CULMINATING LESSON

The Formation of the Hawaiian Archipelago – A Play

Lesson at a Glance

Students demonstrate their knowledge by participating in a short play that illustrates the idea of plate tectonics and hot spots during the formation of the Hawaiian archipelago. They perform this play for other classes and parents. After their play, they will complete an assessment drawing.

Lesson Duration

Three or four 45-minute periods

Essential Question(s)

How do hot spot volcanoes form, and how can they be recognized?
How do plate tectonics help explain the characteristics of an island chain formed by a hot spot?

Key Concepts

- Most Hawaiian volcanic islands go through eight stages of development, beginning with the deep submarine stage and ending with an atoll.
- Subsidence (sinking) combined with the erosive forces of rain, wind, and wave action transform volcanic islands into atolls.
- The geological age of the Hawaiian Islands increases as you move northwest, away from the main island group.
- The youngest volcano is *Lō'ihi* Seamount, which is in the early stages of formation.
- As a volcanic island is moved away from the hot spot, it progresses through a series of stages, including erosion and reef growth and, sometime, rejuvenation of volcanic activity.

Related HCPSIII Benchmark(s):

Science SC.4.8.1
Describe how slow processes
sometime shape and reshape
the surface of the Earth.

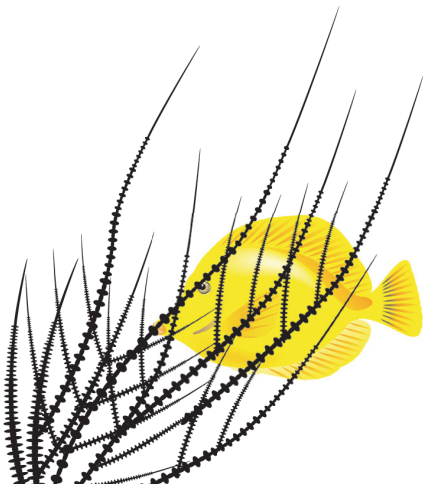
Science SC.4.8.2
Describe how fast processes
sometime shape and reshape
the surface of the Earth.

Fine Arts FA.4.3.1
Interpret a character's external motivations.

Language Arts LA.4.6.1
Participate in grade-appropriate oral group activities.

Instructional Objectives

- I *can* describe changes in islands through fast and slow processes.
- I *can* participate in a positive way that helps the group present a short informational play about the formation of the Hawaiian archipelago.
- I *can* understand the characters' message in the play, and how they use different movements, vocal expressions, and roles to help get across the information being acted out.



Assessment Tools

Benchmark Rubric:

Topic		Forces that Shape the Earth	
Benchmark SC.4.8.1		Describe how slow processes sometimes shape and reshape the surface of the Earth	
Rubric			
Advanced	**Proficient**	**Partially Proficient**	**Novice**
Use evidence to explain how slow processes have shaped and reshaped the surface of the Earth	Describe how the shaping and reshaping of the Earth's land surface is sometimes due to slow processes	Provide examples of the shaping and reshaping of the Earth's land surface due to slow processes	Recognize that the shaping and reshaping of the Earth's land surface is sometimes due to slow processes

Topic		Forces that Shape the Earth	
Benchmark SC.4.8.2		Describe how fast processes (e.g., volcanoes, Earthquakes) sometimes shape and reshape the surface of the Earth	
Rubric			
Advanced	**Proficient**	**Partially Proficient**	**Novice**
Use evidence to explain how fast processes have shaped and reshaped the surface of the Earth	Describe how the shaping and reshaping of the Earth's land surface is sometimes due to fast processes	Provide examples of the shaping and reshaping of the Earth's land surface due to fast processes	Recognize that the shaping and reshaping of the Earth's land surface is sometimes due to fast processes
Topic		Discussion and Presentation	
Benchmark LA.4.6.1		Participate in grade-appropriate oral group activities	
Rubric			
Advanced	**Proficient**	**Partially Proficient**	**Novice**
Participate in grade-appropriate oral group activities, in a highly effective way	Participate in grade-appropriate oral group activities	Participate in grade-appropriate oral group activities, in a limited way or in a way that only partially facilitates the group's work	Participate very little in grade-appropriate oral group activities or participate in a way that does not facilitate the group's work

Topic		How the Arts are Organized	
Benchmark FA.4.3.1		Interpret a character's external motivations	
Rubric			
Advanced	**Proficient**	**Partially Proficient**	**Novice**
Interpret a character's external motivations using a wide variety of movement and vocal expression; assume roles that exhibit concentration, focus, and commitment, and contribute to the action of the dramatization	Interpret a character's external motivations, using variations of movement and vocal expression; assume roles that exhibit concentration, and contribute to the action of the dramatization	Interpret a character's external motivations, using a few variations of movement and vocal expression; assume roles that exhibit some concentration, and contribute to the action of the dramatization	Interpret a character's external motivations, using one or two variations of movement and vocal expression; assume roles that do not exhibit concentration, and do little to contribute to the action of the dramatization

Assessment/Evidence Pieces

Lesson
- *Self-Assessment Rubric for the Formation of the Hawaiian Archipelago Play*

Unit
- The *Culminating Drawing Task* may be used to assess student progress for the unit.

