

Teaching the Earth's Layers, Latitude and Longitude, and Plate Tectonics using a 3D Model

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Abstract

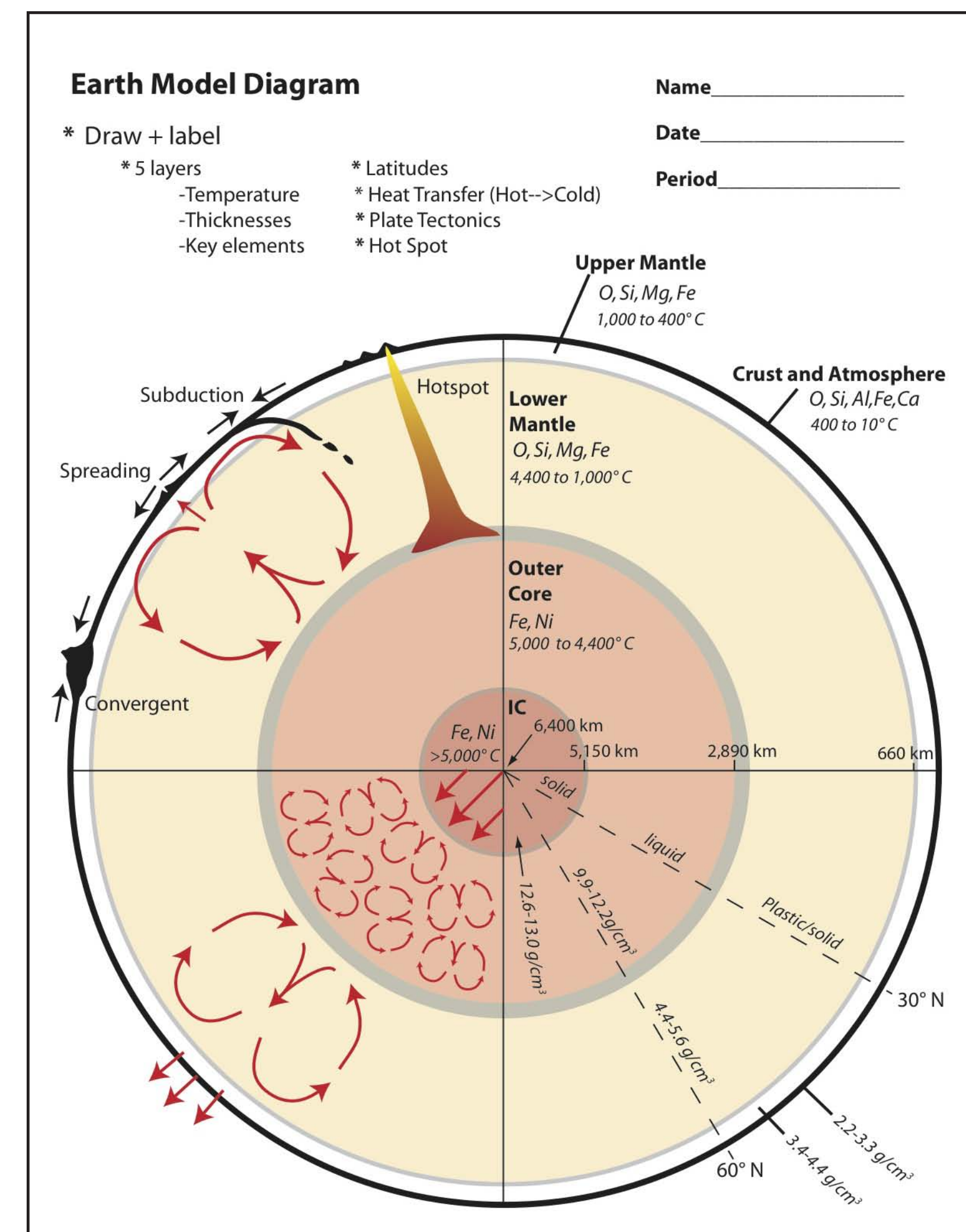
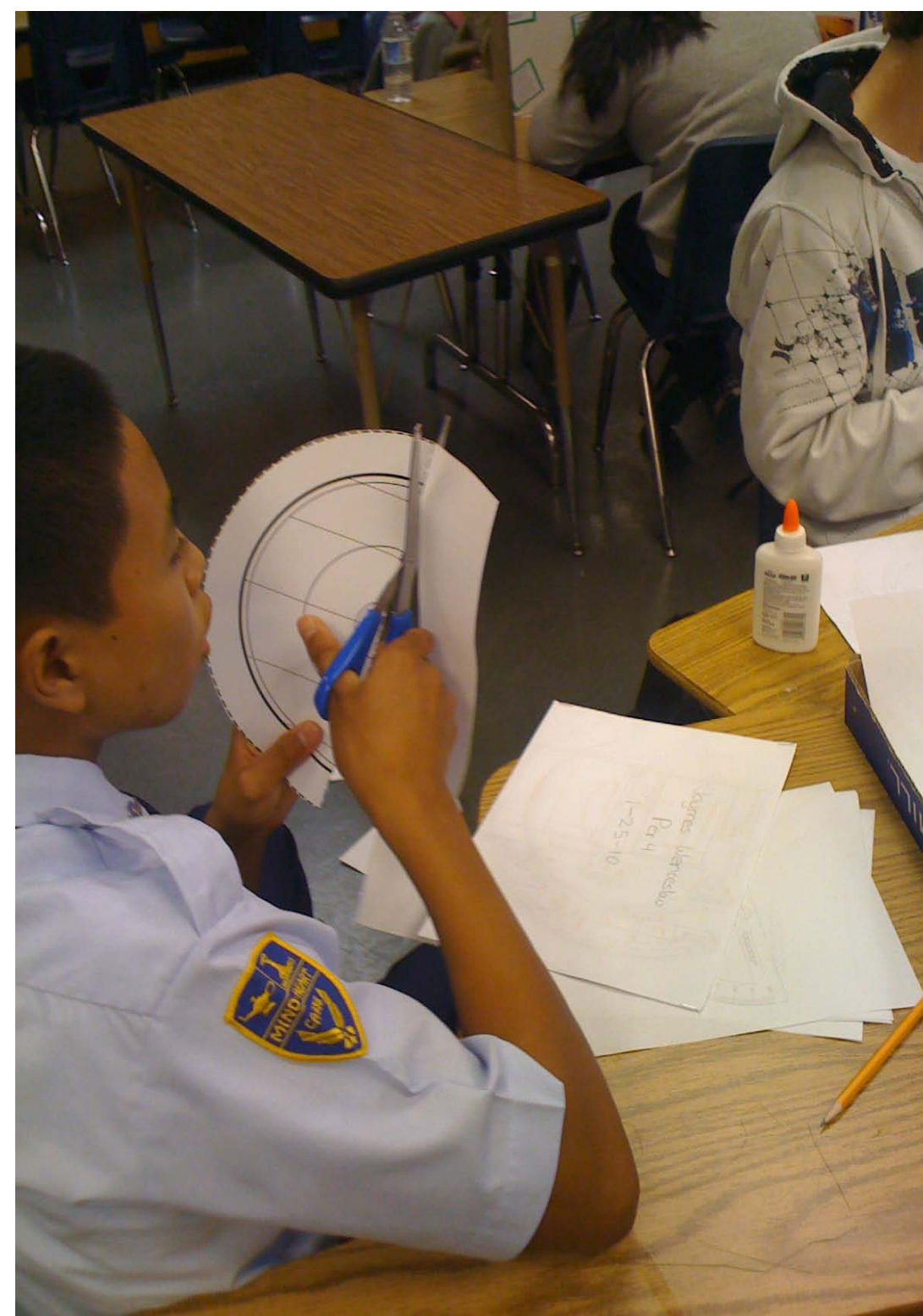
This week long lesson uses a three dimensional model to help teach the Earth's layers, longitude/latitude, and plate tectonics. The activity allows students to build a scaled 3D model of the Earth, which they use and interact with to complete activity sheets. The model is constructed using basic materials (paper, cardboard, string, and glue) and can be broken down to fit into a folder. Finally, the lesson is broken into four daily activities, each day focusing on different material. Worksheets and PowerPoints are provided for each daily activity. Pre and post exams are provided for assessment purposes.

