

“Pangea Puzzle”

The lesson plan was developed according to Turkey’s national curriculum

School Level: Middle School

Grade, age of students: 6th Grade

App. time needed: 2 Class hours

Domain: Science

Sub-domain: Geography

Classroom Organization: teams of 3-4 students

Conceptual Competencies:

- Students learn the structure of the Earth is made up of layers such as crust, mantle and core.
- The students can explain the properties of these layers.
- The students become aware of the existence of continental drift and the scientist who proposed it.
- The students realize Earthquakes are one of the results of continental drift and therefore Earth’s structure.

Skill Competences:

Students use their logic and reasoning capabilities to define a model about the structure of the Earth as it once was 220 million years ago and support their ideas with clues from today’s findings.

Means and Materials: World map, globe, Pangea puzzle, geological clue key

Activity Description:

Orientation Phase: The teacher begins by relaying the big question of the day: “How could it be possible to find same type of plants or same species of animals that lived 220 million years ago, in different parts of the Earth? (Before any real means of travelling across the continents.)

After volunteers tell what they think about this situation, the teacher can ask more questions like:

Do you think, do the continents float over the oceans?

Are the layers of the Earth the same thing as the continents on it? If not what is the difference?

If we could empty all the oceans, what would we find at the bottom?

Is Earth’s crust a single solid shell?

What makes the tectonic plates move?

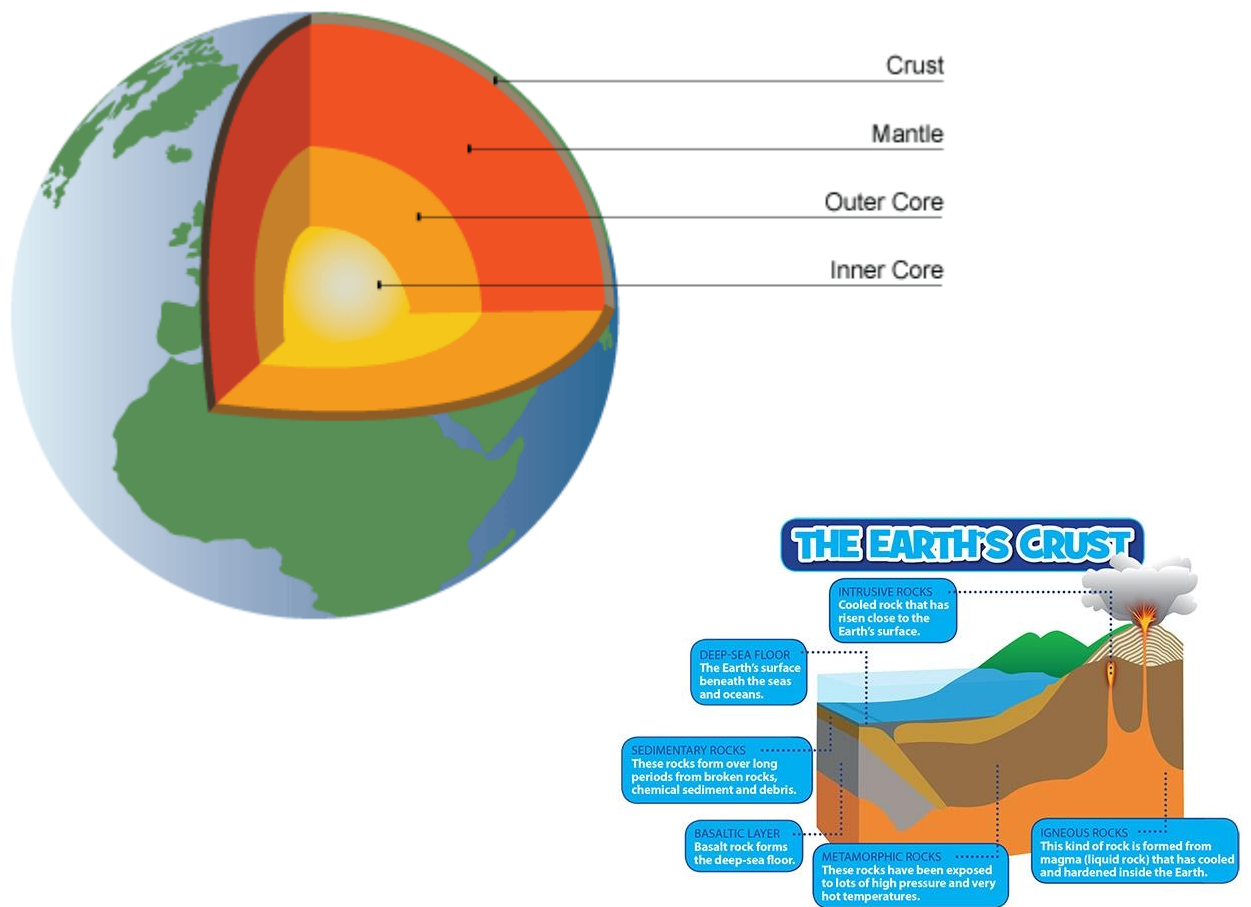
What do you think happens on the seafloor if two continents are shifting away from each other?

