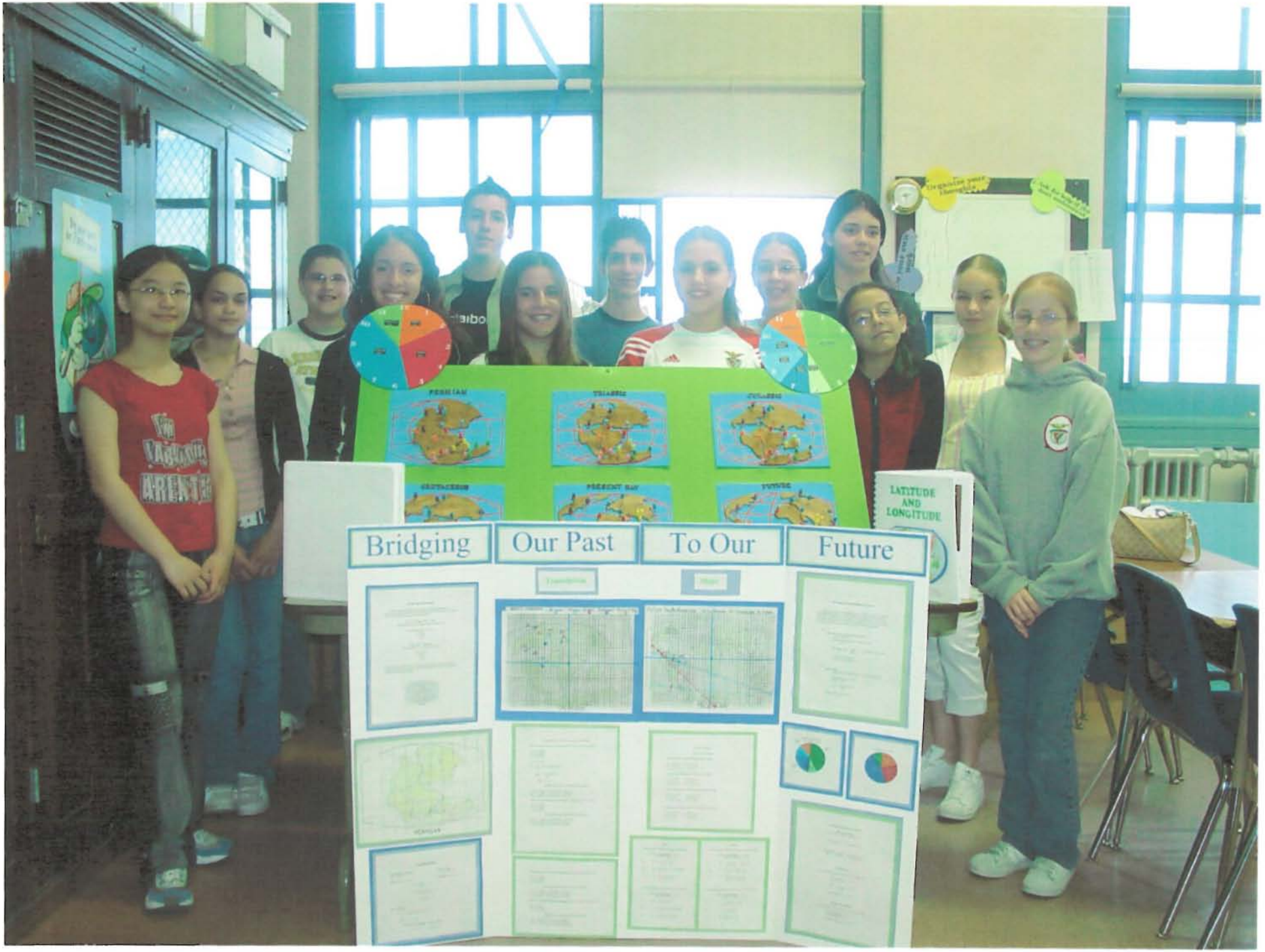

Bridging
Our Past
To Our
Future
LATITUDE AND LONGITUDE

Math Fair 2005
The Nature of Mathematics

When our group was given the theme, "The Nature of Mathematics," we decided to use the Earth as our guide. We took concepts that we learned in Science and Mathematics class and applied them to the theory of plate tectonics and continental drift. Our team then began to track the Earth's land movements from the Permian time period until present day. Calculating the slope and rate of land movement, allowed us to predict future land positions.

The various mathematical concepts involved with our project are scale factors, slope, x and y coordinates, conversion, translations, latitude, longitude, degrees, rate of speed, basic math operations and Pythagorean Theorem to create a stand.

We started by using scale factoring to enlarge world maps from different time periods. We also used grids to create a 3 – D and 2 – D models of the world maps. Our next step was to plot the positions of the different plates to find their translation throughout millions of years. The plotted points enable us to find the slope over the time period.

Another section of our project was to create geological clocks, which divides the Earth's history into a time frame of 12 hours. One clock represents the 4 different eons. The second clock is divided into 3 different eras and 5 periods.

We also connected mathematics to literature by writing and illustrating a primary grade informational book explaining latitude and longitude. Understanding latitude and longitude will help students locate points on both a map and on a coordinate grid.

Our last and final step was to put together a display board and notebook exhibiting all of our work.

Scale Measurements

Researching the Internet on the Theory of Plate Tectonics, we acquired maps dating from the Permian time period to Present Day. We then used scale factors to draw and enlarge the maps.

Ex: 2 3/4in.* X= 11in.

Width of actual map *Scale factor =width of enlarged map.

Solution 2.75in. * X=11in.

$$X = \frac{11\text{in.}}{2.75\text{in.}}$$

$$X = 4$$

Ex: 2in.*X=8in.

Height of actual map*Scale factor = Enlarged height of map

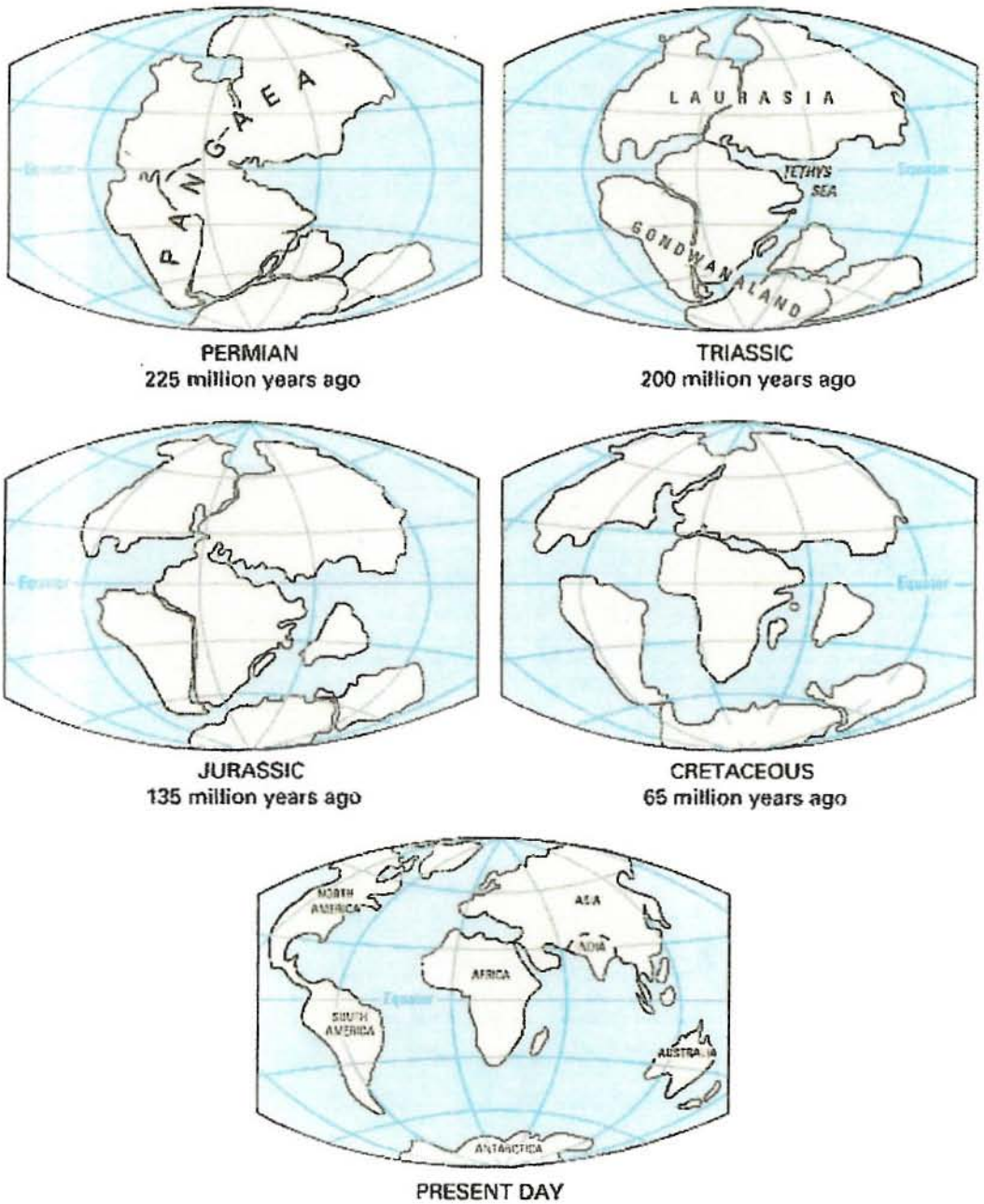
2in. * X= 8in.

$$X = \frac{8\text{ in.}}{2\text{ in.}}$$

$$X = 4$$

Actual map was divided into 1/4in squares and enlarged map divided into 1in squares. We then drew our two dimensional model maps and created our 3-dimensional exhibit model.

the Greek root "to build." Putting these two words together, we get the term *plate tectonics*, which refers to how the Earth's surface is built of plates. The *theory of plate tectonics* states that the Earth's outermost layer is fragmented into a dozen or more large and small plates that are moving relative to one another as they ride atop hotter, more mobile material. Before the advent of plate tectonics, however, some people already believed that the present-day continents were the fragmented pieces of preexisting larger landmasses ("supercontinents"). The diagrams below show the break-up of the supercontinent *Pangaea* (meaning "all lands" in Greek), which figured prominently in the *theory of continental drift* -- the forerunner to the theory of plate tectonics.



PERMIAN
225 million years ago

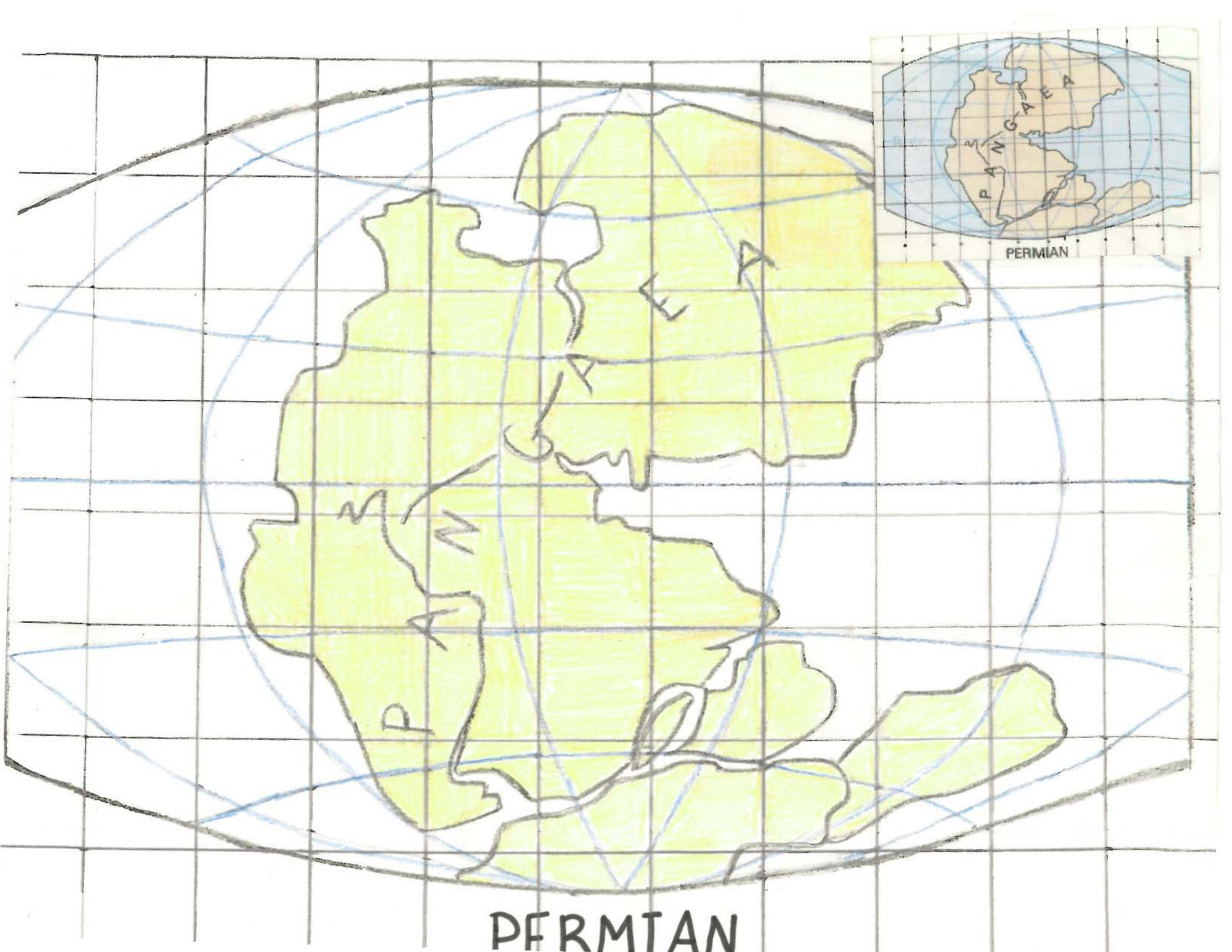
TRIASSIC
200 million years ago

JURASSIC
135 million years ago

CRETACEOUS
65 million years ago

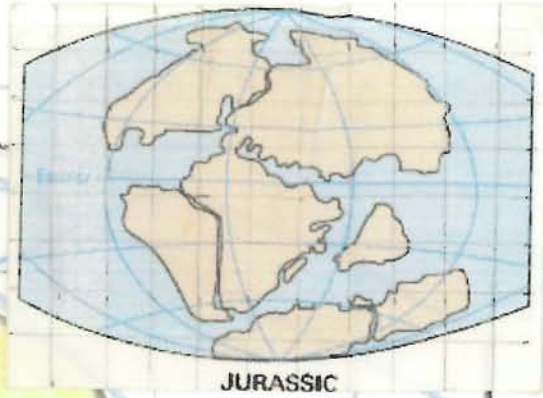
PRESENT DAY

According to the continental drift theory, the supercontinent Pangaea *began to break up about 225-200 million years ago, eventually fragmenting into the continents as we know them today.*

