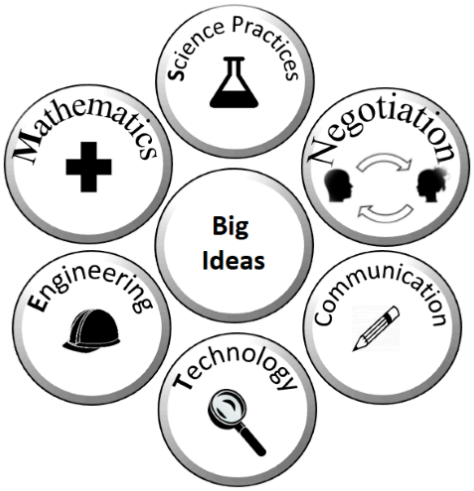
4th Grade
Science Journal

Earth Science: Processes that Shape the Earth





The ASSIST Approach

Name: _____

Sandbox Station

Draw what you observed in your sandbox.

Use your senses to make observations about what is in the sandbox.

What do you see, hear, or smell? Don't taste anything. What does it feel like when you touch it? The sand feels ….

_____

_____

_____

_____

What happened when we poured the water in?- What do you see, hear, or smell? Did anything change?

_____

_____

_____

_____

What questions do you still have?

_____

_____

_____

_____



What did you learn from the video?

Explain your observations of the wind on Earth

Explain your observations of water on Earth

Explain your observations of ice on Earth

Explain your observations of vegetation (plants) on Earth





What is the "Big Idea" for the unit?

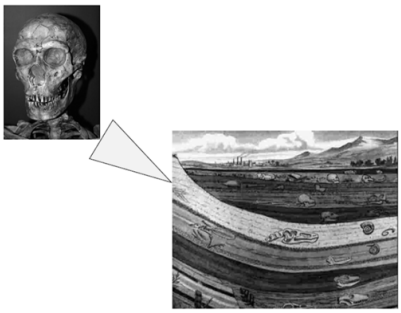
What Questions do you have?

Big Ideas

Layers of Earth Models



What do you think the layers of the cup represent?



This human skeleton was found on the same level of this dinosaur skeleton. What does that mean for the age of the human and the dinosaur?

CLAIM **Remember a claim is your answer to the question that we are testing.*

I support the claim that

_____

_____



Evidence: **Remember evidence is the information that supports your claim.*

My evidence to support my claim is that

_____

_____



Reasoning: **Remember reasoning is thinking of all the reasons why an idea might be right or wrong.*

How will you figure out if this idea is right?	Why might this idea be wrong?
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____





Hello, my name is Dr. Jay Cutler. I am an archeologist, which means I study the bones and remains of really old items.

- I have been digging up dinosaur fossils for 31 years and have led 50 successful expeditions where we recovered artifacts shared at some of the top museums around the world.
- When our team makes a discovery we share our results with other scientists so they can check our work and verify that the fossils are real.
- Science can be so exciting because we can learn about the ancient past! I write these stories so students can learn how interesting science can be.

Do you think this person is trustworthy? Why or why not?

_____

_____

_____

_____

_____



Understanding the Check With Experts

Question: Which fossils are the oldest?

Evidence from the text: When an animal or plant dies, its skeleton settles on the ground and is buried by sediment.

How does this evidence support or reject your claim?

Evidence from the text: Fossils are the remains of very old animals and plants.

How does this evidence support or reject your claim?

Evidence from the text: The skeleton is buried by sediment, which is tiny bits of rock, sand, or mud.

How does this evidence support or reject your claim?

Evidence from the text: The dinosaur skull and human fossils were found in the same area.

How does this evidence support or reject your claim?



Final claim

Make a statement about your learning and include the vocabulary words below. Draw an image, label the words in your picture, and then write out your final claim.

Fossil	Sediment	Mold	Cast	Chemical
.				