Materials Needed

Teacher	Class	Group	Student
• None	• None	• Props for play (see script)	• Script of play

Instructional Resources

Student Reading: *The Formation of the Hawaiian Archipelago Play Script*
Assessment Tool: *Culminating Task*
Assessment Tool: *Self-Assessment Rubric for the Formation of the Hawaiian Archipelago Play*

Student Vocabulary Words

Below is a comprehensive list of the vocabulary words used in the previous lessons.

absolute location: the exact location on the planet where something resides, or the latitude and longitude of a place.
archipelago: a group of islands in an expanse of water, with many scattered islands.
atoll: a ring-shaped coral reef or string of closely spaced small coral islands that enclose or nearly enclose a shallow lagoon.
convergent boundary: two tectonic plates collide and one is pushed under the other plate.
divergent boundary: two tectonic plates that are moving away from each other.
fringing reefs: a reef that runs parallel to and is in close proximity or is directly adjacent to the shoreline.
guyot: a submerged seamount that at one time was above or in close proximity to the sea surface.
hemisphere: half the Earth, divided at the equator (northern and southern hemispheres) or at the Prime Meridian and International Date Line (western and eastern hemispheres).
high islands: islands that are composed of volcanic rock whose landmass is above the sea surface.
hotspot: generally localized plumes of magma that originate in the Earth's mantle and move outward through the crust; magma movement may result in volcanic eruptions.
lines of latitude: numerical system of imaginary circles on Earth's surface that lie parallel to the Equator and are used to describe position north and south of the Equator; measured in increasing degrees north and south away from the Equator.
lines of longitude: numerical system of imaginary half circles on Earth's surface that lie perpendicular to the Equator and end at the poles, used to describe position east and west, measured in degrees with 0° at the Prime Meridian.
low islands: islands that are composed of coral and/or sand whose landmass is above the sea surface.
plate tectonics: geologic theory that combines the concepts of sea floor spreading and continental drift to explain the large-scale movement of the Earth's crust.
Prime Meridian: Longitude line of 0° that all other longitudes are measured by; passes through Western Europe and Africa.
relative location: the location of a place in relation to another place (*Kauai* is WNW of Oahu).
transform boundary: tectonic plates slide and grind against each other.

