Dam Models

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PURPOSE
Understand the complexities and physical difficulties involved with holding back on active river.

THEME STATEMENT
Good ideas and concepts must be technically feasible. Constructing a dam has many positives, but they must be able to fit in with an area's topographical landscape.

SUGGESTED TIME:
Approximately two to three class sessions (continuing throughout the unit).

KEY VOCABULARY & CONCEPTS
Dam, reservoir, hydroelectricity, TVA, Yangtze River, flood plain.

MATERIALS NEEDED

INITIATION (Inquiry, Preview, Involvement)
Suggest that the students are all engineers and that the federal government needs their assistance. Show the students the river model (or chute) and dump a pail of water down it. Explain that the river is getting out of control and that the government has determined that a dam is needed on the river. To design and build the dam, the government has turned to them, the best engineers in the country.

DEVELOPMENT (Instruction, Data Collection, Organization)
1. Form groups of approximately four students. Each group of "engineers" will be responsible for making a dam, assessing the cost of the dam, and justifying in a paper why they chose their dam.
2. Inform groups that the dam materials are available, but they cost money. The materials range from a 3" by 3" square of construction paper (cheapest) all the way up to legos (most expensive).
The construction paper can cost $100 per square while the legos are $5,000 per piece. The toothpicks can be worth $200 each and the popsicle sticks cost $1,000 a piece. Connecting material (i.e., rubber cement, glue, string) is free and other materials can be added with a comparable price.

* The government would like to purchase a dam that is cost efficient but still works.

EXTENSION:

1. Using the model river (which should be approximately 3 feet long and descending at a 30 degree decline) each group will individually position their dam for a test. A small bucket of water will be released down the cute and each dam's effectiveness will be assessed.

2. The group will precede their demonstration by explaining to the class: what materials were used, its total cost, and why they chose those materials. The price and justification paper will be turned in after the demonstration.

ASSESSMENT:

1. Each group will be graded on a two-point rubric scale for their dam: Full credit (two points) if the dam holds back the water for a few seconds or so; one point for an attempt to build a dam and it does not hold back the water; zero points for not completing the assignment.

2. The paper will be on a two-point scale as well: Two points for cost figures and some attempt to justify the dam; one point for some figures or no justification; zero points for failure to turn in assignment.

3. Class interaction and discussion on what problems the groups may have encountered while building their dams.

KEY QUESTIONS:

1. What is the first thing that must be determined when building a dam? (dimensions of the river bed).

2. What restrictions did you face when building your dam? (limited materials, how the total cost was affected, ineffective co-workers, poor planning, etc.)

3. What happens to a river on each side when it's dammed up? (one side goes up, one down).

4. What happens if your farm is on the side that rise? What if it's on the other side?

5. If you live in an area flooded by a dam, how would it affect your life?