SUCCESS ACADEMY EDUCATION INSTITUTE

Earth's Changing Landscape

Name: _____

Teacher: _____

Class: _____

Earth and Space Science
Unit 1
Lab Notebook

Lesson 1:
A Strange Discovery

Directions: Record any knowledge you have about rock layers, fossils, or geography in the space below.

Using your knowledge of science, brainstorm about this strange phenomenon. How is it possible? Record your thoughts below.

Lesson 1

Hypothesis:

Discussion Questions:

1. Can the same organism live in different parts of the world?

2. Are there ways for organisms to cross an ocean?

3. What other information might be helpful for finding the truth about this phenomenon?

Lesson 2:
Digging into Earth

Directions:

1. Examine the structure and components of each candy bar. Diagram and record your observations. (Tip: Remember to label your diagrams clearly!)

Diagrams of Candy Bar Cross-Sections

Written Notes

Lesson 2

Discussion Questions:

1. Based on your diagram, how do you think candy bars are made?
    - How could this help us understand how rock layers are formed?
    - How long does it take for rock layers to form?
2. What in the candy bar might represent fossils in a rock layer?
    - How did they get there?
    - What could this imply about the fossils found in rock layers?

Lesson 3:
The Rock Cycle

Directions: Read the sign at your station and follow each station's directions. Record your progress in the tables below.

Station 1
What are you?
What did you become?
How did you change?

Lesson 3

Station 2
What are you?
What did you become?
How did you change?

Lesson3

Station 3
What are you?
What did you become?
How did you change?

Lesson 3

Station 4
What are you?
What did you become?
How did you change?

Discussion Questions:

1. What does the rock cycle have to do with the formation of rock layers?
    - How do rocks form on Earth?
2. Does the rock cycle tell us anything about our Essential Question?

Lesson 4:
Reading Rock Layers

Directions: Draw a diagram of one of your rock layer scene models below.

Describe how you built your model.

Lesson 5:
Finding Fossils

Directions:

1. Dig into each model “rock layer” by sifting through each container to find the fossils within it.

2. Using the key provided, identify each fossil and its approximate age.

3. Determine how you can use this information to “order” the layers in the order they would have originally appeared in underground.

Data:

Color Sand	Fossil(s) Found	Age of Fossil(s)	Relative Age of Rock Layer: Oldest (1) to Youngest (5)

Lesson 5

Additional Notes:

Lesson 6:
The Geologic Timescale

Directions: Conduct research to learn more about each era in Earth's history and record your observations in the table below. Consider Earth's major landforms, climate, and life-forms as you study what makes each era unique, and record the approximate time period in which each era occurred.

Time Period	Key Characteristics/Features
Cenozoic Era Time period:	
Mesozoic Era Time period:	

Lesson 6

Time Period	Key Characteristics/Features
Paleozoic Era Time period:	
Precambrian Eon Time period:	

Additional Notes: Record any additional information from your research below.

Lesson 7:
Putting the Puzzle Together — The Theory of Continental Drift

Directions:

1. Read the three pieces of strange evidence that Wegener found.
2. Look at the images of the continents that contain fossil evidence. Use the provided key to identify the fossils on each continent, and color-code them with colored pencils according to the instructions in the key.
3. Once all of the fossils are colored in, cut out each continent. (Note: You do not have every continent on Earth — that's okay!)
4. Arrange the continents on the table in front of you. Place them in their current locations. Use the world map to help you put them in the right places.
5. Once the continents are arranged, look at the fossil evidence you colored in and reread Wegener's evidence. Think:
    a. What do you notice about the locations of the fossils?
    b. Why would there be aligned mountain ranges on opposite sides of the ocean?
    c. Why might there be matching rock layers *deep underground* on opposite sides of the ocean? What could this all mean?
6. Discuss your ideas with your group. Record your thoughts in the space provided.

Hypotheses: Record your observations and ideas below.

Lesson 8:
Introducing Plate Tectonics, Day One

Directions: Read the information on the “Inside the Earth” web page. Record your notes below.

Part of the Earth	Description/Notes

Lesson 8, Day One

Watch the “Everything You Need to Know About Planet Earth” video. Record your notes below.