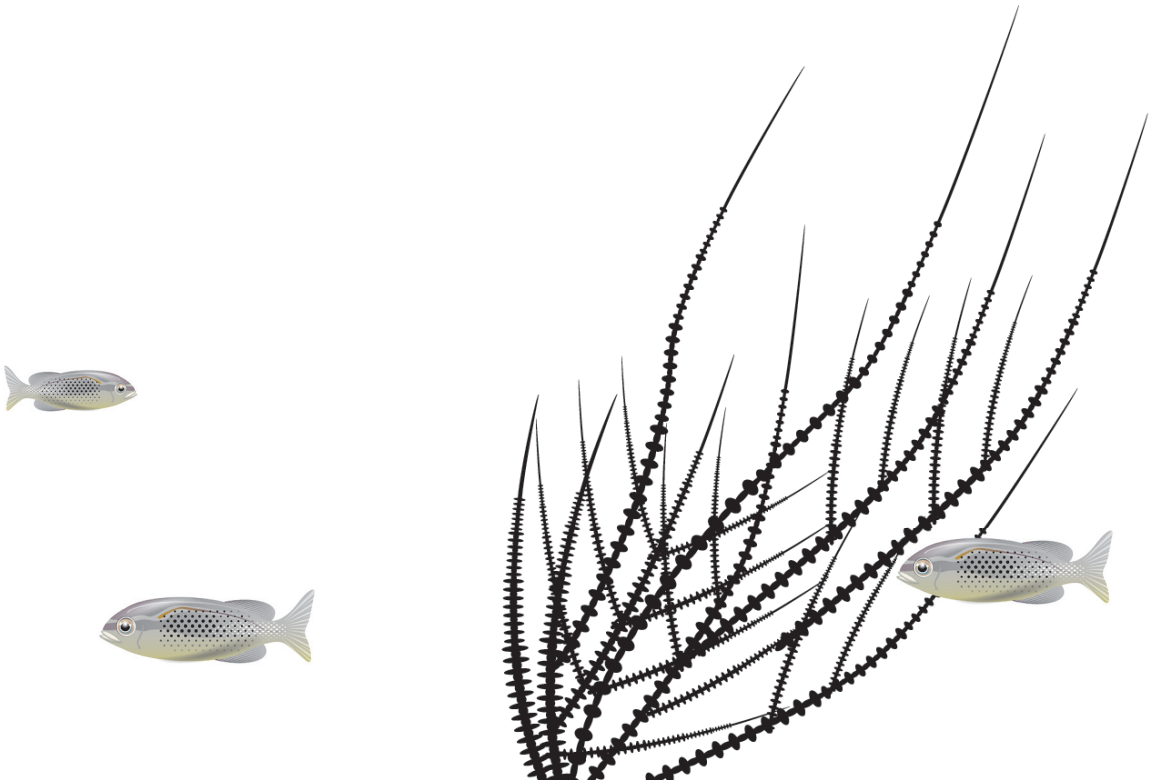
Lesson Plan

Lesson Preparation

- Preview the *Formation of the Hawaiian Archipelago Play Script.*
- Assemble the props listed.
- Make copies of the script for students.
- Make copies of the *Culminating Drawing Task* for each student.
- Go to the Bishop Museum website on the formation of the Hawaiian Islands for pictures of the 8 stages. http://www.bishopmuseum.org/research/nwhi/geoact.htm

I. *Formation of the Hawaiian Archipelago Play*

A. Read through the script and assign roles to students. It is recommended that smaller students act as the older islands, and taller students as the newer ones. (Option: Assign eight students per act, allowing each student in the class to have a part.)
B. Assign a group of students to prepare the posters of the different stages of volcanoes.
C. Have students design and make headbands with their island name on it.
D. Label a long piece of blue butcher paper with the island names, starting with Kure on one end, and the Big Island on the other end. (See diagram in script.)
E. Rehearse the play.
F. Present the play to another 4th grade class or other classes.
G. Have students complete the *Self-Assessment Rubric for the Formation of the Hawaiian Archipelago Play*.
H. Have students complete the *Culminating Drawing Task.*



CULMINATING LESSON

The Formation of the Hawaiian Archipelago Play Script

CHARACTERS:

Narrator (Tutu)
Boy
Girl
Scientist
Hot Spot Fire (Pele)
Big Island
Maui
Lana'i
Kaho'olaw'e
Moloka'i
O'ahu
Kaua'i
Ni'ihau
Niohoa
Necker
French Frigate Shoals
Gardner Pinnacles
Maro Reef
Laysan
Lisianski
Pearl & Hermes
Midway Atoll
Kure Atoll

Other students can act as "coral reef" and assist with the props.

PROPS:

Four small chairs, canoe paddles, length of blue butcher paper, soft boiled egg, small knife to cut egg in half, remote control, eight posters made with the geologic history of volcanic islands in the Pacific (with masking tape on the back), red and orange streamers, white tissue paper, headbands labeled with the different island names for the students to wear. Anything else to make it fun! You can be as simple or creative as you like!

Information for Posters to use for Stage Sets:

DEEP SUBMARINE STAGE

Island formation over a hot spot begins with submarine eruptions, which eventually reach the ocean surface. *Lō'ihi* is in this stage.

SHALLOW SUBMARINE STAGE

An island in this stage features an above water crater, which erupts lava from the volcano's summit.

SUBAERIAL SHIELD BUILDING STAGE

During this stage of a volcanic island formation, the volcano summit collapses and forms a caldera. The volcano continues to emit lava from the summit caldera and from its two rift zones. *Mauna Loa* and *Kilauea* on the Big Island are in this stage.

POST-CALDERA STAGE

During this time, lava fills and sometimes overflows the caldera, forming a more rounded summit. Overall volcanic activity may slow down, but occasional eruptions along the rift zones may build cones. *Mauna Kea* on the Big Island is an example of this stage.

EROSIONAL STAGE

Lava is no longer being added, and the volcanoes which make up the volcanic islands are eroded from the ocean, rain, and wind. A sea bluff, deep valley, and sharp ridges are characteristic features. *Kaua'i* is a good example of this stage.