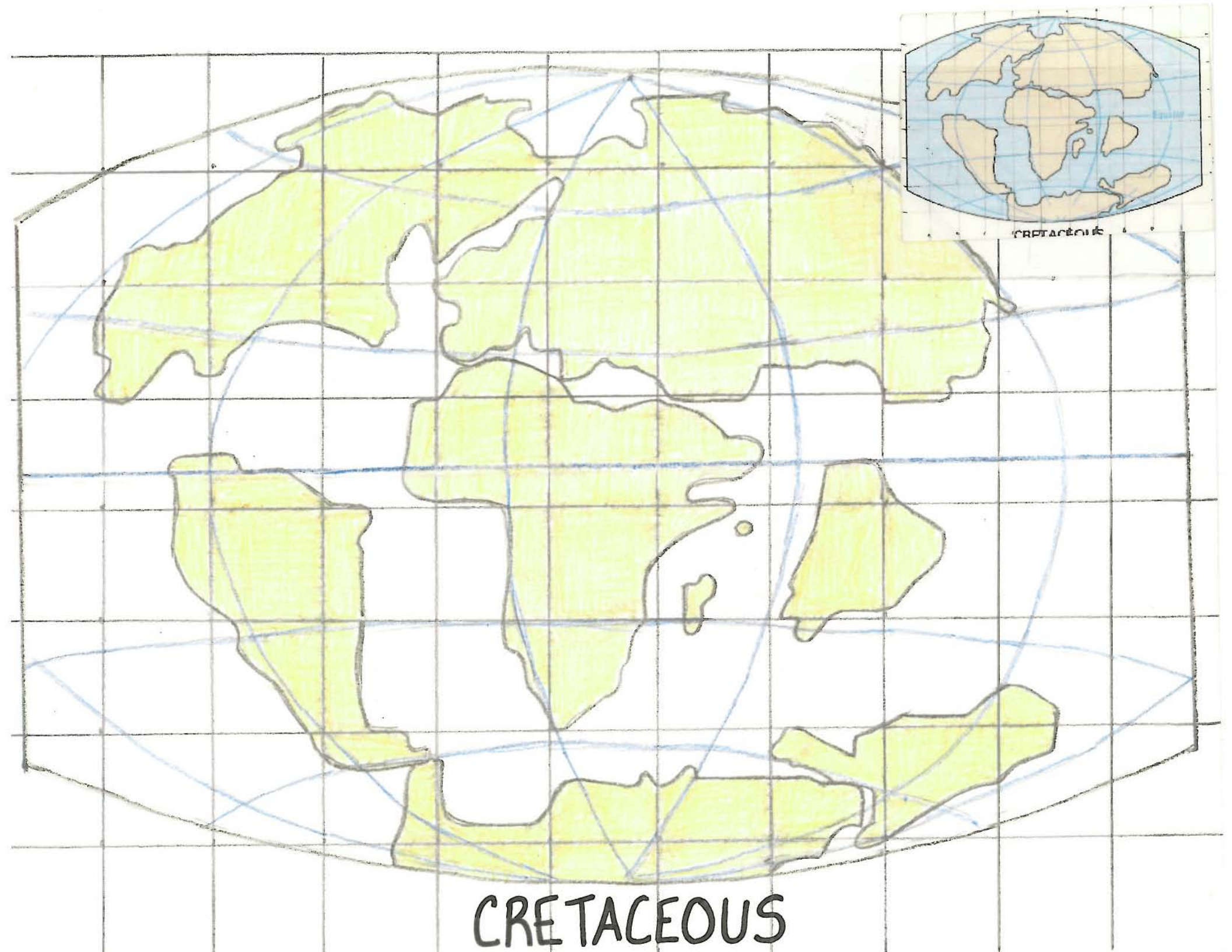


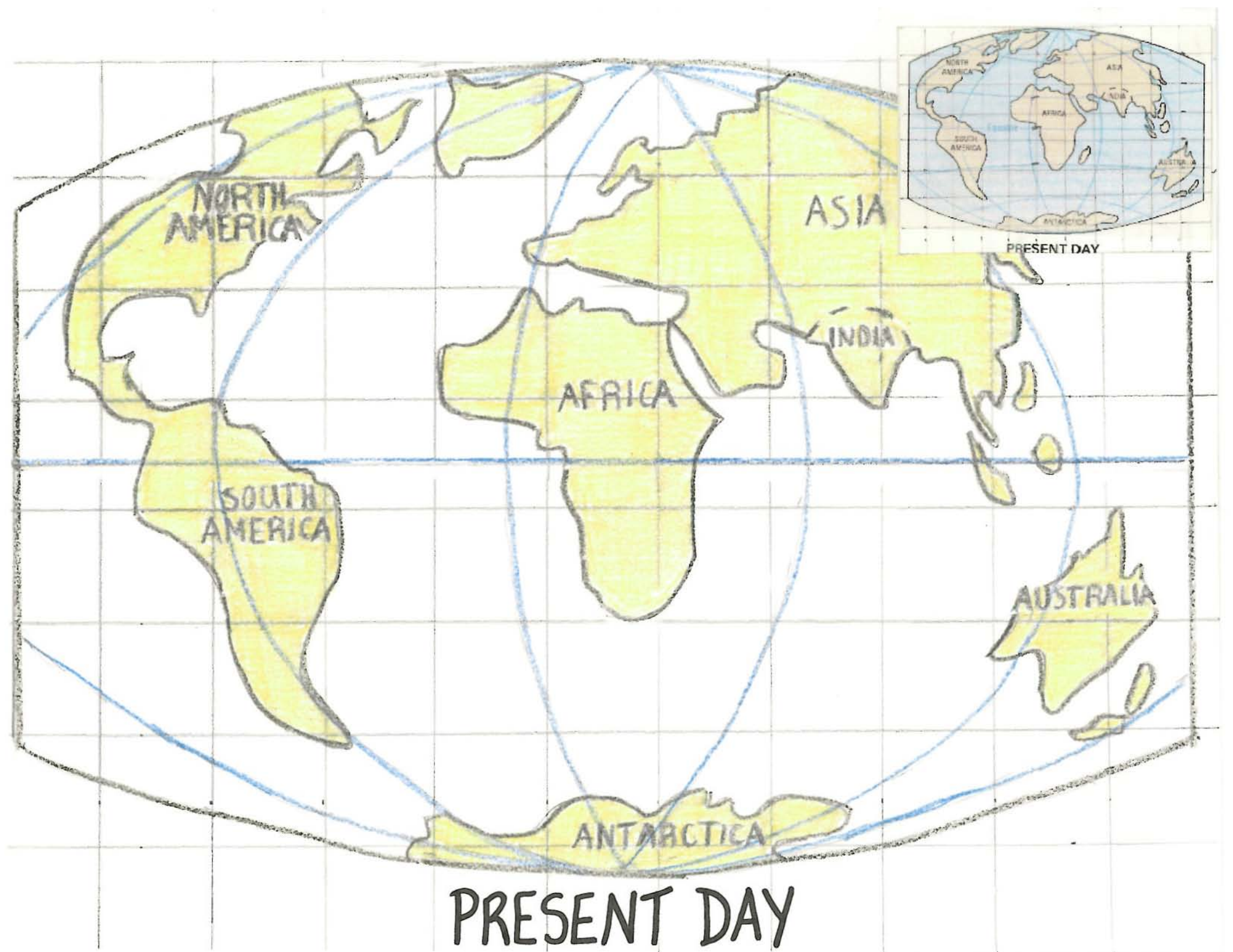
PERMIAN

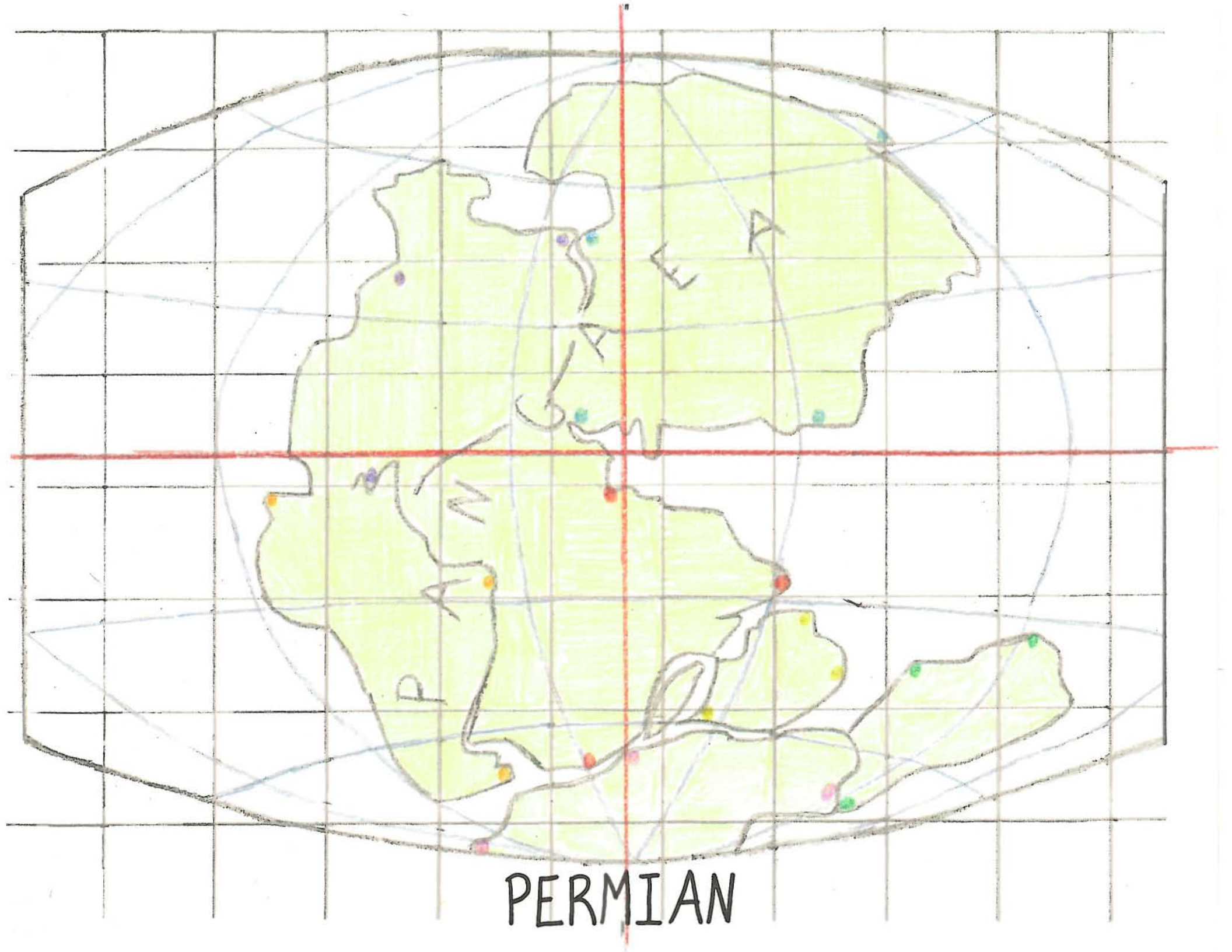

LAURASIA
TETHYS SEA
GONDWANALAND
LAURASIA
TETHYS SEA
GONDWANALAND
TRIASSIC

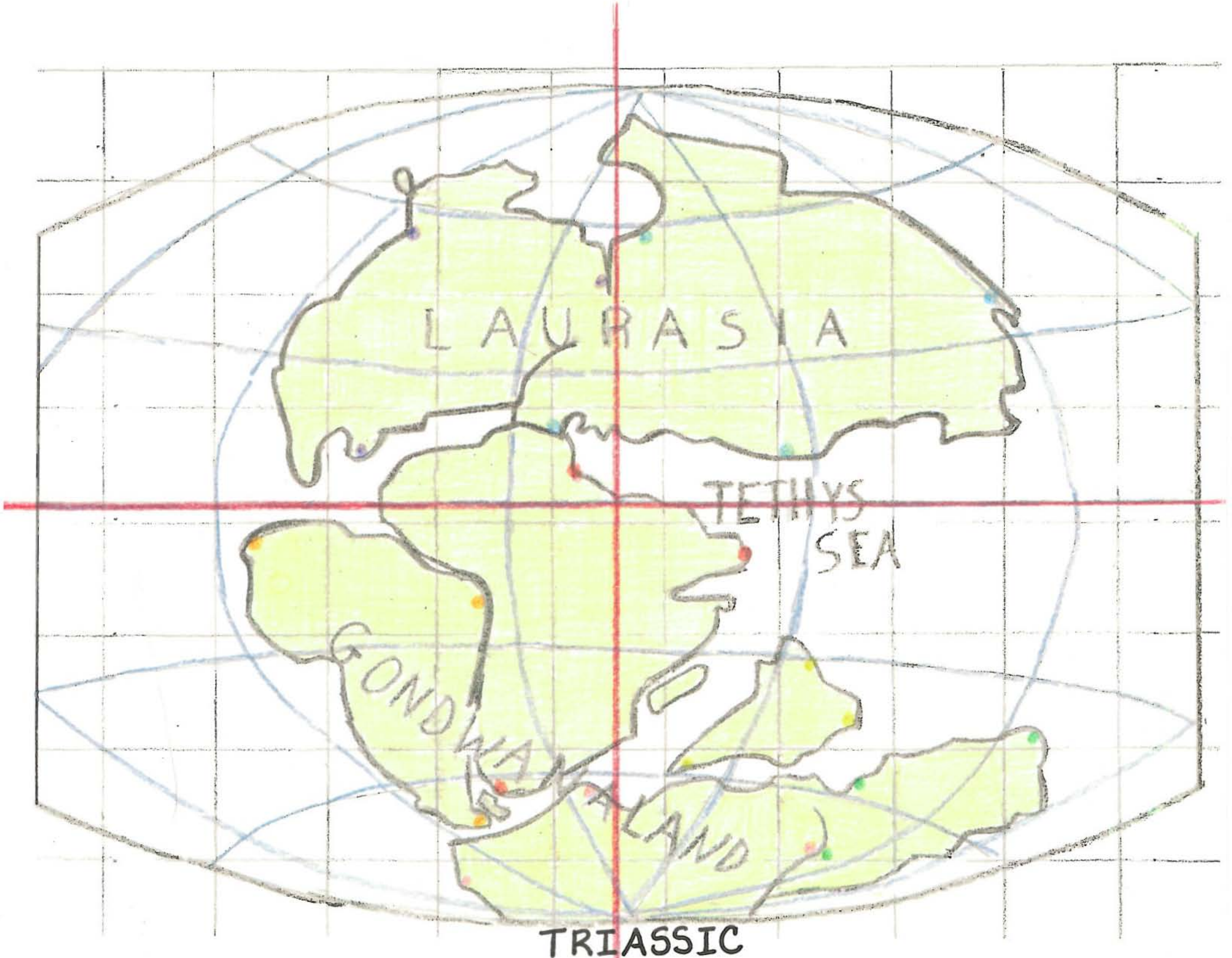


JURASSIC

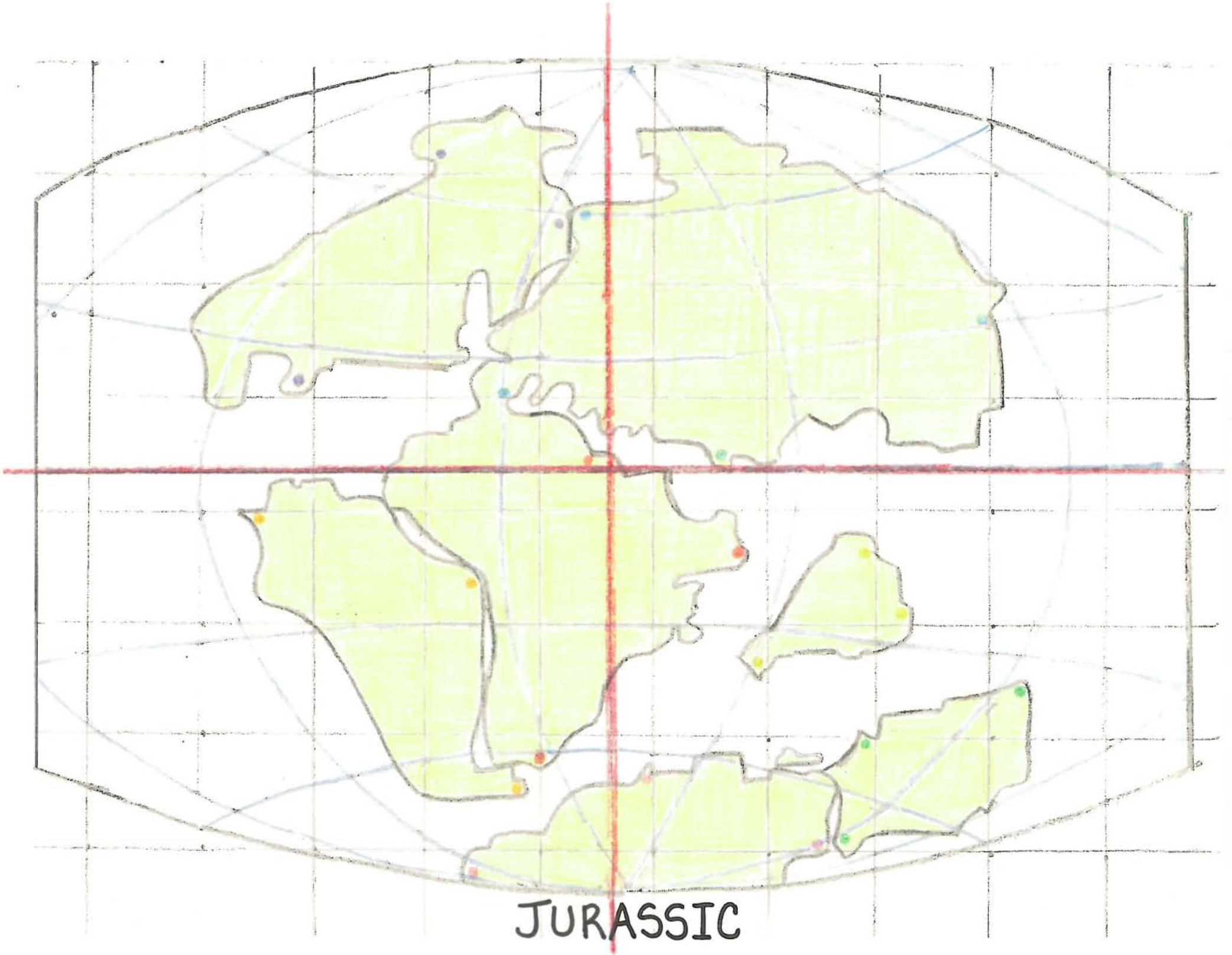

CRETACEOUS

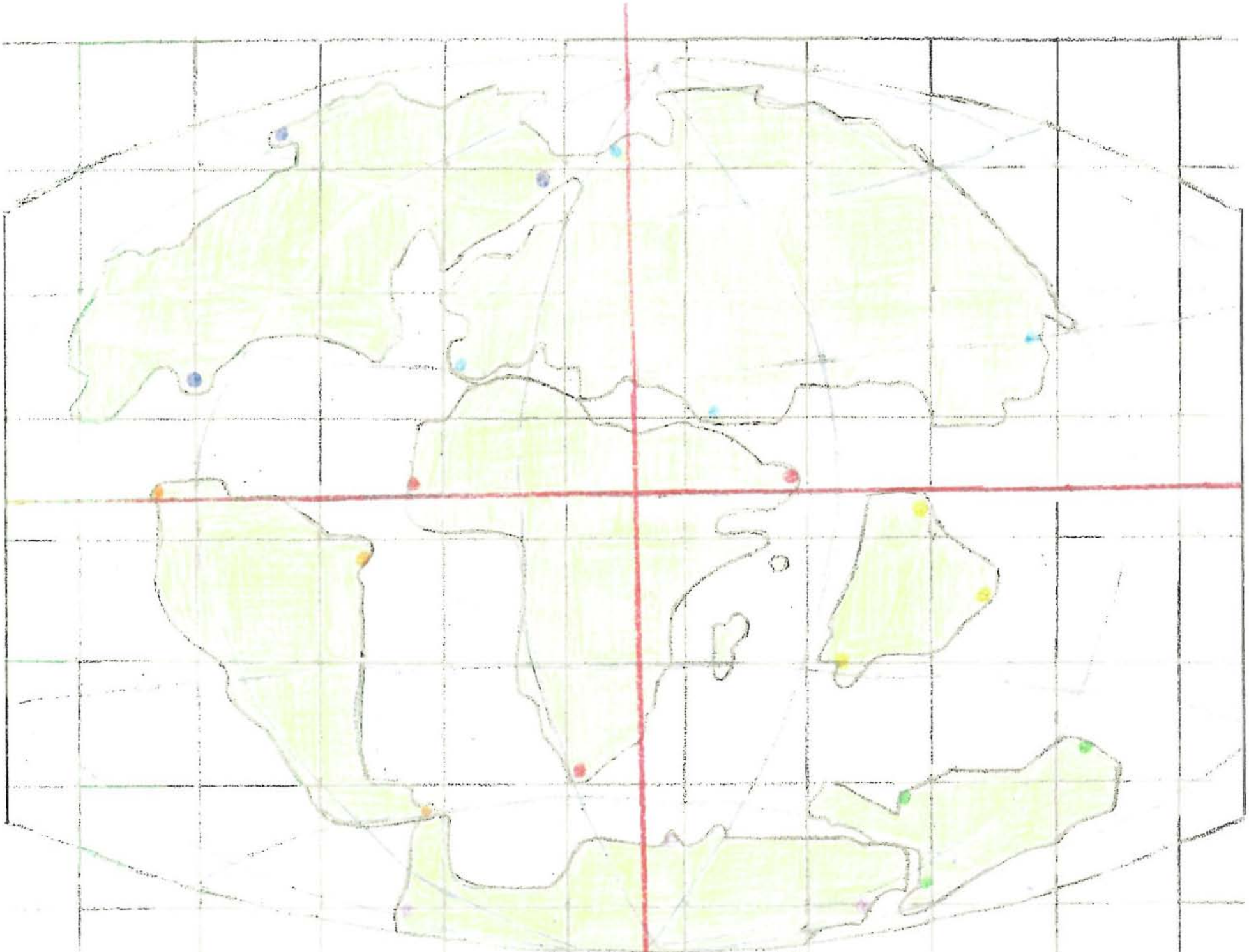

NORTH AMERICA
ASIA
INDIA
AFRICA
SOUTH AMERICA
AUSTRALIA
ANTARCTICA
PRESENT DAY

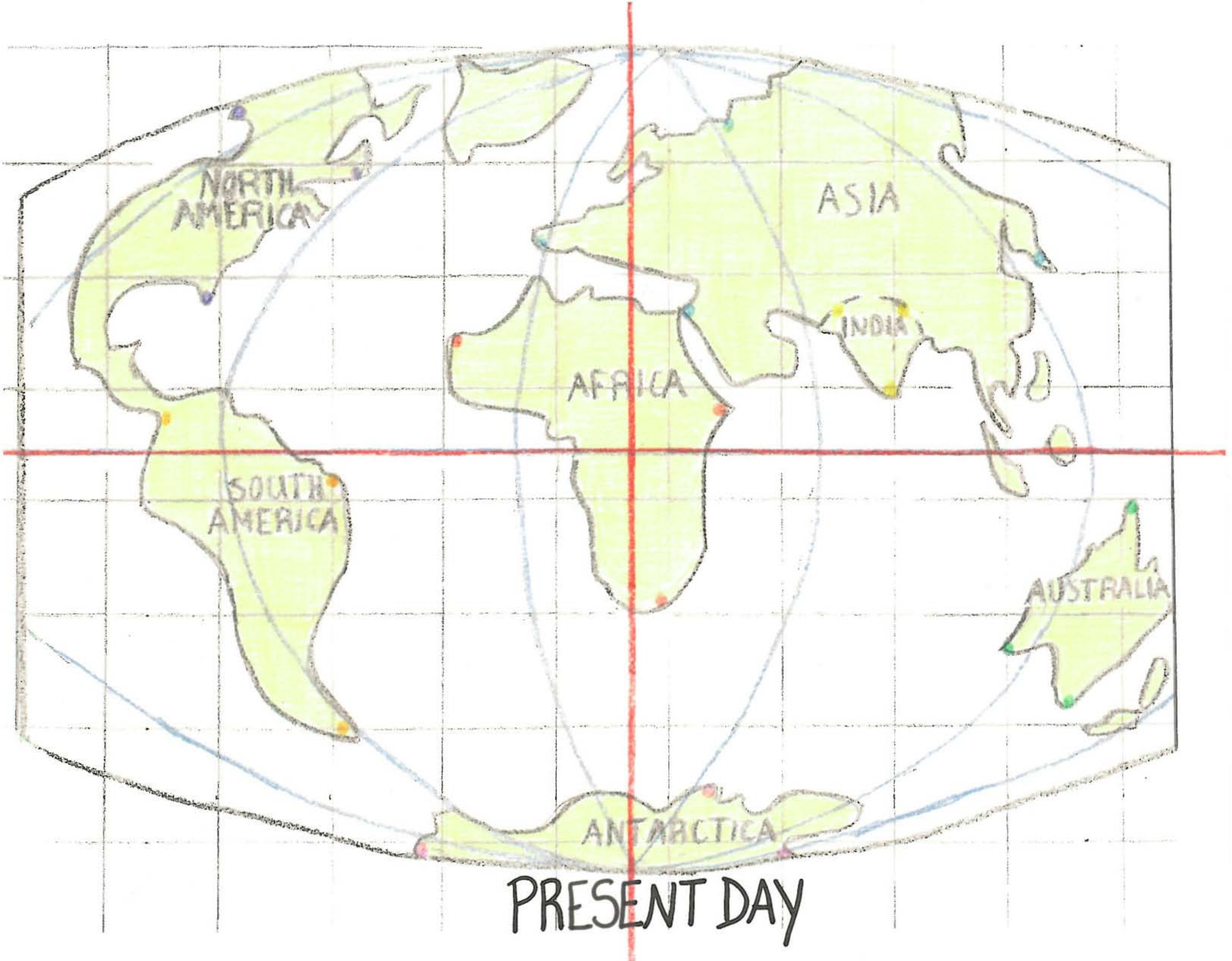

PERMIAN



TRIASSIC


JURASSIC


CRETACEOUS


NORTH AMERICA
ASIA
INDIA
AFRICA
SOUTH AMERICA
AUSTRALIA
ANTARCTICA

PRESENT DAY

FUTURE

Transformations and Translations

Using our 2 dimensional scale drawings of the original map, we then plotted specific colored points on various locations throughout the Permian Time Period map. These specific points were then estimated and plotted to their locations on the Triassic, Jurassic, Cretaceous, and Present Day maps. Using an x-y coordinate grid transparency, we then tracked the movement of these points throughout the various time periods. Using the data collected, we converted the movement into actual distance using miles as our unit of measurement.

Scale Factoring

First, we measured the equator's latitude line from the large world map in our classroom. It measured 61 inches. The scale on that map was one inch equals 405 miles. We wanted our 10¼ inch project map to equal the scale in our classroom world map. Therefore, we decided to set up an equation [$61 \cdot 405 = 10\frac{1}{4} \cdot x$] and solve for x, which was the number of miles an inch equals in our project map. After solving the equation, we found out that x equals approximately 2410.24 miles per inch. Then we checked our answer by substituting x in the equation. We got 24705 = 24704.96. they are not exactly equal to each other because x was rounded to the nearest hundredth.

Conversion Factor

Classroom World Map
1 in. = 405 mi.

Project Map
1 in. = 2,410.24 mi.

Equator Line – 61 in.

Equator Line – 10 ¼ in.

$$61 \text{ in.} * \frac{405 \text{ mi.}}{1 \text{ in.}} = 10\ ¼ \text{ in.} * X$$

$$\frac{24,\ 705 \text{ in.} * \text{miles}}{10\ ¼ \text{ in.}} = X$$

$$\frac{2{,}410.24 \text{ mi.}}{1 \text{ in.}} = X$$

Check Answer

$$10\ ¼ \text{ in.} * \frac{2{,}410.24 \text{ mi.}}{\text{in.}} = \text{Equator}$$

24, 704.96 mi. = Equator

Classroom World Map		**Project Map**
24,705 mi.	=	24,704.96 mi.

Translation of North America Land Mass

Distance of movement from the 2 Dimensional Permian Map to Triassic Map

A to A: 10/16 in
B to B: 14/16in
