

Name: _____

Plate Tectonics

Date: _____ Period: _____

Earth Science

Lab Activity: Hawaiian Hot Spot

INTRODUCTION:

The Emperor Hawaiian chain of islands consists of 107 volcanoes. They extend from the Big Island of Hawaii towards the northwest due to the Pacific plate slowly moving over a stationary hole in the lithosphere. For over 80 million years the Hawaiian Hot Spot has been providing a fresh supply of magma used to create the chain of islands.

OBJECTIVE:

You will use information about the formation and age of the Emperor Hawaiian chain of islands to determine the direction and rate of movement for the Pacific Plate.

VOCABULARY:

Volcano -

Hot Spot -

Mantle Plume -

Seamount -

Guyot -

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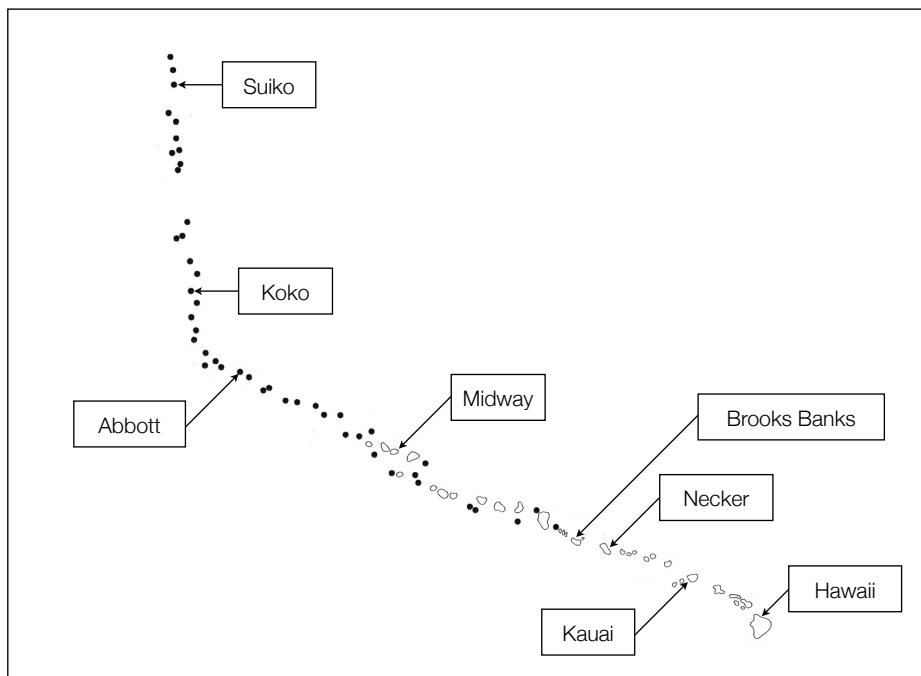
PROCEDURE A:

Using the data table below create a graph on the “Hawaiian Island Graph” to show the relationship with the age of the islands and distance from the hot spot. Be sure to connect the points with a line.