STAGE OF REEF GROWTH

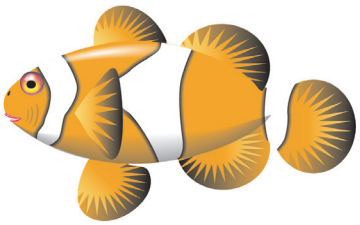
As the volcanic mountains are eroded to rocks that barely break the ocean's surface, and the island slowly sinks, if coral growth around the island keeps pace with the sinking island, then the island will be fringed with a coral reef. The French Frigate shoals are in this stage.

STAGE OF POST-EROSIONAL ERUPTIONS

After the island eroded, subsided and was fringed with a coral reef, secondary (rejuvenation stage) eruptions took place. Diamond Head, Koko Head and Punchbowl are examples of rejuvenation-stage eruptions.

ATOLL STAGE

When the rocks forming the island erode or sink below the sea level, so that only the coral reef remains at the surface, an atoll is formed. Pearl and Hermes reef, and Kure are in this stage.



SCRIPT

ACT I

Darkness with spotlight on Tutu, the Narrator, sitting in a rocking chair with two young *keiki* (*children*) sitting at her feet.

TUTU: (*to the audience*) E komo mai! That is a traditional Hawaiian greeting to welcome you. We welcome you to take a trip back in time, millions of years ago, to visit all the islands in our Hawaiian Archipelago.

GIRL: Tutu what's an archipelago?

TUTU: Well, my young keiki, an archipelago is a LARGE group of islands.

BOY: Oh! You mean like the ones we live on!

TUTU: Yes my boy, the island we live on is part of the Hawaiian archipelago.

GIRL: What do you mean only a part of?

TUTU: There are actually over 20 islands that make up the Hawaiian Island chain. You probably know about the eight main islands, but there are more than that, which we call the "*Kupuna*" islands, because they are very wise and old.

BOY: I think I know all of the eight islands….hmmmm…There is *the Big Island, Maui, Lana'i, Moloka'i, O'ahu, Kaua'i*.....hmmm that's only six. I can't remember the other two.

TUTU: That's because you don't often hear much about them. They are not open for visitors. They are *Kaho'olaw'e* and *Ni'ihau*.

GIRL: Oh Tutu! Tell me about our islands, how did we get here in the middle of the gigantic Pacific Ocean?

TUTU: Well my keiki, climb into my magic canoe and I will take you back millions of years ago to where it all began. (*Pretend to get inside a canoe.*) I am going to tell you the story scientists tell about the islands, however, your ancient Hawaiian Elders believed in a different idea of how the islands were formed. According to Hawai'i mo'olelo, or legend, Maui, the demigod, and his brothers pulled the islands up while fishing. Legends are very important to the Hawaiian people, and are still told today to keep the Hawaiian culture alive. I have a special friend who will tell us the story from the Scientist's Point of View, Doctor Kookeynefilus….ahhh…. here he comes now! (*Enter the Scientist.*)

BOY and GIRL: Cool! Hi Doctor ahhhhh…Kookeynef…i…what?

SCIENTIST: Dr. Kookeynefilus, but my friends just call me Dr. Kookey! And boy oh boy do I have a treat for you! Your Tutu has the most marvelous magic canoe that can take us to amazing places.

BOY and GIRL: (*jumping up and down*) Yippee, Yahoooo!!!

TUTU: Come, get in the magic canoe so we can begin our journey….

(*All climb in a magic canoe and begin paddling.*)

END ACT I

ACT II: TECTONIC PLATES

Tutu, Scientist, boy and girl are in canoe in the middle of the ocean. Have two students hold up a long roll of blue butcher paper vertically as water. The water will stay in place for the remainder of the skit; you may want to secure it to broom handles, or chairs, so the students do not have to hold it the whole time. Place the four chairs in a row in front on the blue paper in a line like seats in a canoe.

SCIENTIST: Well, here we are, in the middle of the largest ocean, the Pacific!

BOY: But there isn't anything out here…..

SCIENTIST: (*pulling out the hardboiled egg*) Ahhhh, but this is where my story begins!

You see, if this egg were the Earth, it would look more like (crack the egg) this. Our Earth's surface is not one big hard surface; it is cracked like this egg. We call all the different cracked up parts TECTONIC PLATES. Scientists believe that, at one time, all the continents were joined together to form a supercontinent called Pangaea. Pangaea is a Greek word meaning all land. After millions of years, Pangaea slowly drifted apart, forming the continents we have today.

GIRL: Wow, so we just had one giant continent at first?

SCIENTIST: That's right! But remember those plates began to drift apart. Some of the major plates are the Eurasian Plate, North and South American Plate, Indo-Australian Plate, Nazca Plate, Antarctic Plate, African Plate, and the Pacific Plate.

