POLAR TREC Learning Resources

Details

Completion Time: More than a week

Permission: Download, Share, and Remix

Life Size Models of Bowhead Whales

Overview
Students create a life size model of a bowhead whale based on information they have collected.

Objective
Students will be able to organize specific technical information from a variety of resources to develop a "blue print" or pattern to create a life size model of a bowhead whale.

Procedure
Introduction to project, student research on whale characteristics from provided sources, creation of bowhead pattern, creation of life size model.

Introduction
Show whale video from: http://video.nationalgeographic.com/video/animals/mammals-animals/whales/whale_bowhead/

Introduce: species, location (use globes to find it) general ecology, relate the location to social studies class for early North American explorers (Basques and Vikings) as well as First Nations.

Activity: Using a piece of paper (or small white boards) how would you describe this piece of fruit (an orange) to someone from another planet? Remember that the visitor doesn't know what the word or fruit orange means.

Whale Research
Discuss: Thinking about describing the orange, if you were asked to describe one of these whales, what would you need to know? Create a list on the board. How would you describe the size and shape? How could we make a model of a whale to show your parents since a trip to Greenland isn't possible? Create a

Materials

- rolls of butcher paper
- recycled newspaper or old wrapping paper and packing peanuts for filler
- markers
- staplers and staples
- clear tape (package and scotch)
- computers and internet access (or if not, print the resources and download the video for later)
- oranges – one per student if possible (great snack after)
- globes
- pattern models: sewing pattern, cross stich pattern, soccer or football field grass pattern, model plane plans, car blueprint/schematic, school architectural drawing
- 1-cm square graph paper
- rulers
- calculators
- pencils and paper

list of student ideas on the board. Tie in home economics class if one on campus for sewing patterns. Use various blueprint and plan models to direct students to specifics that they will need to know in order to make the model whale plan. Be sure to generate specific measurements needed from the readings: tail length, overall body length, width, size of head, location of eye, fin length and placement, size of mouth.

Assign: these are the resources you have to gather your information from. Restate what students need to look for in order to make their pattern (either use a handout with specifics or a student generated list as guide for research.) Allow time for students to collect information.

Notes: include a body part general measurements and sketch with information gathering requirements to start students thinking about the drawing product, other resources may exist in school library or on-line to round out available information. If computer use is limited, print out and make copies of the information for students to use.

Regroup
Discuss: What students found (generating a large list or overhead for students to fill in would be helpful to compare different information gathered). Which resources were helpful? Which ones were not? What information is missing? Are there multiple sets of the same data or are there conflicting numbers? Decide as a class what information to use to create the drawing.

Model/scale drawing creation
Assign: Although we are planning to make a life-sized model of a whale, we need to make a pattern before we make the big whale so that we don't waste our resources and or make it funny looking (too thin, disproportioned, etc.). Discuss scale and proportions (coordinate with math teacher to ensure that students understand what they are drawing), demonstrate how to create – but be careful not to have a specific model so that students are unable to copy. Students will need to create a scaled side, top down, and front view. Remember to discuss scale and ratio for correct placement of body parts. After creating refined product, conduct a gallery walk and have students write one positive and suggestive comment (plus/delta) about their classmates' drawings. Use these plus/delta charts as basis for student personal reflection on scale drawing process. As a class, select which student-generated pattern to use. Make copies of the pattern for the next step.

Notes: Have students create a sample scale drawing of something with straight lines and geometric shapes first may make the transition into curved lines easier, a pre-created example might be helpful for comparison after students' initial attempt, a rubric for the drawing may assist in scoring, using a created form for reflection and plus/delta may facilitate student ease of use.

Build the Whale!
Using a selected student pattern, construct the life-size whale from butcher paper, staples and tape. Use cafeteria or gym as a staging area. Walking out the size with string will help

students see true size before breaking into groups to make various parts based on selected pattern.

Extension
Create plans and perhaps models of other cetaceans for overall size comparison, create a model "cetacean" park. Publish student scale drawings on class website or in school paper, use the whale to "give tours" to other classes by making students expert model whale keepers so they can assist other students in exploring various parts of the paper whale and its ecology, have the model whale be the center of science night at school, alert the local paper or district publication.

Resources
1. http://www.youtube.com/watch?v=1IsW7t2e22g
2. http://wwf.panda.org/what_we_do/endangered_species/cetaceans/about/right_whales/bowhead_whale/
3. http://worldwildlife.org/species/bowhead-whale
4. http://en.wikipedia.org/wiki/Bowhead_whale
5. http://www.enchantedlearning.com/subjects/whales/species/Bowheadwhale.shtml
6. http://acsonline.org/fact-sheets/bowhead-whale/
7. http://marinebio.org/species.asp?id=278
8. http://www.savethewhales.org/bowhead.html

Credits
Turtle Haste

National Science Education Standards (NSES)
Content Standards, Grades 5-8

Content Standard A: Science As Inquiry
a. Abilities necessary to do scientific inquiry
b. Understandings about scientific inquiry

Content Standard B: Physical Science
a. Properties and changes of properties in matter
b. Motions and forces
c. Transfer of energy

Content Standard C: Life Science
a. Structure and function in living systems
b. Reproduction and heredity
c. Regulation and behavior

Common Core State Standards:
http://www.corestandards.org/ELA-Literacy/RST/6-8
CCSS.ELA-Literacy.RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.
CCSS.ELA-Literacy.RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
CCSS.ELA-Literacy.RST.6-8.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.