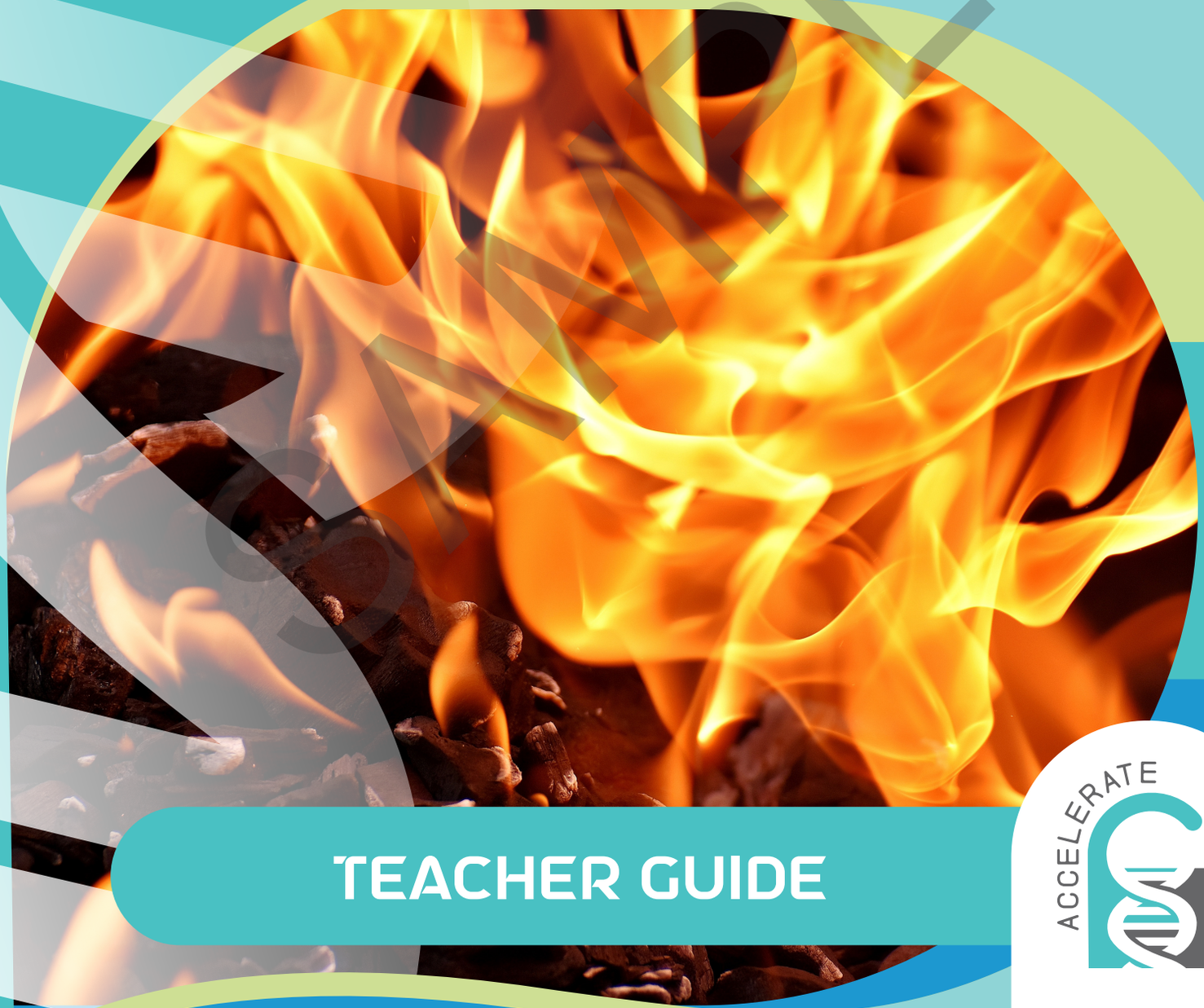
FIZZ, FOAM, FIRE!



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.

