

## LAYER CAKE CORE DRILLING

(Advanced version of Cupcake Core Drilling)

### INTRODUCTION

Trying to “see” what is beneath the surface of the earth is one of the jobs of a geologist. Instead of digging up vast tracts of land, core samples can be taken and analyzed to determine the likely composition of the earth’s interior.

### PURPOSE

In this activity, students model core sampling techniques that reveal the structure of rocks beneath the surface using a specially prepared layer cake.

### MATERIALS NEEDED:

- 2 pkgs White cake mixes
- 1 pkg Chocolate frosting
- 1 Rectangular foil baking pan
- Food coloring (blue, red, green yellow)
- Plastic transparent straws
- Graph paper
- Colored pencils (black, blue, red, green yellow)
- Rulers
- Paper plates
- Plastic forks
- Napkins
- Sharp knife

### PROCEDURE

#### 1) CAKE PREPARATION:

- a) Make layer cake with at least three layers of colored batter.
  - i) Mix 2 cakes mixes together.
  - ii) Take approximately 1/3 of the batter and set aside.
  - iii) Take the remaining 2/3 of the batter and divide in 3 or 4 (depending on number of colors used) small bowl for coloring.
  - iv) Add a different food color to each bowl (make sure it is dark for that color).
  - v) Layer all the batters in the baking pan.
  - vi) Use different patterns and thickness while leaving some areas uncolored.
  - vii) Baking and temperature will have to be estimated.
  - viii) Temperature should be approximately 25 degrees lower than directions and time will be anywhere from 10 to 20 minutes longer.



- (1) Check center of cake with toothpick for doneness. Toothpick should be clean and sides pulling away from pan.
  - b) Once cake has cooled, frost the cake in the pan to prevent showing any of the cake.
- 2)



#### ACTIVITY:

- a) Provide each student/group with a clear straw, graph paper, colored pencils and ruler.
  - i) Straws can be cut to a length slightly higher than the cake.
  - ii) Ask the students how they might get more information about the layer cake without peeling the foil back or cutting the cake open.
- b) Determine a coordinate system for straw drill holes (i.e., X, Y); see accompanying figure, making sure that the coordinate system and the cake are oriented the same and that **North** is indicated. The grid should reflect the rectangular shape of the pan.
- c) Determine a unit of measurement all must use (centimeters or other artificial measure).
- d) Have students/group drill the cake (one per group) and then create their cross-section on graph paper.
- e) Once cross-section has been done and students have discussed the exercise, cut cake and see how the cake compares to the cross-section.
- f) Eat cake.

#### EVALUATION

- 1) Through this activity, students should be able to answer questions and discuss various answers about the structures of their cakes.
  - a) Does the cross section represent the structure of the whole cake?
  - b) How could the internal structure of the whole cake be represented?
  - c) Which layer comprises the most volume of the cake?
  - d) Predict the locations of the various layers in another “drill hole.” Check the prediction.
  - e) Measure the thicknesses of the layers.
- 2) Relate the model to the real Earth. Discuss how the model is similar to the Earth, and discuss how it is different.
- 3) Students should raise and answer their own questions.

