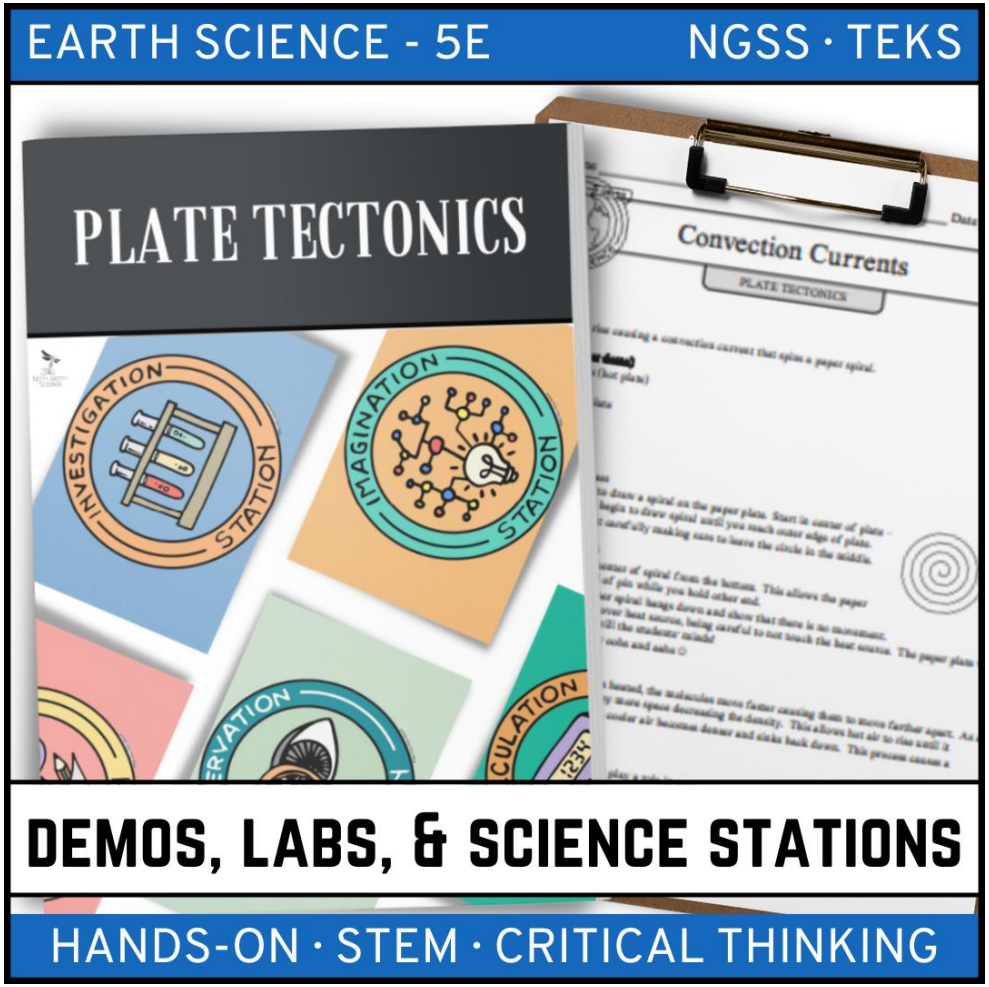
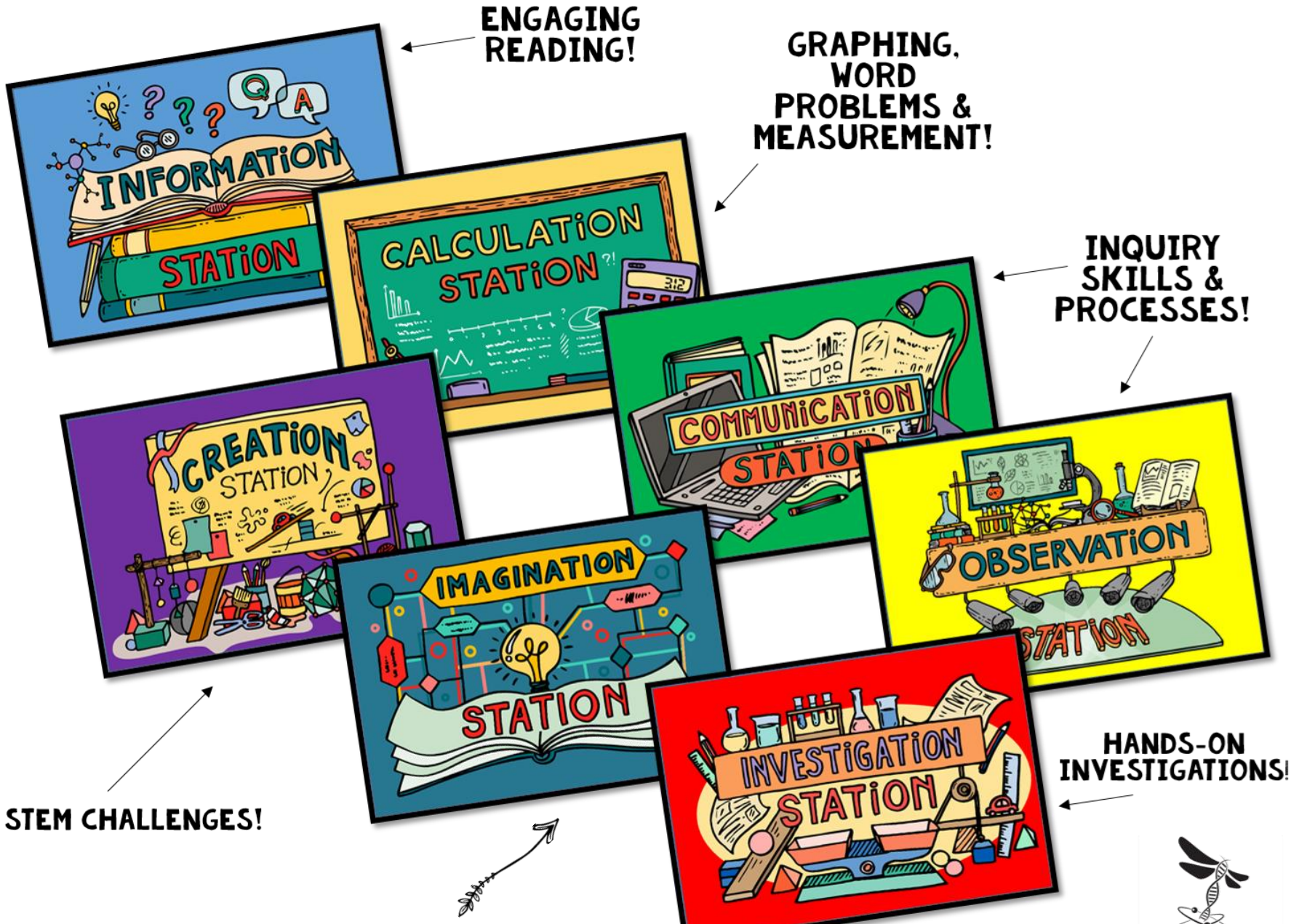
Demos, Labs, & Science Stations Feature:

