Odyssey of the Eyes
Beginning Level

Purpose

To familiarize students with the importance of perspective and introduce students to various scales of remotely sensed data.

Overview

Students create a 3-D model of an area and develop a classification system for the landforms in their model. They use their eyes as remote sensors and view the model from a variety of heights and perspectives. Students then create maps of the objects they see. The maps can be used to answer certain questions about the environment.

Student Outcomes

Science Content

Physical Science

Symbols are alternative ways of representing data.

Science as Inquiry

Draw pictures that correctly portray at least some of the features of the thing being described.

Geography

Primary

How to describe the student's own region from different perspectives

How to display spatial information on maps and other geographic representations

The spatial concepts of location, distance, direction, and scale

Middle

Physical characteristics of places

How to make and use maps and to analyze spatial distributions and patterns

Enrichment

A map is a symbolic representation of a certain area.

Maps of the same area can be represented with different scales.

Field of view is how large an area you can perceive.

The field of view increases as the distance from the ground or object increases.

Remote sensing is collecting data about something from a distance.

Scientific Inquiry Abilities

Observe a landscape and design a model of it.

Draw a landscape from various perspectives.

Use different scales to view a group of objects.

Level

Primary

Time

Three to four class periods

Materials and Tools

Paper towel or toilet paper tubes

A variety of materials (boxes, cardboard, paper, paint, glue, tape, etc.) to make the models

Ruler

Writing materials

Odyssey of the Eyes Registration Form

Odyssey of the Eyes Observations of the Model

Odyssey of the Eyes Symbolic Map Data Sheet

Preparation

Gather all materials prior to the building of the model.

Using a common road map, review the basic components of maps and models such as map keys and symbols.

Prerequisites

None

Note: This activity presents concepts similar to those in *Relative and Absolute Directions Learning Activity* in the *GPS Investigation*.

Background

In the *Manual Interpretation* and *Unsupervised Clustering Mapping learning activities*, students create a land cover type map of the 15 km x 15 km GLOBE Study Site. The image you receive has been acquired from a satellite. Your students will classify the land cover types manually or with the use of a computer. They will also collect data, using the *Land Cover Sample Site Protocol*, to verify the accuracy of their resulting map. It is important to understand the concepts of modeling and remote sensing to have a clear understanding of where this information comes from and the significance of it.

Maps are very common models for representing the Earth's surface. When we create a map, we often use remote sensing to obtain the information needed to make the map. Satellite images are one type of *remotely sensed* information or data.

We may think of remote sensing as work that is only done by satellites, yet there are many instruments, including ourselves, that are used to remotely sense objects. Although students may not know it, they have a great deal of experience with remote sensing. Anytime they observe and learn about something (using their senses) without touching it; they are remotely sensing the object. Also, using a camera and a microscope are other forms of remote sensing. Cameras and microscopes give us information that we would not be able to access if we attempted to observe an object with our own limited senses.

Scientists who study land cover use a variety of aerial photography and satellite images depending on the purpose of their study. GLOBE scientists are interested in analyzing the satellite images to determine land cover types and land use changes over time.

Satellite images are made up of tiny squares called pixels. Look very closely at the satellite image of your GLOBE Study Site and you will be able to see this. Each square/ pixel contains information about the dominant characteristics of a certain land cover area. Some images have pixels that represent a large area on the ground and others have pixels that represent smaller areas. The size of the area covered in a pixel is known as the resolution of the satellite image. The smaller the pixels' size, the better the resolution.

Resources *(Optional)*

Looking Down. Jenkins, Steve. NY: Hutton Houghton Mifflin, 1995. ISBN 0-395-72665-4

View from the Air. Lindberg, R. NY: Viking, 1995. ISBN 0-670-84660-0

Mouse Views. McMillan, B. NY: Holiday House, 1995. ISBN 0-8234-1132-x

What To Do and How To Do It

Part 1: Building and Viewing the Model

1. Students form groups and write a plan for building a model of an area, real or imagined. The schoolyard is a popular choice; however, the design of the model should be student generated. Students should list materials necessary and draw a proposed picture of their model on the *Odyssey of the Eyes Registration Form*.
2. Students will need two to three class periods to build their models.
3. Students will now use their eyes to view the model through a paper towel tube from four different views. This will give students an opportunity to view a change in *resolution* and a change in *field of view*. Have students record their observations on the *Odyssey of the Eyes Observations of the Model Work Sheet*.
    a. **Mouse View** — Observe the model from the side. Draw a map of the model and label it.
    b. **Bee's View** — Observe from 10 cm above the model. Draw a map of the model and label it.
    c. **Bird's Eye View** — With the model on the floor, observe from desk level. Draw a map of the model and label it.
    d. **Satellite View** — Observe from a second story window or stairwell. Draw a map of the model and label it.

