Ring Around the Rock

(20 minute activity)

Objectives

Students will be able to:

1) Explain the concept of embeddedness and the way it can affect aquatic life

Materials

- ❑ Rocks (from previous activity)
- ❑ Plastic tub
- ❑ Half a bucket of soil
- ❑ Water

Background

Aquatic life is challenged when there are too many sediments, and they fill in spaces around larger substrates. It is especially a problem when sediment transport and deposition happens frequently, and gravels cleaned by spawning fish become smothered by transported sediment, suffocating developing fish eggs. Many aquatic insects live on substrate in interstitial spaces and cannot survive if a sediments smother their gills. A common evaluation performed by fisheries biologists is measuring the *embeddedness,* the degree that larger rock particles are surrounded by silt. If 35% or more of each rock is covered with sediment, it raises a red flag about the quality of that area for insect production, spawning, and providing cover for fish. Substrate or rocky particles on a streams bottom are classified as: **sand** which is <2 mm, **gravel** 2-64 mm, **cobble** 64 – 256 mm and **boulders**, 256-1024 mm.

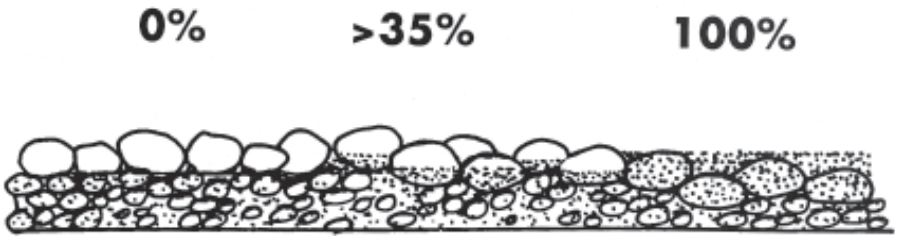

Figure 3. Embeddedness

Procedure

1. Place substrate in the plastic box.

2. Pour soil over the substrate, distributing it unevenly.

3. Add enough water to soak the soil. Keep the box flat. Check the rocks in a week. There will be a line around the rocks created by the silt. The longer the rocks soak, the clearer the mark will be.

4. Add water to the substrate before presenting to students to simulate a stream.

5. Ask students to measure the level of embeddedness and to classify the rock size in proportion to the size of the stream in the box. Cobble may represent boulders, for example. Is the amount safe or in the danger zone for aquatic life?

Assessment

Ask students to:

- ❑ List the ways silt finds its way into a stream or creek.
- ❑ Discuss the effects of embeddedness on fish and macroinvertebrate habitats.
- ❑ Ask the students to bring in examples of substrate particle sizes such as sand (sugar, salt), gravel (peas), cobbles (tennis balls), and boulders (basketballs) and provide the technical substrate names for them.
- ❑ Using examples of sand, gravel, cobbles, and boulders, ask the students to demonstrate where the embeddedness line would be for 25%, 35%, 50%, etc., and for the percent (35%) that raises a red flag about a possible sedimentation problem.