- Hands-on Investigations
- STEM Challenge
- Scientific Literacy
- Inquiry Process Skills

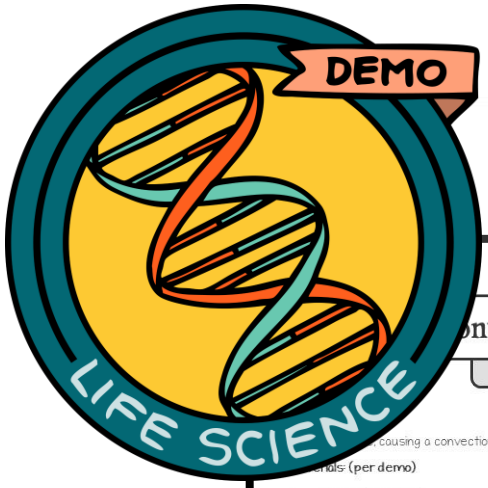




ALL Station Signage Included!!

Color & Black and White

Nitty Gritty Science



Teacher guide and answer key offered for every lab!

Easy-to-get materials!



nvection Currents

PLATE TECTONICS

causing a convection current that spins a paper spiral.

erials (per demo)

- Candle (hot plate)
- Pin
- Paper plate
- Marker
- Scissors



Demo:

Part A: Before class

1. Use the marker to draw a spiral on the paper plate. Start in center of plate – draw a circle, then begin to draw spiral until you reach the outer edge of plate.
2. Cut the spiral out carefully, making sure to leave the circle in the middle.

Part B: During class

1. Push pin through center of spiral from the bottom. This allows the paper spiral to rest on head of pin while you hold the other end.
2. Hold pin so the paper spiral hangs down and shows that there is no movement.
3. Slowly move spiral over a heat source, being careful not to touch the heat source. The paper plate will start spinning, and so will the students' minds!
4. Repeat for necessary oohs and aahs!

