help your student search the internet for nutrition facts about fresh foods and produce if they are interested.*



SCIENCE UNLOCKED

© Home Science Tools. All rights reserved.
Reproduction for personal or classroom use only.

Contact us at: www.homesciencetools.com/customer-service/

A Product of Homesciencetools.com

Kit	SU-ENBURN
Instructions	IN-ENBURNT
Revision Date	6/2022