Final Claim: I support the claim that the age of the dinosaur and the human are

_____

I know this because we investigated and we learned:_____

_____

this makes sense because_____

_____

_____

_____

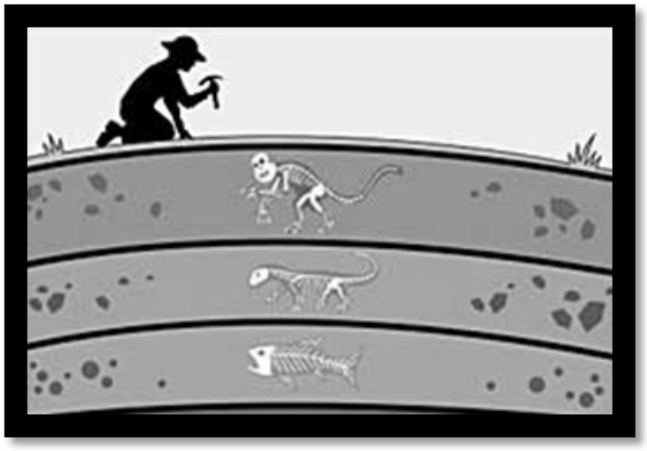
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Big Ideas

Communication CCSS.ELA. RL.4.1

Post-Test

Look at the information below and write a short story explaining how the land where the fossils were found has changed over millions of years. Make sure to explain what kind of animals lived on the land and if you think the land has changed.



A monkey at the top level		*Carbon-14 Level* ●●●
A dinosaur at the middle level		*Carbon-14 Level* ●
A fish at the lowest layer		*Carbon-14 Level* ●●

Use the space below to write your story.

Provide multiple pieces of evidence of how you know which fossil is the oldest, middle, and newest. Then, write a story about how the land changed from one time period to the next.



Investigation #2: *Where Should We Build?*

You have been hired by a development company to help them decide where they will build a new neighborhood. All three locations are in a valley, but the composition of the hills are very different. Your job is to evaluate the data you have, conduct an experiment, and give your recommendation to the company.

		
Option 1 The hills are full of vegetation. Lots of grass and other plants.	**Option 2** This location is in a very dry area. The hills are made of sand and small rocks.	**Option 3** The hills in this area are made mostly of dirt and very few rocks or plants.
Large amounts of rainfall.	Small amounts of rainfall, but some large storms.	Very little rain.
Very expensive to build here	**Moderate costs to build here**	**Very cheap to build here**

In the area below draw a sketch of where you think you should build and explain why.

	_____ _____ _____ _____ _____ _____ _____

Science Practices

What kind of experiment will you conduct?

Question: _____

Variable (What is being tested?):

_____

_____

Controls (What needs to stay the same?):

_____

_____

_____

_____

_____

How will the data be collected?

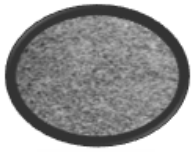
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Test	Weight in cup
Sand 	
Soil 	
Soil and vegetation 	

In the space below make a bar graph of the data above



Mathematics
CCSS.MATH.
4.MD.A.1

Question: What helped stop erosion the most?

Write out the ideas being negotiated. *Put a check in the box next to the idea you support.*	
Idea 1 _____ _____ ☐	Idea 2 _____ _____ ☐
If you support an idea different from Idea 1 or 2 put it here. _____ ☐	



Evidence: **Remember evidence is the information that supports your claim. You can use observations from the investigation, the information from the math activity, or other information you have learned outside of school.*

My evidence to support my claim is that

_____

_____

_____

_____

Reasoning: **Remember reasoning is thinking of all the reasons why an idea might be right or wrong.*

How will you figure out if this idea is right?	Why might this idea be wrong?
_____ _____ _____	_____ _____ _____





Hello, my name is Dr. Susan Ramirez. I was an Earth Science researcher for 30 years at the University of California Los Angeles (UCLA).

- During my career I won numerous awards for research on mudslides and other natural disasters.
- My team of scientists and I have worked all over the world helping people make decisions about how to help reduce the impact of natural disasters.
- I write short papers about our work to help inspire the next generation of scientists. I hope you enjoy it!

Do you think this person is trustworthy? Why or why not?

_____

_____

_____

_____

_____



Understanding the Check With Experts

Question: What helped stop erosion the most?



Evidence from the text: When rocks break down wind, water, and ice all cause the sediment to move.



How does this evidence support or reject your claim?



Evidence from the text: Grass and other plants slow down erosion because the roots of the plant grab the soil and hold on to it.



How does this evidence support or reject your claim?



Evidence from the text: Grass and other plants slow down erosion because the roots of the plant grab the soil and hold on to it.



How does this evidence support or reject your claim?



Final claim

Make a statement about your learning and include the vocabulary words below. Draw an image, label the words in your picture, and then write out your final claim.

Weathering	Erosion	Deposition

Final Claim: I support the claim that option 1 ___ 2___ 3____ is the best option to build.