C to C: 8/16in

X = 2,410.24 mi.

Ex: $\frac{10}{16}$ in. * X = miles in reality

$\frac{10 \text{ in.}}{16} * \frac{2{,}410.24 \text{ mi.}}{\text{in.}} = R$

1,506.4 mi. = R

Distance of movement converted to miles in reality

A to A: 10/16in x 2,410.24mi/in= 1,506.4mi
B to B: 14/16in x 2,410.24mi/in= 2,108.96mi
C to C: 8/16in x 2,410.24mi/in= 1,205.12mi

Distance of movement from the 2 Dimensional Triassic Map to Jurassic Map

A to A: 11/16in
B to B: 8/16in
C to C: 6/16in

Distance of movement converted to miles in reality

A to A: 11/16in x 2,410.24mi/in= 1,657.04mi
B to B: 8/16in x 2,410.24mi/in= 1,205.12mi
C to C: 6/16in x 2,410.24mi/in= 903.84mi

Distance of movement from the 2 Dimensional Jurassic Map to Cretaceous Map

A to A: 13/16in
B to B: 1 4/16in
C to C: 8/16in

Distance of movement converted to miles in reality

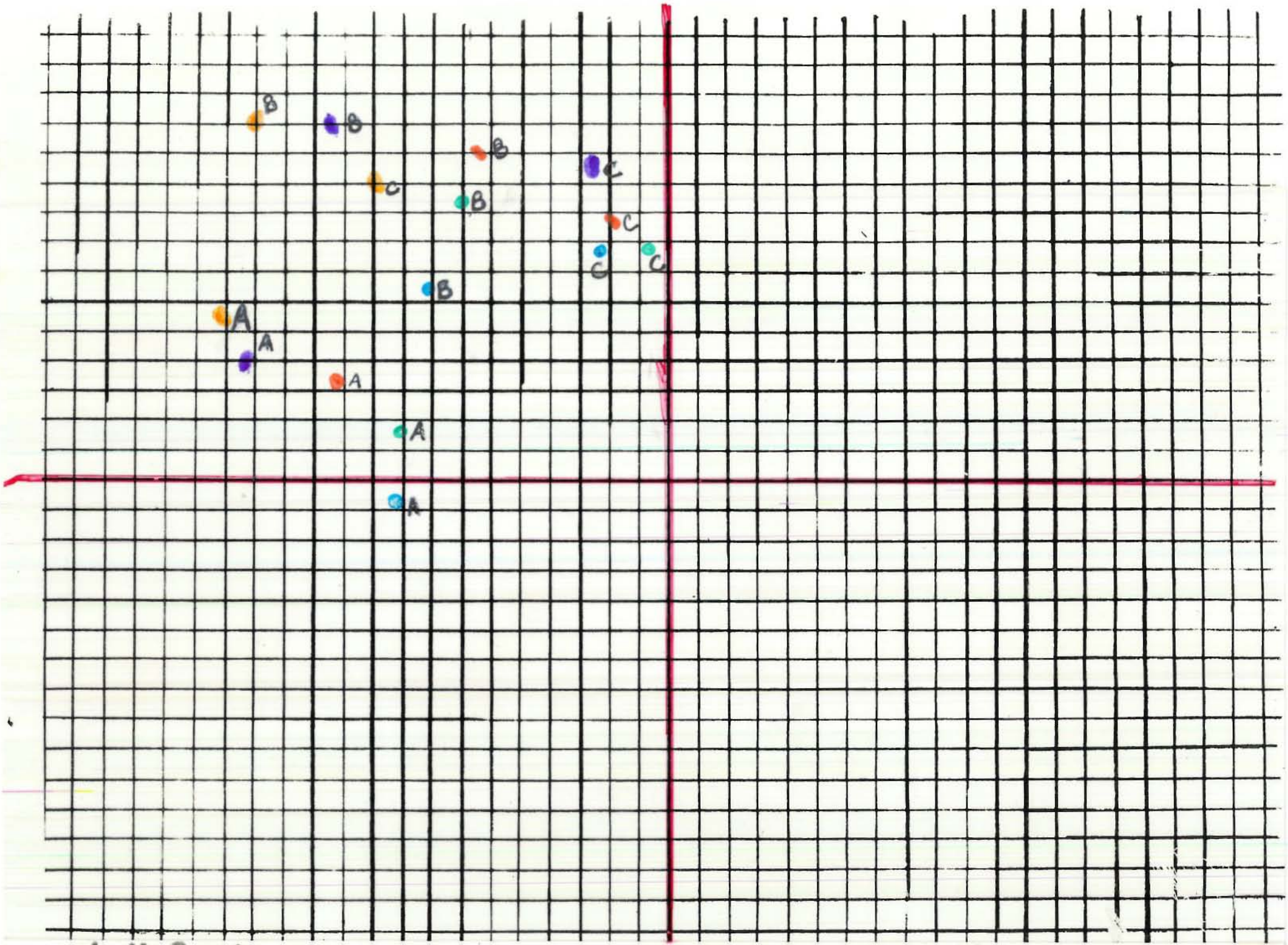
A to A: 13/16in x 2,410.24mi/in= 1,958.32mi
B to B: 1 4/16in x 2,410.24mi/in= 3,012.8mi
C to C: 8/16 in x 2,410.24mi/in= 1205.12mi

Distance of movement from the 2 Dimensional Cretaceous Map to Present Day Map

A to A: 6/16in
B to B: 10/16in
C to C: 1 14/16in

Distance of movement converted to miles in reality

A to A: 6/16in x 2,410.24mi/in= 903.84mi
B to B: 10/16in x 2,410.24mi/in= 1,506.4mi
C to C: 1 14/16 in x 2,410.24mi/in= 4,519.2mi


B
B
B
C
B
C
C
C
B
A
A
A
A
A
North America
Permian:
Triassic:
Jurassic:
Cretaceous:
Present Day:

Translation of South America Map

Distance of movement from the 2 Dimensional Permian Map to Triassic Map

A to A: 1/16 in
B to B: 4/16in = 1/4in
C to C: 2/16in

X = 2,410.24 mi.

Ex: $\frac{1}{16}$ in. * X = miles in reality

$\frac{1 \text{ in.}}{16} * \frac{2{,}410.24 \text{ mi.}}{\text{in.}} = R$

150.64 mi. = R

Distance of movement converted to miles in reality

A to A: 1/16in x 2,410.24mi/in= 150.64mi
B to B: 4/16in x 2,410.24mi/in=602.56mi
C to C: 2/16in x 2,410.24mi/in= 301.28mi

Distance of movement from the 2 Dimensional Triassic Map to Jurassic Map

A to A: 3/16in
B to B: 3/16in
C to C: 8/16in = 1/2in

Distance of movement converted to miles in reality

A to A: 3/16in x 2,410.24mi/in= 451.92mi
B to B: 3/16in x 2,410.24mi/in= 451.92mi
C to C: 8/16in x 2,410.24mi/in= 1,205.12mi

Distance of movement from the 2 Dimensional Jurassic Map to Cretaceous Map

A to A: 1in
B to B: 1 1/16in
C to C: 14/16in

Distance of movement converted to miles in reality

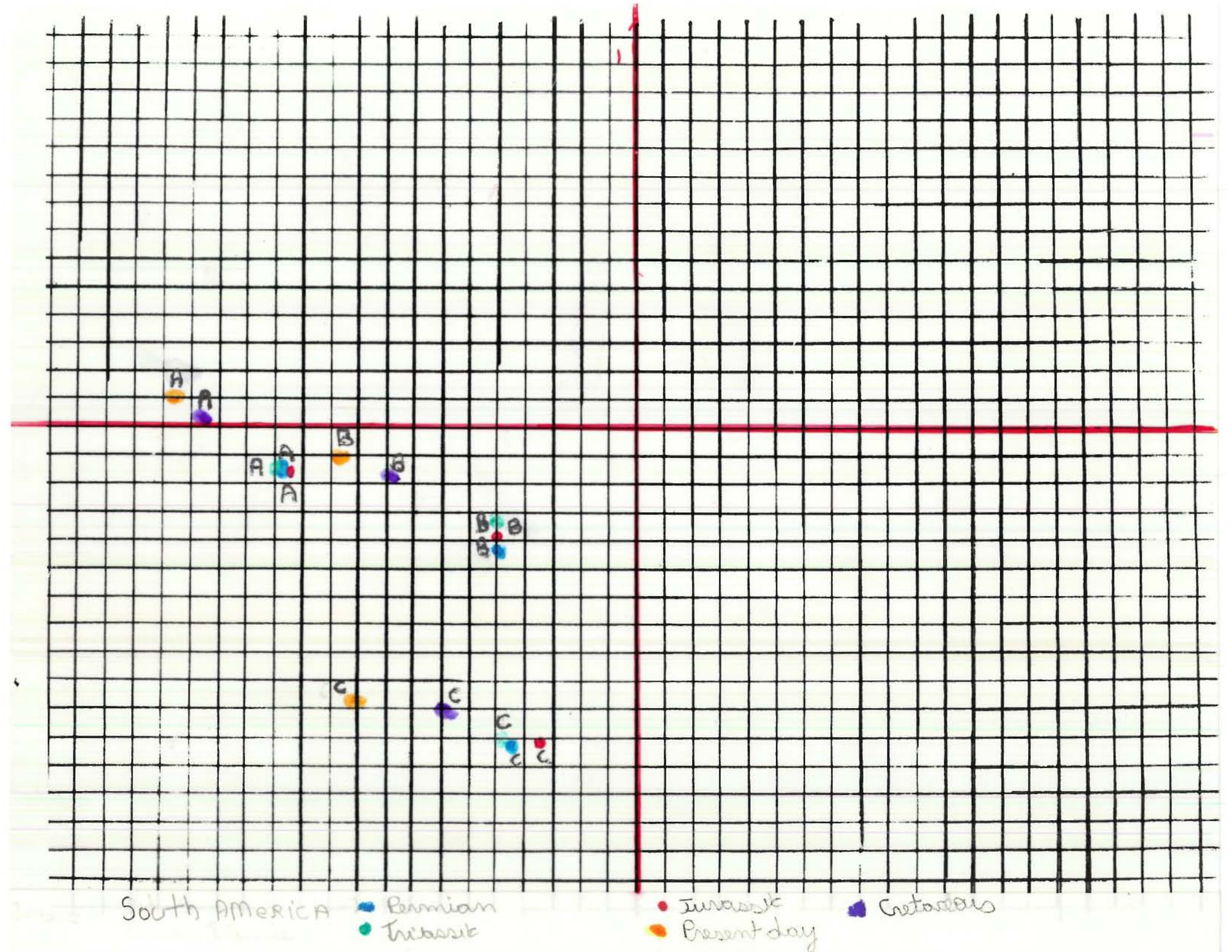
A to A: 1in x 2,410.24mi/in= 2,410.24mi
B to B: 1 1/16in x 2,410.24mi/in= 2,560.88mi
C to C: 14/16 in x 2,410.24mi/in= 2,108.96mi