Grade Level: 6-9

Duration of lesson: 1 week (50 minute periods)

Context for Use

This lesson was designed for introductory Earth science (grade 6-9). The goal of the activity is for the students to build their own Earth model and use this model to understand the Earth's layers and what drives plate tectonics. Students will also learn about latitude and longitude and map projection. The lesson also helps students visualize structures and processes in three dimensions. This activity covers standards based on the structure of the Earth and plate tectonics.



Name _____ Class _____ Date _____

Parallel and Latitude

Key Term Review
Parallel: Line (full circle) on map running from east to west.
Latitude: Measurement in degrees north or south (of equator).
Hemisphere: One-half of a sphere (N-hemi, S-hemi).
Equator: Line that divides N-hemi and S-hemi (longest parallel).

Modeling
 Carefully complete drawing the five meridian strings and the parallel discs. Look at your model.

- Why are the five horizontal lines called parallels? Briefly explain.
 The horizontal lines (latitudes) are parallel to each other.
- Label the five all parallel lines with their correct degrees. Label 0, 30, 60 degrees N and S
- With degrees parallels become latitudes. What is the one important difference between a parallel and latitude? Degrees
- What would be the lowest latitude and what would be the highest latitude? (hint you need two answers for highest latitude)? Lowest = 0° Highest = 90° N + 90° S
- What latitude divides the two hemispheres? 0° + What is its name? Equator

Apply Your Knowledge
 Where do the sun's rays shine most directly, high latitudes or low latitudes? Explain why this is.
 Low Latitudes. This is do the tilt of the Earth and the angle at which the sun's rays hit the Earth.

Daily lessons

Each day of the week is dedicated to a different topic or concept. Each day begins with a short Powerpoint introducing the students to the material that is being covered. Activity sheets are then handed out and students use the model as a 3D reference to answer the questions. The teacher should demonstrate the activities using the model they built. Below are some examples of the daily activity sheets and powerpoints. Students will be provided an overview sheet, which will be slowly filled in each day. This sheet will serve (in combination with the model) as an overview study guide for the students. The overview sheet is broken into four quadrants that represent the four days of activities. Students fill in the overview sheet clockwise. The lesson ends with a review and test day. A Glossary is also provided for vocabulary review.

