

## Activity 10: Designing for Salmon and Steelhead

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Chinook (top), Steelhead (largest fish), and Coho (in front of steelhead) from the Shasta River, northern California.  
Photo by Lisa Thompson

### **Overview**

Participants design a tank habitat that mimics as closely as possible the creekbed habitat of spawning salmon and steelhead, and salmon and steelhead eggs, alevin, and fry. In creating their designs, participants focus on the habitat requirements of salmon and steelhead at these critical phases of their lives, when they may be present in the local creek.

### **Background Information**

In the Enrichment to this activity, we suggest that your group raise salmon or steelhead from eggs to fry. To do this, the group would receive salmon or steelhead eggs from a hatchery, raise them in a tank, and then release the young fry at a designated site in the wild. While this project can be a lot of work, it is a wonderful learning opportunity for participants. Through this experience, they learn to care about salmon in a deeply personal way as they gain a practical understanding of salmon and steelhead habitat requirements.

There are many organizations around California that can support groups wanting to incubate salmon or steelhead eggs. For information about raising salmon or steelhead, check with your resource professional for a local organization or contact one of the organizations listed in [Resources: Raising Salmon and Steelhead](#). Local organizations may be able to help you get the needed equipment and permits, acquire eggs, and release the fry.

Because of the sensitivity of salmon and steelhead in California, the Department of Fish and Game regulates the raising and releasing of salmon and steelhead. Educators must obtain an approved authorization from the Department of Fish and Game to raise salmon or steelhead eggs and release the fish in a designated site in the wild. That site might not be in your watershed, so be aware that you may have to travel some distance to release your fry.

### **Objectives**

Participants will (1) design a tank habitat for eggs and young salmon or steelhead that will meet their needs for water temperature, oxygen level, and substrate, and (2) compare their tank design with tank set-up instructions online to see how well it meets the needs of salmon and steelhead.

### **Time**

One group session

## Materials

- Drawing paper, 1 per team
- Colored pens or pencils for each team
- Empty 20- to 30-gallon aquarium (optional)
- Aquarium or scientific supply catalogs, online or hard copies (optional)
- Access to Internet
- Equipment for setting up salmon or steelhead egg incubator (optional, see [Advance Preparation, step 3](#))

## Advance Preparation

1. (Optional) For their tank designs, it is helpful for participants to see what types of equipment are actually available. Collect copies of catalogs that may come to your science department, or have available online catalogs for participants to see (see [Resources: Scientific Supply Companies](#)).
2. (Optional) Ask your salmon and steelhead resource professional to connect you with a program for [raising salmon and steelhead eggs](#). You must have written authorization from the California Department of Fish and Game to raise and release salmon or steelhead (see [Background Information](#)). If you do participate in such a program, you will need to acquire the necessary equipment to actually set up and monitor a salmon and steelhead tank. Ask the program coordinator for specific details. Plan for the salmon or steelhead fry's release when they are about one and a half inches in length (about six weeks after you get the eggs).

## Setting the Stage

1. Ask participants, "What have we learned so far about what spawning salmon and/or steelhead and salmon and/or steelhead eggs, alevin, and fry need to live in our local creek?" (They need clean water, cool temperatures, gravel, plenty of dissolved oxygen, and moving water.)
2. Explain to participants that they will use what they learned about the habitat requirements of young salmon and steelhead to design a suitable tank habitat for salmon and steelhead eggs and fry. If your group will actually be raising salmon or steelhead eggs, tell participants that their designs will help them set up a suitable tank for them.
3. Show participants the aquarium (if you have one), and ask, "What things might we need to add or do to this aquarium to make it suitable for salmon and steelhead eggs, alevin, and young fry?"

## Conducting the Activity

1. Give each team a sheet of drawing paper and colored pens or pencils.

2. Explain that each team must develop a tank design that will meet the needs of salmon eggs, alevin and young fry. Assuming that they start with an aquarium tank, teams will plan together what they would put in, on, or around the tank to make it a suitable habitat. The team should work together to draw a picture of their design.
3. Point out that teams may “invent” equipment as necessary to their designs, or they can look at catalogs or websites (if you have them available) to see what might be helpful for meeting certain habitat needs.
4. Circulate among the teams to answer any questions or to help resolve any issues.
5. When teams have completed their designs, post them on the wall. Have a participant from each team briefly describe their tank’s design features, including how the design meets the salmon and steelhead needs for clean water, cool temperatures, bottom materials (gravel), food, plenty of dissolved oxygen, and moving water.

### **Wrap-Up**

1. Have participants compare their designs to [Salmon in the Classroom: Closed System Tank Set-Up and Maintenance](#). You can also download instructions for tank setup from the California Department of Fish and Game’s web site.
2. Have teams place their tank designs in their portfolios.

### **Enrichment**

Raise salmon or steelhead eggs. Have participants keep journals to document the changes they observe over time. (See [Advance Preparation](#) for information about how to get started.) Discuss how the fish may have to adjust to the natural conditions in the wild after growing up in the tank (different types of food, presence of predators, and so on). Matching tank temperatures to the temperature of the stream where the salmon or steelhead will be released will help the fish grow at the same rate as wild fish. If their growth rates are suppressed by overly cold water, the fish you raise may be smaller than wild fish when they get released, which would lead to higher predation rates than natural (larger fish swim faster and are more likely to escape predators).