RAINING ON OUR PARADE

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: CHANGES OF LAND AND SEA View changes to naturally occurring and man-made structures. **Total time: 30 min**	☐ Beautiful Before, Damaged After	30 minutes	Day 1
ACTIVITY 2: PHANTASTIC SCIENCE Test the pH of substances all around you. Total time: 1 h 30 min	☐ Scale Science	45 minutes	Day 2
	☐ What is pH?	45 minutes	Day 3
ACTIVITY 3: ACIDS IN THE AIR AND WATER Use pH to demonstrate the impact of acid rain and ocean acidification on our Earth. **Total time: 1 h 45 min**	☐ In Just a Day (Set up)	30 minutes	Day 4
	☐ In Just a Day (Observati		Day 5
	☐		

Question 3: Are the causes of the changes related? If so, how are they related?
Answer: Yes, they are related. Acid rain and ocean acidification are the result of increased sulfuric acid (SO_x), nitric acid (NO_x), and carbon dioxide (CO_2) in the atmosphere, which is a byproduct of burning fossil fuels. As humans burn more fossil fuels to power cars, buildings, etc., the greater quantity of acids in our atmosphere. When these acidic gases mix with moisture in our atmosphere, it produces acid rain. When they mix with moisture in our ocean, it produces ocean acidification.
How to Help: *Students will most likely assume that they are related because they are presented together. However, they may not be able to give more reasoning than that, or that they are related because of damage done to the materials.*

Question 4: Is the damage to the statues more, less, or of the same importance as what is happening to the coral reefs? Explain.
Answer: Answers will vary.
How to Help:
• Students may choose to say one is more important than the other, or that both are equally important.
• Acid rain has reduced with the invention of the catalytic convertor for vehicles. So, it could be plausible that acid rain is a less significant problem than ocean acidification, which we do not have concrete solutions for as of yet.

Question 5: What are two questions you have about the statues, structures, or reefs in the pictures?
Answer: Answers will vary.
How to Help: *Encourage your student to think about what they have wondered when answering the prior questions. Often, when being unsure about an answer to a question, it leads us to new question.*

activity 2

pHANTASTIC SCIENCE

Something must have happened to damage the long-lasting structures and parts of our oceans from Activity 1. While some changes were faster than others, what is causing the damage?

LEARNING GOALS:

I can gather information to show how communities use science to protect natural resources and the environment.

2 SCALE SCIENCE

SAFETY: **WARNING! Contains hazardous chemicals. Corrosive liquid and poison; read warning label carefully. Do not eat or drink. Wash your hands after use.**

PREPARATION AND SUPERVISION

- In this experiment, students will be testing the pH of a variety of soils and liquids.
- While there are a set of substrates and liquids your student is expected to test as part of the experiment, they may test the pH of as many things as they would like. However, keep in mind that they will want to save at least 10 pH strips for the experiment in Activity 3.

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ENERGY PLAN

CONTENT

- In this section, your student will:
  - take what they have learned, including independent research if they choose,
  - choose a problem from a list of topics,
  - develop a plan for monitoring and minimizing the impact of that problem,
  - create a podcast or informercial,
  - edit a podcast or informercial, and
  - presenting a podcast or informercial by uploading it to social media platform.

MULTIPLE AGES AND ABILITIES:

If you are working with several students, have each student choose a different topic. Then, they can listen to each other's podcasts or watch each other's infomercials, and report back on what they learned. This can be a fun, easy way to affirm students have learned the material.

Another alternative to working with several students, is to put students into groups and have them work on their cooperation skills by making a podcast or infomercial as a team.

activity 6

FUELED FOREVER

There are four ideas in the Student Workbook that can extend the learning experience. You can let your student decide which ones to pursue, or you can recommend options based on your available time and materials. There are opportunities for several types of learning styles and preferences, as well as ways to get more use out of the kit materials.

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MELTING POWER

HANDS-ON

- Different acids have different corrosive strengths. This extension allows your student to observe how acids with different pH impact the same material – marble.
- Your student should find that the vinegar (pH 3) did cause some damage to their statue, but not in the same way the hydrochloric acid (pH 1) did in Activity 4.

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BREADY FUEL

HANDS-ON

- This model of fossil fuels shows both how the oils and fossils are made.
- Your student may find this model more helpful in understanding how fossil fuels are made compared to their model from Activity 5. However, for best understanding, have your student complete both models and discuss how each represents fossil fuel formation.
- Here is what each layer represents:
  - gummy candy: dead plants and animals
  - bread: layers of sediment
  - book: pressure

ACCELERATE

SCIENCE UNLOCKED

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

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Kit	SU-RAINON
Instructions	IN-RAINONT
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