← Overview sheet

Activity sheets

Powerpoints →

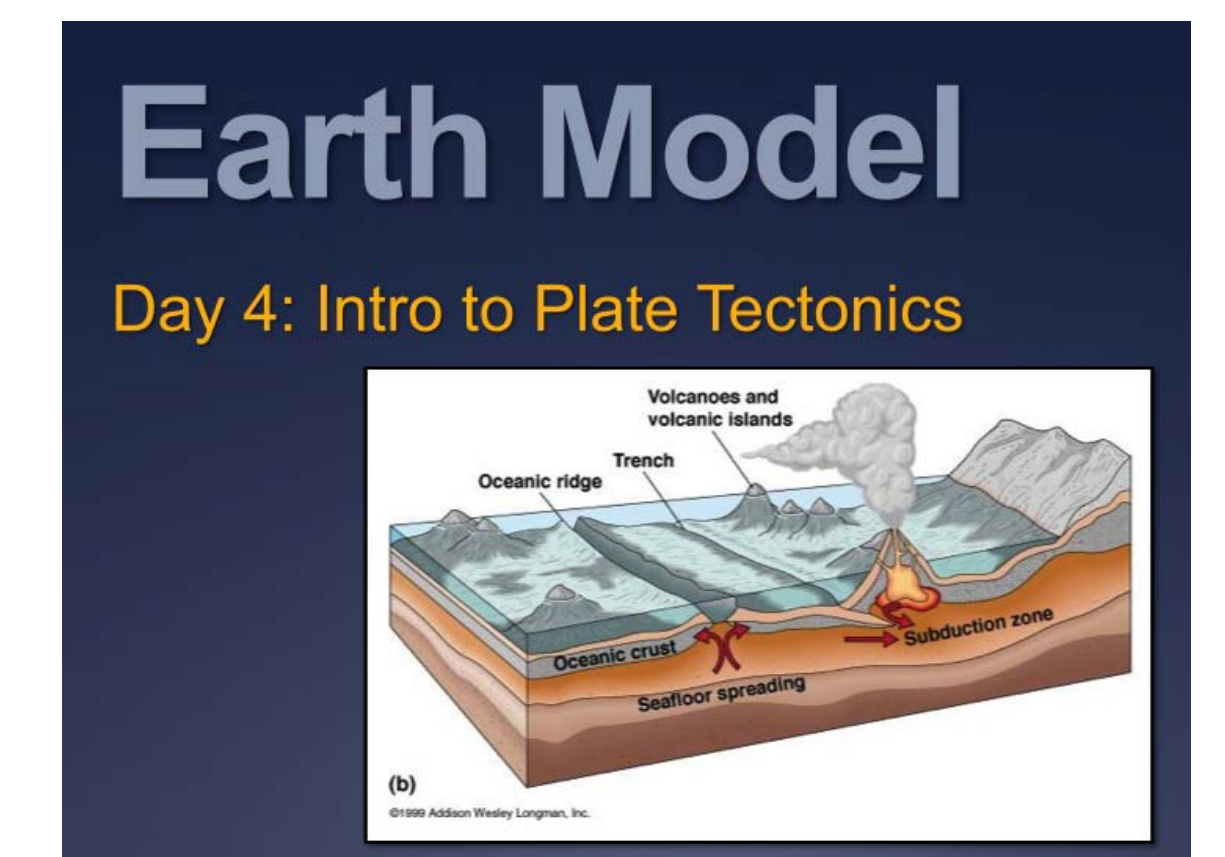
