

# PROJECT REPORT

Northern Wyoming Community College District / National Science Foundation  
Summer Energy Education Program 2011

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## TITLE

Layers in the Earth

## SUMMARY

This activity demonstrates how sedimentary layers were deposited in horizontal positions and later repositioned by natural forces. Plants and animals which became part of the layering turned into fossil fuel sources and fossils. Minerals are also contained within the layers.

## ENERGY CONTEXT

Fossil fuels such as oil, coal, natural gas contained in these layers are the source for much of our energy. This energy is needed to provide heat, light, and power.

## ANTICIPATED TIME REQUIRED

This activity will require two 90 minute class periods or three 60 minute periods.

Introduction-10 min.

Discussion of materials - 10 min.

Construction session - 30 min.

Manipulation session – 30 min.

Label session – 20 min.

Presentation – 30 min.

Discussion and Journaling – 30 min.

## INTENDED STUDENT LEVEL

This lesson is intended for 5<sup>th</sup> grade.

## ASSUMED PRIOR KNOWLEDGE

This activity assumes students have prior knowledge of:

- Erosion and weathering
- Rock cycle
- Principle of superposition
- Plate tectonics

## LEARNING OBJECTIVES

- Understand how layering occurs
- Describe how layers can change position
- Identify and label examples of vocabulary
- Write journal entry

## MATERIALS

### Each group needs:

- 5 packs of different colored clay – at least 5 colors
- 1 aluminum cookie sheet
- 2 plain Hershey chocolate bars
- Small zip lock bag of charcoal
- 20 wooden tooth picks
- 10 marbles or beads
- 1 foot of soft solder (lead free)
- 6 3 X 5 note cards
- Small quantities of small hard candy

### Class needs:

- Plastic ice cream scoop
- Butter knife
- Block of wood – 6 inch 2X2
- $\frac{3}{4}$  inch pvc cap and 4 inch pvc pipe
- Rolling pin or 6 inch pvc pipe ( 1  $\frac{1}{2}$  diam.)

## INTRODUCTION / MOTIVATION FOR STUDENTS

Many students are interested in looking at rocks and learning where they came from and how they were formed. Most students know about minerals which come from the earth but don't think about the energy sources contained in the layers.

## PROCEDURE

- Divide class into teams ( 2 or 4 students)
- Each group constructs a model tectonic plate using cookie sheet as a base and color coded clay layers for different formations. Use large pvc to roll out clay.
- Organic materials represented by chocolate for oil deposits, charcoal for coal, toothpicks for plants, marbles for minerals, solder for uranium, hard candy for animal fossils added to layers at appropriate levels
- Plates are manipulated by using forces provided by hardware. Wood and butter knife can

make faults, Layers can be pushed or pulled to simulate converging or diverging plates, small pvc can be inserted under plate and pressed to simulate volcanic pressure, scoop and knife can be used to show erosion and expose layers which have been shifted from horizontal.

- Add labels showing examples of vocabulary words
- Model is presented to class
- Discussion of visible and hidden features
- Journal writing

### SAFETY ISSUES

Don't eat the models!

### TROUBLESHOOTING TIPS

None

### ASSESSMENT

#### Pre-Activity

Opening discussion will include vocabulary which students will demonstrate in their models.

Definitions will be posted

Students can choose 5 terms to demonstrate – 20 points per example

#### Suggested vocabulary

- Deformation
- Orogeny
- Fault
- Volcanic activity
- Rift
- Erosion
- Outcrop

#### Journal Questions

1. What did you like about this activity?
2. What did you not like about this activity?
3. How difficult would it be to get the minerals or fuel out of the layers?
4. How would you do it?

### SUGGESTED EXTENSIONS

Students could do a research project on how geologist find minerals and fuel deposits hidden in the earth and report back to the class.