Distance of movement from the 2 Dimensional Cretaceous Map to Present Day Map

A to A: 6/16in
B to B: 8/16in = 1/2in
C to C: 14/16in

Distance of movement converted to miles in reality

A to A: 6/16in x 2,410.24mi/in= 903.84mi
B to B: 8/16in x 2,410.24mi/in= 1,205.12mi
C to C: 14/16 in x 2,410.24mi/in= 2,108.96mi


A
A
A
A
A
B
B
B
B
B
C
C
C
C
C
South America
Permian
Triassic
Jurassic
Present day
Cretaceous

Translation of Eur/Asia Land Mass

Distance of movement from the 2 Dimensional Permian Map to Triassic Map

A to A: 11/16in
B to B: 1 7/16in
C to C: 4/16in = 1/4in
D to D: 6/16

X = 2,410.24

Ex: $\frac{11}{16}$ in. * X = miles in reality

$\frac{11 \text{ in.}}{16} * \frac{2{,}410.24 \text{ mi.}}{\text{in.}} = R$

1,657.04 mi. = R

Distance of movement converted to miles in reality

A to A: 11/16in x 2,410.24mi/in=1,657.04mi
B to B: 1 7/16in x 2,410.24mi/in= 3,464.72mi
C to C: 4/16in x 2,410.24mi/in= 602.56mi
D to D: 6/16in x 2,410.24mi/in= 903.84mi

Distance of movement from the 2 Dimensional Triassic Map to Jurassic Map

A to A: 7/16in
B to B: 8/16in = 1/2in
C to C: 11/16in
D to D: 8/16in = 1/2in

Distance of movement converted to miles in reality

A to A: 7/16in x 2,410.24mi/in= 1,054.48mi
B to B: 8/16in x 2,410.24mi/in= 1,205.12mi
C to C: 11/16in x 2,410.24mi/in= 1,657.04mi
D to D: 8/16in x 2,410.24mi/in= 1,205.12mi

Distance of movement from the 2 Dimensional Jurassic Map to Cretaceous Map

A to A: 10/16in = 5/8in
B to B: 1/16in
C to C: 11/16in
D to D: 10/16in = 5/8in

Distance of movement converted to miles in reality

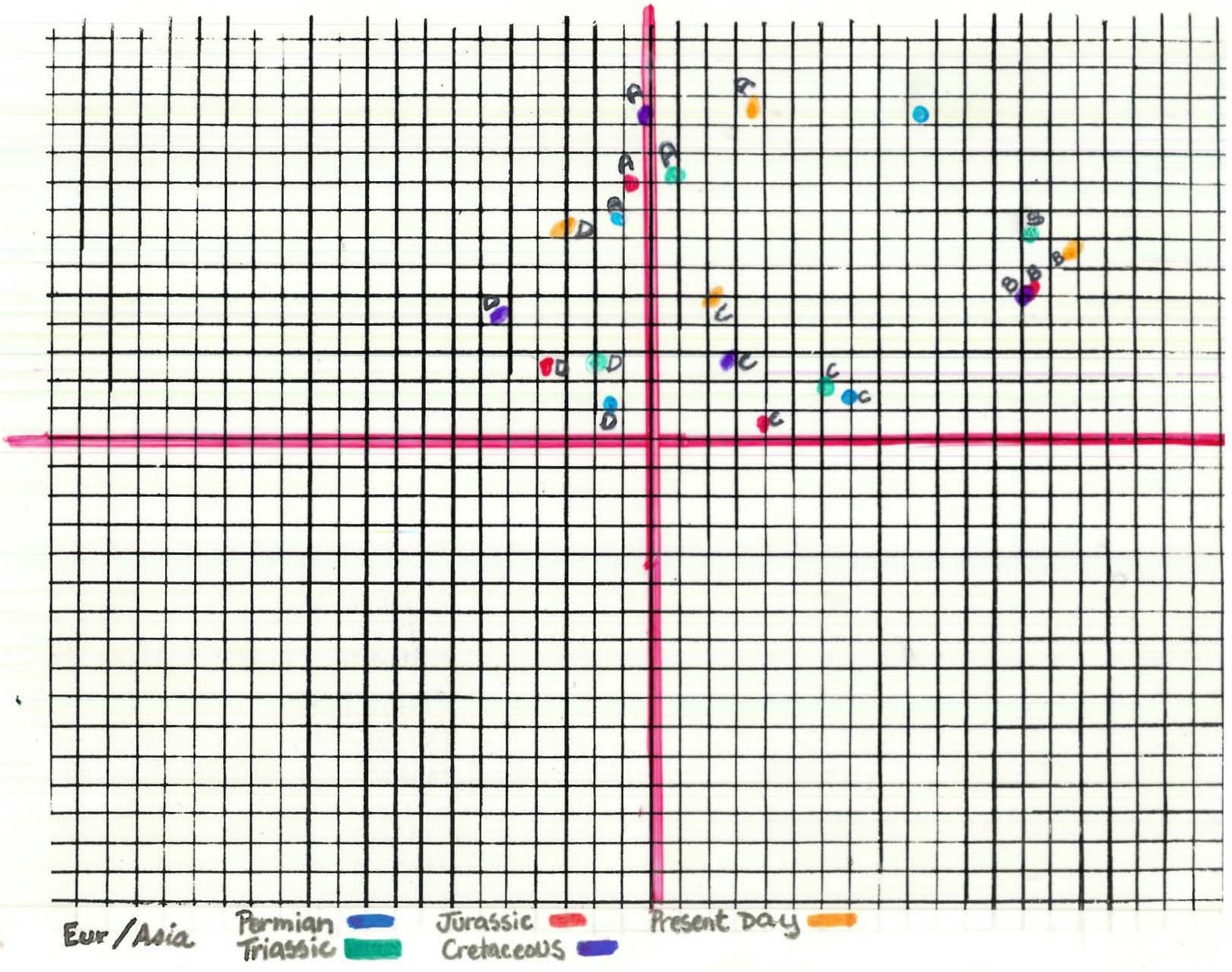
A to A: 10/16in x 2,410.24mi/in= 1,506.4mi
B to B: 1/16in x 2,410.24mi/in= 150.64mi
C to C: 11/16 in x 2,410.24mi/in= 1657.04mi
D to D: 10/16in x 2,410.24mi/in= 1,506.4mi

Distance of movement from the 2 Dimensional Cretaceous Map to Present Day Map

A to A: 1in
B to B: 11/16in
C to C: 9/16in
D to D: 1in

Distance of movement converted to miles in reality

A to A: 1in x 2,410.24mi/in= 2,410.24mi
B to B: 11/16in x 2,410.24mi/in= 1,657.04mi
C to C: 9/16in x 2,410.24mi/in= 1,355.76mi
D to D: 1in x 2,410.24mi/in= 2,410.24mi


Eur / Asia
Permian
Triassic
Jurassic
Cretaceous
Present Day

Translation of Africa Land Mass

Distance of movement from the 2 Dimensional Permian Map to Triassic Map

A to A: 15/16in
B to B: 12/16in
C to C: 14/16in

X = 2,410.24

Ex: $\frac{15}{16}$ in. * X = miles in reality

$\frac{15}{16}$ in. * $\frac{2,410.24 \text{ mi.}}{\text{in.}}$ = R

2,259.6 mi. = R

Distance of movement converted to miles in reality

A to A: 15/16in x 2,410.24mi/in = 2,259.6mi
B to B: 12/16in x 2,410.24mi/in = 1,807.68mi
C to C: 14/16in x 2,410.24mi/in = 2,108.96mi

Distance of movement from the 2 Dimensional Triassic Map to Jurassic Map

A to A: 7/16in
B to B: 5/16in
C to C: 7/16in

Distance of movement converted to miles in reality

A to A: 7/16in x 2,410.24mi/in = 1,054.48mi
B to B: 5/16in x 2,410.24mi/in = 753.2mi
C to C: 7/16in x 2,410.24mi/in = 1,054.48mi

Distance of movement from the 2 Dimensional Jurassic Map to Cretaceous Map

A to A: 9/16in
B to B: 1 10/16in
C to C: 1in

Distance of movement converted to miles in reality

A to A: 9/16~~in~~ x 2,410.24mi/~~in~~= 1,355.76mi
B to B: 1 10/16~~in~~ x 2,410.24mi/~~in~~= 3,916.64mi
C to C: 1~~in~~ x 2,410.24mi/~~in~~= 2,410.24mi

Distance of movement from the 2 Dimensional Cretaceous Map to Present Day Map

A to A: 1 4/16in
B to B: 1in
C to C: 11/16in

Distance of movement converted to miles in reality

A to A: 1 4/16~~in~~ x 2,410.24mi/~~in~~= 3012.8mi
B to B: 1~~in~~ x 2,410.24mi/~~in~~= 2,410.24mi
C to C: 11/16 ~~in~~ x 2,410.24mi/~~in~~= 1,657.04mi

Present Day-
Jurassic-
Cretaceous-
Permian-
Triassic-
Africa

Translation of India Land Mass

Distance of movement from the 2 Dimensional Permian Map to Triassic Map

A to A: 2/16in = 1/8in
B to B: 3/16in
C to C: 2/16in = 1/8in

X = 2,410.24

Ex: $\frac{2}{16}$ in. * X = miles in reality

$\frac{2 \text{ in.}}{16} * \frac{2{,}410.24 \text{ mi.}}{\text{in.}} = R$

301.28 mi. = R

Distance of movement converted to miles in reality

A to A: 2/16in x 2,410.24mi/in= 301.28mi
B to B: 3/16in x 2,410.24mi/in= 451.92mi
C to C: 2/16in x 2,410.24mi/in= 301.28mi

Distance of movement from the 2 Dimensional Triassic Map to Jurassic Map

A to A: 1in
B to B: 13/16in
C to C: 14/16in = 7/8in

Distance of movement converted to miles in reality

A to A: 1in x 2,410.24mi/in= 2,410.24mi
B to B: 13/16in x 2,410.24mi/in= 1,958.32mi
C to C: 14/16in x 2,410.24mi/in= 2,108.96mi

Distance of movement from the 2 Dimensional Jurassic Map to Cretaceous Map

A to A: 10/16in = 5/8in
B to B: 9/16in
C to C: 10/16in = 5/8in

Distance of movement converted to miles in reality

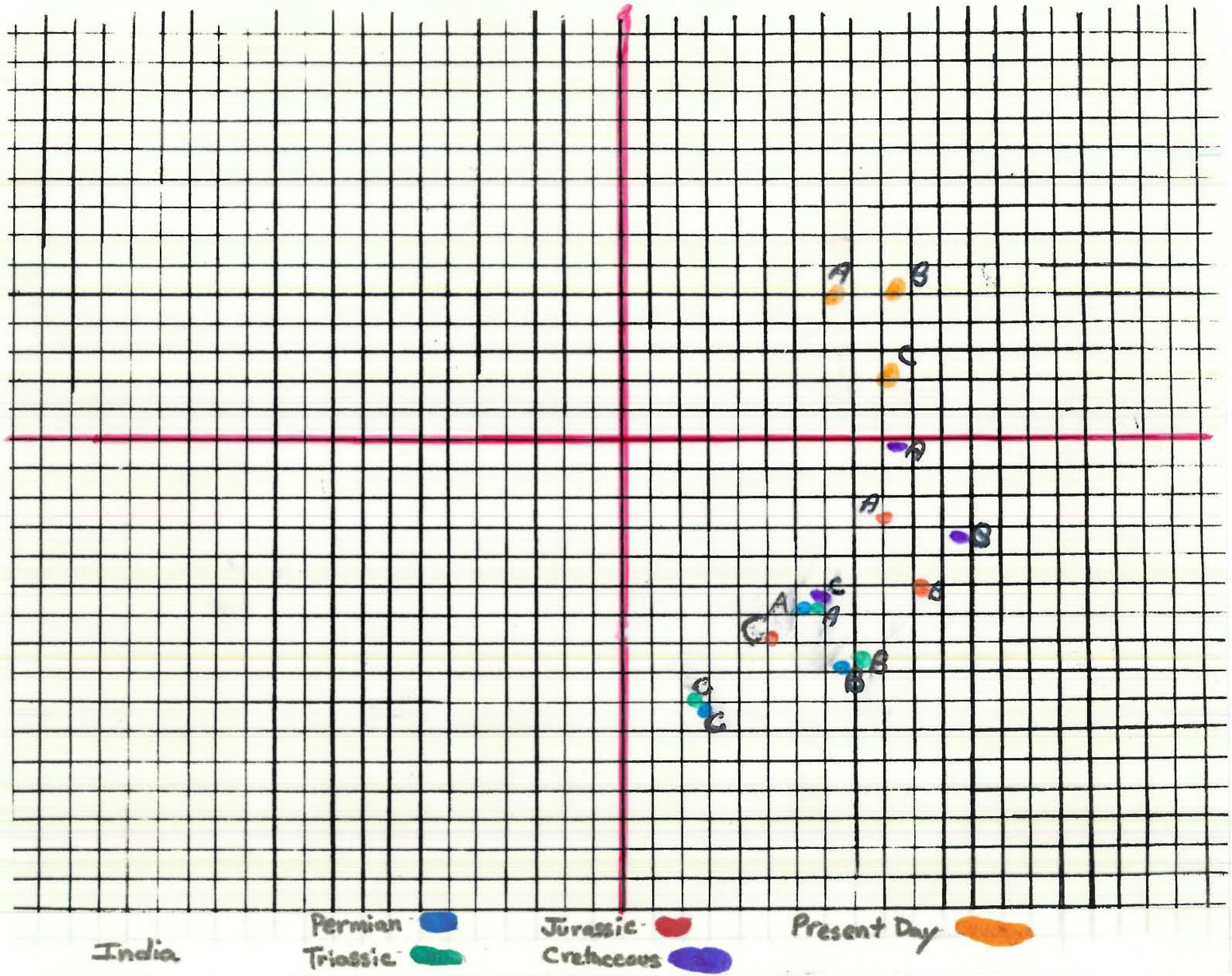
A to A: 10/16in x 2,410.24mi/in= 1,506.4mi
B to B: 9/16in x 2,410.24mi/in= 1,355.76mi
C to C: 10/16 in x 2,410.24mi/in=1,506.4mi

Distance of movement from the 2 Dimensional Cretaceous Map to Present Day Map

A to A: 1 8/16in = 1 1/2in
B to B: 2 4/16in = 2 1/4in
C to C: 2 1/16in

Distance of movement converted to miles in reality

A to A: 1 8/16in x 2,410.24mi/in= 3,615.36mi
B to B: 2 4/16in x 2,410.24mi/in= 5,423.04mi
C to C: 2 1/16in x 2,410.24mi/in= 4,971.12mi


A
B
C
A
B
A
B
C
A
C
B
B
C
Permian
Triassic
Jurassic
Cretaceous
Present Day
India

Translation of Australia Land Mass

Distance of movement from the 2 Dimensional Permian Map to Triassic Map

A to A: 8/16in = 1/2in
B to B: 12/16in = 3/4in
C to C: 2/16in = 1/8in

X = 2,410.24 mi.

