

Forecasting Plate Drift – 100,000,000 Years into the Future

	4 (x 4)	3 (x 3.4)	2 (x 3)	1 (x 2.6)
Plate Placement (x 3)	<p>All of the required 10 Earth's major tectonic plates are placed on a two-dimensional world map and reasonably predict where those plates will be located.</p> <p>Placement is based upon current scientific understanding of tectonic plate boundaries and the movement associated with those boundaries.</p> <p>Predicted map completely fits within the bounds of original map (7 1/8" x 10 1/2").</p>	<p>Most of the required 10 Earth's major tectonic plates placed on a two-dimensional world map reasonably predict where those plates will be located.</p> <p>Placement is mostly based upon current scientific understanding of tectonic plate boundaries and the movement associated with those boundaries.</p> <p>Predicted map has only a small part of one plate extending beyond the original map size (7 1/8" x 10 1/2").</p>	<p>Some of the required 10 Earth's major tectonic plates placed on a two-dimensional world map reasonably predict where those plates will be located.</p> <p>Placement is somewhat based upon current scientific understanding of tectonic plate boundaries and the movement associated with those boundaries.</p> <p>Predicted map has more than one (1) and less than three (3) plates extending beyond the original map size. (7 1/8" x 10 1/2").</p>	<p>Few or none of the required 10 Earth's major tectonic plates placed on a two-dimensional world map reasonably predict where those plates will be located.</p> <p>Placement is not based upon current scientific understanding of tectonic plate boundaries and the movement associated with those boundaries.</p> <p>Predicted map has three (3) or more plates extending beyond the original map size. (7 1/8" x 10 1/2").</p>
Plate Movement Justification by Essay (x 3)	<p>Student accurately describes the projected movement of each of the required 10 major plates based upon the type of boundary.</p> <p>Student correctly uses all of the science vocabulary acquired during research and classroom discussions throughout the essay.</p> <p>Student uses correct spelling and acceptable grammar throughout the essay. There are fewer than three (3) grammar and/or spelling errors in the essay.</p>	<p>Student accurately describes the projected movement of most of the required 10 major plates based upon the type of boundary.</p> <p>Student correctly uses most of the science vocabulary acquired during research and classroom discussions throughout most of the essay.</p> <p>Student uses correct spelling and acceptable grammar throughout most of the essay. There are fewer than five (5) grammar and/or spelling errors in the essay.</p>	<p>Student accurately describes the projected movement of some of the required 10 major plates based upon the type of boundary.</p> <p>Student correctly uses some of the science vocabulary acquired during research and classroom discussions throughout some of the essay.</p> <p>Student uses correct spelling and acceptable grammar throughout some of the essay. There are fewer than seven (7) grammar and/or spelling errors in the essay.</p>	<p>Student does not accurately describe the projected movement of any of the required 10 major plates based upon the type of boundary.</p> <p>Student incorrectly uses the science vocabulary acquired during research and classroom discussions throughout the essay or does not use it at all.</p> <p>Student uses incorrect spelling and unacceptable grammar throughout the entire essay. There are more than seven (7) grammar and/or spelling errors in the essay.</p>
Score				

Purpose:

Student demonstrates understanding that the Earth's surface changes slowly over time:

- The solid crust consists of separate plates
- The plates constantly move at a slow pace in different directions
- The plates interact with one another as a result of plate motion.

Students demonstrate understanding by moving the 10 tectonic plates on the map to their likely locations 100 million years in the future according to the current understanding of boundaries.

Rules:

Each plate moves 1 cm/year resulting in 1000 km of movement in 100 million years. One thousand kilometers is the east to west width of the Iberian Peninsula as modeled in class. The reconfigured map must fit within the same space occupied by the original map. The Earth does not get larger as a result of plate movement nor does it get smaller.

Materials:

Forecasting Plate Drift – 100,000,000 Years into the Future rubric (reverse)
100 Million Years Continental Drift PLATES map

9x12 construction paper or 8-1/2 x 11 printer paper (color varies)
Glue (in class) or tape (student supplied)

Resources:

Plate Tectonics Websites (classroom and HAC)

Inside Earth text (classroom only) and a photo reproduction of the map on page 43 in the text (and on the HAC).

Study Notes for Chapter 1 Plate Tectonics (student binder)

Directions:

1. Mark the boundaries on plate map according to those shown on the map on page 43 of the text and as modeled in class. We are including the Juan de Fuca and Caribbean plates in the North American plate, the Cocos plate in the Nazca plate, the Philippine plate in the Pacific plate and the Scotia plate in the South American plate.
 - a. Mark the convergent boundaries (\rightarrow | \leftarrow) to show plates colliding with each other.
 - b. Mark the divergent boundaries (\leftarrow | \rightarrow) to show plates pushing apart from each other.
 - c. Mark the transform boundaries (\downarrow | \uparrow ; \uparrow | \uparrow ; or \downarrow | \downarrow) to show plates sliding past each other.
2. Remove the thin white border around the map using a pair of scissors. Then carefully trace the outline of the plate map onto the construction paper.
 - a. The prediction map must fit within this space.
3. Carefully cut out each of the 10 tectonic plates outlined by the heavy dark lines, Remember that for this project, we are including the Juan de Fuca and Caribbean plates in the North American plate, the Cocos plate in the Nazca plate, the Philippine plate in the Pacific plate and the Scotia plate in the South American plate.
 - a. Join the two pieces that make up the Eurasian plate.
 - b. Join the two pieces that make up the Australian plate.
4. Fit the map back together over the construction paper. Proceed to move each plate according to the direction indicated by the arrows you drew when marking the boundaries.
 - a. Once you have moved each plate the appropriate distance according to its boundaries, creating mountains, ocean trenches, volcanic mountains or new crust, glue the pieces to the construction paper making sure all of the Rules have been followed carefully.