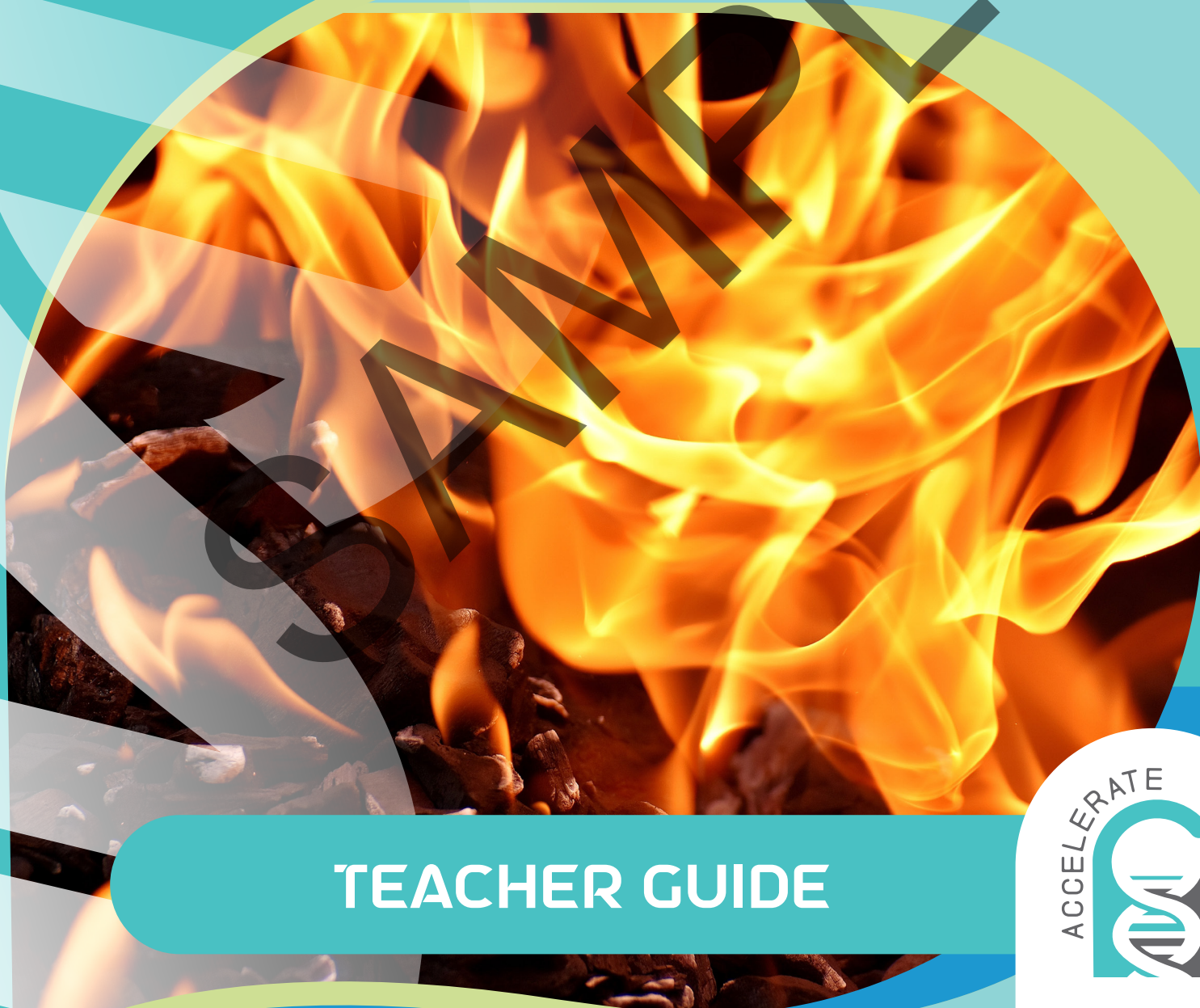


# FIZZ, FOAM, FIRE!



TEACHER GUIDE

ACCELERATE



# 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. The time required for each lesson may vary.

ACTIVITY INFORMATION	SECTION (S)	TIME REQUIRED	DAY/ LESSON
<b>ACTIVITY 1: ELEPHANT TOOTHPASTE EXPLOSION!</b> See a chemical reaction that creates lots of foam! <b>Total time: 30 min</b>	<ul style="list-style-type: none"> <li>Making Toothpaste</li> </ul>	30 minutes	Day 1
<b>ACTIVITY 2: CHEMICAL CHANGES</b> Use chemical reactions to learn about physical and chemical changes. <b>Total time: 1 h 30 min</b>	<ul style="list-style-type: none"> <li>Change Happens</li> </ul>	45 minutes	Day 2
	<ul style="list-style-type: none"> <li>Testing for Chemical Change</li> </ul>	45 minutes	Day 3
<b>ACTIVITY 3: RELEASING OR ABSORBING HEAT</b> Design your own experiment to identify endothermic and exothermic reactions. <b>Total time: 1 h 30 min</b>	<ul style="list-style-type: none"> <li>Endothermic vs. Exothermic</li> </ul>	30 minutes	Day 4
	<ul style="list-style-type: none"> <li>Design an Experiment</li> </ul>	60 minutes	Day 5
<b>ACTIVITY 4: WHAT'S THE SHORTHAND FOR SCIENTISTS? EQUATIONS!</b> Write chemical equations to identify reactants and products. <b>Total time: 1 h</b>	<ul style="list-style-type: none"> <li>Products and Reactants</li> </ul>	30 minutes	Day 6
	<ul style="list-style-type: none"> <li>Show What You Know</li> </ul>	30 minutes	Day 7
<b>ACTIVITY 5: CREATIVITY IN CHEMISTRY</b> Extinguish a flame with citric acid and baking soda reaction products. <b>Total time: 1 h 15 min</b>	<ul style="list-style-type: none"> <li>Day-to-Day Chemistry</li> </ul>	15 minutes	Day 8
	<ul style="list-style-type: none"> <li>Mini Fire Extinguisher</li> </ul>	30 minutes	Day 9
	<ul style="list-style-type: none"> <li>Time to Extinguish</li> </ul>	30 minutes	Day 10
<b>ACTIVITY 6: CHEMICAL CHANGES ARE EVERYWHERE</b> Use any or all of these fun extensions to take your student's learning further! <b>Total time: 2+ h</b>	<ul style="list-style-type: none"> <li>Decomposition Chemistry</li> </ul>	60 minutes	Day 11
	<ul style="list-style-type: none"> <li>Fighting Fire</li> </ul>	60 minutes	Day 12
	<ul style="list-style-type: none"> <li>History of Chemical Equations</li> </ul>	45 minutes	Day 13
	<ul style="list-style-type: none"> <li>Catalyst Chemistry</li> </ul>	30 minutes	Day 14
	<ul style="list-style-type: none"> <li>Practice Makes Perfect</li> </ul>	30 minutes	Day 15
	<ul style="list-style-type: none"> <li>Good Bye Potatoes</li> </ul>	60 minutes	Day 16

8+ hours

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# ELEPHANT TOOTHPASTE EXPLOSION!

Your student will perform a chemical reaction to make what many people call “elephant toothpaste”. It makes so much foam that an elephant could use it to brush its teeth.

activity

## MAKING TOOTHPASTE

### PREPARATION AND SUPERVISION



#### WARNING:

**CHEMICAL WARNING:** This kit contains chemicals that may be harmful if misused. Read cautions on individual containers carefully. Not to be used by children except under adult supervision.

- Help your student in step 2 with handling hydrogen peroxide.
- Please note that for extra effect in step 12, use the provided thermometer to measure the temperature during the reaction. Your student should notice the modest increase.

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### THINK ABOUT IT!

