DANGER ZONE

TEACHER GUIDE

LAUNCH

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. Required times are estimated.

ACTIVITY INFORMATION	SECTION(S)	TIME REQUIRED	DAY/ LESSON
ACTIVITY 1: OUR CHANGING WORLD What are examples of natural hazards caused by climate change? **Time required: 45 minutes**	☐ The World in Danger	45 minutes	Day 1
ACTIVITY 2: LIVING IN A BUBBLE Explore how gases in the atmosphere affect the temperature on Earth. **Time required: 3 hours**	☐ The Heat Trap	90 minutes	Day 2
	☐ What Fuels Us?	90 minutes	Day 3
ACTIVITY 3: TIME IS MELTING AWAY Learn about how water and ice on Earth are impacted by global temperatures. **Time required: 3 hours**	☐ Melting Ice	90 minutes	Day 4
	☐		

activity 2

LIVING IN A BUBBLE

Throughout this kit, students will learn about the direct and indirect impacts of climate change on human life. In this activity, they will learn about the release of greenhouse gases that affect climate.

LEARNING GOALS:

- I can explain the factors that cause changes in global temperatures.
- I can use a model to show changes in the energy going into and out of Earth's systems cause changes in climate.
- I can use evidence to explain how current rates of regional and global climate change allow people to predict future effects on Earth's systems.
- I can use evidence to show how changes in climate have affected the occurrence and severity of natural hazards as well as human activity.

2 THE HEAT TRAP

WARNING! - Light bulbs gets very hot and bright when in use. Do not touch until cooled. Do not look directly at the bulb.

All Bottled Up

• In this experiment, your student will heat two different bottles next to a lamp to compare the increase in temperature of air and carbon dioxide.
• The incandescent bulb included in this kit can get very hot. Be sure that nothing is touching the heat lamp during the experiment. Use the bulb for 15 minutes at a time and wait until the bulb is cooled before storing.

– If you do not have a stand that is stable enough to hold the heat lamp, clamp it to a secure kitchen cabinet. The experiment can be completed on a kitchen counter.

– Your student may need a box or stack of books to set the experiment at the right height next to the light bulb. This will depend on the height of the heat lamp. Each bottle should be about 5 cm away from the bulb.
– This bulb is only recommended for this activity and NOT for standard lighting.

• When your student is reading the thermometers during the experiment, have them block the light with their hand or a piece of paper. They may need to turn the bottles so that the thermometers can be read, but make sure that the bottles stay at the same distance from the light bulb throughout the experiment.
• Encourage your student to make precise temperature measurements throughout the experiment as the final results may only differ by a few degrees.

Question 3: What is one thing listed above that you think would be a bit harder to do in your life? What are the barriers to accomplishing this?
Answer: Answers will vary.
How to Help: *Your student should identify one thing that may be difficult for them or their whole family to implement, such as driving less or eating less meat.*

AT WHAT COST?

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Science Communication

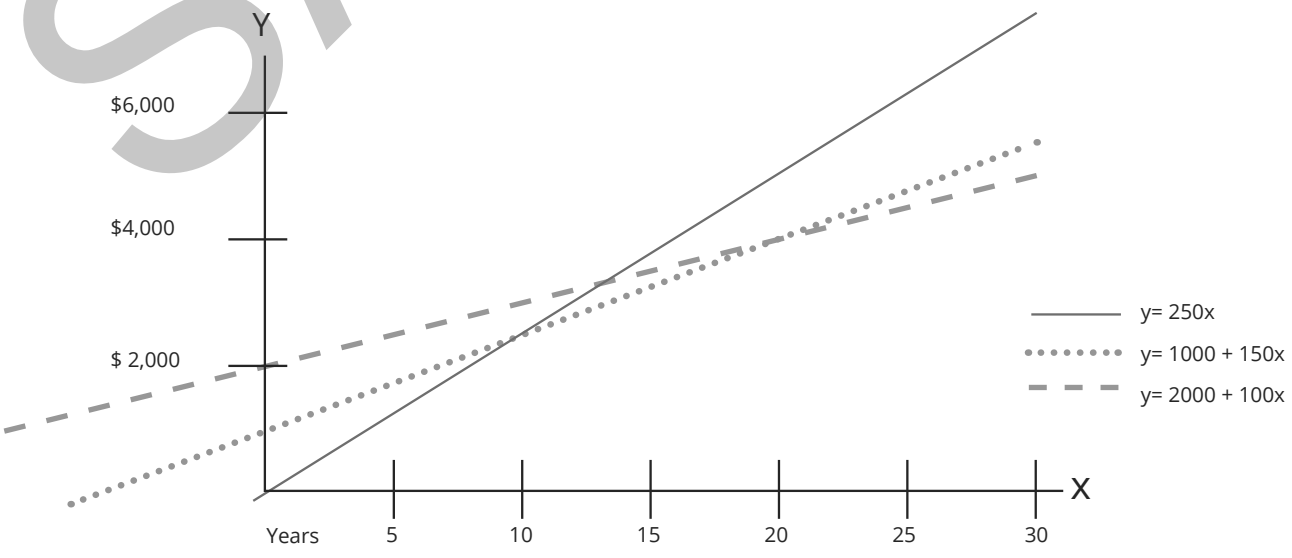
• The concept of science communication is reflected in the rubric for the student's proposal in this section.

Green is the New Black

• This community-based problem is based on relative costs that highlight short-term and long-term costs.
  – The costs are not representative of actual materials and labor associated with a project.
  – The energy savings are estimates from actual reports, based on small buildings and parking lots.
• Encourage your student to do their own research about materials used in their selected project and find images online to add to their final report.
• They should complete simple algebra calculations by solving each equation for t = 10 and 20 years, to analyze savings. For example: $C_w = 250(10)$ is \$2500 and $C_w = 250(20)$ is \$5000.
  – The costs change over time and at the 10-year and 20-year mark, costs could be similar for different options.
  – They may find it helpful to also analyze costs in 5-year increments for better comparison.

MULTIPLE AGES AND ABILITIES:

If your student has experience graphing linear equations, it may benefit their presentation to include a graph of costs associated with each project. In the graph, the cost of the white roof starts at \$0, but has the highest rate of increase. The cost of the green roof has the highest starting costs, but the lowest rate of increase over time. The cost of the parking lot is a mid-range solution at both ends.



LAUNCH

SCIENCE UNLOCKED

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

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Kit	SU-DANGER
Instructions	IN-DANGERT
Revision Date	3/2022