BOY: (*Yawning*) Yeah, but what does that have to do with OUR islands????

SCIENTIST: Good question! (*Hands the boy the egg and knife.*) You see, if you were to dig through the Earth, there would be different layers. Go ahead and peel off the outside of the egg. Those tectonic plates you are peeling off represent the Earth's crust. Now cut the egg in half. (*Boy cuts egg in half.*) The white harder part represents the Earth's mantle, and that yellow area in the middle is the Earth's core.

BOY: Ha ha! I still don't see what that has to do with the Hawaiian Islands though!

SCIENTIST: You see there are more than 300 volcanoes around the Pacific Plate. These volcanoes are known as the Ring of Fire. It is called the Ring of Fire because there are so many volcanoes around the edges of the Pacific Plate.

TUTU: These plates move about a half inch to 4 inches a year by spreading apart, sliding, or colliding. (*model by using flat hands to show collision and spread.*) When these plates spread apart, they cause Earthquakes and volcanic eruptions.

GIRL: So you're telling me our islands are over one of these cracks??

SCIENTIST: Ahhh, good deduction my friend, but actually the Hawaiian Islands are unique in that they form over what we call a hot spot.

TUTU: (fanning herself) Ohhhh my, I thought I was getting a bit warm!

ACT III: HOT SPOTS

Prior to this scene, all the islands form a line back stage in the following order: the oldest, Kure Atoll will enter first, next Midway, Pearl and Hermes Atoll, Lisianski, Laysan, Maro reef,

Gardner Pinnackes, French frigate shoals, Necker, *Nihoa*, *Ni'ihau, Kaua'i, O'ahu, Moloka'i, Maui, Lani,* and *Hawai'i*. Each person/island will wear a head band with the island's name on it.

Enter the volcanic Hot Spot with streamers of red and orange to act as fire and the volcanic explosion. The hot spot will stay seated to the far right in front of the blue paper.

BOY and GIRL: Whoa! That's hot!

SCIENTIST: Precisely why it's called a hot spot in the Earth's crust! You see, the Pacific Ocean is situated on top of the Pacific Plate…remember one of those pieces from the cracked egg? The Hawaiian Islands were formed as the Pacific Plate moved in a Northwesterly direction over a hot spot. The hot spot never moves. Magma spurts out of the hot spot….POOF… (*Hot Spot shakes the streamers and Kure Atoll pops up from behind the blue paper and moves one space over, Midway to "erupt" next and so on.*)

TUTU: This is about 30 million years ago when what we know now as Kure Atoll broke the surface to form a volcanic island.

BOY and GIRL: 30 Million Years Ago??? That's older than you Tutu!

TUTU: Remember, I told you that the Pacific Plates moves several inches a year? Every million years or so, the hot spot under Hawai'i gets active and makes another island, and then cools. This island moves as the Pacific Plate moves. Then, when the hot spot gets active again, it forms another island. POOF

(*Hot Spot shakes the streamers signaling another explosion. Up pops Midway, Kure drifts down a little*.)

GIRL: How long did it take that island to come up?

SCIENTIST: Oh, only a short while geologically speaking. Midway came up about 2.3 million years after Kure.

BOY: 2.3 million years seems like a LONG time to me!

SCIENTIST: Well, when you figure the Earth itself is about 4.6 <u>BILLION</u> years old, that really isn't too old!

Hey, Tutu, you still have that fast forward remote control in this magic canoe of yours?

TUTU: I sure do Dr. Kookeynefilus. (*Pulls out a remote control.*) I keep it around just for occasions like this!

BOY: Awesome! Can you zap me so I will already be graduated from school and making lots of money?

TUTU: Absolutely not young man! There is too much fun, excitement and learning to be had--trust me on that!

