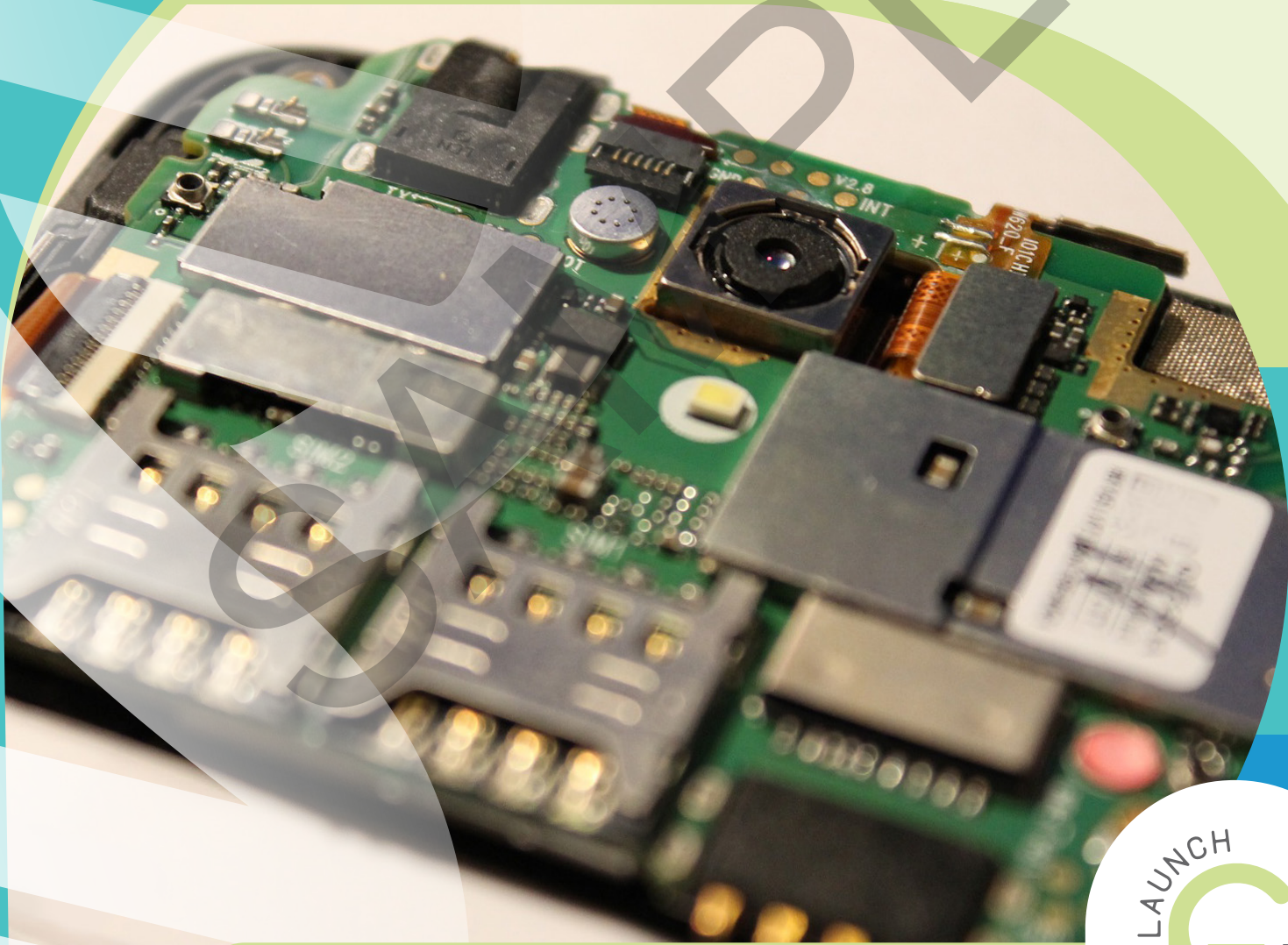


REDUCING RELIANCE ON RARITY



TEACHER GUIDE



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: WHAT'S FOUND INSIDE? Uncover the anatomy of a cell phone with this interesting diagram. Total time: 45 min	<input type="checkbox"/> We Love Our Smartphones	45 minutes	Day 1
	<input type="checkbox"/> Anatomy of a Smartphone		
ACTIVITY 2: WE ARE LIVING IN A MATERIAL WORLD Learn the hidden information on materials used in common technology that are found in nature. Total time: 3 h	<input type="checkbox"/> My Own Mine	60 minutes	Day 2
	<input type="checkbox"/> Materials for Technology	60 minutes	Day 3
	<input type="checkbox"/> Possible Properties and Uses	30 minutes	Day 4
	<input type="checkbox"/> Case Studies	30 minutes	Day 5
ACTIVITY 3: RENEWABLE OR NONRENEWABLE, THAT IS THE QUESTION Simulate how renewable and nonrenewable resources are used. Total time: 3 h 30 min	<input type="checkbox"/> Beady Resources (Renewable Resources)	30 minutes	Day 6
	<input type="checkbox"/> Beady Resources (Nonrenewable Resources)	30 minutes	Day 7
	<input type="checkbox"/> Are Resources Replenishable? (Through Renewable Resources)	60 minutes	Day 8
	<input type="checkbox"/> Are Resources Replenishable? (Through Nonrenewable Resources)		
ACTIVITY 4: IF THE PRICE			

Full schedule available with purchase

PREPARATION AND SUPERVISION

WARNING! Contains chemicals. Do not eat or drink.
Wash your hands after use.

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



WARNING! Inhalation Hazard – Do not inhale or eat any of the kit contents.

- Students will build two mounds over charcoal briquets. Then, they will use a different type of mining to remove each charcoal briquets from the mounds.
- If your student's mounds are not holding together well, have them use more peat moss to act as a glue for the sand and pebbles.
- Peat moss will also be used in Activity 5. Make sure your student saves half of the peat moss for it.

MULTIPLE AGES AND ABILITIES:

If you are working with multiple children, you can each build their own mountain and test out one type of mining. You can also have your students work on cooperation skills by building the mountains and excavating the charcoal together.

REFLECT

? Question 1: With which type of mine was it easier to get to and remove the charcoal briquet with? Why do you think that is?

Answer: Answers will vary.

How to Help:

- *There is no wrong answer.*
- *Students will likely find that it was easier to get to and remove the charcoal using the open-pit mining method because they had a better visual of the briquet.*

? Question 2: With which type of mine was it quicker to get to and remove the charcoal briquet with? Why do you think that is?

Answer: Answers will vary.

How to Help: *While there is no wrong answer, most likely students will find that it was quicker to get to the charcoal briquet with the underground mining method because they could use the straws to bore directly to the charcoal rather than removing layer upon layer of material.*

4

MATERIALS FOR TECHNOLOGY

Around the World

