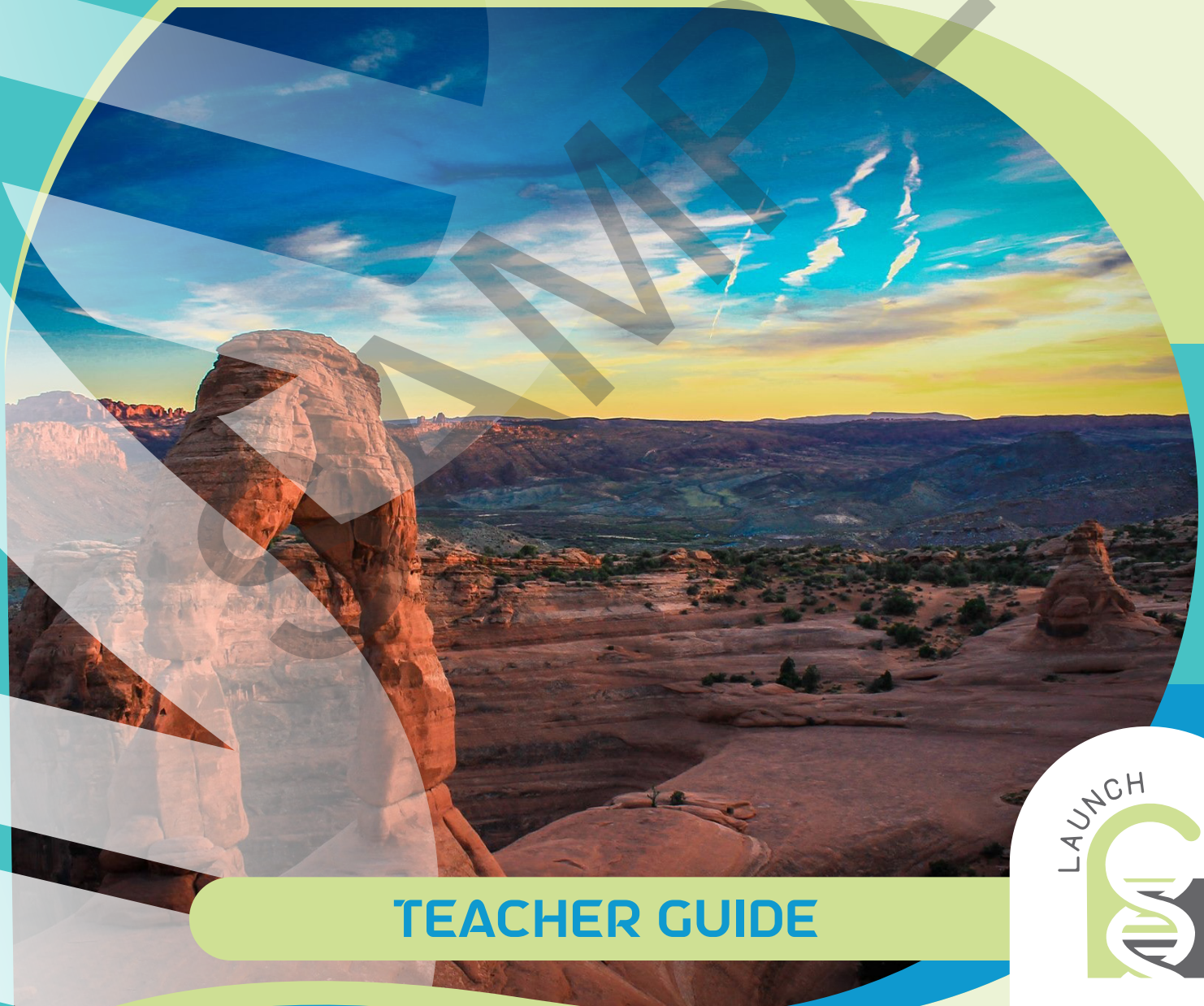
UNUSUAL STRUCTURES



TEACHER GUIDE

LAUNCH

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: ODD LANDSCAPES View images of unique natural structures from around the world. **Total time: 30 min**	☐ Discovering the Unusual	30 minutes	Day 1
ACTIVITY 2: ON THE MOVE Test your knowledge on what dirt really is and how nature moves it. **Total time: 5 h**	☐ Moving Dirt	90 minutes	Day 2
	☐ Dirty Investigation	90 minutes	Day 3
	☐ The Dirt on Dirt	45 minutes	Day 4
	☐ Know Your "Dirt"	30 minutes	Day 5
	☐ Moving Out	45 minutes	Day 6
ACTIVITY 3: IT'S IN THE DIFFERENCES Erosion and weathering are compared to see how these interconnected geological processes are different. **Total time: 1 h 45**	☐ Breaking Up	60 minutes	Day 7