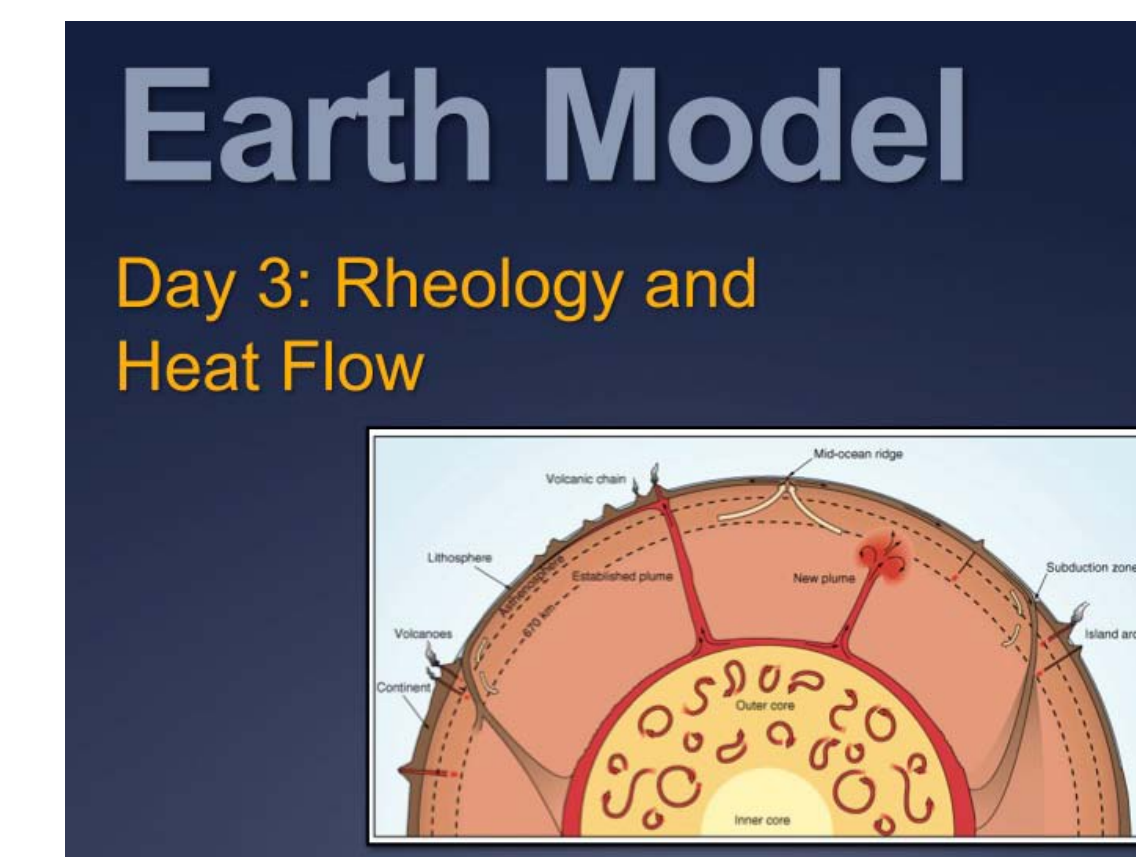
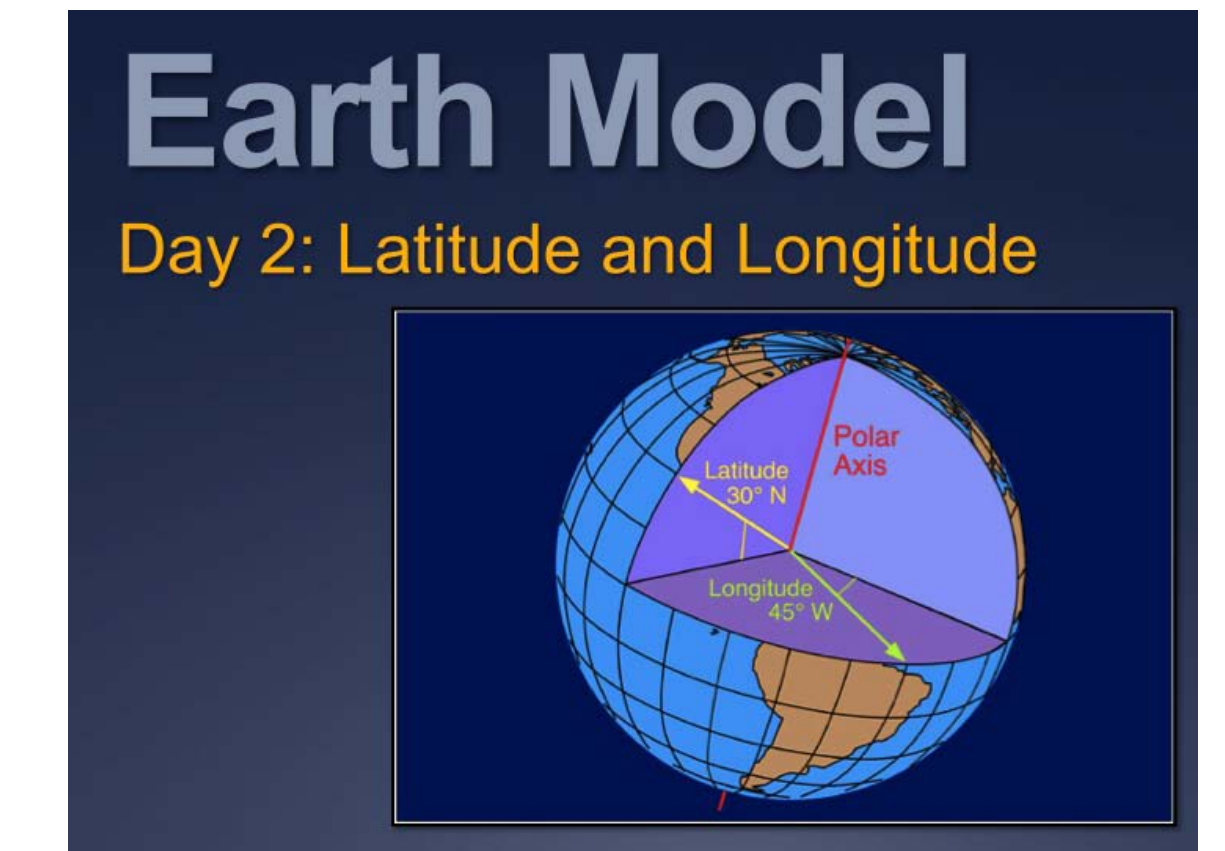