Discussion Questions

1. Are there any visual differences between the Bee's View and the Mouse's View? What are they?

   Note: Young elementary school children often have more difficulty with the concept of "top view." Some extra time may be needed here. See resource list for suggested resources.

2. Compare your four drawings. Which view would be the most useful if you were:

   a. An eagle looking for a mouse?

   b. Deciding where to build a mall?

   c. Looking for animal tracks?

   d. Studying the extent of deforestation or reforestation?

   e. Finding a lost child in the woods?

   f. Seeing how much of the forest in your area has been damaged by pollution?

   g. Looking for a lost pin?

3. What are the advantages of using satellites to view the Earth? Are there any disadvantages?

Part 2: Making a Symbolic Map of the Model

1. Have students pick a symbol to represent each land cover type in their model (roads, rocks, playground equipment, pond, river, grass, houses, etc.). List the land cover items and symbols in the *Odyssey of the Eyes Symbolic Map Data Sheet*.

2. Use the symbols to create a map of the area on another sheet of paper.

3. Have student groups exchange symbolic maps, decipher the maps, and write a fictional story about an event that could occur within the depicted environment.

Note: If you plan on doing *Odyssey of the Eyes Intermediate Level*, please save the maps and models for comparison.

Discussion

1. If you were asked to make a map of your neighborhood, would you prefer to draw a true to life map or a map using symbols? Why?

2. Which distance (mouse, bee, bird, or satellite) would give you the best field of view for observing the area in your GLOBE Study Site? Why?

Extension

Collect a few different types of maps or ask students to research different types of maps. Discuss the purpose of each map. Explore the maps' different scales and fields of view in the discussion.
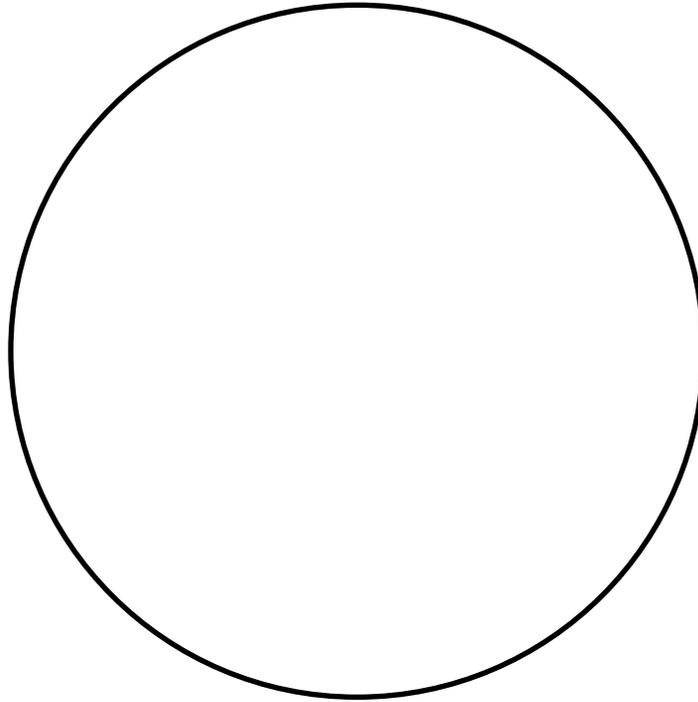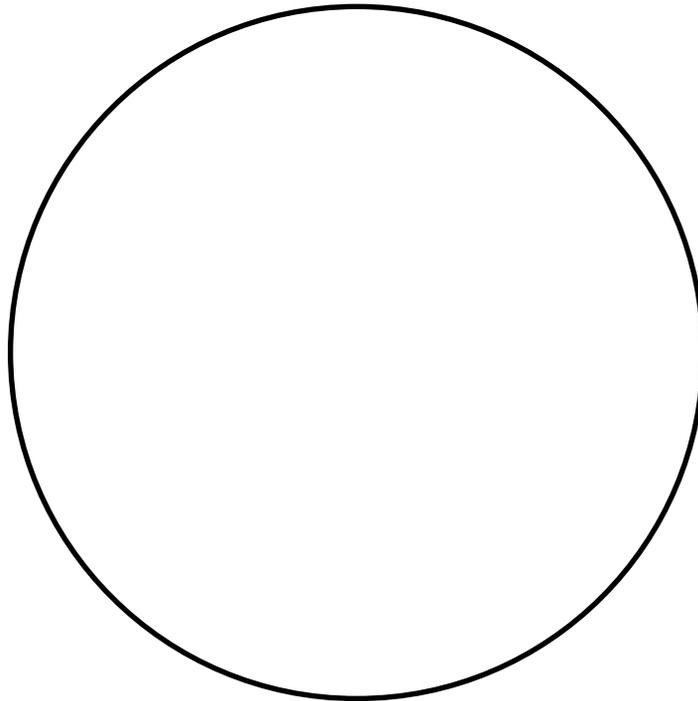
Odyssey of the Eyes
Registration Form

Name: _____Date: _____

Write a short description of the model you are going to create in the space below.