What's Happening?

When a fluid (air or gas) is heated, the molecules move faster, causing them to move farther apart. As a result, the particles occupy more space, decreasing the density. This allows hot air to rise until it eventually cools off. The cooler air becomes denser and sinks back down. This process causes a convection current.

Discussion:

Question: How does gravity play a role in convection currents?

Answer: Gravity pulls denser (cooler) material down in the air and the Earth's mantle.

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Discussion questions and teacher set-up included!

Name _____ Date _____

LAB

EARTH SCIENCE

Burning Ring of Fire

PLATE TECTONICS

Overview:

Earth's tectonic plates are constantly in motion, driven by convection currents in the mantle. As the plates move, they collide, pull apart, or grind past one another. Plate boundaries that converge (push together) or diverge (pull apart) cause fractures, allowing magma to reach the surface. Transform boundaries where plates slip past each other are where earthquakes often occur.

Geologists have recorded that roughly ninety percent of all earthquakes occur in what is known as the "Ring of Fire." The Ring of Fire is also where seventy-five percent of all active volcanoes on Earth can be found.

Students will plot the known coordinates of volcanoes and earthquakes and discover which tectonic plate the Ring of Fire is located on.

Materials:

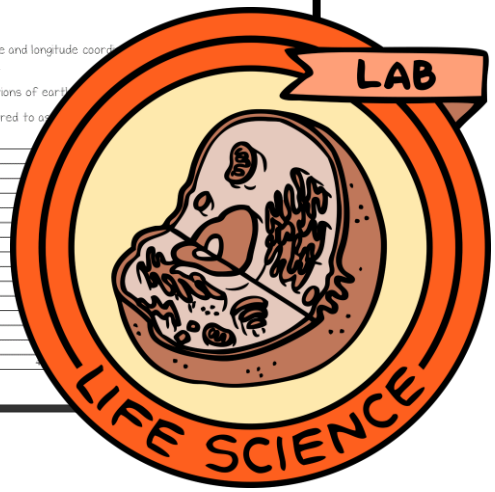
- Colored pencils
- World Map

Procedure:

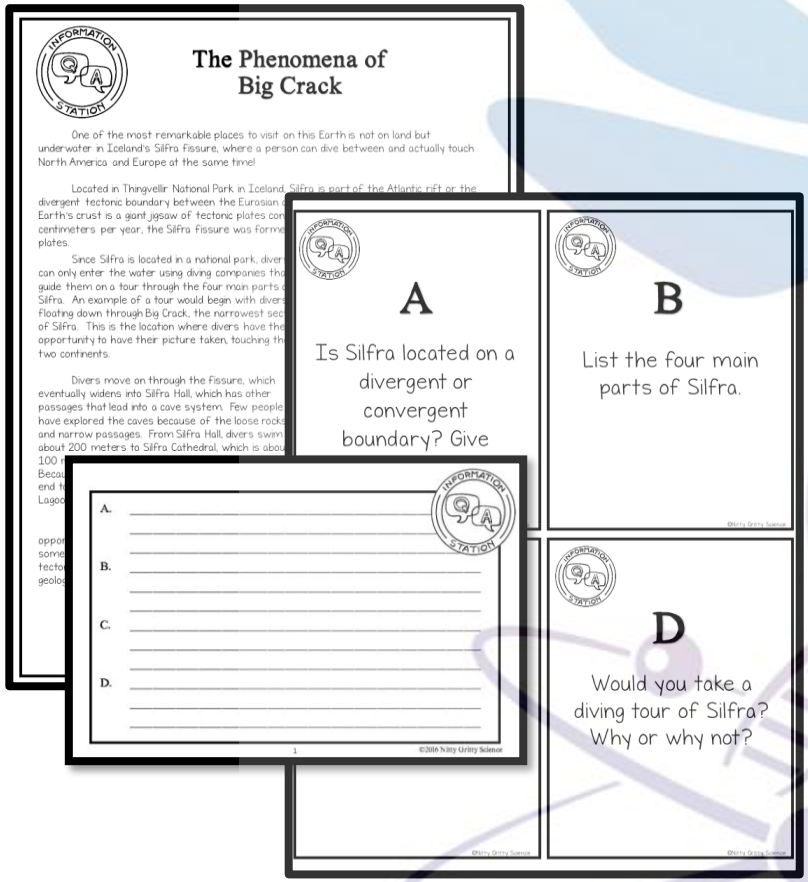
1. Locate volcanoes on the world map using the latitude and longitude coord
   Mark locations of volcanoes with a red colored pencil.
2. Locate earthquakes using data in Table 1. Mark locations of eart
3. Use a yellow colored pencil to highlight the belt referred to a