HAWAIIAN ISLANDS DATA

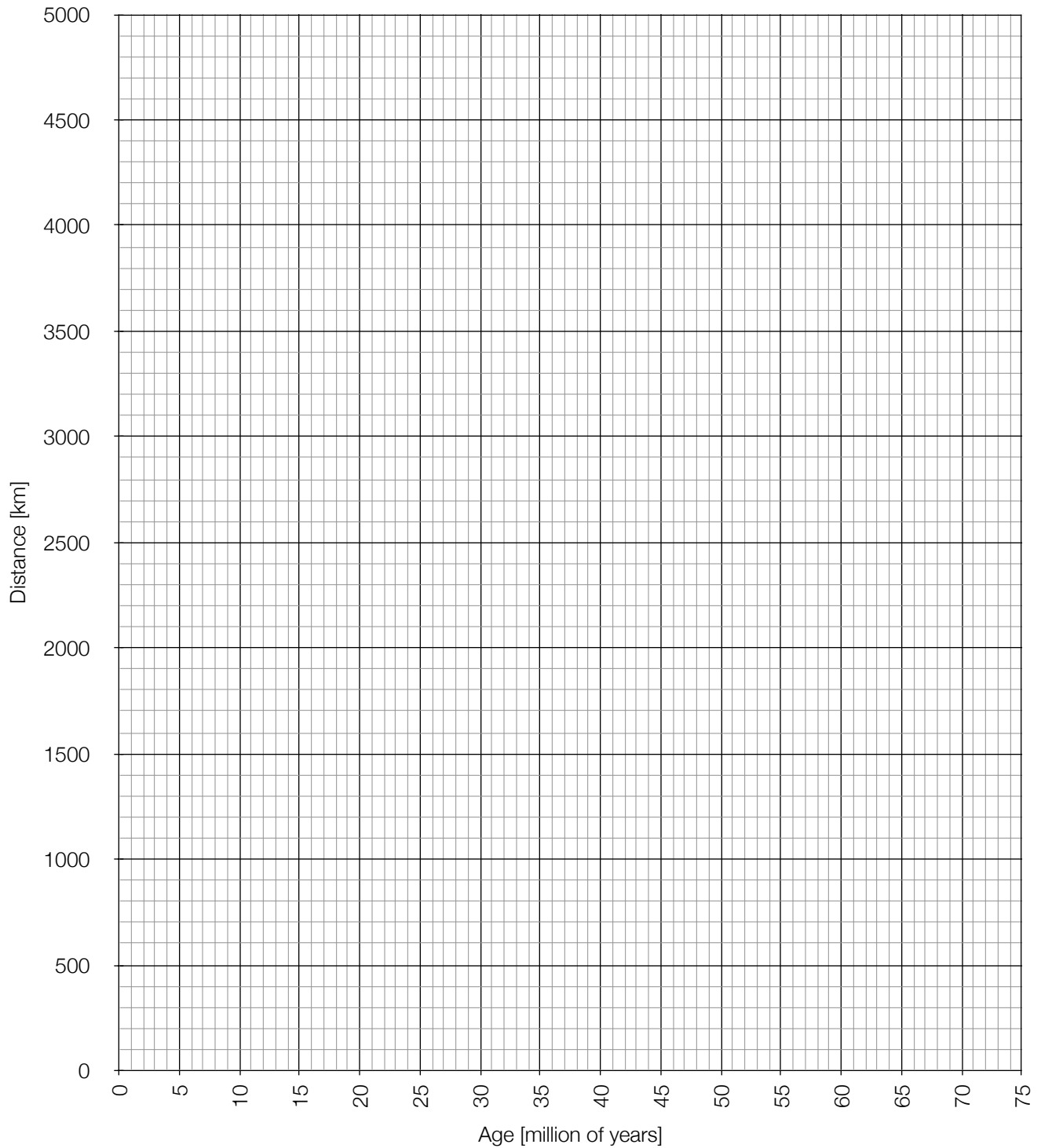
Island	Age [millions years old]	Distance from Hot Spot [kilometers]
Hawaii	0	0
Kauai	4	500
Necker	9	1000
Brooks Bank	13	1200
Midway	27	2400
Abbott	39	3300
Koko	48	3800
Suiko	65	4900

EMPEROR HAWAIIAN CHAIN OF ISLANDS



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HAWAIIAN ISLAND GRAPH



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PROCEDURE B:

Calculate the rate of change for the plate movement between the two island pairs and record your answers on the “Rate of Plate Movement” chart. Be sure to round to the nearest tenths place.

$$\text{Rate of change} = \frac{\text{change in field value}}{\text{time}}$$

RATE OF PLATE MOVEMENT CHART

Island Pairs	Rate of Plate Movement [km/millions of years]
Suiko to Koko	
Koko to Midway	
Midway to Necker	
Necker to Kauai	
Kauai to Hawaii	