Ex: $\frac{8}{16}$ in. * X = miles in reality

$\frac{8 \text{ in.}}{16} * \frac{2{,}410.24 \text{ mi.}}{\text{in.}} = R$

1,205.12 mi. = R

Distance of movement converted to miles in reality

A to A: 8/16~~in~~ x 2,410.24mi/~~in~~= 1,205.12mi
B to B: 12/16~~in~~ x 2,410.24mi/~~in~~= 1,807.68mi
C to C: 2/16~~in~~ x 2,410.24mi/~~in~~= 301.28mi

Distance of movement from the 2 Dimensional Triassic Map to Jurassic Map

A to A: 4/16in = 1/4in
B to B: 4/16in = 1/4in
C to C: 6/16in = 3/8in

Distance of movement converted to miles in reality

A to A: 4/16~~in~~ x 2,410.24mi/~~in~~= 602.56mi
B to B: 4/16~~in~~ x 2,410.24mi/~~in~~= 602.56mi
C to C: 6/16~~in~~ x 2,410.24mi/~~in~~= 903.84mi

Distance of movement from the 2 Dimensional Jurassic Map to Cretaceous Map

A to A: 4/16in = 1/4in
B to B: 2/16in
C to C: 6/16in = 3/8in

Distance of movement converted to miles in reality

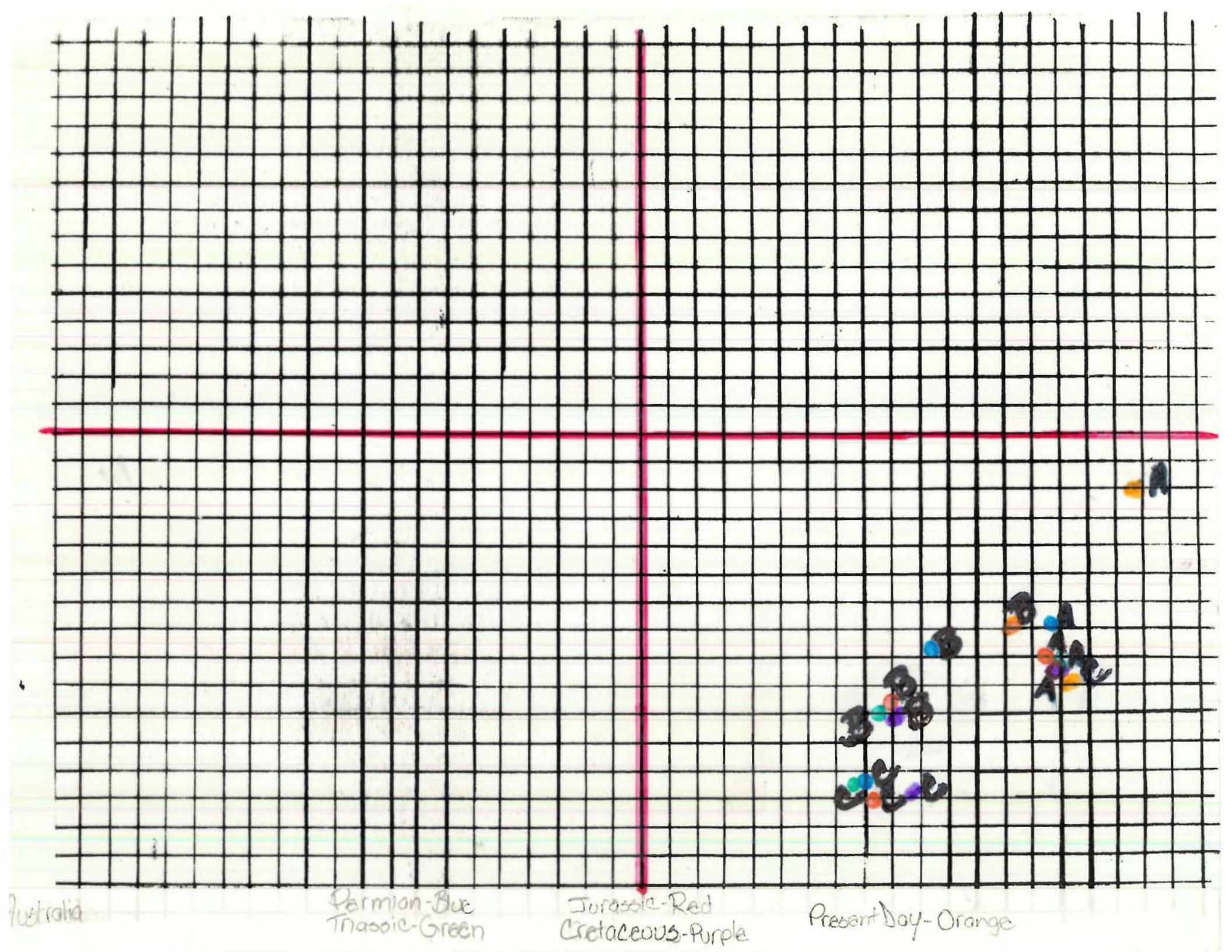
A to A: 4/16in x 2,410.24mi/in= 602.56 mi
B to B: 3/16in x 2,410.24mi/in= 451.92mi
C to C: 6/16 in x 2,410.24mi/in= 903.84mi

Distance of movement from the 2 Dimensional Cretaceous Map to Present Day Map

A to A: 1 12/6in = 1 3/4in
B to B: 1 4/16in = 1 1/4in
C to C: 1 12/16in = 1 3/4in

Distance of movement converted to miles in reality

A to A: 1 12/16in x 2,410.24mi/in= 4,217.92mi
B to B: 1 4/16in x 2,410.24mi/in= 3,012.8mi
C to C: 1 12/16in x 2,410.24mi/in= 4,217.92mi


Australia
Permian-Blue
Triassic-Green
Jurassic-Red
Cretaceous-Purple
Present Day-Orange

Translation of Antarctica Land Mass

Distance of movement from the 2 Dimensional Permian Map to Triassic Map

A to A: 2/16in = 1/8in
B to B: 5/16in
C to C: 2/16in = 1/8in

X = 2,410.24

Ex: $\frac{2}{16}$ in. * X = miles in reality

$\frac{2 \text{ in.}}{16} * \frac{2{,}410.24 \text{ mi.}}{\text{in.}} = R$

301.28 mi. = R

Distance of movement converted to miles in reality

A to A: 2/16~~in~~ x 2,410.24mi/~~in~~=301.28mi
B to B: 5/16~~in~~ x 2,410.24mi/~~in~~= 753.2mi
C to C: 2/16~~in~~ x 2,410.24mi/~~in~~= 301.28mi

Distance of movement from the 2 Dimensional Triassic Map to Jurassic Map

A to A: 5/16in
B to B: 9/16in
C to C: 4/16in = 1/4in

Distance of movement converted to miles in reality

A to A: 5/16~~in~~ x 2,410.24mi/~~in~~= 753.2mi
B to B: 9/16~~in~~ x 2,410.24mi/~~in~~= 1,355.76mi
C to C: 4/16~~in~~ x 2,410.24mi/~~in~~= 602.56mi

Distance of movement from the 2 Dimensional Jurassic Map to Cretaceous Map

A to A: 12/16in = 3/4in
B to B: 2/16in = 1/8in
C to C: 3/16in

Distance of movement converted to miles in reality

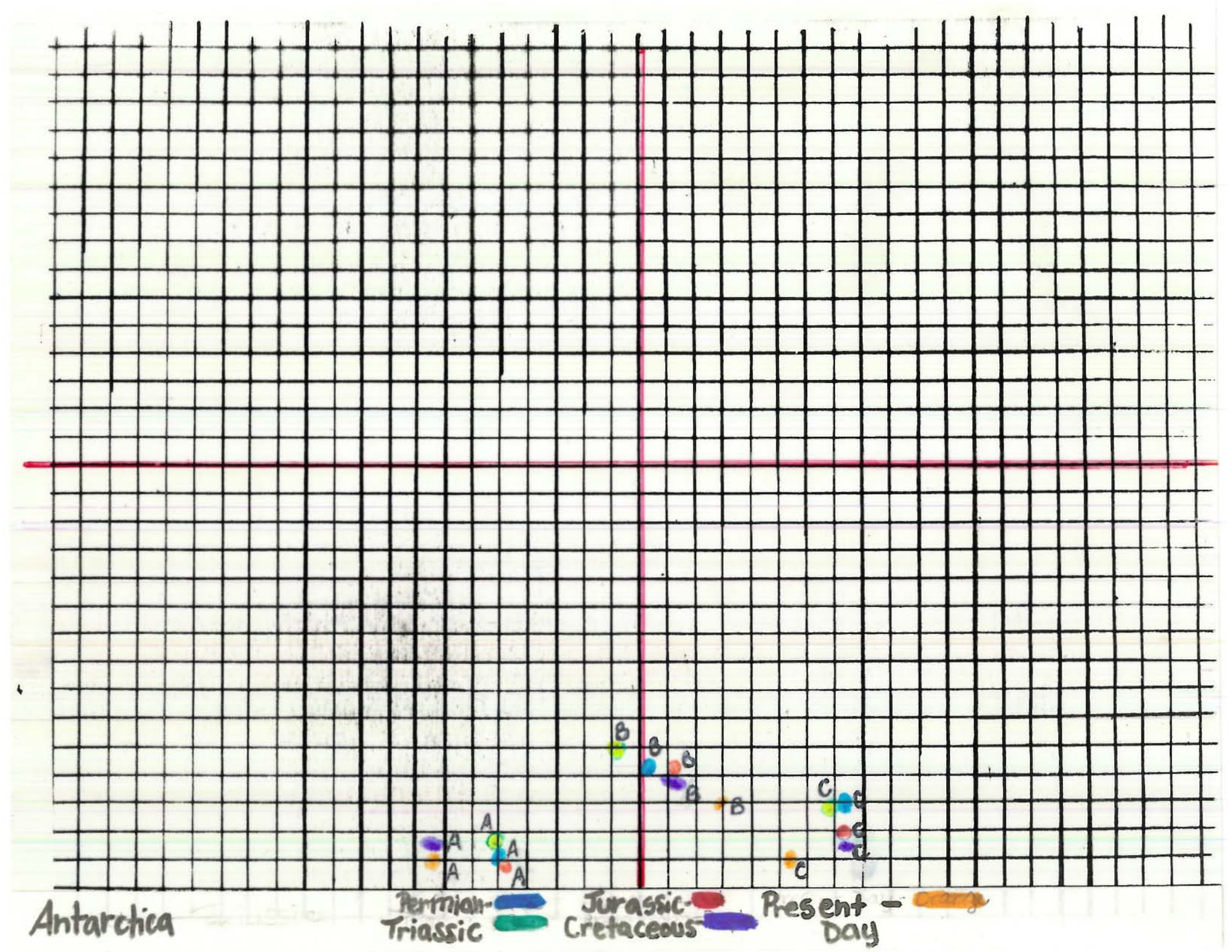
A to A: 12/16in x 2,410.24mi/in= 1,807.68mi
B to B: 2/16in x 2,410.24mi/in= 301.28mi
C to C: 8/16 in x 2,410.24mi/in= 451.92mi

Distance of movement from the 2 Dimensional Cretaceous Map to Present Day Map

A to A: 2/16in = 1/8in
B to B: 8/16in = 1/2in
C to C: 9/16in

Distance of movement converted to miles in reality

A to A: 2/16in x 2,410.24mi/in= 301.28mi
B to B: 8/16in x 2,410.24mi/in= 1,205.12mi
C to C9/16in x 2,410.24mi/in= 1.355.76mi


A
A
A
A
A
B
B
B
B
B
C
C
C
C
C
Antarctica
Permian-Triassic
Jurassic-Cretaceous
Present Day

North America

X and Y Coordinates

Permian Time Period to Triassic Time Period

A. (-9, -1)
B. (-8, 6.5)
C. (-2.5, 7.5)

A. (-9, 1.5)
B. (-7, 9.5)
C. (-1, 7.75)

Triassic Time Period to Jurassic Time Period

A. (-9, 1.5)
B. (-7, 9.5)
C. (-1, 7.75)

A. (-11, 3)
B. (-6.5, 11)
C. (-2, 8.75)

Jurassic Time Period to Cretaceous Time Period

A. (-11, 3)
B. (-6.5, 11)
C. (-2, 8.75)

A. (–14.25, 4)
B. (-11.5, 12)
C. (-2.5, 10.5)

Cretaceous Time Period to Present Day Time Period

A. (–14.25, 4)
B. (-11.5, 12)
C. (-2.5, 10.5)

A. (-15, 5.5)
B. (-14, 12)
C. (-10, 10)

Slopes

Permian Time Period to Triassic Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{1.5 - -1}{-9 - -9} = \frac{2.5}{0} =$ undefined

B $S = \frac{9.5 - 6.5}{-7 - -8} = \frac{3}{1} = 3$

C. $S = \frac{7.75 - 7.5}{-1 - -2.5} = \frac{.25}{1.5} = .16$

Triassic Time Period to Jurassic Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{3 - 1.5}{-11 - 9} = \frac{1.5}{-2} = \frac{-3}{4}$

B. $S = \frac{11 - 9.5}{-6.5 - -7} = \frac{1.5}{.5} = 3$

C. $S = \frac{8.75 - 7.75}{-2 - -1} = \frac{1}{-1} = -1$

Slopes

Jurassic Time Period to Cretaceous Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{4 - 3}{-14.25 - -11} = \frac{1}{-3.25} = -4$

B. $S = \frac{12 - 11}{-11.5 - -6.25} = \frac{1}{-5.25} = -4$

C. $S = \frac{10.5 - 8.75}{-2.5 - -2} = \frac{1.75}{-.5} = -3.5$

Cretaceous Time Period to Present Day Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{5.5 - 4}{-15 - -14.25} = \frac{1.5}{-.75} = -2$

B. $S = \frac{12 - 12}{-14 - -11.5} = \frac{0}{-2.5} = 0$

C. $S = \frac{10 - -10.5}{-10 - -2.5} = \frac{-.5}{-7.5} = \frac{1}{15}$

Future North America

South America

X and Y Coordinates

Permian Time Period to Triassic Time Period

A. (-12.25, -1.5)
B. (-5, -4.25)
C. (-4.5, -11.25)

A. (-13, -1.5)
B. (-5, -3.25)
C. (-4.75, -11)

Triassic Time Period to Jurassic Time Period

A. (-13, -1.5)
B. (-5, -3.25)
C. (-4.75, -11)

A. (-12.5, -1.5)
B. (-5, -4)
C. (-3.5, -11.25)

Jurassic Time Period to Cretaceous Time Period

A. (-12.5, -1.5)
B. (-5, -4)
C. (-3.5, -11.25)

A. (-15.75, .25)
B. (-9, -1.75)
C. (-7, -10)

Cretaceous Time Period to Present Day Time Period

A. (-15.75, .25)
B. (-9, 1.75)
C. (-7, -10)

A. (-16.5, 1)
B. (-10.75, -1)
C. (-10, -9.75)

Slopes

Permian Time Period to Triassic Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{-1.5 - -1.5}{-13 - -12.5} = \frac{0}{-.75} = 0$

B. $S = \frac{-3.25 - -4.25}{-5 - -5} = \frac{1}{0} = \text{undefined}$

C. $S = \frac{-11 - -11.25}{-4.75 - -4.5} = \frac{.25}{-.25} = -1$

Triassic Time Period to Jurassic Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{-1.5 - -1.5}{-12.5 - -13} = \frac{0}{.5} = 0$

B. $S = \frac{-4 - -3.25}{-5 - -5} = \frac{-.75}{0} = \text{undefined}$

C. $S = \frac{-11.25 - -11}{-3.5 - -4.75} = \frac{-1.25}{1.25} = -1$

Slopes

Jurassic Time Period to Cretaceous Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{.25 - -1.5}{-15.75 - -12.5} = \frac{-1.75}{-3.25} = \frac{-7}{13}$

B. $S = \frac{-1.75 - -4}{-9 - -5} = \frac{-2.25}{-4} = 5\,\frac{5}{8}$

C. $S = \frac{-10 - -11.25}{-7 - -3.5} = \frac{1.25}{-3.5} = \frac{-5}{14}$

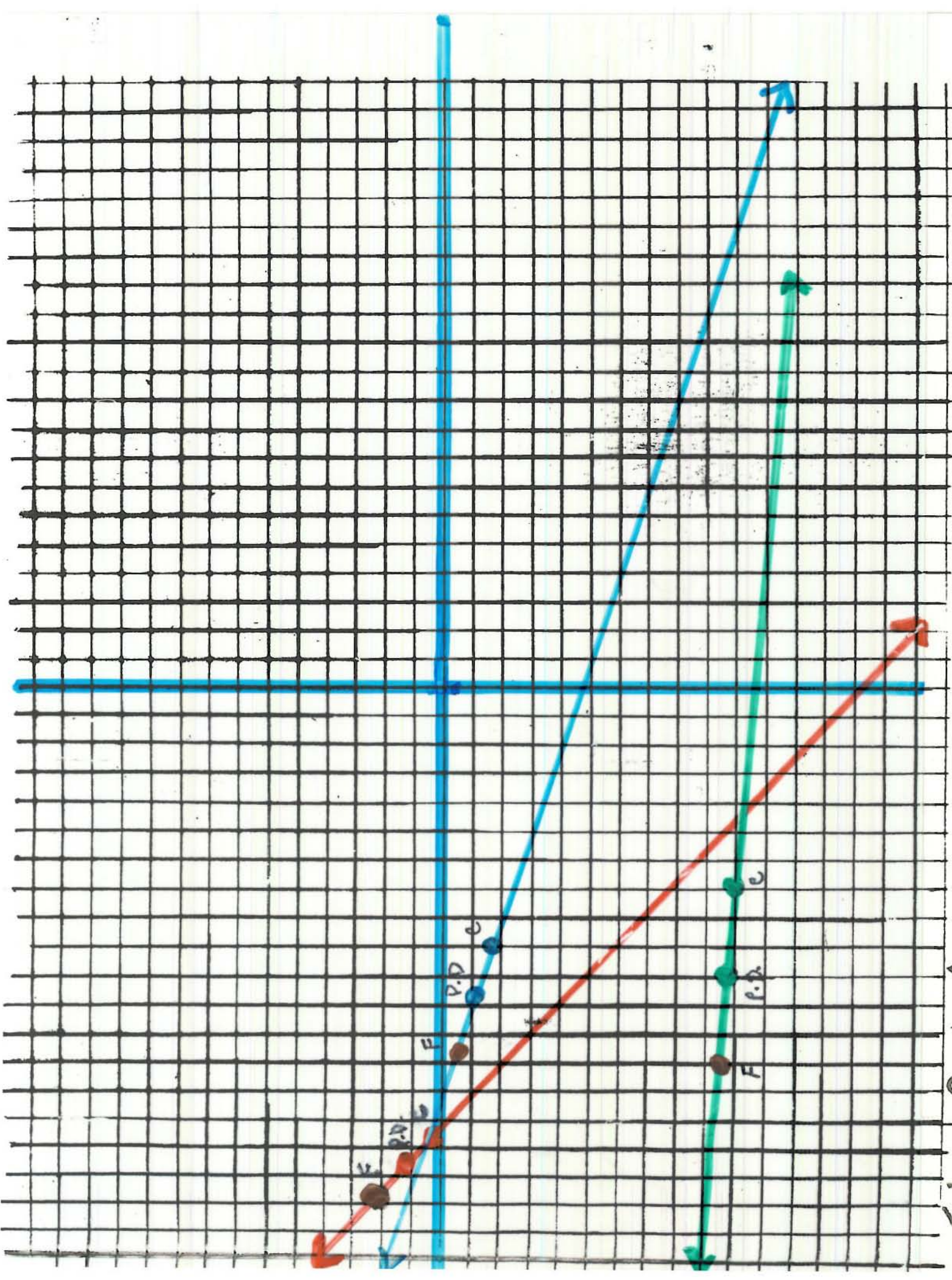
Cretaceous Time Period to Present Day Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{1 - .25}{-16.5 - -15.75} = \frac{.75}{-.75} = -1$