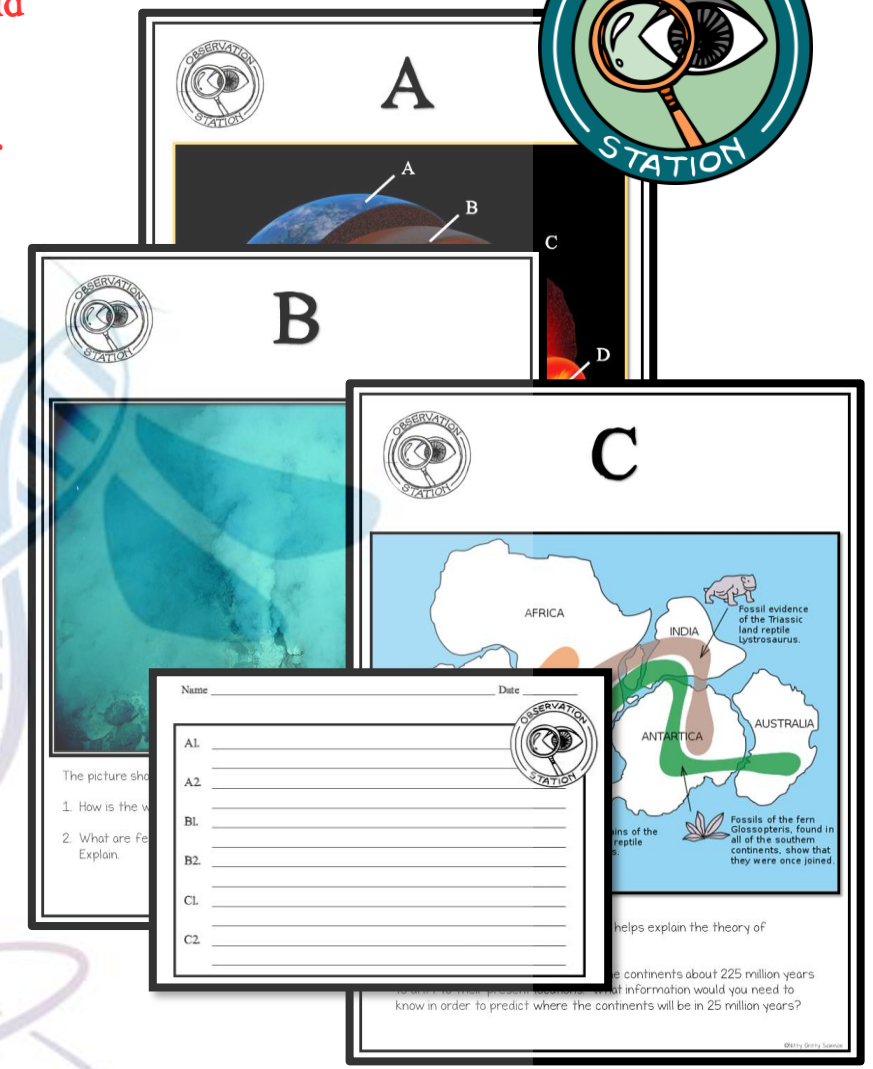
Table 1

Volcanoes	
Latitude	**Longitude**
60° N	138° W
35° N	138° E
46° N	122° W
5° S	152° E
20° N	105° W
0°	78° W
41° N	122° W
3° S	120° E
27° S	69° W
10° S	77° W
78 N	125° E
38° S	178° E
56° N	162° W



