

Dams and Levees



1. What is a dam? Briefly describe what it does and how it is different from a levee.
2. Explain how beavers build dams and why. How do beaver dams affect the environment? How else can dams be created in nature?
3. What are the benefits of dams? What are some potentially negative aspects of dams?
4. List five materials historically used in constructing a dam embankment.
5. From pictures, identify the following structures and explain their features and application:
 - a. Arch dam
 - b. Buttress dam
 - c. Gravity dam
 - d. Diversion dam
 - e. Hydroelectric dam
 - f. Levee or dike
 - g. Locks
 - h. Low-head dam (weir)
 - i. Run-of-the-river dam
 - j. Saddle dam
6. Know the following terms to be able to explain it to someone unfamiliar with dams and levees:
 - a. Cut-off trench
 - b. Fish passage/ladder
 - c. Rock toe
 - d. Spillway
 - e. Piping
7. Explain why someone should consider a low-head dam dangerous and avoid it while canoeing, kayaking or swimming.
8. Dams are complicated structures. How do the following issues affect the consideration, design or construction of a dam?
 - a. Wildlife
 - b. Water quality
 - c. Emergency spillway
 - d. Emergency action plan
 - e. Safety
 - f. Geotechnical investigations
 - g. Discharge structure
 - h. Slope stability
 - i. Hydrology and hydrologic analysis
 - j. Flow net analysis
 - k. Permitting

9. Research or interview an engineer or other expert on dam safety. Have the expert explain the inspection techniques that they use to identify a failing dam.
10. Do one of the following:
- a. Research and/or visit a fish passage/ladder for a dam structure and design/sketch one for a dam near you.
 - b. Research and/or visit a locks system. Using materials of your choice, construct a model of a lock system with moving parts.
 - c. Using contour maps, design a dam for a local stream and do/answer the following:
 - i. Draw a plan view and cross section(s) of your dam showing spillway, emergency spillway, crest, slope angles, toe of slopes, normal high-water elevation and other pertinent features.
 - ii. What type of dam did you select and why?
 - iii. What is the Hydraulic Head of your dam?
 - iv. Outline the limits of the watershed that is tributary to your dam.
 - v. How large (surface area and volume) of a reservoir will be impounded by your dam?
11. Read Daniel 5 and research how Darius the Mede captured Babylon. Find two other places in the Bible where dams or the control of water are mentioned.
12. Share a devotional with your Pathfinder Club on a spiritual lesson that you learned while studying this honor

Skill Level 2

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