I know this because we investigated and we learned:_____

_____

this makes sense because_____

_____

_____

_____

_____

Big Ideas

Communication CCSS.ELA. RL.4.1

Report to the Development Company

Next Generation Housing Development

Dear Investors,

After conducting an investigation and consulting with other experts we have made a conclusion about where we think you should build your new homes. Please read the report from our scientists and contact us if you have any further questions.

Communication
CCSS.ELA.RL.4.1

Investigation #3: Potato Mountain

Why do you think volcanoes form in some areas of the world, but not in others? For example, there are many volcanoes by islands and cities close to the ocean.

_____

_____

_____

_____



Look at the images of different maps of the world.

Draw the areas where you think you would find mountains, earthquakes, and volcanoes?



Volcanoes



Earthquakes



Mountains



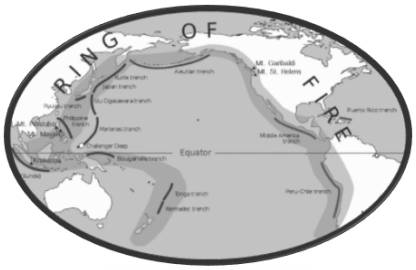
What patterns do you notice? Where are most of the volcanoes, earthquakes, and mountains located?

Science Practices





The picture below is the “Ring of Fire”



Most of the world’s volcanoes are located on the Ring of Fire. This makes up about and about 8/10 of the world's volcanoes. [1]
Can you represent the number of volcanoes in different ways?

For example, can you represent the number of volcanoes in the Ring of Fire as a decimal and a percentage.

_____ of the world's volcanoes are on the Ring of Fire.

_____ of the world's volcanoes are on the Ring of Fire.

There are approximately 550 active volcanoes in the world. If 80% of the volcanoes are located on the Ring of Fire how many volcanoes are found there.

Work Space

[1] Ring of Fire". USGS. 2012-07-24. Retrieved 2013-06-13.

Question: Why do you think mountains,earthquakes, and volcanoes are located where they are?

Write out the ideas being negotiated. *Put a check in the box next to the idea you support.*	
Idea 1 _____ _____ ☐	Idea 2 _____ _____ ☐
If you support an idea different from Idea 1 or 2 put it here. _____ ☐	



Evidence: *Remember evidence is the information that supports your claim. You can use observations from the investigation, the information from the math activity, or other information you have learned outside of school.

My evidence to support my claim is that

_____

_____

_____

_____

Reasoning: **Remember reasoning is thinking of all the reasons why an idea might be right or wrong.*

How will you figure out if this idea is right?	Why might this idea be wrong?
_____ _____ _____	_____ _____ _____





Hello my name is General Jin Soo-Kwon. I am a senior officer in the army and have been making maps for our soldiers for over 18 years.

- I studied map making at the Army Academy and graduated at the top of my class.
- My team of scientists have traveled all over the world to map different areas so we know where our troops are going.
- I once was a young kid who loved science and I want to share my information about maps with you. I hope it helps!

Do you think this person is trustworthy? Why or why not?

_____

_____

_____

_____

_____

Understanding the Check With Experts

Question: Why do you think mountains and volcanoes are located where they are?

Evidence from the text: Topography describes the physical features of an area of land.

How does this evidence support or reject your claim?

Evidence from the text: Topographical maps show that most mountains and volcanoes are close to the ocean and where tectonic plates meet.

How does this evidence support or reject your claim?

Evidence from the text: Topographical maps show people where high and low points are at. They show that most mountains and volcanoes are close to the ocean and where tectonic plates meet.

How does this evidence support or reject your claim?



Final claim

Make a statement about your learning and include the vocabulary words below. Draw an image, label the words in your picture, and then write out your final claim.

Landforms	Elevation	Tectonic plates

Final Claim: I support the idea that earthquakes, volcanoes, and mountains mostly form_____