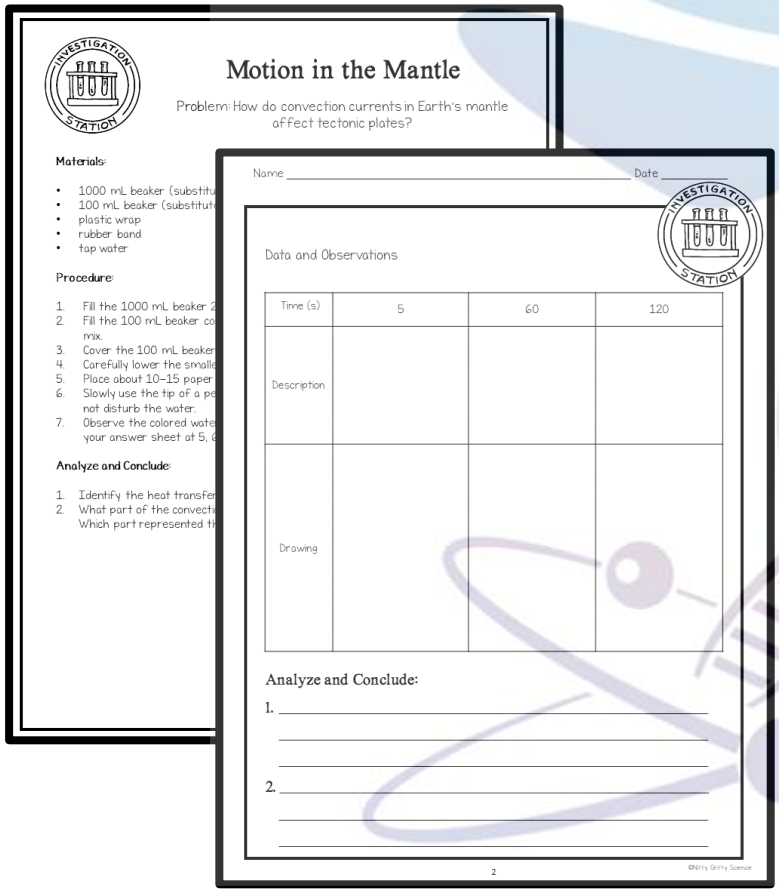
Group members will read a passage and then complete a task to help increase science literacy and deepen their understanding of the science concept.

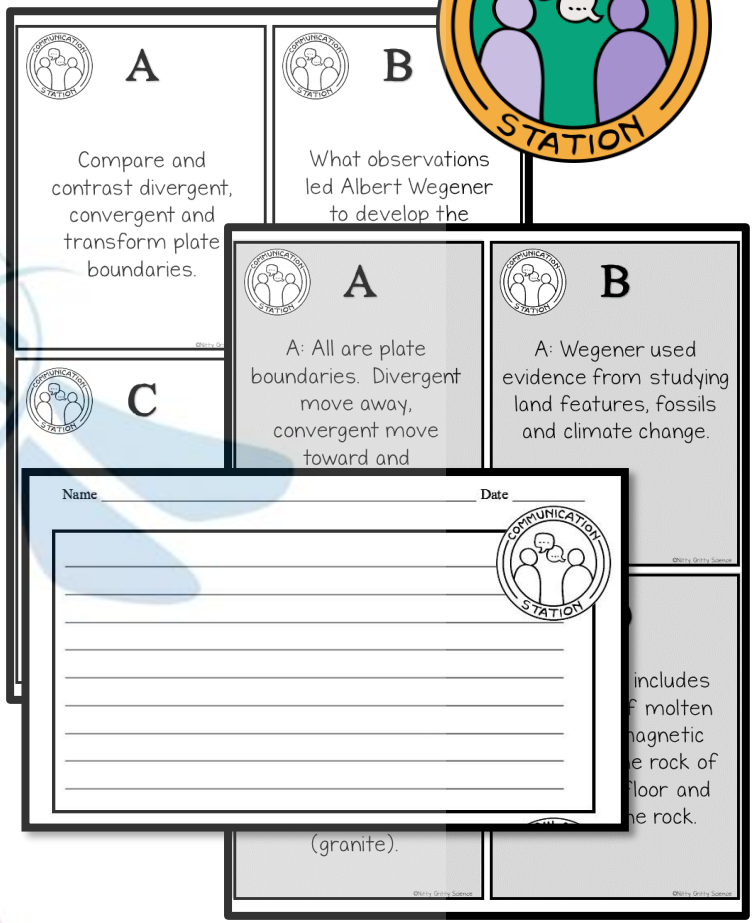




Group members will have images, illustrations, or actual samples at this station that show applications or processes of the science topic.

Group members will work with one another to explore the concept through hands-on activities, so they may practice specific inquiry process skills as they learn.