After listening to different answers, it would be a good idea for the class to form a mind-map about the key concepts they would like to learn in order to give a better answer to these questions.

(evidence to support the existence of a giant super continent, scientist who suggested ideas about the reasons, details about the plate tectonics, the fact that earthquakes are a result of continental drift are relevant points)

Conceptualization Phase: Here the teacher can give more detailed information about the structure of the Earth and the eight major plates on the surface of the Earth that constantly keep moving atop the underlying mantle, a really thick layer of hot molten rock.

Major plates on the surface of the Earth Picture:



The class collectively should learn about continental drift, the reasons, the scientist who proposed it, the results and the evidence that supports the Pangea idea.

The structure of the Earth video: <https://www.youtube.com/watch?v=eXiVGEEPQ6c>

Plate tectonics Video: <https://youtu.be/TcZtMFnyj1M>

Plate tectonics Simulation: <https://phet.colorado.edu/en/simulation/plate-tectonics>

Continental Drift Infographic: <http://www.kidsdiscover.com/infographics/infographic-continental-drift-theory-for-kids/>

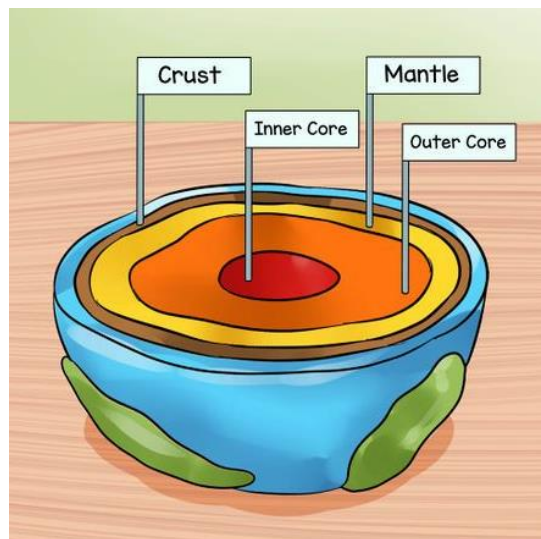
Continental Drift Info: http://www.geography4kids.com/files/earth_tectonics.html

<http://www.nationalgeographic.org/encyclopedia/continental-drift/>

http://www.geography4kids.com/files/earth_intro.html

Interactive Media about Earthquakes: <http://earthquake.usgs.gov/learn/kids/>

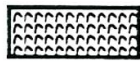
Investigation Phase: First we expect the students to make a model of the structure of the Earth using colorful playdough. Each layer will be represented with a corresponding color. The properties of the main layers should be emphasized and the fact that each layer may also be divided into sub-layers should be mentioned.



We expect the groups of students to use the Pangea puzzle pieces (North America, South America, Antarctica, Africa, Australia, India, Greenland and Eurasia) and the geological clue key (both may be found @ the Appendix) to form one giant super-continent known as Pangea. After they cut the continents and place them on a flat surface, they should discuss among themselves and decide which continent should be placed where and support their ideas using the geological clue key and the mind-map they did before. The teacher should remind the students that the landmasses they will be cutting out, represent the continents and some of the larger islands of the Earth the way scientists think they appeared 220 million years ago.

They should compare the physical shape of the continents with the given globe, see if the shapes will fit with each other.

The legends on the continents indicate:

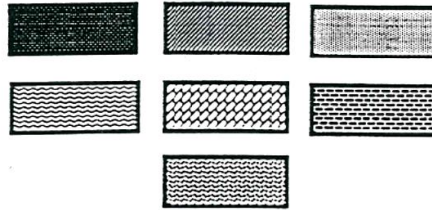


Indicates mountains that were formed millions of years ago



Leaf indicates continents where material left by glaciers coal and fossil plant land deposits are found.

Kinds of rocks:



Conclusion Phase:

At the end of the lesson the students are encouraged to share their ideas and the underlying reasons behind them. If the students ask, which group found the right answer, the teacher should tell them we would need to invent a time machine and go back in time to be sure. We are just speculating regarding to the clues we have as the alternative is not a possibility yet.

Appendix:

Pangea Puzzle Pieces