_____

I know this because we investigated and we learned:_____

_____

this makes sense because_____

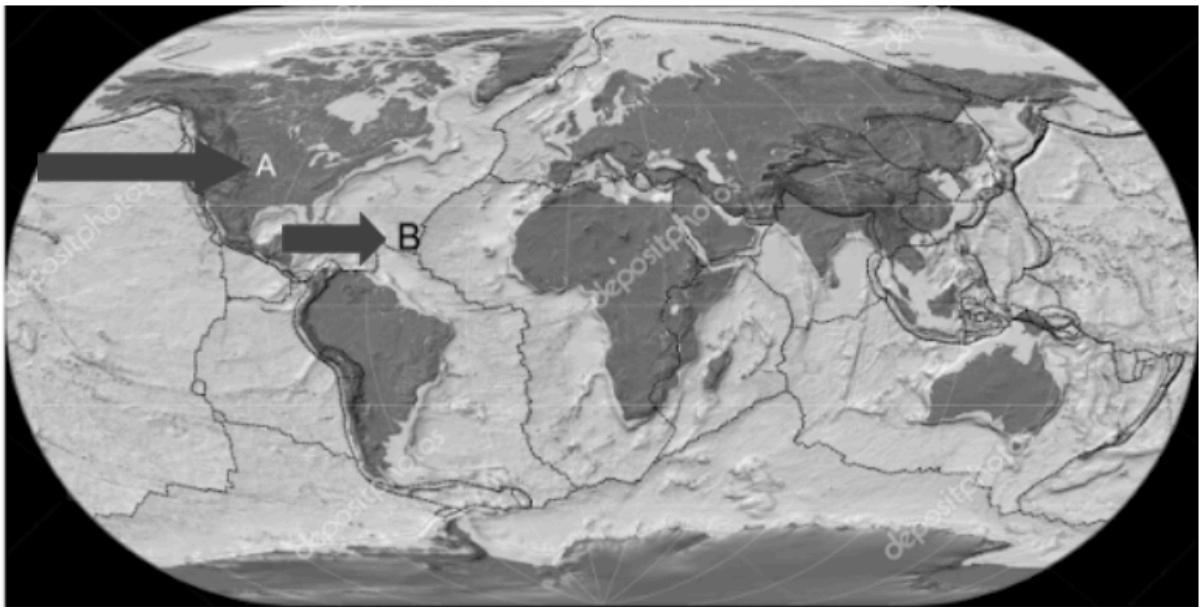
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_____

_____

_____





Look at the picture above. Where do you think it is more likely for an earthquake to happen A or B?

Idea #1	Ideas #2
An earthquake will likely happen at A because it is on land.	An earthquake will likely to happen at B because it is where tectonic plates meet.

Do you support Claim #1 or Claim #2 _____

Why do you support that claim?

_____

_____

_____

_____

Why do you **NOT** support the other claim?

_____

_____

_____

_____

Negotiation



Hello, from Mayor Santiago

Greetings! My name is Maria Santiago. I am the mayor of the great city of San Juanita, California. Recently, thousands of new jobs have been created in our city because we decided to invest in science, technology, and engineering careers. This is great for our city, but now we have the challenge of building new homes for all of the people who are planning to move here.

Here is our problem.

San Juanita was built on top of a fault line. There will certainly be small earthquakes in the future, and geologists think there is the possibility that a large earthquake could happen, which would cause major damage.

The City Council of San Juanita wants to adopt new laws, **based on science**, for constructing new buildings. They would like to build strong buildings to resist earthquakes in the future.

We need to help them figure out what kind of building is better at resisting earthquakes and the **reasons** why.

We need your help because the members of the City Council are not scientists. They don't know if they should allow people to build any type of home they want, or if they should only allow specific types of homes to be built.

Can you design a model and give a recommendation?

Negotiation

Engineering

City Engineer's Report

Geology: San Juanita was built on top of a fault line. A fault line is occurs where two large slabs of the earth meet. There will certainly be small earthquakes in the future, and geologists (scientists who study the earth and rocks) think there is the possibility that a large earthquake could happen, which would cause major damage.

Problem: The city of San Juanita sometimes has earthquakes. The city is growing. As we add new buildings we would like to make them as strong as possible.

Summary: We are currently testing several different shake table designs. Shake tables are a small platform that will shake a model building. We build models buildings as a way of cheaply testing a building design before actually building the entire building. We use the shake table to test buildings to see if they will stand up in an earthquake.

Shake Table Design.

We need a reliable process to test our buildings. Reliable means we can count on it to be high quality and repeatable.

A good shake table will:

A. Move in all 3 directions (up and down, left and right, back and forth)
B. Can be easily controlled
C. Can shake a building hard enough that it will fail.

Can you look at our earthquake shake table options and give a recommendation?





Engineering Experiment Design

Question: What structure could we design to protect a home?

Requirement: 16 CM

Independent Variable (What is being tested?)

Controls (What needs to stay the same?)