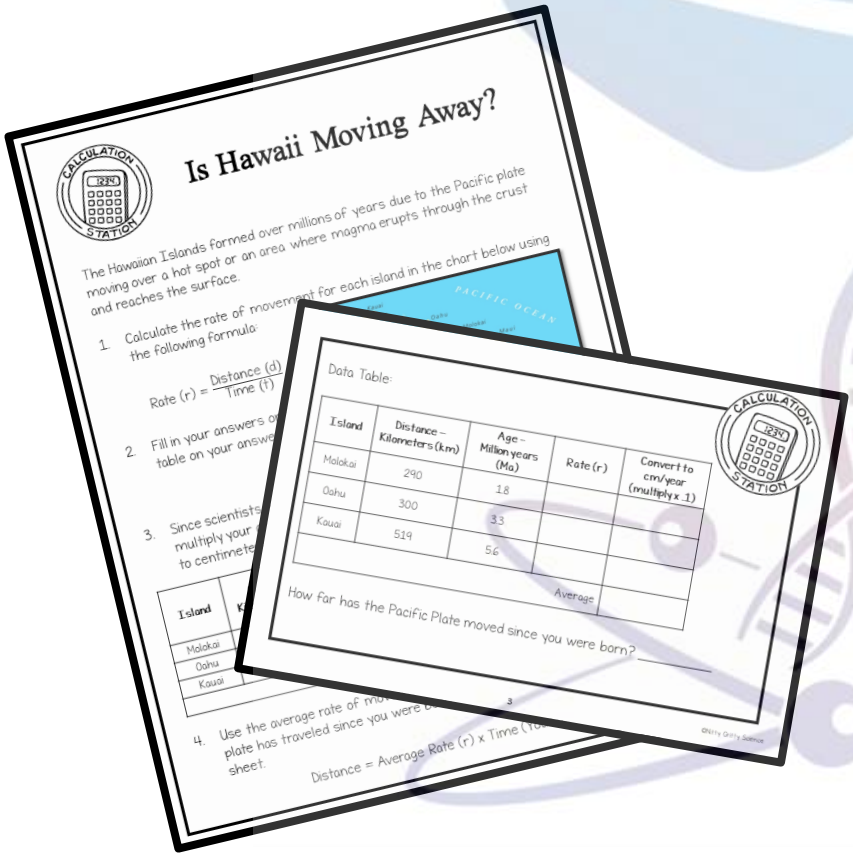




There are three different options for this station: interviews, videos, or group essay. Depending on the option you choose, group members will communicate what they know by answering questions in creative ways.



Group members use their math skills to complete the station challenge. Skills may include graphing, analyzing data, using models, measurement, and calculating formulas or word problems.



Is Hawaii Moving Away?

The Hawaiian Islands formed over millions of years due to the Pacific plate moving over a hot spot or an area where magma erupts through the crust and reaches the surface.

1. Calculate the rate of movement for each island in the chart below using the following formula:

$$\text{Rate (r)} = \frac{\text{Distance (d)}}{\text{Time (t)}}$$

2. Fill in your answers o… table on your answe…

3. Since scientists… multiply your… to centimete…

Island	K…
Molokai	
Oahu	
Kauai	

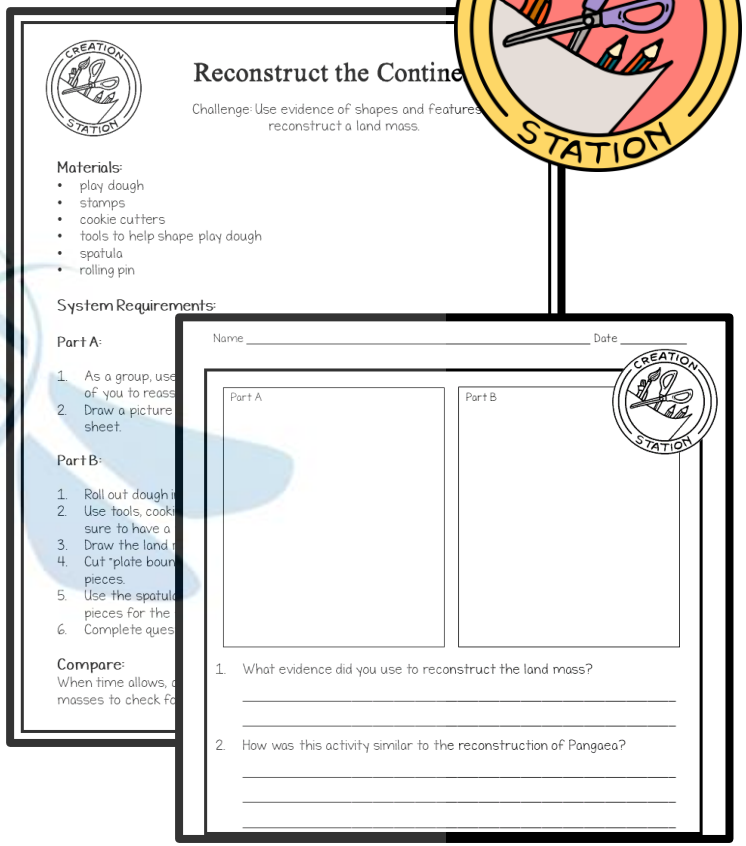
4. Use the average rate of m… plate has traveled since you were b… sheet.