#### Question 1: What are two things you observed during this reaction?

**Answer:** Answers will vary, but the student is likely to mention that it is foamy, it feels a little warm, it smells like yeast, it happened quickly, etc.

**How to Help:** You can prompt the student to make observations by reminding them to describe (but not explain) what is happening. You could also ask them questions about their senses, such as “What does it look like?” or “How fast did it happen?” or “Does it feel warm, cold, or neither?”

#### Question 2: What are two questions you have about this reaction?

**Answer:** Answers will vary.

**How to Help:** You can help students build off their observations by asking them what they think is happening and why, what would happen if the ingredients were different or if there were different amounts.

## CHEMICAL CHANGES

Your student made elephant toothpaste and a change happened. There are two types of changes that could have occurred. Your student will learn about physical and chemical changes. They will test their knowledge with a fun experiment.

### LEARNING GOALS:

- ✓ I can do an investigation to find out if a new substance will be made from mixing two substances.
- ✓ I can use evidence about properties of substances before and after a change to decide if the change was a chemical reaction.

activity

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## HISTORY OF CHEMICAL EQUATIONS

RESEARCH

- Matches were once made with more toxic and less safe materials.
- Students who are interested in health and medicine may enjoy reading about the change in the manufacture of matches and connection to disease by way of “phossy jaw.”

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## CATALYST CHEMISTRY

HANDS-ON

- Your student can explore physical and chemical change by dropping Mentos® into Diet Coke®.
- You can help them expand on this experiment by encouraging them to try different variables, such as the amount of candy, the type of soda, or the temperature of the soda.

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## PRACTICE MAKES PERFECT

WRITTEN ACTIVITY

- A good starting point here would be writing the chemical formulas for simple molecules like carbon dioxide, water, oxygen, hydrogen, and sodium chloride.
- Focus on the particle basis of matter, as in chemicals are made of tiny atoms and the types of atoms can be represented by symbols.

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## GOOD BYE POTATOES

HANDS-ON

- Please supervise the use of hydrogen peroxide.

## GLOSSARY

**Catalyst** – a substance that is used to speed up a chemical reaction.

**Chemical change** – a change in which new substances are formed with new chemical identities.

**Chemical equation** – a set of words and symbols used to describe a chemical reaction.

**Endothermic reaction** – a chemical reaction in which heat is absorbed from the surroundings.

**Exothermic reaction** – a chemical reaction in which heat is released to the surroundings.

**Hypothesis** – a prediction of what will happen during a scientific experiment, often in the form of an If-Then statement.

**Physical change** – a change in which an object or substance becomes different in appearance but not identity; a change in size, shape, or state.

**Product** – a substance that a chemical reaction ends with.

**Reactant** – a substance that a chemical reaction starts with.

**Variable** – something that changes in an experiment.

**Yield** – to make as a result of a chemical reaction.

SAMPLE

ACCELERATE



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