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Materials Needed	Provided By

On the back of this page, draw a diagram of the model you are going to create.

Odyssey of the Eyes

Observations of the Model-1
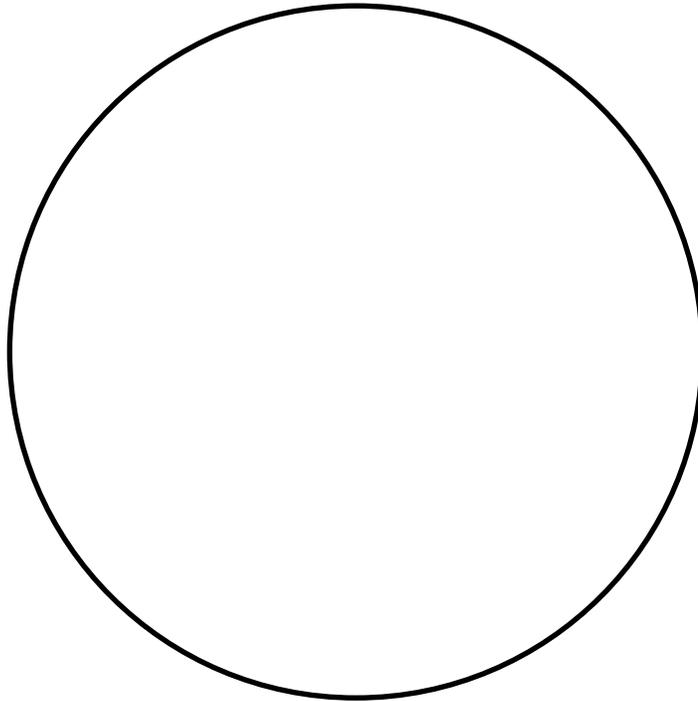
Name: _____ Date: _____

Mouse View

Bee's View

Odyssey of the Eyes
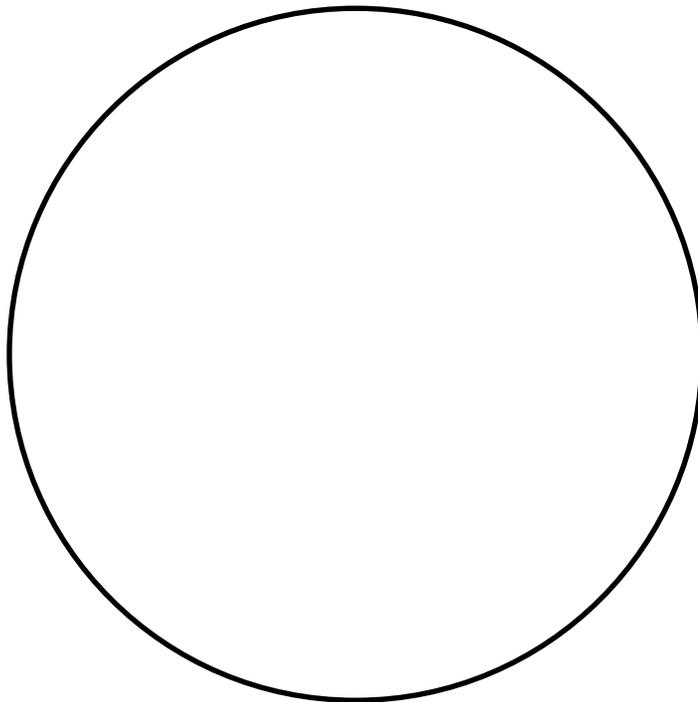
Observations of the Model-2

Name: _____ Date: _____

Bird's Eye View

Satellite View

Odyssey of the Eyes

Symbolic Map Data Sheet

Name: _____ Date: _____

	Land Cover Key	
	Land Cover Type	Symbol
	Example: Road	≡≡≡≡≡
	Example: Tree	▲
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Use the back of this paper to draw your symbolic map. Include the dimensions of the map in centimeters (length and width).