B. $S = \frac{-1 - -1.75}{-10.75 - -9} = \frac{.75}{-1.75}$

C. $S = \frac{-9.75 - -10}{-10 - -7} = \frac{.25}{-3}$


P.D
P.D
P.D
E
F
Future South America

Eur/Asia

X and Y Coordinates

Permian Time Period to Triassic Time Period

A. (-1.25, 7.75)
B. (9.5, 11.5)
C. (7, 1.5)
D. (-1.5, 1.25)

A. (1, 9.25)
B. (13.25, 7.25)
C. (6, 1.75)
D. (-2, 2.75)

Triassic Time Period to Jurassic Time Period

A. (1, 9.25)
B. (13.25, 7.25)
C. (6, 1.75)
D. (-2, 2.75)

A. (-.75, 9)
B. (13.25, 5)
C. (4, .50)
D. (-3.75, 2.5)

Jurassic Time Period to Cretaceous Time Period

A. (-.75, 9)
B. (13.25, 5)
C. (4, .50)
D. (-3.75, 2.5)

A. (-.25, 11.25)
B. (13, 5)
C. (2.75, 2.75)
D. (-5.25, 4.25)

Cretaceous Time Period to Present Day Time Period

A. (-.25, 11.25)
B. (13, 5)
C. (2.75, 2.75)
D. (-5.25, 4.25)

A. (3.5, 11.5)
B. (14.75, 6.75)
C. (2.25, 5)
D. (3, 7.25)

Slopes

Permian Time Period to Triassic Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{9.25 - 7.75}{1 - -1.25} = \frac{1.5}{2.25}$

B. $S = \frac{7.75 - 11.5}{13.25 - 9.50} = \frac{-4.25}{3.75}$

C. $S = \frac{1.75 - 1.5}{6 - 7} = \frac{.25}{-1}$

D. $S = \frac{2.75 - 1.25}{-2 - -1.5} = \frac{1.5}{-.5}$

Triassic Time Period to Jurassic Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{9 - 9.25}{-.75 - 1} = \frac{-.25}{-1.75}$

B. $S = \frac{5 - 7.25}{13.25 - 13.25} = \frac{-2.25}{0}$ = undefined

C. $S = \frac{.5 - 1.75}{4 - 6} = \frac{-1.25}{-2}$

D. $S = \frac{2.5 - 2.75}{-3.75 - -2} = \frac{-.25}{-1.75}$

Slopes

Jurassic Time Period to Cretaceous Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{11.25 - 9}{-.25 - -.75} = \frac{2.25}{.5}$

B. $S = \frac{5 - 5}{13 - 13.25} = \frac{0}{-.25} = 0$

C. $S = \frac{2.75 - .5}{2.75 - 4} = \frac{2.25}{-1.25}$

D. $S = \frac{4.25 - 2.5}{-5.25 - -3.75} = \frac{1.75}{-1.5}$

Cretaceous Time Period to Present Day Time Period

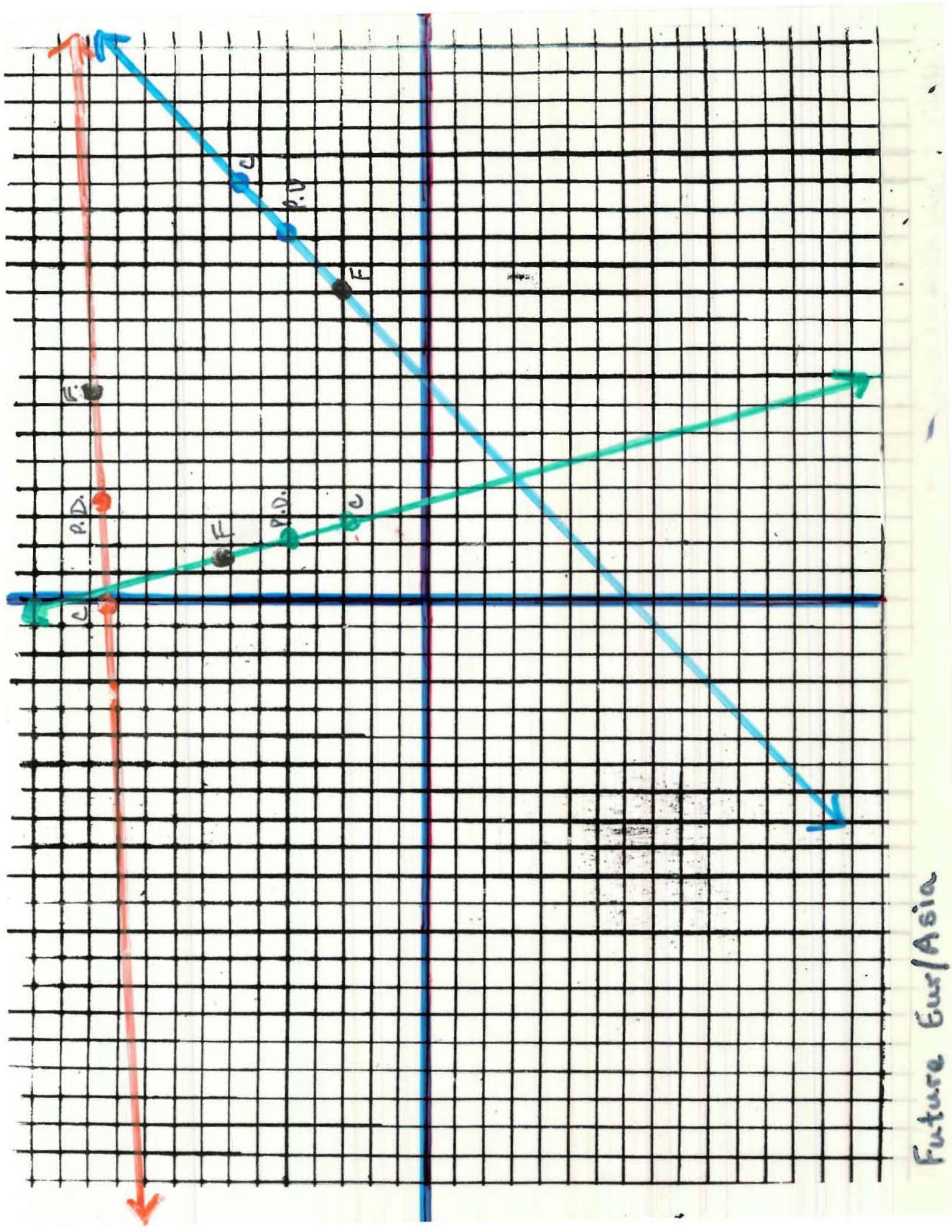
Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{11.5 - 11.25}{3.5 - 2.5} = \frac{.25}{1}$

B. $S = \frac{6.75 - 5}{14.75 - 13} = \frac{1.75}{1.75} = 1$

C. $S = \frac{5 - 2.75}{2.25 - 2.75} = \frac{2.25}{-.5}$

D. $S = \frac{7.25 - 4.25}{3 - -5.25} = \frac{3}{8.25}$



Future Eur/Asia

Africa

X and Y Coordinates

Permian Time Period to Triassic Time Period

A. (-1.2, -10.9)
B. (-.5, -1.2)
C. (5.9, -4.2)

A. (-4, -10)
B. (-1.2, 1)
C. (4.75, -1.75)

Triassic Time Period to Jurassic Time Period

A. (-4, -10)
B. (-1.2, 1)
C. (4.7, -4.7)

A. (-2.9, -10)
B. (-1, .5)
C. (4, -3)

Jurassic Time Period to Cretaceous Time Period

A. (-2.9, -10)
B. (-1, .5)
C. (4, -3)

A. (-1.5, -9)
B. (-7, .5)
C. (5.25, .5)

Cretaceous Time Period to Present Day Time Period

A. (-1.5, -9)
B. (-7, .5)
C. (5.25, .5)

A. (.9, -5.2)
B. (-6.2, 4)
C. (3.2, 1.2)

Slopes

Permian Time Period to Triassic Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2-y_1}{x_2-x_1}$

A. $S = \frac{-10- -10.9}{-4- -1.2} = \frac{.9}{-2.8}$

B. $S = \frac{1- -1.2}{-1.2- -.5} = \frac{2.2}{-.7} = -3\frac{1}{7}$

C. $S = \frac{-1.75 - -4.2}{4.75-5.9} = \frac{2.45}{-1.15} = -2\frac{3}{23}$

Triassic Time Period to Jurassic Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2-y_1}{x_2-x_1}$

A. $S = \frac{-10 - -10}{-2.9 - -4} = \frac{0}{1.1} = 0$

B. $S = \frac{.5 - 1}{-1- -1.2} = \frac{-0.5}{0.2} = -2.5$

C. $S = \frac{-3 - -4.7}{4 - 4.7} = \frac{1.7}{-0.7} = -2\frac{3}{7}$

Slopes

Jurassic Time Period to Cretaceous Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S. = \frac{-9 - -10}{-1.5 - -2.9} = \frac{1}{1.4} = \frac{5}{7}$

B. $S. = \frac{.5 - .5}{-7 - -1} = \frac{0}{-6} = 0$

C. $S. = \frac{.5 - 3}{5.25 - 4} = \frac{-2.5}{1.25} = -2$

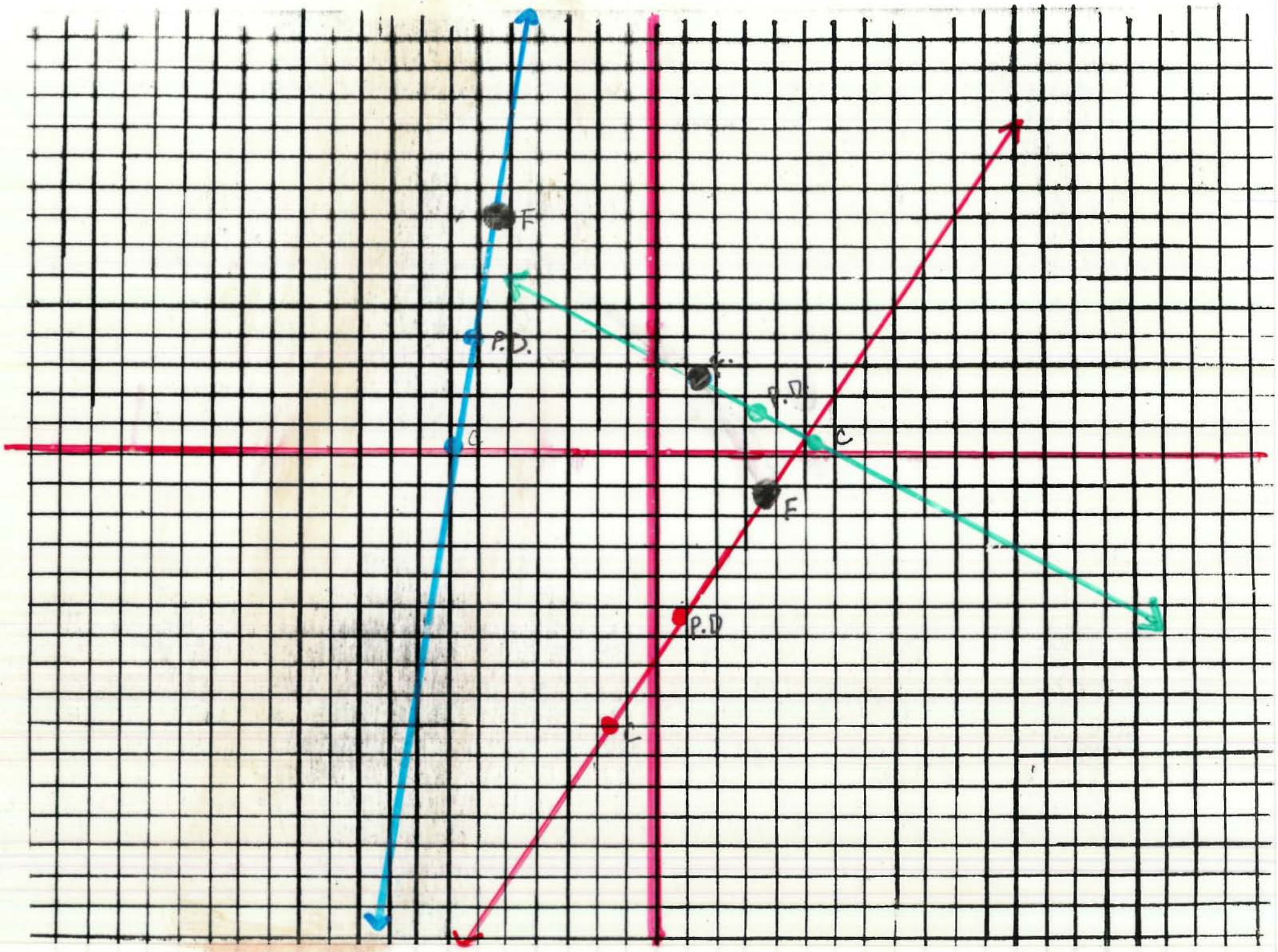
Cretaceous Time Period to Present Day Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2 - y_1}{x_2 - x_1}$

A. $S = \frac{-5.2 - -9}{.9 - -1.5} = \frac{3.8}{2.4} = 1\frac{7}{12}$

B. $S = \frac{4 - .5}{-6.2 - -7} = \frac{3.5}{0.8} = 4\frac{3}{8}$

C. $S = \frac{1.2 - .5}{3.2 - 5.25} = \frac{0.7}{-2.05} = \frac{-14}{41}$



Future Africa

India

X and Y Coordinates

Permian Time Period to Triassic Time Period

A. (6.25, -5.75)
B. (6.5, -7.75)
C. (3, -9.25)

A. (6.75, -5.75)
B. (8.25, -7.5)
C. (2.5, -9)

Triassic Time Period to Jurassic Time Period

A. (6.75, -5.75)
B. (8.25, -7.5)
C. (2.5, -9)

A. (9, -2.75)
B. (10.25, -5)
C. (5, -6.75)

Jurassic Time Period to Cretaceous Time Period

A. (9, -2.75)
B. (10.25, -5)
C. (5, -6.75)

A. (9.5, -.5)
B. (11.5, -3.25)
C. (7, -5.5)

Cretaceous Time Period to Present Day Time Period

A. (9.5, -.5)
B. (11.5, -3.25)
C. (7, -5.5)

A. (7.5, 5)
B. (9.5, 5)
C. (9.25, 2)

Slopes

Permian Time Period to Triassic Time Period

Slope: $\frac{\text{vertical change} = y_2 - y_1}{\text{horizontal change } x_2 - x_1}$

A. $S = \frac{-5.75 - -5.75}{6.75 - 6.25} = \frac{0}{.5} = 0$

B. $S = \frac{-7.5 - -7.75}{8.25 - 6.5} = \frac{.25}{2.25} = .11$

C. $S = \frac{-9 - -9.25}{2.5 - 3} = \frac{.25}{-.5} = -.5$

Triassic Time Period to Jurassic Time period

Slope: $\frac{\text{vertical change} = y_2 - y_1}{\text{horizontal change } x_2 - x_1}$

A. $S = \frac{-2.75 - -5.75}{9 - 6.75} = \frac{3}{2.25} = 1.33$

B. $S = \frac{5 - -7.5}{10.25 - 8.25} = \frac{2.5}{2} = 1.25$

C. $S = \frac{-6.75 - -9}{5 - 2.5} = \frac{2.25}{2.5} = .9$

Slopes

Jurassic Time Period to Cretaceous Time Period

Slope: $\frac{\text{vertical change} = y_2 - y_1}{\text{horizontal change } x_2 - x_1}$

A. $S = \frac{-.5 - -2.75}{9.5 - 9} = \frac{2.25}{.5} = 4.5$

B. $S = \frac{-3.25 - -5}{11.5 - 10.25} = \frac{1.75}{1.25} = 1.4$

C. $S = \frac{-5.5 - -6.75}{7 - 5} = \frac{1.25}{2} = .625$

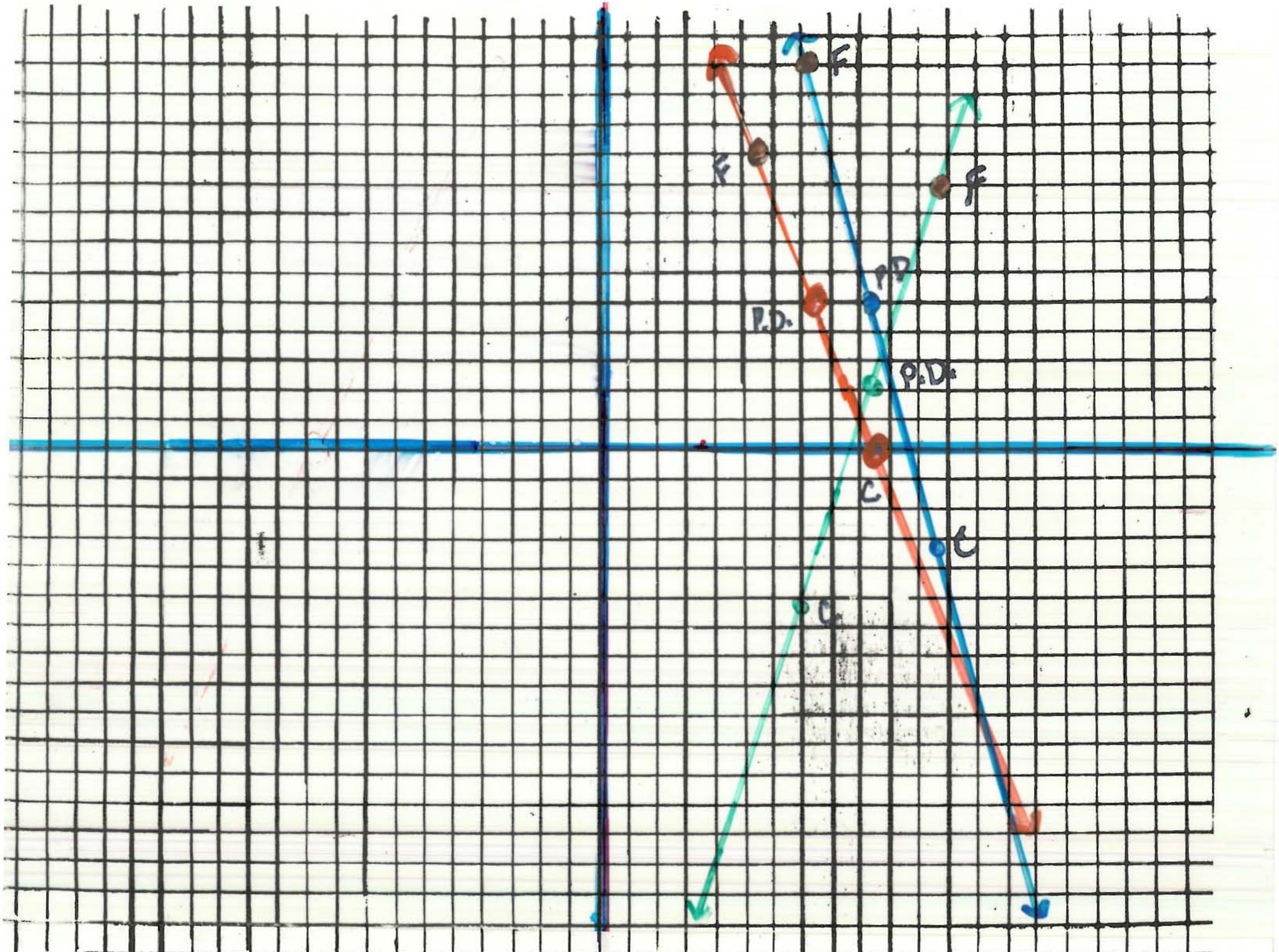
Cretaceous Time Period to Present Day Time Period