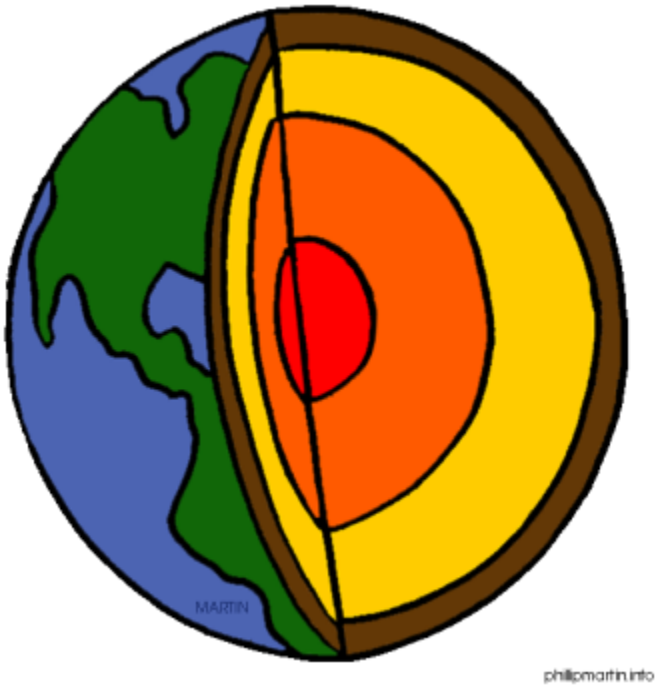
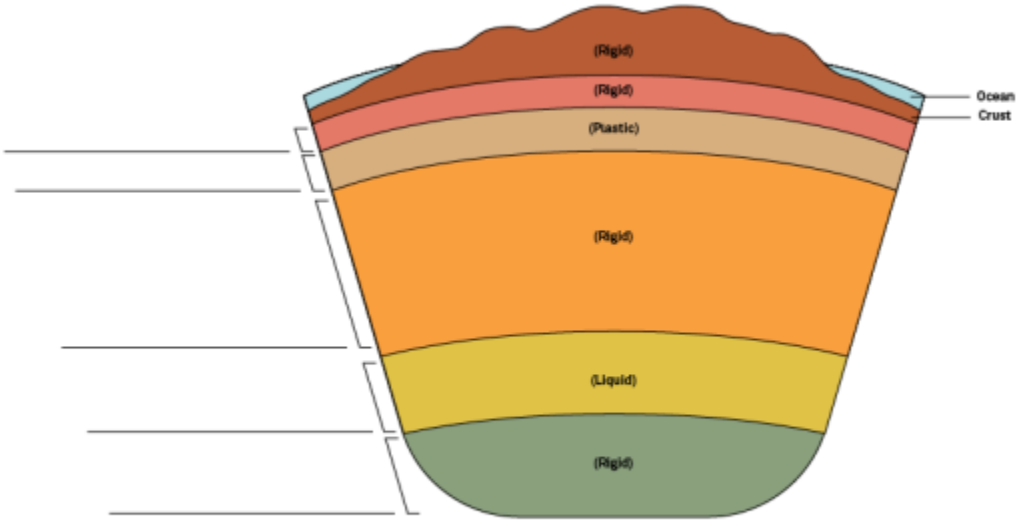


Image credit: Phillip Martin Clip Art CC BY-NC-ND 3.0



Lesson 8, Day One

Additional Notes:

Lesson 8:
Introducing Plate Tectonics, Day Two

Directions: Observe the fluid as it is heated to determine how the motion is affected and record your observations in the box below.

Diagram of Rheoscopic Fluid	Description of Motion

Additional Notes:

Discussion Question:

1. How can the heating of the fluid serve as a model for the theory of continental drift?

Lesson 9:
Seafloor Spreading

Directions: Use the steps below to create the seafloor spreading model. Then use the model to answer the questions on the lines below.

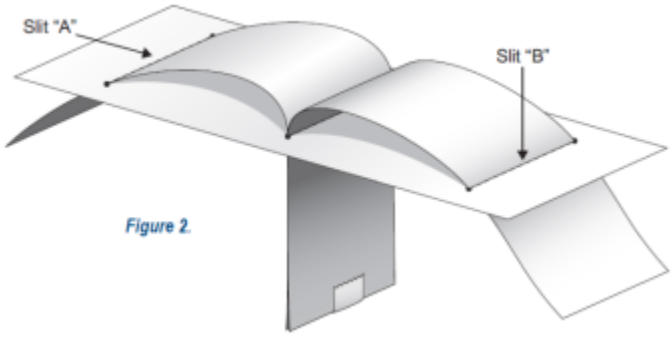


Image credit: Joides Resolution International Ocean Discovery Program

1. Cut three slits in the base as indicated by the dotted lines. Label the slits “A” and “B” at either end.

2. Cut out the plate strips and place them back to back. Tape them together at one end.

3. Thread the two strips up through the center slit and then curve them, gently feeding one down through each of the slits at either end of the base.

4. Work together to hold the base steady while pushing the taped end of the paper strips upward.

Analysis Questions:

What are you modeling by pushing the strips up through the base?

Lesson 9

What is being modeled at slits A and B as you pull the strips down through the base?

Why is it necessary to use a model to study seafloor spreading? What are the benefits of using this model?

Seafloor spreading is continuing today along mid-ocean ridges such as the Mid-Atlantic Ridge. Predict what the effects of this will be by the year 2300.

Lesson 10:
On a Planet Far, Far Away…

Directions: Use the evidence in the folder and knowledge from the unit to answer the following questions.

What did Brota look like 500 million years ago?

Additional Notes:

Lesson 10

Analysis Questions:

Based on Brota's structure, is it likely that the planet's land masses are moving?

Looking at the rock layer outcrops from the five different landmasses, does Brota have any index fossils?

Based on the fossils found on the coastlines of each landmass, is it possible that Brota's landmasses were once combined as a single supercontinent?

Lesson 11:
Putting the Puzzle Together

Directions: Plan and compose your response to the letter below.

Lesson 11