



WHAT DO FISH EGGS NEED TO SURVIVE?

Healthy streams provide the physical and chemical environment fish eggs need to survive.

Your classroom incubator . . .

- provides an artificial, but protected, healthy habitat for rearing trout eggs to the fry stage, and
- gives students an opportunity to observe and participate in fish development and to understand the habitat needs of eggs and fry.

The following chart describes conditions necessary for egg and fry development, how nature provides for those requirements, and how the classroom incubator models them.

EGG/FRY REQUIREMENTS	NATURAL HABITAT	AQUARIUM HABITAT
<ul style="list-style-type: none"> • Clean water (contaminant-free) 	Clean water is stored and gradually released in a healthy, properly functioning watershed. A healthy stream can absorb minimal human impacts. Human pollutants can harm streams. Bacteria and other organisms usually break down or eat naturally decaying matter in streams. Some pollutants are resistant to the natural processes of decay. Plants also absorb nitrates.	<ul style="list-style-type: none"> • Dechlorinated water • Filter removes wastes. Biofilter encourages microorganisms which change harmful ammonia to harmless nitrates.
<ul style="list-style-type: none"> • Cold water (35° - 55° F) 	<ul style="list-style-type: none"> • Snowmelt, water from underground sources, and shade from streamside plants help keep water cool. 	Refrigeration unit (or other watercooling system) maintains desirable water temperature.
<ul style="list-style-type: none"> • Oxygen (7 - 12 ppm dissolved) 	<ul style="list-style-type: none"> • Cold, rushing water gathers and holds oxygen from the air. 	<ul style="list-style-type: none"> • Aeration system adds and circulates oxygen.
<ul style="list-style-type: none"> • Limited light (as eggs and alevin) 	<ul style="list-style-type: none"> • Eggs are buried in the redd. 	<ul style="list-style-type: none"> • Styrofoam or other types of insulation protect aquarium from direct sunlight and harmful ultraviolet light in classroom (also helps keep water cool).
<ul style="list-style-type: none"> • pH (6.5 - 7.5) 	Runoff from nearby rock and soil types, parking lots, animal wastes, and decaying organic matter in the water all affect pH	<ul style="list-style-type: none"> • Proper balance between acidity and alkalinity - optimum is 7.0 (a neutral solution).
<ul style="list-style-type: none"> • Gravel 	<ul style="list-style-type: none"> • Rocks and gravel are washed into the stream and tumbled smooth by the water and other rocks. Spaces between the gravel are sediment-free. 	<ul style="list-style-type: none"> • Clean gravel is placed into aquarium.
<ul style="list-style-type: none"> • Food 	<ul style="list-style-type: none"> • Aquatic insects that live in the gravel or fall into the water and tiny zooplankton are food items for fry. 	<ul style="list-style-type: none"> • Not provided in aquarium - unfed fry are released into an approved water body.
<ul style="list-style-type: none"> • Protection from predators. 	<ul style="list-style-type: none"> • Eggs buried in the gravel are generally safe from birds and other predators. Fry have protective coloration and hide under rocks and other stream habitat. 	<ul style="list-style-type: none"> • No predators in the aquarium.



Water Education Programs from the **Portland Water District**

www.pwd.org Irishard@pwd.org