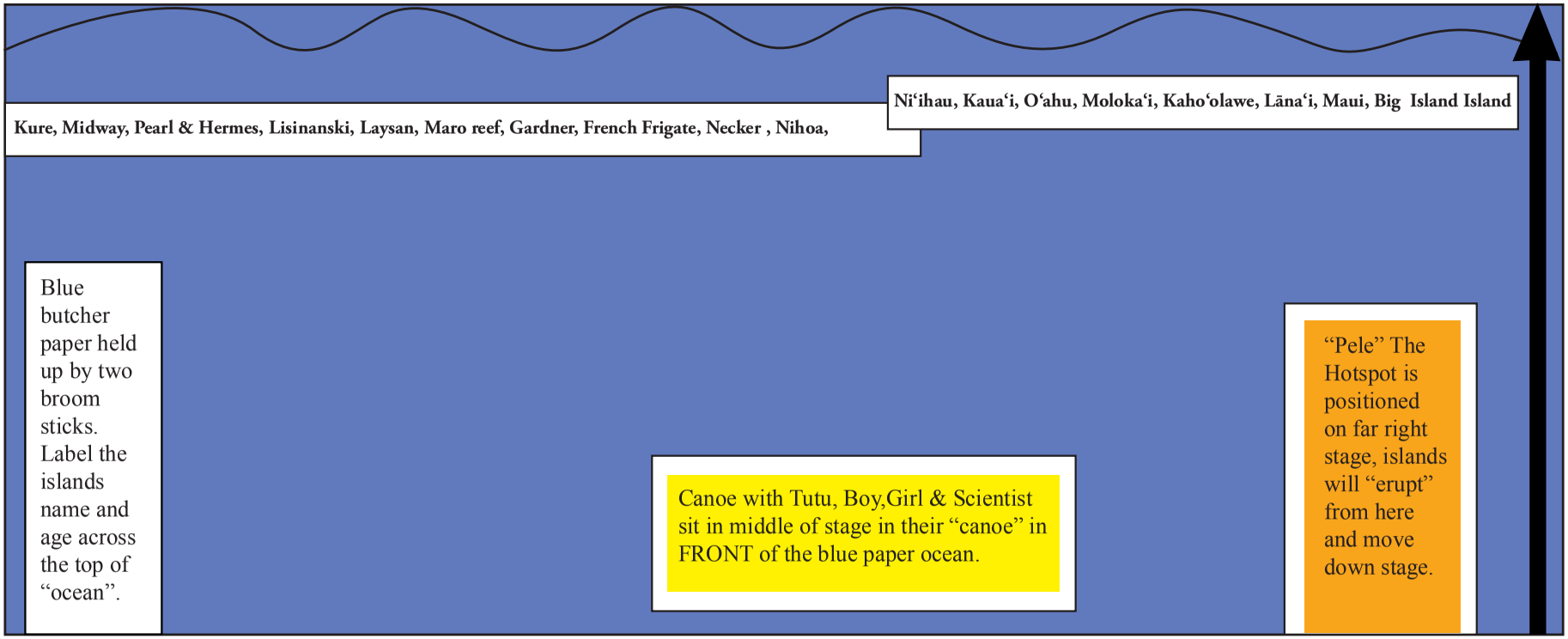
SCIENTIST: Okay folks, hang onto the canoe. We're going to zoom fast forward about 25 MILLION years!

EXAMPLE

Islands will enter and "float" down, sinking and getting smaller as they progress

NORTHWEST

Place a chair BEHIND the hot,spot for the island to stand on initially. Next, a low stool, stand, squat, etc., the idea is that they will sink as they move NW.



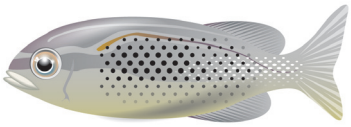
(*At this point, one by one, the NWHI ERUPT and pop up at the hot spot, and begin drifting down to the far end of the blue butcher paper. As they drift down they begin to squat, kneel, and sit down to represent sinking and getting smaller. You may want your smaller students to act as the older islands, and taller students as the newer ones.*)

ORDER OF APPEARANCE

First, the island of Kure makes its appearance above the hot spot and drifts down to the opposite end of the blue paper that represents the ocean. After Kure (sitting) will come Midway and sit on their knees showing only their shoulders and above. Then Pearl and Hermes *erupt* out of the hot spot and drift down, getting smaller and smaller until they are sitting, showing only the crown of their heads. Lisianski follows Pearl and Hermes in the same fashion until sitting. Next, Laysan erupts from the hot spot and begins drifting down getting smaller. However, they should only kneel rather than sit, since their square mileage of land is larger. Maro Reef is next in line for eruption, again *drifting* down to the sitting position. Gardner pinnacles explode up, drift Northwest, this time, sitting on a chair to be a little higher, so as to indicate a newer island. Next, the French Frigate Shoals, Necker island, and Nihoa will erupt and sit in chairs behind the blue paper.

If you have extra students, they can be the coral reef by wearing coral hats made of white tissue paper, and sit down in front of Kure Atoll, Midway, Pearl and Hermes, etc., until reaching the main Hawaiian Islands.

STOP HERE UNTIL ACT IV.



ACT IV

All of the NWHI will have white tissue paper to crumple and tape to the blue butcher paper in front of them to represent the fringing reef forming as they drift down and sink. Therefore, the older the island, the more tissue paper you should give them.