Slope: $\frac{\text{vertical change} = y_2 - y_1}{\text{horizontal change } x_2 - x_1}$

A. $S = \frac{5 - -.5}{7.5 - 9.5} = \frac{5.5}{-2} = -2.75$

B. $S = \frac{5 - -3.25}{9.5 - 11.5} = \frac{8.5}{-2} = -4.25$

C. $S = \frac{2 - -5.5}{9.25 - 7} = \frac{7.5}{2.25} = 3.33$



Future India

Slopes

Jurassic Time Period to Cretaceous Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2-y_1}{x_2-x_1}$

A. $S = \frac{-8.5 - -8}{15 - 14.5} = \frac{-.5}{.5} = -1$

B. $S = \frac{-10 - -9.8}{9 - 9} = \frac{-.2}{0} =$ undefined

C. $S = \frac{-12.8 - -13}{9.7 - 8.1} = \frac{.2}{1.6} = \frac{1}{8}$

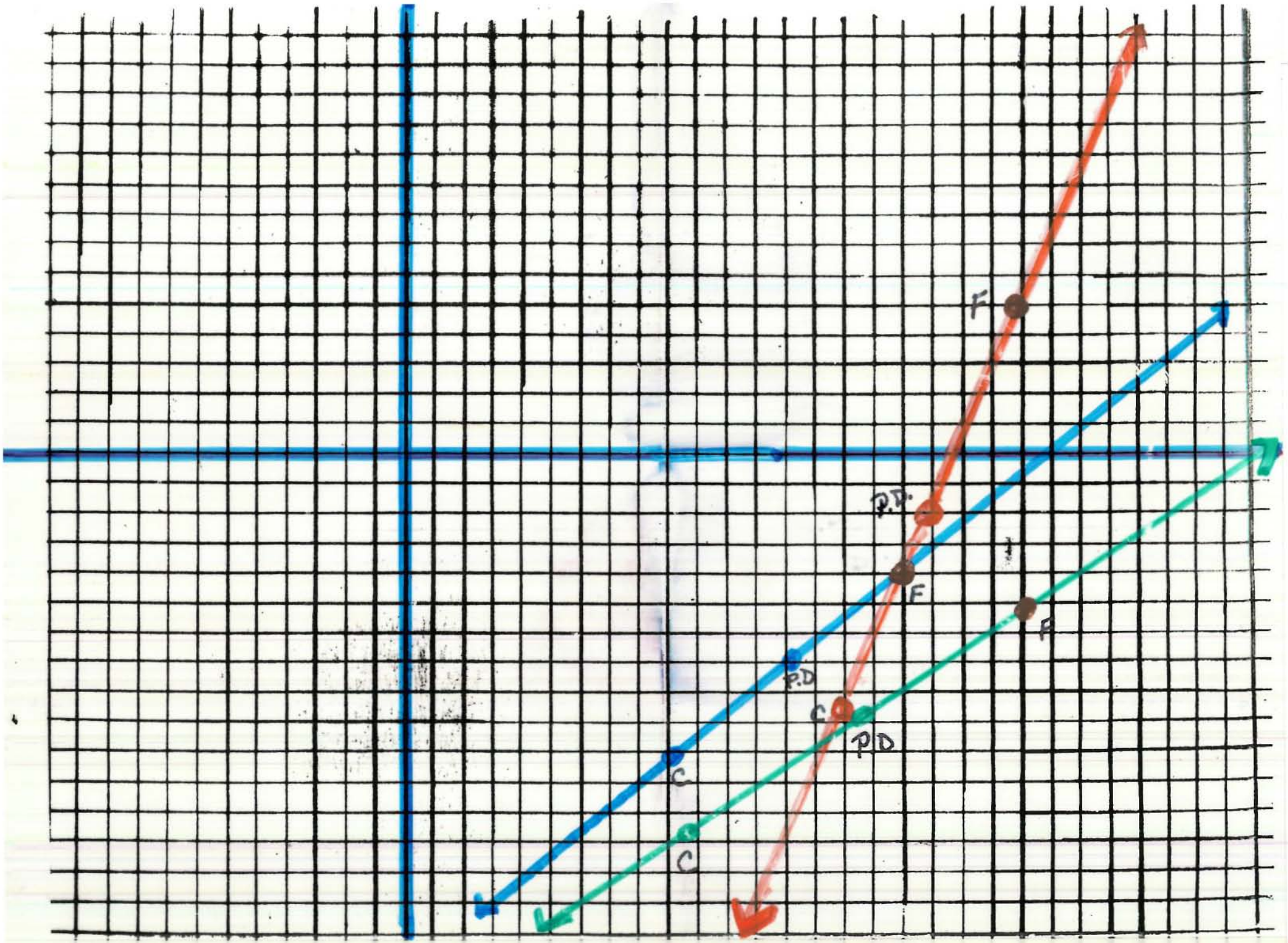
Cretaceous Time Period to Present Day Time Period

Slope: $\frac{\text{vertical change}}{\text{horizontal change}} = \frac{y_2-y_1}{x_2-x_1}$

A. $S = \frac{-.2 - -8.5}{17 - 15} = \frac{8.3}{2} = 4.15$

B. $S = \frac{-6.9 - -10}{13 - 9} = \frac{3.1}{4} = .775$

C. $S = \frac{-11 - -12.8}{15 - 9.7} = \frac{.2}{5.3} = \frac{2}{53}$



Future Australia

Antarctica

X and Y Coordinates

Permian Time Period to Triassic Time Period

A. (-5, -14)
B. (.25, -10.75)
C. (7.25, -12)

A. (-5, -13.25)
B. (-.75, -10)
C. (6.75, -12.25)

Triassic Time Period to Jurassic Time Period

A. (-5, -13.25)
B. (-.75, -10)
C. (6.75, -12.25)

A. (-4.75, -14.25)
B. (1.25, -10.75)
C. (7.25, -13)

Jurassic Time Period to Cretaceous Time Period

A. (-4.75, -14.25)
B. (1.25, -10.75)
C. (7.25, -13)

A. (-7.5, -13.5)
B. (1.25, -11.25)
C. (7.5, -13.5)

Cretaceous Time Period to Present Day Time Period

A. (-7.5, -13.5)
B. (1.25, -11.25)
C. (7.5, -13.5)

A. (-7.5, -14)
B. (3, -12)
C. (5.5, -14)

Slopes

Permian Time Period to Triassic Time Period

Slope: $\frac{\text{vertical change} = y_2 - y_1}{\text{horizontal change } x_2 - x_1}$

A. $S = \frac{-13.25 - -14}{-5 - -5} = \frac{.75}{0} =$ undefined

B. $S = \frac{-10 - -10.75}{-.75 - .25} = \frac{.75}{-1} = -.75$

C. $S = \frac{-12.25 - -12}{6.75 - 7.25} = \frac{-.25}{-.5} = .5$

Triassic Time Period to Jurassic Time Period

Slope: $\frac{\text{vertical change} = y_2 - y_1}{\text{horizontal change } x_2 - x_1}$

A. $S = \frac{-4.75 - -5}{-14.25 - -13.25} = \frac{.25}{-1} = -4$

B. $S = \frac{-10.75 - -10}{1.25 - -.75} = \frac{-0.75}{2} = -0.375$

C. $S = \frac{-13 - -12.25}{7.25 - 6.75} = \frac{1.7}{.5} = -1.5$

Slopes

Jurassic Time Period to Cretaceous Time Period

Slope: $\frac{\text{vertical change} = y_2 - y_1}{\text{horizontal change } x_2 - x_1}$

A. $S = \frac{-13.5 - -14.25}{-7.5 - -4.75} = \frac{.75}{-2.75} = -2$

B. $S = \frac{-11.25 - -10.75}{1.25 - 1.25} = \frac{-.5}{0} = \text{undefined}$

C. $S = \frac{-13.5 - -13}{7.5 - 7.25} = \frac{.5}{.25} = 2$

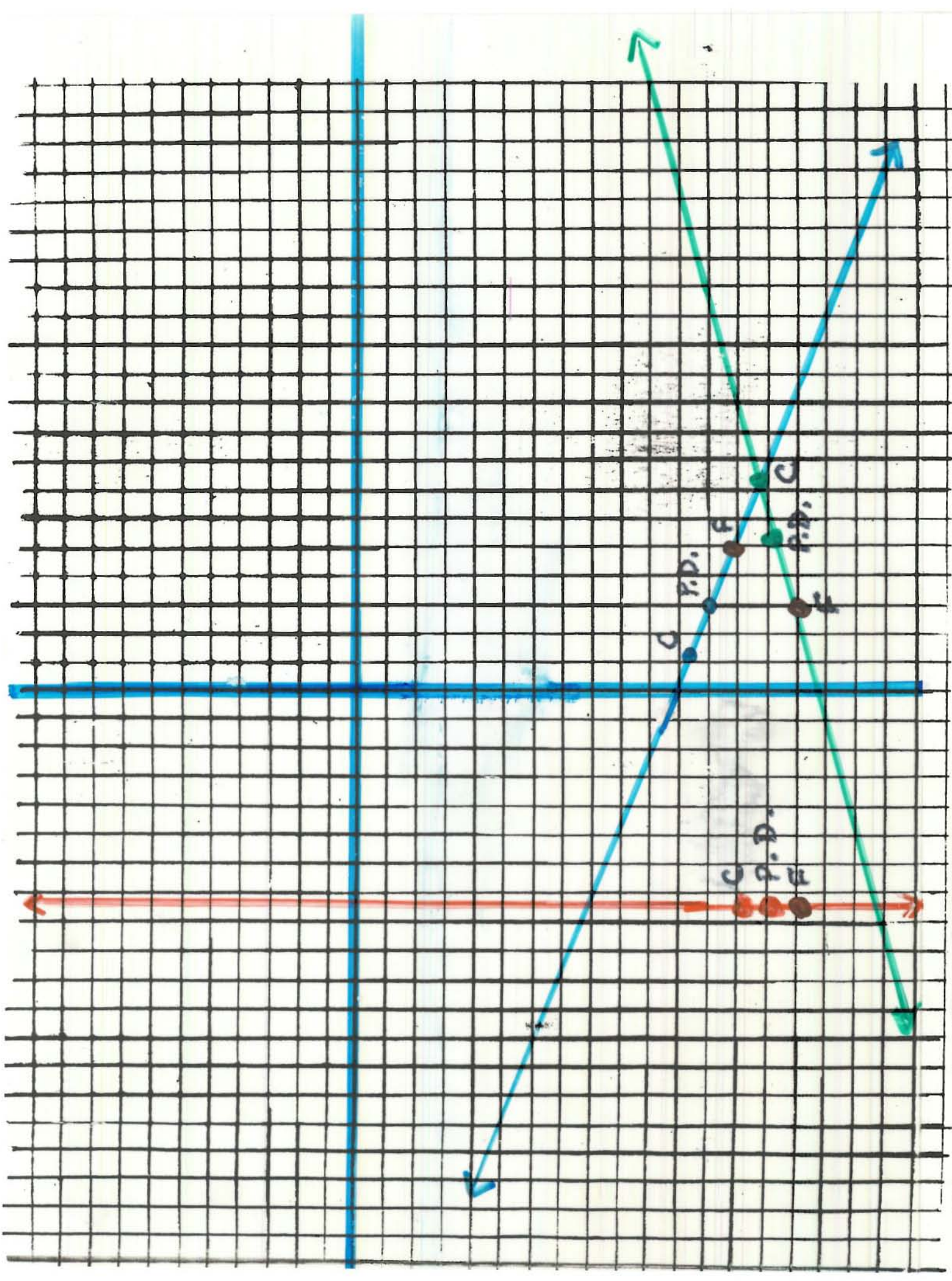
Cretaceous Time Period to Present Day Time Period

Slope: $\frac{\text{vertical change} = y_2 - y_1}{\text{horizontal change } x_2 - x_1}$

A. $S = \frac{-14 - -13.5}{-7.5 - -7.5} = \frac{-.5}{0} = \text{undefined}$

B. $S = \frac{-12 - -11.25}{3 - 1.25} = \frac{-.75}{1.75} = -0.42$

C. $S = \frac{-14 - -13.5}{5.5 - 7.5} = \frac{-.5}{-2} = .25$



Future Antarctica

Geological Earth-History Clock

One way to organize the geological time scale of the Earth is to create a Geological Earth-History Clock. In order to do this, we took the Earth's Geological Time History, which equaled 4,600,000,000 years and divided it by 12 hours and again by 60 minutes. This enabled us to convert the number of years in each eon, era and period into specific hours and minutes.

Ex:

Geological Earth-History Clock (Eon)

4,600,000,000 yrs

$\frac{4{,}600{,}000{,}000 \text{ yrs}}{12\text{hrs}} \approx 383$ million yrs / hr

$\frac{383 \text{ million yrs}}{\cancel{\text{hr}}} \times \frac{1\cancel{\text{hr}}}{60\text{min.}} = 6.4$ million yrs/ minutes

1 hour= 383 million yrs

1 minute= 6.4 million yrs

Ex:

Hadean Eon

4,600 million yrs-3,800 million yrs= 800 million yrs

$\frac{800 \text{ million yrs}}{383 \text{ mil. yrs/hr}} = 2.1$ hrs

$.1\ \cancel{\text{hr}} \times \frac{60 \text{ min.}}{1\ \cancel{\text{hr}}} = 6\text{min.}$

Hadean Eon= 2hrs 6min.

Geological Earth-History (ERA)

Phanerozoic Eon

540 million yrs ago- present day

$$\frac{540 \text{ million yrs}}{12 \text{ hrs}} = 45 \text{ million yrs/ hr}$$

$$\frac{45 \text{ million yr}}{1 \cancel{\text{hr}}} \times \frac{1 \cancel{\text{hr}}}{60 \text{min.}} = .75 \text{ million yr / min.}$$

$$750{,}000 \text{ yrs/min}$$

Ex:

Paleozoic Era

540 million yrs – 248 million yrs= 292 million yrs

$$\frac{292 \cancel{\text{million yrs}}}{45 \cancel{\text{mil. yr}}/ \text{ hr}} = 6.5 \text{ hr}$$

$$.5 \cancel{\text{hr}} \times \frac{60 \text{ min.}}{1 \cancel{\text{hr}}} = 30 \text{ min.}$$

Paleozoic Era = 6 hr 30 min.

Ex:

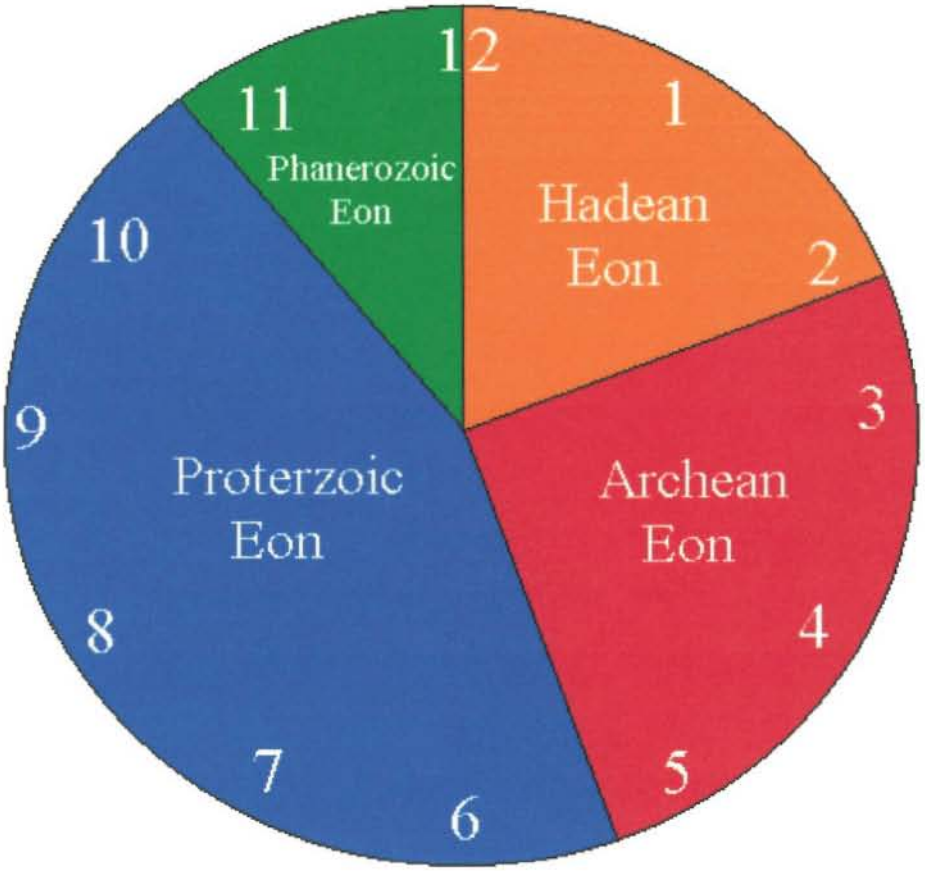
Permian Time Period

290 million years –248 million years = 42 million years

$$\frac{42 \text{ million } \cancel{\text{years}}}{45 \text{ million } \cancel{\text{years}}/ \text{ hr.}} = 0.93 \approx 1 \text{ hr.}$$

Permian Time Period = 1 hour

Geological Earth-History Clock



Eons

Phanerozoic Eon 0.01- 540 million years ago
Proterozoic Eon 540 – 2500 million years ago
Archean Eon 2,500 – 3,800 million years ago
Hadean Eon 3,800 – 4,600 million years ago

Geological Earth-History Clock
4,600,000,000 years

$$\frac{4{,}600{,}000{,}000 \text{ years}}{12 \text{ hours}} \approx 383 \text{ million years/ hr}$$

$$\frac{383 \text{ million years}}{1 \text{ hr}} \times \frac{1 \text{ hr}}{60 \text{ min.}} = 6.4 \text{ million years/minutes}$$

Hadean Eon

4,600 million years – 3,800 million years = 800 million years

$$\frac{800 \text{ million years}}{383 \text{ million years/hr}} = 2.1 \text{ hrs}$$

$$.1 \text{ hr} \times \frac{60 \text{ min.}}{1 \text{ hr}} = 6\text{min.}$$

Hadean Eon = 2hrs 6min.