Distance = Average Rate (r) x Time (t…

Data Table:

Island	Distance – Kilometers (km)	Age – Million years (Ma)	Rate (r)	Convert to cm/year (multiply x .1)
Molokai	290	1.8		
Oahu	300	3.3		
Kauai	519	5.6		
			Average	

How far has the Pacific Plate moved since you were born? _____



Reconstruct the Contine…

Challenge: Use evidence of shapes and features… reconstruct a land mass.

Materials:
- play dough
- stamps
- cookie cutters
- tools to help shape play dough
- spatula
- rolling pin

System Requirements:

Part A:

1. As a group, use… of you to reass…
2. Draw a picture… sheet.

Part B:

1. Roll out dough i…
2. Use tools, cooki… sure to have a…
3. Draw the land …
4. Cut "plate boun… pieces.
5. Use the spatula… pieces for the…
6. Complete ques…

Compare:
When time allows, … masses to check fo…

Name _____ Date _____

Part A | Part B

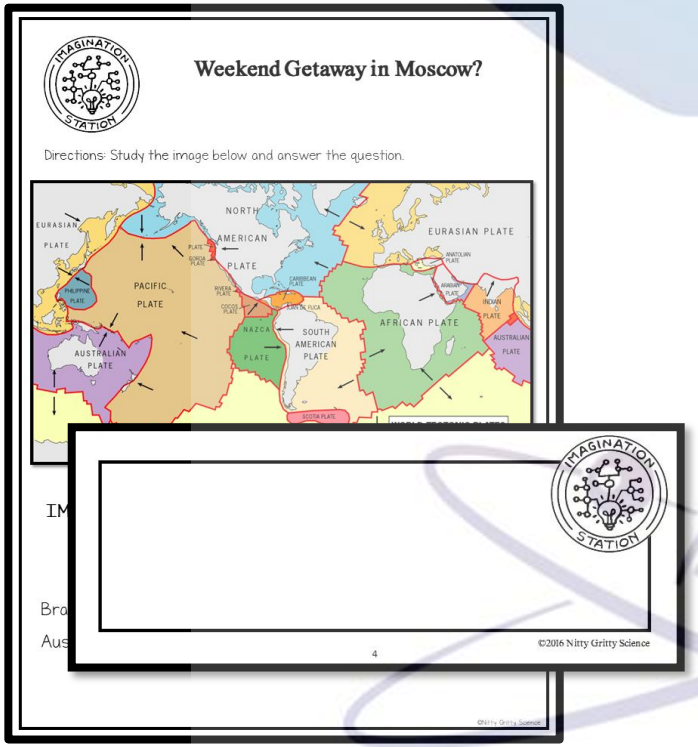
1. What evidence did you use to reconstruct the land mass?

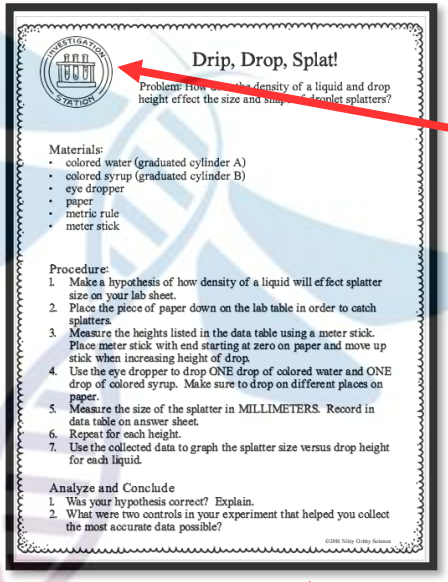
2. How was this activity similar to the reconstruction of Pangaea?

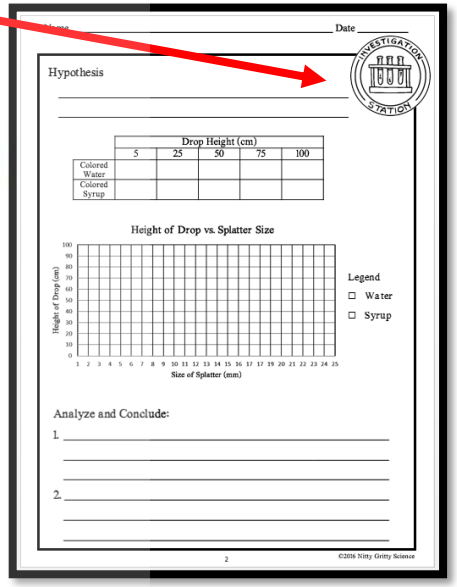
Group members will work together to solve a STEM (Science, Technology, Engineering, Math) challenge by creating models or designs that demonstrate their understanding of the science topic being taught.

