Science Standard 2 Objective 1 or 3

Math Standard 5.MD Mesurements and Data

Reading Standard RI5.10

Writing Standard W5.2, W5.7, W5.9

Social Studies Standard IV Objective 2 Indicator A

Technology/Engineering: Understand societal issues related to technology, use critical thinking to plan and make informed decisions and solve problems

Innovations to study land forms

**Modeling Erosion**

To set up the exploration, assign groups the type of soils they will use. The different soil is what we are exploring. This is called the **independent/manipulated** variable. What changes in response is called the **dependent/responding** variable. This is what is usually measured in numbers. We are going to estimate amount of soil erosion using a fraction statement.

*OPTIONAL:* *A different experiment could be same soil type for each group, but different heights of incline to cause slope.*

**Materials:**

Aluminum pan (square 32 cm X 24 cm)

Two cups (250 mL per cup=500mL) of soil per group (sand, potting soil, pea stone, mixture)

Two cups (500 mL) of water

*Optional experiment*: *Blocks or books for incline/slope*

styrofoam cup with ~ 4 small hole—use pencil

Ruler cm

Timer

Data sheets for students

Same amount of soil, same size pan, same amount of water, same amount of time, same number of holes, and same size of holes in cup for each group. These are called **constants** in an experiment.

**Soil types**: sand, potting soil, pea stones, and mixture (4-5 different groups or experiments. Could add more types such as wood chips, clay, etc

*Optional: Angel of incline Aluminum pan (stream bed model) with different size blocks under one end to create an incline/slope. (Example: 2-6 cm height with blocks/books)*

**Flow rate of water**: Strainers created with syrofoam cups that have holes punched in bottom



<http://science-made.blogspot.com/2011/10/structured-inquiry-lesson-erosion.html>

Source of lesson plan with journal and documentation examples.

**Pre-Lab Questions:**

What is the purpose of this exploration?

What do you think will happen to the soil?

Which type of soil do you think will move the most? Least? Not at all?

What is the variable you are testing?

What type of data/information are you collecting?

What are some weathering terms that can be used with this exploration?

**DATA TO COLLECT**--- Label all features in your drawing. Example: sediment, deposition, delta, weathering, stream, run off, etc. Observe the other stream beds in the class after 2 minutes. Record your observations about all the different soil types used in the stream beds by drawing the final stream bed of each Document soil type with each drawing.

Soil Type:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Type soil | ***Incline***  ***Block cm***  ***Opt.*** | Time  Sec. | What happened  Important Events | Total  Soil  Moved in Fraction |
|  |  | 5 |  |  |
|  |  | 10 |  |  |
|  |  | 15 |  |  |
|  |  | 20 |  |  |

Soil Type: Soil Type:



Soil Type: Soil Type:

**Post Lab Questions:**

In your experiment, did any soil move? If so, what is this called?

Estimate the amount of soil that moved using a fraction sentence statement for each soil type.

Where did the soil move to? What is this called?

Which soil moved the most? Why do you think this happened?

Which soil moved the least? Why do you think this happened?

List any other natural processes that could cause erosion?

*Optional: Same type questions, but with different height of incline*.

**Higher level Technology/Engineering Application:**

Suggested materials: Popsicle sticks, rocks, mesh, plants, plastic, moss, weed block, small baggies-for sand bags

Website with pictures to illustrate erosion prevention: Can be viewed with class to provide ideas for their erosion prevention model.

<http://www.shutterstock.com/s/erosion-prevention/search.html>

<http://www.wikihow.com/Control-Erosion>

<http://www.civil.ryerson.ca/stormwater/menu_5/index.htm>

Some possible questions to help guide groups:

Suggest some ways man can prevent erosion?

Have you seen examples erosion prevention/control? Show pictures.

Design and construct an erosion prevention model.

Prepare to present your group model to the class. Indicate the construction method used and if the model prevented erosion or not. What would improve your model? Can have them present by poster, powerpoint, ipad pictures, etc.

Document by drawing and labeling the other models of erosion prevention. Or could use ipad to take pictures.

Which model prevented the most erosion?

Which model did not prevent erosion?

Why would we want to prevent erosion?

Current events tie in with each student sharing a news article or broadcast about erosion/weathering in the state of Utah.

**Terminology:** weathering, erosion,erode, buttes, arches, deposition, physical and chemical weathering, sedimentation, delta, erosion control/prevention

**Career connections:** Civil engineer, Soil Scientist, Ecologist, Geologist, Map maker (Cartographer) Agriculturist, Architect, Construction,

**Extension questions for trip home:**

What evidence of weathering can you observe outside?

Where did you observe this weathering?

What type of weathering do you think is happening? Chemical or Physical? Explain.

*This could lead into a chemical vs physical change lab.*