- In this subsection, students will learn where each of the materials (besides aluminum and copper) are found around the world and which type of mining they are obtained through. The locations provided are the most common places around the world and do not include every country each material may be found.
- Students will learn that all but one material are chemical elements found on the periodic table. They will also learn that graphite and charcoal are allotropes of carbon. Another allotrope of carbon you and they will be familiar with is diamond.
- Students will learn the following vocabulary terms: allotrope, electrolysis, fracking, human impact, natural resource, ore, and smelting.

Question 2: Was there a particular strategy you used? If so, explain it.

Answer: Answers will vary.

How to Help: This question is intended to get students thinking about strategies we might use in society to manage renewable (and later nonrenewable) resources.

8

PREPARATION AND SUPERVISION

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



- In this subsection, students will play another game/simulation experiencing the effects of nonrenewable resources.
- In the game, your student is supposed to replace green, blue, and yellow beads that were removed during the round. If they run out of one of those three colors of replacement beads, but need to replace them for a round, use another color bead that can be replaced. For example, if a yellow bead is pulled but there are no yellow replacement beads left, a green or blue bead can be used in its place.

REFLECT

Question 1: Why do you think beads were not added each round?

Answer: This represents nonrenewable resources, because the beads didn't renew.

Question 2: Was there a particular strategy you used? If so, explain it.

Answer: Answers will vary.

How to Help: This question is intended to get students thinking about strategies we might use in society to manage nonrenewable resources.

9

ARE RESOURCES REPLENISHABLE?

Content

- In this reading section, your student will begin to connect what they learned in Activity 2 to renewable and nonrenewable resources.
- Students will learn the following vocabulary terms: atom, electron, element, energy, Law of Conservation of Energy, metal, metalloid, metal ore, mineral, neutron, plastic, polymer, polymerization, proton, and subatomic particle.
- While all the materials in the infographic from Activity 1 are nonrenewable, it will be explained to students that water and energy are both used in the process of making a smartphone and are renewable resources.

(PREDICT) Question:

Which of the materials used to make a smartphone do you think are renewable and which do you think are nonrenewable? List them here.

Answer:

Renewable	Nonrenewable
<i>None of the materials used to build a smartphone listed in the graphic from Activity 1 are renewable resources.</i>	<i>All of the materials used to build a smartphone listed in the graphic from Activity 1 are nonrenewable resources.</i>





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Kit	SU-REDUCE
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