activity 2

ON THE MOVE

Rocks and dirt are connected through geological processes. In this activity, students will begin to discover how the unique, natural structures from Activity 1 were able to form.

LEARNING GOALS:

- ✓ I can explain how geological processes have changed Earth's surface at small and large space and time scales.
- ✓ I can argue that one change to Earth's surface can cause changes to other Earth systems.

2 MOVING DIRT

☑ PREPARATION AND SUPERVISION

- Your student will be building erosion tables and testing how three different substrates react to erosion.
- Depending on your student's available resources, they may have to get creative with how they build their slope. Useful objects may include books, blocks, bowls, or trays.
- Later in this activity, students will learn the difference between dirt and soil.
- At the end of this activity, students will have learned about the different sizes of soils, from boulder to clay.

WARNING! SCISSORS – Always cut away from your body.

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

WARNING! INHALATION HAZARD – Do not inhale or eat any of the kit contents.

MULTIPLE AGES AND ABILITIES:

You can split the erosion tables into groups or have each student create an erosion table for a single substrate (peat moss, pebbles, or sand). Then, have the students work together to see how each substrate reacted to erosion. If you do this, you will want to give students greater constraints to make sure that each erosion table has the same slope.
Another alternative is to have each student or group of students create their own set of erosion tables. In this case, you will need to have students or yourself collect or provide more bottles for testing.

3 DIRTY INVESTIGATION

☑ PREPARATION AND SUPERVISION

- In this experiment, your student will first make observations about the three substrate samples and then mix them together in a bottle with water. After mixing, students will let the contents of the bottle settle and observe the layers in the substrates.

MULTIPLE AGES AND ABILITIES:

For scenarios where you are working with more than one child, you can have each student create their own statue with a single rock specimen.

If you are working with more advanced students or students who have performed a baking soda and vinegar reaction experiment before, they may already be aware that the vinegar and baking soda will begin to fizz and bubble. In this case, encourage your student to make connections between the experiment and chemical weathering prior to reading the next section. Additionally, this can lead to more accurate predictions.

Even if your student has previously performed a baking soda and vinegar reaction experiment prior, and is aware of the fizzing and bubbling, they may not expect the result of that reaction to be the degradation of their statue or landscape.

(Predict) Question: You already know about the properties of the three specimens and the pebbles from previous experiments. With those properties in mind, predict how each structure will react to water and vinegar being poured on them.
Answer: Answers will vary.
How to Help: *It is possible that your student has poured vinegar on limestone before and seen the reaction. However, in this experiment, an essential piece is that the reaction results in the degradation of their statue or landscape, which is what their prediction may not include.*

REFLECT

Question 1: How did your predictions match the results of your experiment?
Answer: *Answers will vary.*
How to Help:
• Your student's response will be based on how well their predictions matched their results.
• Even if your student's prediction matched their results perfectly, encourage your student to find opportunities where their prediction could have been improved with the knowledge they now have. Additionally, you can have your student think about whether their results were as intense or dramatic as they had expected when writing their prediction.

Question 2: How were the known properties of each rock important in predicting what happened correctly?
Answer: Knowing the properties of each rock specimen allows us to better understand how each specimen will react, and, therefore, make a more accurate prediction of the results.

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CHEMICALS ALL AROUND

CONTENT

• In this reading section, your student will learn the following vocabulary terms: acidification, acid rain, carbonation, hydration, hydrolysis, oxidation, and rust.
• Students will learn about chemical weathering, which has occurred for thousands of years. Additionally, they will be introduced to ways that human behavior has resulted in increased frequency and intensity of chemical weathering.

LAUNCH

SCIENCE UNLOCKED

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Kit	SU-UNSTRUC
Instructions	IN-UNSTRUCT
Revision Date	3/2022