ACTIVITY INFORMATION	SECTION (S)	TIME REQUIRED	DAY/ LESSON
ACTIVITY 1: ELEPHANT TOOTHPASTE EXPLOSION! See a chemical reaction that creates tons of foam! **Total time: 30 min**	☐ Making Toothpaste	30 minutes	Day 1
ACTIVITY 2: CHEMICAL CHANGES Use chemical reactions to learn about physical and chemical changes. **Total time: 1 h 30 min**	☐ Change Happens ☐ Testing for Chemical Change	45 minutes 45 minutes	Day 2 Day 3
ACTIVITY 3: RELEASING OR ABSORBING HEAT Design your own experiment to id endothermic and exoth			

8+ hours

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CHANGE HAPPENS

CONTENT

• In this section, your student will learn about chemical and physical changes. Please feel free to read along with your student.

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REFLECT

Question: What were the signs of a chemical reaction you observed when you made elephant toothpaste?

Answer: Some signs were bubbling, sound, a change in temperature, and a gas being produced.

How to Help: *If the student does not offer these clues right away, ask them what they saw, heard, smelled, felt, etc. and remind them that those signs were evidence of a chemical reaction.*

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TESTING FOR CHEMICAL CHANGE

PREPARATION AND SUPERVISION

■ In this part, your student will be doing an experiment where they determine physical and chemical changes. Note: It can be helpful to keep on hand a heat-safe cup or bowl filled halfway with water to place extinguished matches and let them cool.

MULTIPLE AGES AND ABILITIES:

For students who do not enjoy writing or may struggle with dexterity, feel free to write the answers in for them. Additionally, if you are working with multiple students, you can encourage a student who enjoys writing to be the recorder. There are enough actions for multiple students to test one of the changes.

Action	New substances?	Physical or chemical change?	If chemical: what are the signs? If physical: size, shape, or state?
Bend an edge of the pie plate, and then bend it back.	*No, still have aluminum metal*	*Physical*	*Shape*
[Teacher Support] Light a match, and then blow it out (you can then place it in the pie plate).	*Yes, smoke and char*	*Chemical*	*Light, heat, smell*

REFLECT

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Question 1: Think about your results. Do they support your hypothesis? Explain.
Answer: Answers will vary.
How to Help: *Help your student focus on using their results to interpret their predication or hypothesis. They performed the "If" part of the hypothesis, and they should evaluate whether the "Then" part happened or not. For example, if their hypothesis was "If the scoops of citric acid and baking soda increase, then the temperature will get even colder," and they increased the scoops, and saw there was more of a decrease in temperature, then that would support their hypothesis.*

Question 2: What did you notice about the amount of bubbles and the change in temperature? How are they related? Why do you think that is?
Answer: A greater change in temperature means that the reaction was happening on a greater scale, so more bubbles should have been produced. In other words, more products were being produced and more energy was being removed to make those products. The amount of bubbles may be difficult to quantify. However, it may be helpful to pose the question of what would happen on a very large (swimming pool size) scale, or a very small (a few drops) scale.

activity 4

WHAT'S THE SHORTHAND FOR SCIENTISTS? EQUATIONS!

Scientists use equations to understand what did or will happen in a chemical reaction.

In this activity, you write and understand chemical equations for reactions that happen every day.

LEARNING GOALS:

I can write a chemical equation with appropriate placements of the reactants and products.

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PRODUCTS AND REACTANTS

Question: Did you notice a new substance being made in the elephant toothpaste reaction? How did it compare to what you started with?
Answer: *If the student is confused about this, remind them that a new substance was formed (the gas in the foam) and it was a gas while the starting substances were liquids or solids dissolved in liquid.*
How to Help: *You can meet the student at their level with this script:*
- *Teacher: What happened in the reaction?*
- *Student: Foam was produced.*
- *Teacher: Was the foam there before?*
- *Student: No.*
- *Teacher: Are the original liquids still there?*
- *Student: No.*

ACCELERATE

SCIENCE UNLOCKED

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Instructions	IN-FZFMFRT
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