Archean Eon

3,800 million years – 2,500 million years = 1,300 million years

$$\frac{1{,}300 \text{ million years}}{383 \text{ million years/hr}} = 3.4 \text{ hours}$$

$$\frac{.4 \text{ hr} \times 60 \text{ minutes}}{1 \text{ hr}} = 24 \text{ minutes}$$

Archean Eon = 3 hrs 24 min.

Proterozoic Eon

2500million years– 540million years = 1960 million years

$$\frac{1960 \text{ million years}}{383 \text{ million years/hr}} = 5 \text{ hours}$$

Proterozoic Eon = 5hrs

Phanerozoic Eon

540 million years– 0.01million years = 540 million years

$$\frac{540 \text{ million years}}{383 \text{ million years / hr}} \approx 1.5 \text{ hours}$$

$$.5 \text{ hours} \times \frac{60 \text{ min}}{1 \text{ hr}} = 30 \text{ minutes}$$

Phanerozoic Eon = 1 hr 30 min.

Eras

$\frac{540{,}000{,}000 \text{ years}}{12 \text{ hours}} = 45$ million years/ hour

$\frac{45 \text{ million years}}{\text{hour}} \times \frac{1\text{hr}}{60\text{min}} = .75$ million years/ minutes

Paleozoic Era

540 million years – 298 million years = 292 million years

$\frac{292 \text{ million years}}{45 \text{ million-years/hr}} = 6.5$ hrs

.5 hour x $\frac{60 \text{ minutes}}{1 \text{ hour}} = 30$ minutes

Paleozoic Era = 6hrs 30min

Mesozoic Era

248 million years – 65 million years = 183 million years

$\frac{183 \text{ million years}}{45 \text{ million-years/hr}} = 4.1$ hrs

.1 hour x $\frac{60 \text{ minutes}}{1 \text{ hour}} = 6$ min

Mesozoic = 4 hrs & 6 min

Cenozoic Era

65 million years – 0.01 million years = 65 million years

$\frac{65 \text{ million years}}{45 \text{ million-years/hr}} = 1.5$ hrs

.5 hours x $\frac{60 \text{ minutes}}{1 \text{ hour}} = 30$ min

Cenozoic Era = 1hr 30min

Periods

Permian Period- 290 million years ago
Triassic Period- 248 million years ago
Jurassic Period- 206 million years ago
Quaternary Period (Present Day)- 1.8 million years

Permian Period

290 million years – 248 million years = 42 million years

$\frac{42 \text{ million years}}{45 \text{ million years/hr}} = 0.93 \approx 1\text{hr}$

Permian Period = 1 hr

Triassic Period

248 million years – 206 million years = 42 million years

$\frac{42 \text{ million years}}{45 \text{ million years/hr}} = 0.93 \approx 1\text{hr}$

Triassic Period = 1 hour

Jurassic Period

206 million years – 144 million years = 62 million years

$\frac{62 \text{ million years}}{45 \text{ million years/hr}} = 1.37 \approx 1.40\text{hr}$

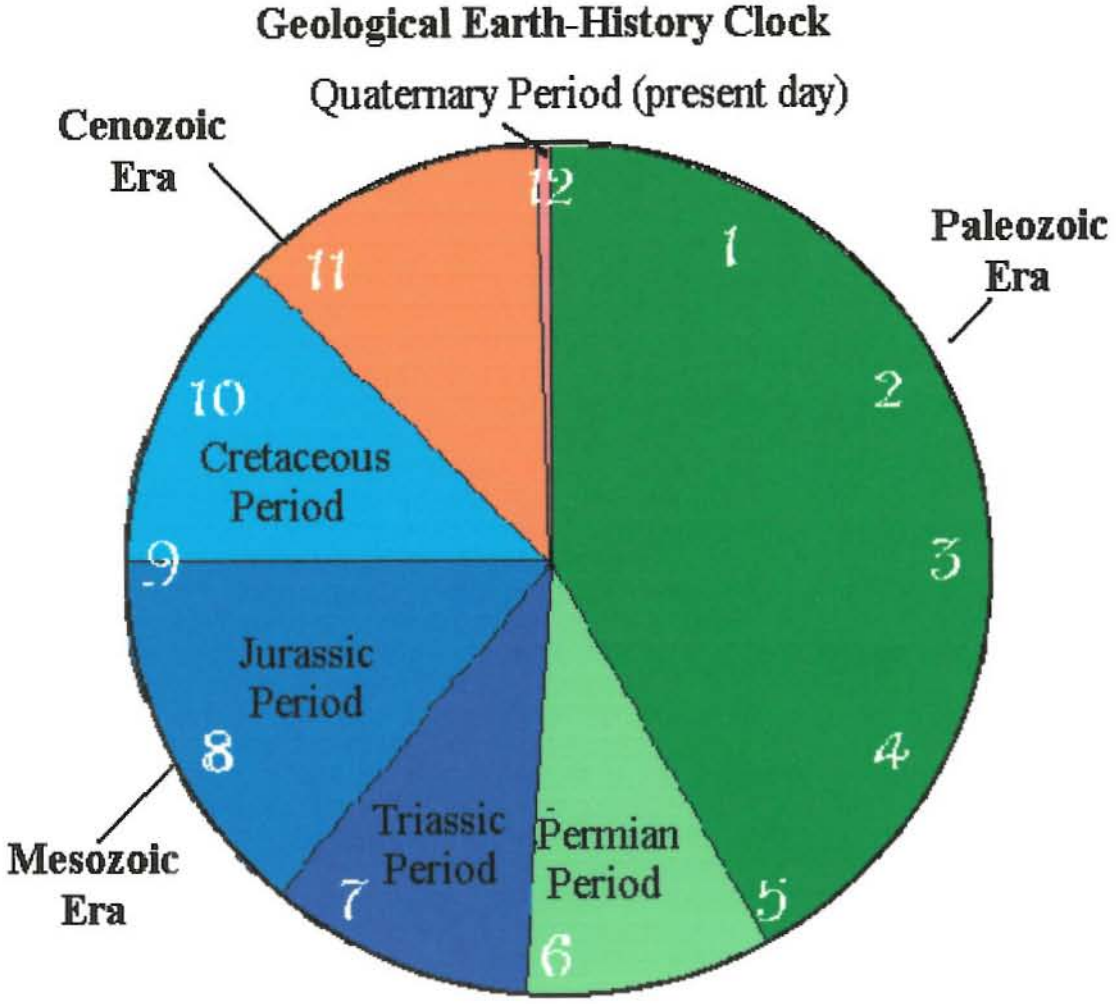
Jurassic Period = 1hr 27min.

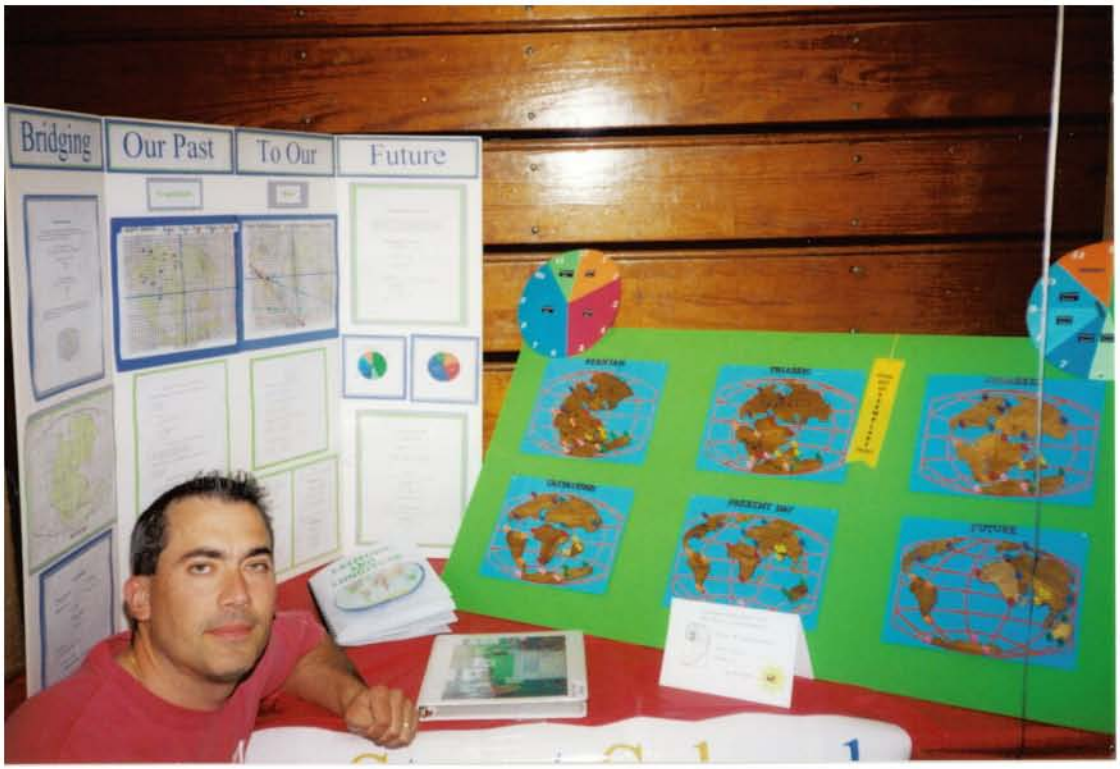
Quaternary Period (Present Day)

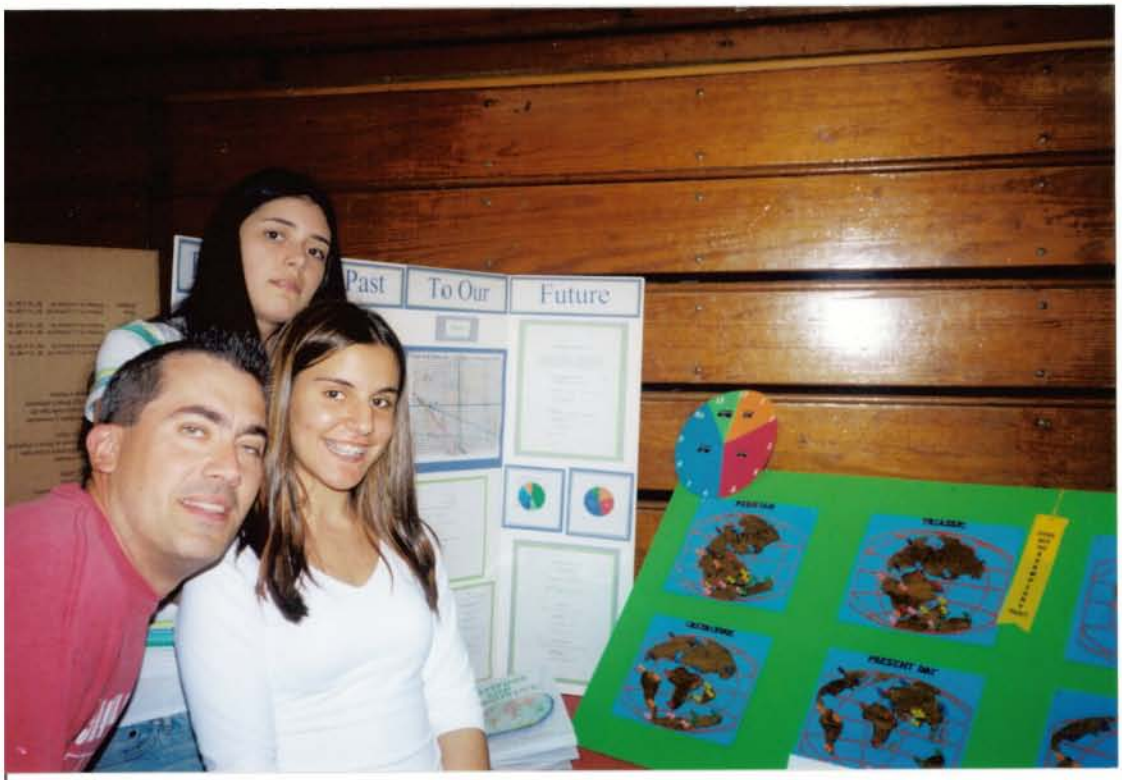
1.8 million years

$\frac{1.8 \text{ million years}}{45 \text{ million years/hr}} = 0.4\text{hr}$

Quaternary Period (Present Day) = 2min.


Geological Earth-History Clock
Quaternary Period (present day)
Cenozoic Era
Paleozoic Era
Mesozoic Era
Cretaceous Period
Jurassic Period
Triassic Period
Permian Period
1
2
3
4
5
6
7
8
9
10
11
12


Bridging
Our Past
To Our
Future


Past
To Our
Future

School Leadership Team I
Ninth ***Annual Professional Colloquium***
June 18, 2005

"Bridging Our Goals and Dreams With Teamwork"

Project Narrative

School: Ann Street School
Project Name: Bridging Our Past to Our Future

Team Members	Grade	Subject
Patricia Lopes	8th	Social Studies
Joel Soltys	8th	Mathematics
Sharon Speck	8th	Language Arts
Manuel Figueiredo	8th	Mathematics
Manuel Oliveira	8th	Science

Primary Objective: Students will be able to explore the natural phenomena of plate tectonics through Interdisciplinary Studies

Learning Objectives: What will your students understand as a result of this project?

Language Arts Literacy

1. Students will demonstrate their ability to analyze and synthesize information about longitude/latitude and plate tectonics in order to write informational material for primary grades.

Science/Mathematics/Social Studies

2. Students will study natural phenomena, plate tectonics, by imagining themselves to be a scientist or researcher and analyzing observations over time. Students will identify and create transformations, dilations, rotations of plane figures.
3. Students will understand how models (physical, mathematical, conceptual) are used in interdisciplinary studies.
4. Students will be able to locate places on Earth using lines of latitude and lines of longitude.
5. Students will be able to identify different types of maps
6. Students will demonstrate an understanding of the geological time scale
7. Students will be able to explore, analyze and investigate different time and climate zones.

Learning Activities: What will your students do to demonstrate the targeted learning objectives?

Language Arts Literacy

1. Students will create/compose an informational book for primary grade students introducing longitude/latitude and the phenomena of plate tectonics.

Science/Mathematics/Social Studies

2. Students will observe changes on 5 different maps in chronological ascending order from Permian to Present Day to predict future land formations
3. Students will be able to create a scaled model of the 5 different maps to include longitude/latitude lines.
4. Students will be able to use a globe or a map to identify coordinates using latitude and longitude lines.
5. Students were provided with multiple maps to identify the one with the least amount of distortion in comparison to a globe
6. Students will create a geological time scale based on a twelve-hour clock
7. Students will make observations using World Time Zone Map to calculate time zone changes.
8. Students will make observations using Climate Zone Map to locate different climate zones.

Procedure: Provide a clearly delineated sequence of teaching episodes.

Language Arts Literacy

1. Students will work in pairs, the writer will use the stages of the writing process:
    a. Prewritten
    b. compose
    c. evaluate
    d. revise
    e. edit
    f. publish

    The illustrator will use drawings and pictures to complement the information text. Teacher will act as facilitator during this process.

Science/Social Studies/Mathematics

2. Students will mark specific points on continents using the x, y coordinate grids, measure the distance traveled over time, calculate slope, rate, and use data to predict future positions of continents

3. Students will use scale factoring, ratios, and proportions to increase map sizes in order to create a 2 dimensional model on paper and then a 3 dimensional model using wood.
4. Students will use maps with latitude and longitude lines to locate specific points and give coordinates
5. Students compared and contrasted Mercator Projection Map, Robinson Projection Map, etc. by the shape and size of the continents.
6. Students will create a geological time scale by dividing a twelve-hour clock into various periods and eras.
7. Students using a World Time Zone Map calculated time zone changes as they moved east and west on the map.
8. Students using a Climate Zone Map located different climate zones by using latitude lines on the map.

Materials/Resources:

- ✓ Internet
- ✓ Science, Social Studies, and Mathematics Textbooks
- ✓ Arts and Crafts Material such as felt, yarn, and wood
- ✓ Coordinate Graph Grid Transparency Paper
- ✓ Globes, Maps, Rulers, Calculators, etc…..