How will data be collected?

Materials

35 toothpicks

18 Jelly beans

1 egg

1 cup

Procedure (Add steps if needed)

1)

2)

3)

4)

Reflection

What part worked well?

_____

_____

_____

_____

What would you change?

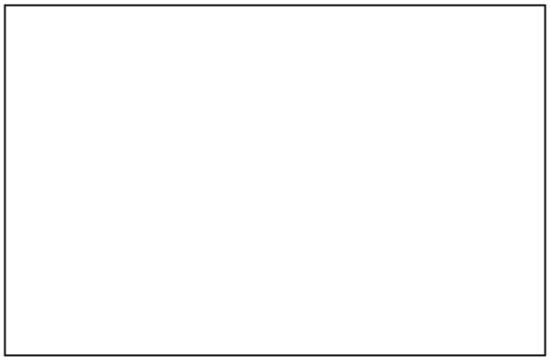
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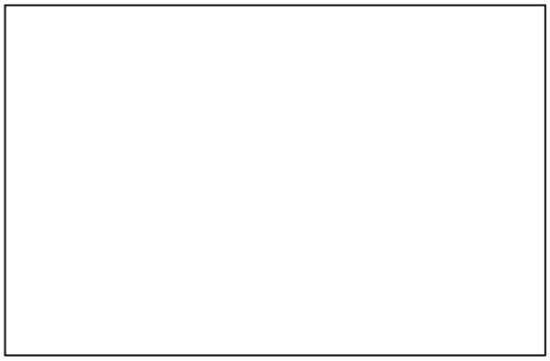
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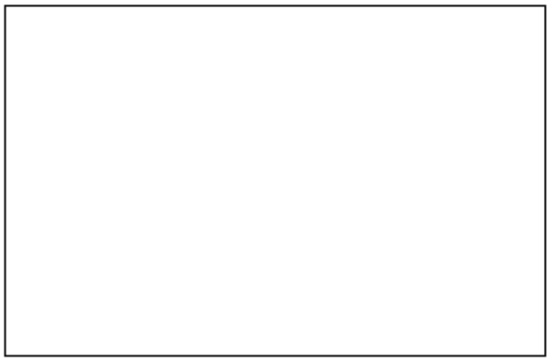
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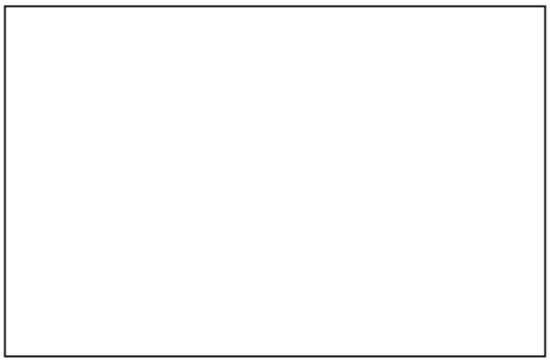
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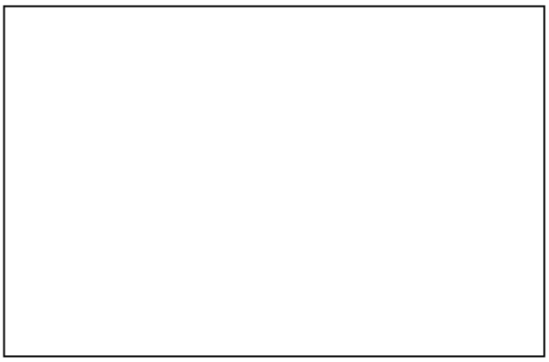
My Home

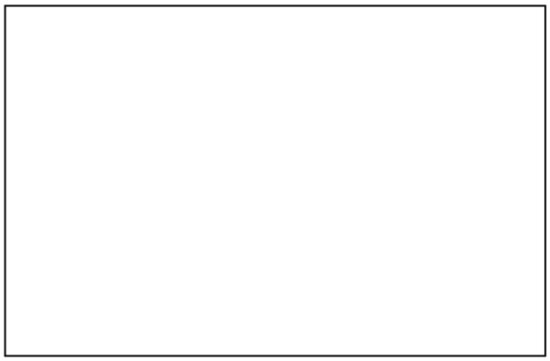












Engineer Report 

Pre-write

Who is the audience?_____

What are the main science ideas you will write about to them?

What are the vocabulary words you will teach them?

How will you explain those words in a way they will understand?