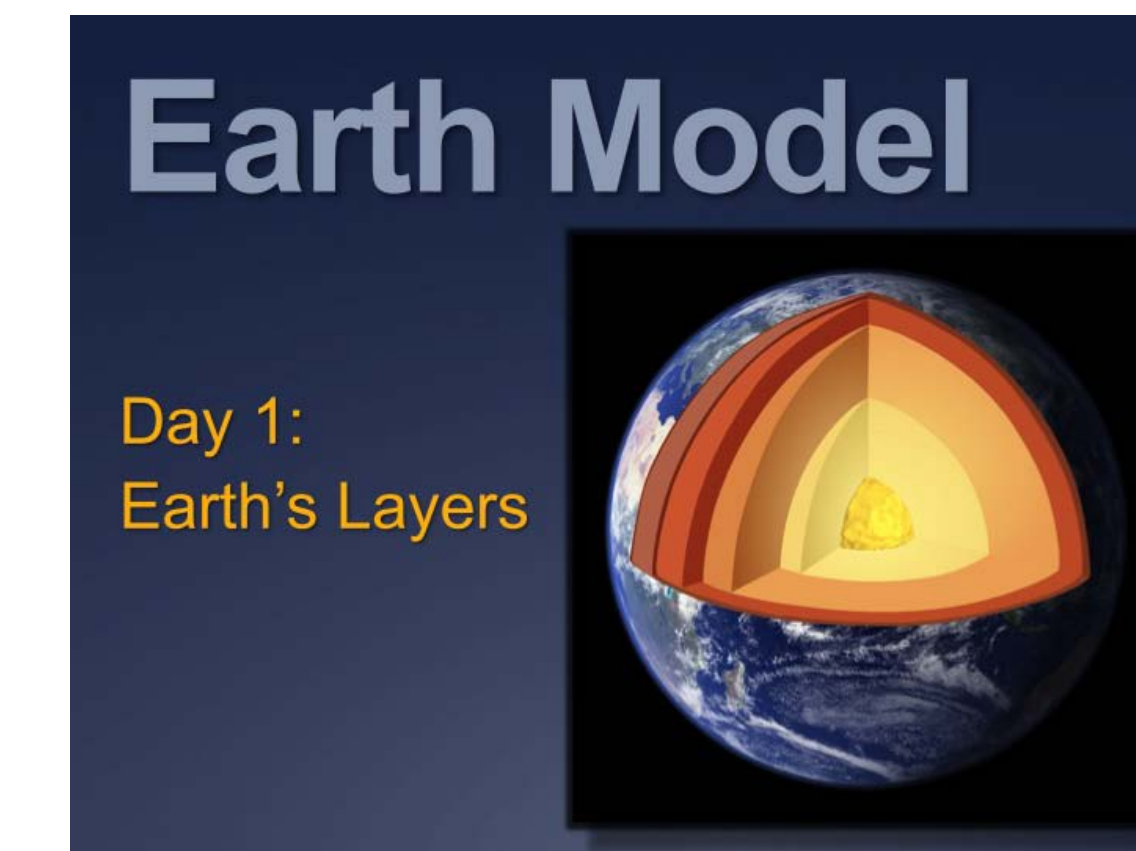
Day 1: Earth's Layers