BOY: Wow that was awesome dude! Look at all those islands!

GIRL: What's the white stuff Dr. Kookey?

SCIENTIST: That, my dear, is the formation of the coral reef. You see as the islands got older they began to sink and erode away. But the coral reef AROUND them kept building up, until eventually, an atoll was formed.

BOY: Is that why the Kupuna Islands have so many cool fish?

SCIENTIST: You bet! The reefs provide habitat to many species of fish, sea birds, and marine mammals. That is why these islands are now protected and make up the largest marine conservation area in the WORLD!

GIRL: That makes me happy that all those cute little fish, seals, and birds will be safe!

BOY: WHoooooooaaaa…..I feel more trembling and Earthquakes.

TUTU: Hold on everyone, more islands are being born!

At this time Hot Spot shakes her red and yellow streamers, *Kaua'i, Ni'ihau*, and *O'ahu* pop up one by one from the hot spot and float along to their place in the island chain.

SCIENTIST: Ahhh, there we go, now we are getting to the islands you are most familiar with – the main Hawaiian Islands. *Kaua'i* is next, being 5.1 MILLION YEARS old, then **Ni'iahu** at almost the same age, 4.9 million years old, and after them *O'ahu* was formed, it is about 3.7 million years old.

GIRL: Wow! The island I live on is almost 4 million years old, no wonder the tall mountains look like they have lots of wrinkles! Kinda like you Tutu!

TUTU: Those aren't wrinkles my dear, those are *age marks.* The older you get, the more wrinkles you get from aging, like the mountains eroding from the water and wind! You too will wrinkle up one day my dear! Everything ages!

BOY: Ha , Ha! Old Lady, Old Lady…. (*teasing the girl*)

Hot Spot: (*erupting and roaring, shaking streamers*) It's not nice to tease mother nature!!!

BOY: Yikes! Look at that! (*Points towards Hot Spot erupting.*)

The following islands erupt out of the hot spot and float down to their spot: *Moloka'i, Kaho'olawe, Lana'i, Maui.*

GIRL: How old are these islands Doctor Kookey?

SCIENTIST: Hmmmm, let's see, *Moloka'i* is 1.9 million years old, *Kaho'olawe* is about 1 million years old, *Maui* and *Lana'i* are the same age, you might call them twins, because they were forming at the same time about 1.3 million years ago. And then, of course, we have…..

(*Big rumble from Hot Spot, and the Big Island* EXPLODES *out of the hot spot.*)

the Big Island, or the island of *Hawai'i*…. as you know, it is still forming new land and rumbling today!

BOY: This is way cool! I can't believe how all of these volcanoes have changed so much over time!

SCIENTIST: There are a lot of stages in the formation of volcanic islands. Scientists actually have names for them: Can I get you three to assist me here?

TUTU, BOY, AND GIRL: Sure!!

SCIENTIST: (*as Dr. Kookey holds talks about each stage the Boy, Girl, and Tutu hold them up, and then tape them onto the blue butcher paper, starting with the newest island, and working down toward Kure.*)

The first stage is called the DEEP SUBMARINE STAGE. This is when an island begins its formation over a hot spot. Underwater eruptions begin which eventually reach the ocean surface. *Lo'ihi* is in this stage.

Hot Spot: (*Rattling red and yellow streamers.*) I am making this seamount now. It's not an island yet, so you still can't see it from the ocean surface, but I am hard at work!!

GIRL: I've heard about that new island! COOL!

Hot Spot: No, you mean HOT!!! HA HA HA!!!!

SCIENTIST: The second stage is called the SHALLOW SUBMARINE STAGE. This is when the volcanic crater can be seen right above the water. Lo'ihi isn't quite there yet.

Hot Spot: (*Rattling red and yellow streamers.*) I'm trying, I'm trying to get there!!

SCIENTIST: The third stage is called the SUBAERIAL SHIELD BUILDING STAGE. During this stage of

volcanic island formation, the volcano summit collapses, forming a caldera. The volcano continues to emit lava from the summit, and from rifts in the side of the cone. *Mauna Loa* and *Kilauea* on **the** *Big Island* are in this stage.

BOY: I've been to the **Hawai'i** Volcanoes National Park on the **Big Island** and seen this!

SCIENTIST: You may have been elsewhere on the Big Island and seen an example of the fourth stage called the POST-CALDERA STAGE. During this time, lava fills and overflows the caldera, forming a rounded summit. *Mauna Kea* is an example of this stage.

GIRL: I've seen Mauna Kea! It looks like an upside down rice bowl!

