# Assignment Summary

For this assignment, you will make a scale model—a “core sample”—showing the layers of the Earth: crust, lithosphere, asthenosphere, mantle, outer core, and inner core.

Background Information

The Earth is composed of six layers with differing thicknesses and properties. The crust forms both land and seafloor. It is thickest under mountains and thinnest under ocean beds. The crust’s thickness ranges from 5 to 70 km thick. The lithosphere consists of the crust plus the upper mantle. It is solid and is about 100 km thick. The asthenosphere is a semisolid layer under the lithosphere. It is about 180 km thick. The lower mantle is 2,250 km thick and is solid, but very hot, rock. The outer core is molten rock and it is 2,266 km thick. Finally, the inner core is 1,210 km thick, and it is solid iron and nickel. Remember that as you go deeper into Earth’s layers, temperature and pressure increase.

A core sample is made by drilling into the Earth and pulling out a long cylinder of rock. Geologists analyze these core samples to learn more about Earth’s history and composition. So far, geologists have not yet succeeded in drilling into Earth’s mantle.

You will construct a scale model of a core sample. When something is “to scale,” it has a uniform reduction or enlargement. You will calculate how deep each layer should be in centimeters, based on the actual depth of Earth’s layers in kilometers. The percentage of the total for each layer remains the same, but the actual number of units changes.

Materials

* Wide-mouth quart jar with lid, that is at least 6.6 inches deep
* Colored sand: dark pink, red, orange, yellow, brown, green, blue, white
* Blank return address labels or masking tape
* Funnel
* Fine-tipped permanent marker
* Calculator
* Ruler

# Assignment Instructions

For this project, you are expected to submit two items:

1. A “core sample” model of Earth’s layers
2. Several paragraphs of written analysis, detailing your observations

**Step 1: Prepare for the project.**

1. Read through the guide before you begin so you know the expectations for this project.
2. If there is anything that is not clear to you, be sure to ask your teacher.

**Step 2: Calculate the depths of each layer in centimeters.**

1. Use Data Table A below and a calculator to determine the percentage of total depth that each layer represents.
	1. Divide the depth of the layer by the total depth. For example, to calculate the percentage of the total depth that the crust represents, divide 40 by 6,046.
	2. Write your answer in the Percent column.
	3. Repeat for the rest of the layers.
2. Use the calculator to determine the depth in centimeters for each layer. This is the depth of sand you will put in your jar.
	1. Multiply the depth of the jar, 16.5 cm, by the percent you calculated for the crust.
	2. Write your answer in the Centimeters column.
	3. Repeat for the rest of the layers.

**Step 3: Fill the jar with sand to create your core sample.**

1. Find the depth in centimeters for the inner core on your table.
2. Use the ruler to measure how deep the sand should be in the jar.
3. Locate the correct color of sand for each layer in the data table.
4. Using the funnel, pour in the correct color of sand to the correct depth.
5. Repeat for the rest of the layers.
6. For the final layer, the crust, be creative! Make some oceans, green land, mountains, and clouds.

**Step 4: Label the layers, using the permanent marker and labels.**

**Step 5: Create a typewritten paper describing your model of Earth’s layers.**

1. Type several paragraphs describing your “core sample” of Earth’s layers in detail.
	1. Explain what a core sample is. Then, tell whether it is currently possible to take a core sample like the model you’ve created.
	2. Compare and contrast the layers in your model, including the significance of the colors.
	3. Discuss what it means to create a scale model.
	4. Include a table with the values you determined for each layer.
	5. Discuss the relationships of each layer to the others, including depth.
2. Answer the following question in a separate paragraph.
	1. How does your “core sample” model of Earth’s layers differ from the actual layers of the Earth?
3. Make sure your paragraphs include correct sentence structure, punctuation, grammar, and spelling.
4. Ask your teacher where you should save your work. Your teacher may also have specific guidelines about the file name you should use.

**Step 6: Evaluate your project using this checklist.**

If you can check each box below, you are ready to submit your project.

**Core sample model**

* Is your name on your core sample?
* Did your model show the use the correct colors of sand?
* Are the layers in the correct order, with inner core on the bottom?
* Are the layers to scale (to the correct depth)?
* Did you correctly label each layer in your core sample?

**Written analysis**

* Did you write several paragraphs describing Earth’s layers in detail?
* Did you explain what a core sample is and tell whether it is currently possible to take a core sample like the model you’ve created?
* Did you explain what it means to make a scale model?
* Did you include a table with the values you determined for each layer?
* Did you discuss the significance of the colors of sand?
* Did you compare and contrast the layers of your model in this paper?
* Did you discuss the relationship of each layer to the others, including depth?
* Did you discuss how your “core sample” model of Earth’s layers differs from the actual layers of the Earth?
* Did you double-check for correct sentence structure, punctuation, grammar, and spelling in your paper?

**Step 7: Revise and submit your project.**

1. If you were unable to check off all of the requirements on the checklist, go back and make sure that your project is complete. Save your project before submitting it.
2. Turn in your core sample model to your teacher. Be sure that your name is on it.
3. Submit your paper through the virtual classroom.
4. Congratulations! You have completed your project.

**Data Table A**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Depth in Kilometers** | **Percentage of Total** | **Depth in Centimers** | **Sand Color** |
| Crust | 40 |  |  | Blue, green, white |
| Lithosphere | 100 |  |  | Brown |
| Asthenosphere | 180 |  |  | Yellow |
| Mantle | 2,250 |  |  | Orange |
| Outer core | 2,266 |  |  | Red |
| Inner core | 1,210 |  |  | Pink |
| **TOTAL** | **6,046** |  |  |  |