

Beavers: Natural Civil Engineers

Introduction:

Objective/Learning Targets

Identify how beavers are natural engineers by discussing how beavers make dams. In addition, create and design a dam to employ civil engineering and architectural principles.

Resources

Materials:

- Illustrations of various dams
- Rectangular trays, like dish bins or storage containers (transparent is ideal)
- Containers to hold and pour water
- Water
- Construction material such as soil, sand, gravel, modeling clay, sticks, and other construction materials
- Books or blocks to elevate one end of each tray
- Scoops for construction material used.

Amount of Time: 60 minutes

Age Range: 6th grade and above

Warm-Up / Before Activity

1. **Optional:** Use the following PowerPoint to guide the discussion questions.



Beaver- Civil
Engineering .pptx

2. **Discuss how animals adapt to their environment:** Ask the students if they can think of any and have them share some of them.
 - a) Many insects can camouflage themselves so they can blend in their surroundings making it hard for predators to find them (WWF).
 - b) The Bactrian camels are able to survive harsh conditions of their environment by being able to conserve food and water for long periods of time (Animal Planet).
3. **Share some fun facts about beavers:** (www.sciencekids.co.nz/sciencefacts/animals/beaver.html)
 - a. Beaver colonies create dams of wood and mud to provide still, deep water in order to protect against predators such as wolves, coyotes, or bears, and also so they can float food and building material to their homes.
 - b. Once the dams are completed and ponds formed, beavers will work on building their homes called lodges in the middle. The dome shaped lodges, like the dams, are constructed with branches and mud. Lodges have underwater entrances, making entry tough for most other animals.
 - c. There are usually two dens within the lodge. One is for drying off after entering from the water. The other is where the family of up to four adults and six to eight young Beavers live.
 - d. Beavers like to keep themselves busy by building during the night. Hence the saying "As busy as a beaver."
3. **Before Construction:** Have students predict what they think will happen with each of material: soil, sand, pebbles or gravel, and modeling clay.
 - a. Also, divide students into equal groups of about 3-5 students.

Activity/Process

1. **Construction:** (<http://www.nationalgeographic.com/geoguide/dams/plansk4.html>)
 - a. Take a rectangular tray and make a dam with soil, gravel, sticks, and other construction materials.
 - b. Be creative in the materials that are used!
 - c. Elevate one side of the dam and fill that area of one side of the dam with water.
 - d. Observe the dam to see if it is able to withstand the water. Measure how long it is able to.
 - e. Identify what materials retained the water the best!
 - f. Afterwards, please help clean up the floor and any mess left by the clay/gravel/sand.



Conclusion

- Discuss the dam experiments. Which materials and designs retained water the best?
- Ask students what they found interesting about the experiment and beavers.
- Discuss how beavers engineering relates to humans and our daily life.

Evaluation

After the students reflect about the dam experiment, illustrate how beavers are natural civil engineers. Beavers intuitively build houses that are sturdy in which water does not easily break it down. Civil engineers also make sure to design houses that are strong and safe for people to live in.