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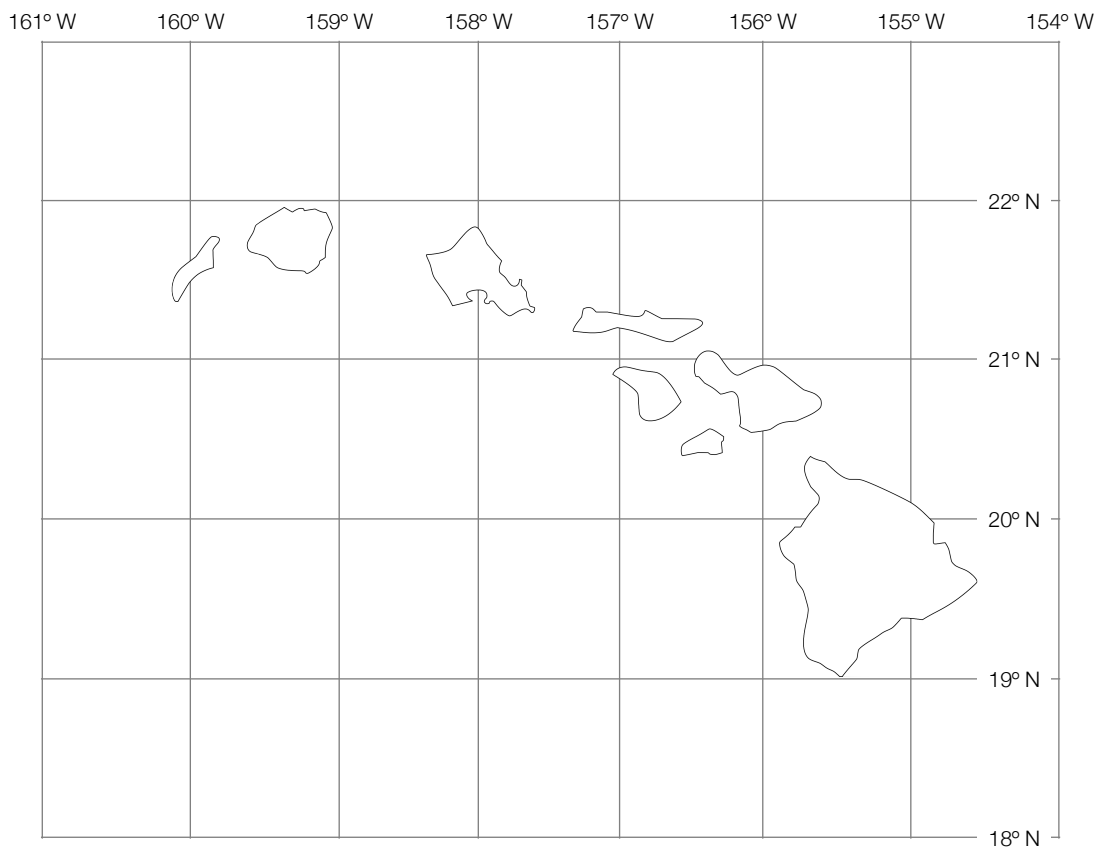
PROCEDURE C:

Plot and label the name of the island and the approximate age using the "Hawaiian Island Ages and Locations" data chart onto the "Hawaiian Islands" map.

HAWAIIAN ISLAND AGES AND LOCATIONS

Island	Approximate Age [millions of years]	Latitude	Longitude
Hawaii	0.5	19.5° N	155.5° W
Kauai	4.7	21.8° N	159.5° W
Maui	1.1	20.8° N	156° W
Molokai	1.6	21.2° N	157° W
Oahu	2.5	21.6° N	158° W

HAWAIIAN ISLANDS MAP



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DISCUSSION QUESTIONS:

1. Using your data, has the rate of plate motion remained constant throughout time?
2. In the event you find a 55 million year old rock, how far from the hot spot would it be located?
3. Based on your calculations, what happened to the rate of plate movement over time?
4. Based on your data, where do you expect the next Hawaii island to form?
5. Why are the Hawaiian Islands towards the northwest generally smaller than the Big Island.

CONCLUSION: Describe how the Hawaiian islands have formed.