

Levers

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Concept:

Simple “machines” like levers have been used throughout history to solve problems like raising totem poles.

Alaska Science Standards:

- ✓ B1) Use the processes of science; observing, classifying, measuring, interpreting data, inferring, communicating, controlling variables, developing models and theories, hypothesizing, predicting, and experimenting.
- ✓ C5) Understand that sharing scientific discoveries is important to influencing individuals and society and in advancing scientific knowledge.
- ✓ D3) Recommend solutions to everyday problems by applying scientific knowledge and skills.

For a description of Alaska Education Standards visit the State of Alaska Department of Education & Early Development Website: www.eed.state.ak.us

Note: The activities in the unit are designed to help children reach these goals. Students participating in the unit are required to partake in; all the activities, record their data, make inferences, create team reports, and take written tests. A suggested scoring guide follows this lesson.

Vocabulary:

- ✓ Lever
- ✓ Fulcrum
- ✓ Effort
- ✓ Resistance
- ✓ Work

Materials:

- ✓ Photographs of totem poles in place in southeast Alaska
- ✓ Special note on the surrounding environment (crowded with trees or open ground?)

Gear-Up:

Students will look at pictures of totem poles that are erected around southeast Alaska. They will discuss how they were raised in the absence of modern equipment.

Gear-Up process skills:

Communicating, Observing, Inferring

Materials:

- ✓ Lincoln Logs® or dowel rods
- ✓ Pickup Sticks® or small twigs
- ✓ string
- ✓ thread
- ✓ spring balances

Explore:

Design different methods of raising poles given materials to work with. Discuss possible solutions. Construct model and test design.

Explore process skills:

Communicating, Hypothesizing, Experimenting, Analyzing

Generalize:

Ask students how they raised their poles. Discuss levers.

Generalize process skills:

Communication

Materials:

- ✓ *Rain Country* video segment on a totem raising
- ✓ Video *Carving from the Heart*

Apply/Assess:

1. Students identify other levers used to raise objects around Alaska. They may find inclined planes also.
2. Assess by discussion resulting from watching the *Rain Country* video and *Carved from the Heart*.

Apply/Assess process skills:

Observing, Communicating

Extensions:

- A. Tour the Totem Heritage Center or the Alaska Native Heritage Center.
- B. Watch power company raise telephone poles.
- C. Interview village elders and compare techniques of the past with what would be used today.

Extensions process skills:

Interpreting, Observing, Communicating

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Scoring Guide: Levers

Standard	Rating of 1 (poor)	Rating of 2 (fair)	Rating of 3 (competent)	Rating of 4 (outstanding)
B-1	Student follows general directions for experimentation.	Students follows the details of directions for experimentation.	Student is competent in recording & evaluating of experiment	Student is competent in all phases of experiment & in analyzes of results
C-5	Student does not compare communities sharing scientific information.	Student compares evidence of local communities sharing information (historically /culturally based.)	Student compares evidence of regional communities sharing information (historically/culturally based.)	Student compares historical evidence of scientific sharing AND current sharing of information (AIDS or genetic global conference, etc.)
D-3	Student recognizes one use for simple machines to solve problems (door wedges for example.)	Student recognizes many uses of simple machines in daily life.	Student recognizes & creates many types of simple machines to ease life.	Student creates & identifies functions of simple machines.