SCIENTIST: Have you ever been to *Kaua'i*?

TUTU: Why yes! That is where I am from.

SCIENTIST: Well *Kaua'i* is an example of the 5th stage in a volcano's life. It is called the EROSIONAL STAGE. At this stage in a hot spot volcano's life, lava is no longer being added, and the volcanic cone is attacked by erosion from the ocean, rain, and wind. Sea cliffs, deep valleys, and sharp ridges are characteristic features. *Kaua'i* is a good example of this stage.

TUTU: (*Closing her eyes and dreaming of her home on Kaua'i.*) Yes, I can see the beautiful sea cliffs of the Napali coast, and the beautiful deep green valley's….ahhhhh….such a beautiful island!

SCIENTIST: If you travel further toward the Northwest, you will see examples of the next two stages. They are the REEF GROWTH stage and the ATOLL stage. In the French Frigate shoals, you can see the reef growth phase. The mountains are completely eroded and barely break the surface of the ocean, as this is happening the coral reef around the island continues to grow and grow. The final stage is called the ATOLL STAGE. Look down to the oldest island of Kure, and you can see a good example of an atoll. This is when the rocks that once formed the island completely erode and sink below the sea level and only the coral reef remains at the surface.

GIRL: Wow! Dr. Kookey, you really know a lot about our islands! I hope one day I can be as smart as you!

SCIENTIST: You can! You both can become scientists and study about our amazing islands, both above the water and below the water.

BOY: Yeah, that would be so cool to be a Marine Biologist and learn all about the fish and coral below us. I've been snorkeling with my Dad and I love it underwater!

GIRL: Not me, I want to hike to the top of the volcanoes and take a submarine down to look at *Lō'ihi*!

TUTU: Yes, boys and girls (*saying to the whole audience*) our islands are filled with some of the most unique places on Earth, filled with some of the most magnificent and diverse plant and animal life in the whole world! I hope that when you grow up, you will think about becoming a scientist to help everyone learn more about our unique islands, and help protect them and their fragile environment for future generations!

BOY and GIRL: (*together*) What are we waiting for? Let's get paddling so we can get back to school and learn some more!

(**Boy and Girl** paddle off quickly in canoe, knocking **Tutu** and the **Scientist** in the water left to swim home)!

THE END

CULMINATING LESSON

Self-Assessment Rubric for the Formation of the Hawaiian Archipelago Play

Criteria	WOW!	YES!	ALMOST	NOT YET
Interpret a character's external motivations. (FA.4.3.1) I can understand the characters message in the play, and how they use different movements, vocal expressions, and roles to help get across the information being acted out. I can show concentration and make positive contributions in the production of the play.	I completely understood the characters' message in the play. I used a variety of different movements, vocal expressions, and roles to help get the information across. I consistently showed concentration, and made positive contributions in the production of the play.	I understood the characters' message in the play. I used different movements, vocal expressions, and roles to help get the information across. I showed concentration, and made positive contributions in the production of the play.	I somewhat understood the characters' message in the play. I used only a few different movements, vocal expressions, and roles to help get the information across. I sometime showed concentration and made positive contributions in the production of the play.	I didn't really understand the characters' message in the play. I didn't use different movements, vocal expressions, and roles to help get the information across. I rarely showed concentration and made positive contributions in the production of the play.
Participate in grade-appropriate oral group activities. (LA.4.6.1) I can participate in a positive way that helps the group present a short informational play about the formation of the Hawaiian archipelago.	I participated, in a highly effective and positive way that helped my class present a play about the formation of the Hawaiian archipelago.	I participated, in a positive way that helped my class present a play about the formation of the Hawaiian archipelago.	I participated, in a limited way with my class to present a play about the formation of the Hawaiian archipelago.	I didn't really participate with my class in a helpful way to present a play about the formation of the Hawaiian archipelago.

NAME: _____ **DATE:**_____

(please add comments on back)

Culminating Lesson Culminating Task

NAME: _____ **DATE:**_____

Use drawings and words to explain how an island changes over time. Include at least four drawings, and use descriptive words to explain what is happening in each picture you draw.

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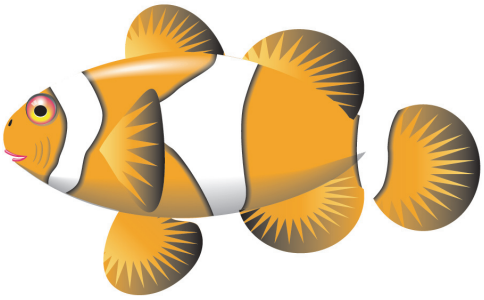
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