Day 2: Latitude and Longitude

Day 3: Rheology and Heat Flow

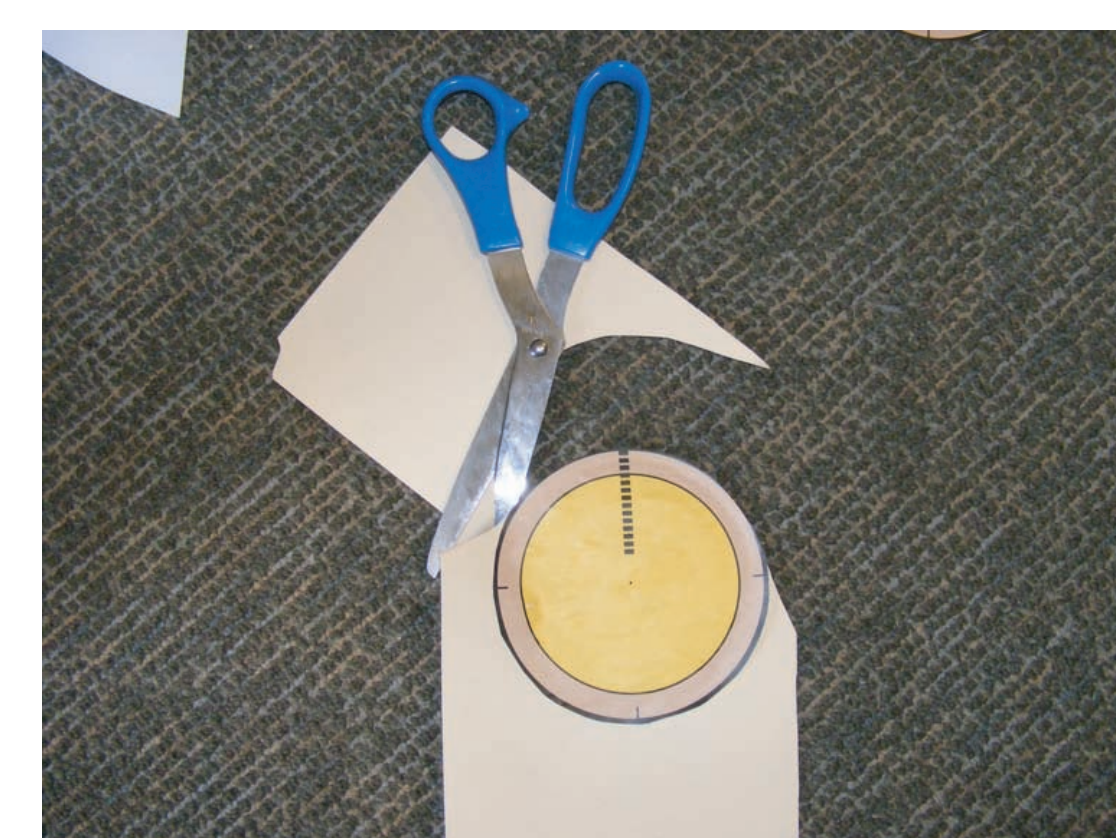
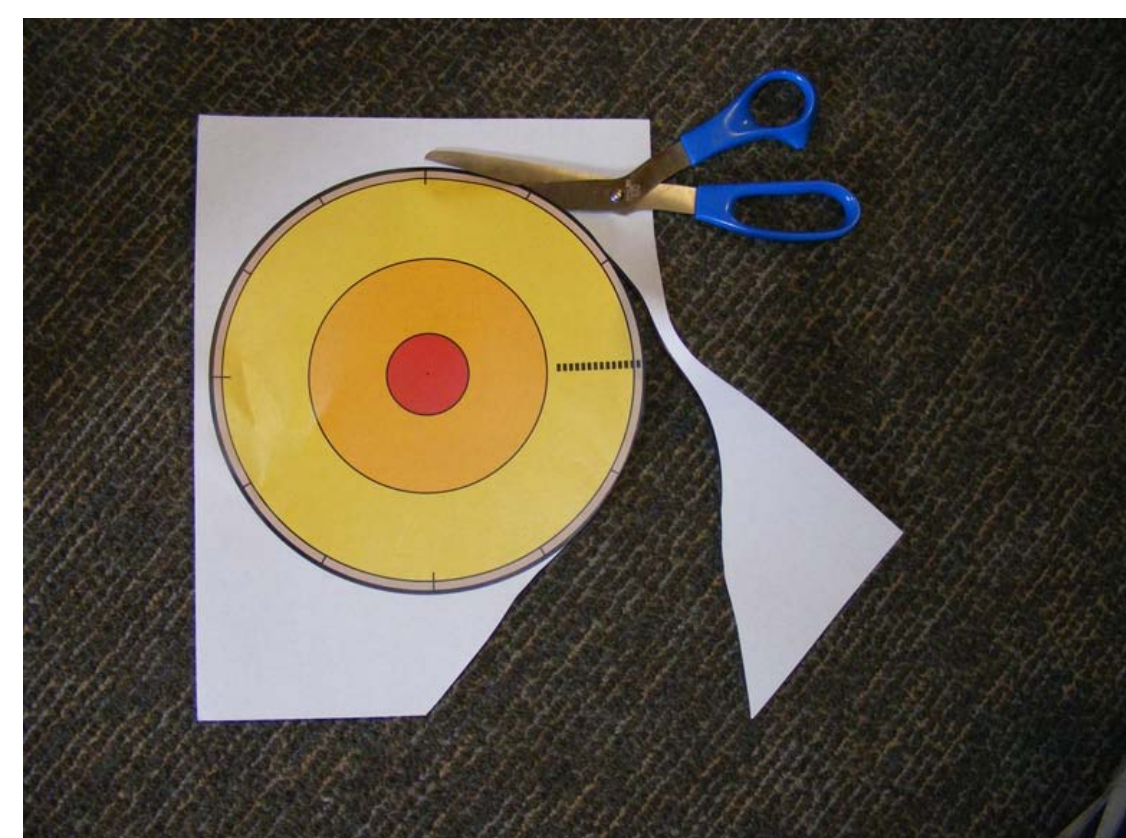
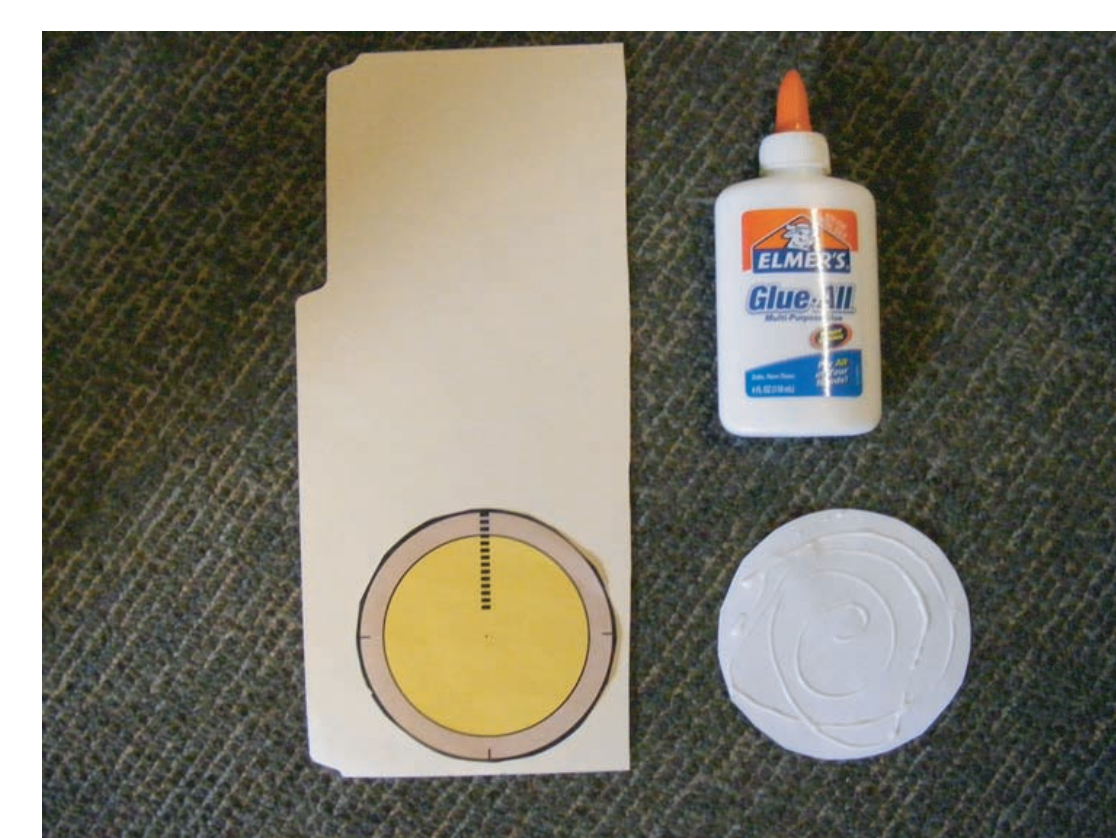
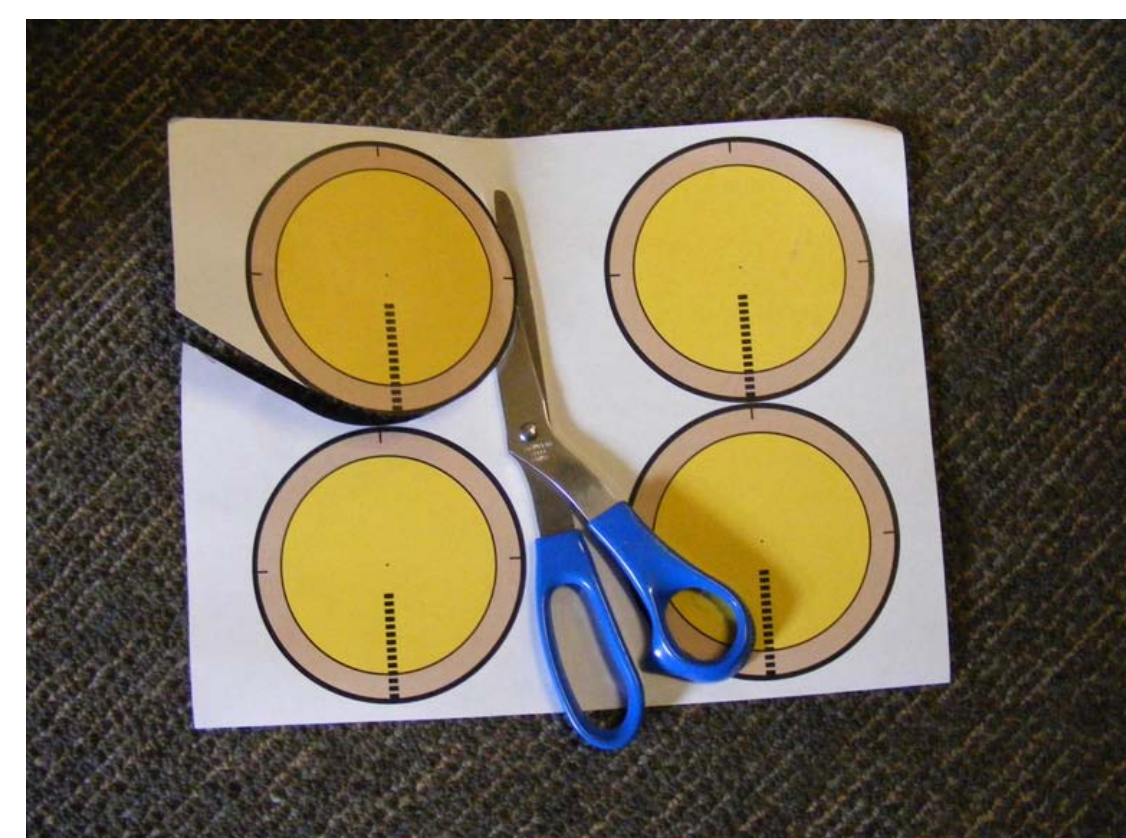
Day 4: Plate Tectonics

Day 5: Review and Test



Intro slides to daily powerpoints

Finished Model hanging from 23.5 degrees (tilt of Earth)



Materials needed per model:

- 8.5" x 11" sheets of paper (thirteen)
- Printer (color or black and white)
- Cardboard (three 8.5"x11" pieces)
- Manila Folder (three 8.5"x11" pieces)
- Glue
- String (4"student" arm lengths)
- Paper Clip (3 paper clips)