This station makes science concepts relevant for students by asking them to imagine scenarios that will bring about discussion and critical thinking.

USER-FRIENDLY PAGES:
Students easily recognize which answer sheet to use at each station by matching station icons located on each page!







TEACHERS SAVE TIME:
Laminate station pages and reuse for each class and for years to follow!

Inquiry and Process Skills

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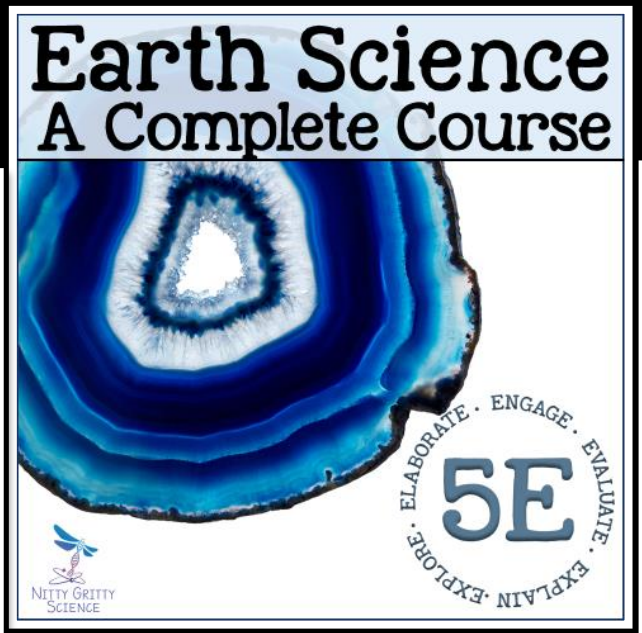
Demo Guided Inquiry Lab Science Stations

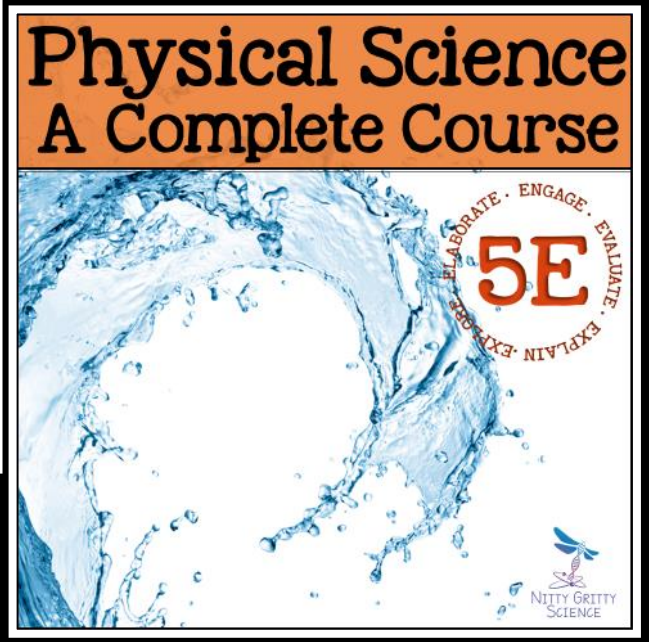
Inquiry-Based Science Unit: Plate Tectonics	Classifying	Communicating	Compare & Contrast	Creating Models	Gather/Organize Data	Generalizing	Identifying Variables	Inferring	Interpreting Data and Graphs	Making Decisions	Manipulating Materials	Measuring / Calculating	Observing	Predicting
Convection Currents		X				X							X	X
Burning Ring of Fire	X		X		X				X		X			
Information Station:	X	X			X	X								
Observation Station: Images & Questions		X			X			X		X			X	
Investigation Station: Motion in the Mantle		X	X	X	X		X		X		X	X	X	
Calculation Station: Is Hawaii Moving Away?					X		X		X			X		
Communication Station: Questions		X	X			X				X				
Creation Station: Reconstruct Continents	X		X	X				X		X	X		X	
Imagination Station: Weekend Getaway		X	X		X			X		X				X

NGS promotes scientific inquiry throughout the curriculum. Students become more confident and effective learners while developing problem-solving and critical thinking skills. Process skills, such as planning, organizing and evaluating, help students to complete projects and assignments. These skills allow students to independently gather information, analyze it, and draw their own conclusions.

This download is part of the Nitty Gritty Science Complete Course Collection. Click below to learn more.







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