

Sediment Experiment- Trout Eggs



Grade	4 th (could be scaffolded for all grades, K-12)
Time	35-45 minutes
Overview	Student model the effect of sediment on trout eggs and learn how sediment affects eggs' ability to survive and exchange gasses with their environment.
Objectives	<p><u>Understanding:</u> Students understand life needs of trout change throughout their life cycle and impacts of sediment on trout egg survival.</p> <p><u>Skills & Processes:</u> Students follow multistep directions to construct a model of fish eggs in a streambed.</p> <p><u>Values:</u> Humans impact organisms in their environments and can positively affect sediment load in streams.</p>
Essential Question	What is the effect of sediment on trout egg survival?
Primary VA SOL	Science (2018): 4.1, 4.3, 4.8
Related VA SOL	Math (2016): 4.8, 4.11

<p>Materials</p> <ul style="list-style-type: none"> • Datasheet & pencil; 1/student • Bendy straw (1/student) • 1 pint or larger container: beaker/takeout tub/cup (1/student) • Buckets of CLEAN gravel • Buckets of CLEAN sand • Buckets of dry clay (crumbled into powder) • Marbles or decorative glass "eggs" (5/student) • Buckets of clean water • 250 mL beakers (one per student) • Clean-up station(s) with 5 gal buckets of water for rinsing, a strainer, and a dump bucket • Student Direction Pages • Labels on buckets listing amount of the material needed for experiment 	<p>Special Safety</p> <p>Remind students not to <i>suck</i> on the straw, only blow.</p>
<p>Set Up</p> <ul style="list-style-type: none"> • Gravel and sand is dirty when purchased and needs to be rinsed. • Buckets of gravel, glass marble "eggs", sand, clay, and water placed around the teaching space. • Place "eggs", straws, containers, beakers, datasheets, and pencils for each student at their designated space. • Clean-up station prepped for multiple classes. 	

Instructional Strategy	
Recommended Grouping/Instructional style	In Pairs or individual Hands-on Modeling
Steps	<ol style="list-style-type: none"> 1. Engage (initiate learning): <ol style="list-style-type: none"> a) Inquire: What are the stages of a Trout life cycle (Eggs, Alevin, Fry, Adult). b) Go through each stage and have students describe the life needs. There is a popular misconception of thinking eggs (and seeds) are not exactly alive, and don't have life needs, however they need a specific range of temperature and oxygen. c) Inform that at this station, they'll be exploring the oxygen need of eggs, and what things can affect how much oxygen they can get in the water. 2. Explore (question & investigate): <ol style="list-style-type: none"> a) Guide student attention to the directions and datasheet at their table. Depending on the independence of the students, either go over the directions with them or let them read independently. Show them where to find their materials and let them build their models. b) As students work through the directions, move among them to help clarify and answer questions. Make sure they're recording observations. 3. Explain (clarify & analyze): <ol style="list-style-type: none"> a) Ask students to explain their observations. They should have noticed that when sand was added to the water it got a little harder to blow bubbles, and then when clay was added, it was much harder AND the eggs were visibly covered with mud. b) It's good to engage students between adding clay and the blowing attempt as the clay needs a few moments to settle. Alternatively, ask them to try again after they have recorded data so that they can experience the settling. c) Depending on how carefully they created and tested their models, students may have different experiences. This is an opportunity to talk about the nature of science process and why we do multiple trials. d) Have students explain what would happen to the eggs if they were real and had been covered in sediment. (Can't breathe.)

	<p>4. Cleanup: Refer to the cleanup instructions. Each station will need to have a bucket for the beakers and containers, trash can for straws, dump or blue buckets and strainers for dumping the rock mixture.</p>
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Extensions

- Refer students to the table on the other side of the datasheet. Depending on the students, this can be independent/partner/small or whole group reflection. Students should use the table to review and discuss ways in which sediment can enter waterways, how it could affect the aquatic system, and how humans can mitigate the harm.

Assessment

- Fact First Questioning- takes a factual "What" question and turns it into a deeper "how" or "why" question because you are asking the students to elaborate to draw out knowledge beyond recall.
 - Trout eggs require clean water to survive. Why do the eggs need clean water?
 - How does sediment impact the trout eggs?

STUDENT DATASHEET

1. Bend a straw into a "L", place short end on the bottom of a pint container.
2. Measure **175 mL** of gravel into a beaker. Pour gravel over the straw.
3. Sprinkle **5** marble "eggs" on the gravel.
4. Measure **200 mL** of water into a beaker. Pour the water into the container.
5. Blow bubbles, record your observations:

How hard is it to add "oxygen"? (Easy, moderate, hard)	What happened to the "eggs"?

6. Measure **75mL** of sand into a beaker. Add this to the pint container.
7. Blow bubbles, record your observations:

How hard is it to add "oxygen"? (Easy, moderate, hard)	What happened to the "eggs"?

8. Measure **50mL** of clay into a beaker. Add this to the pint container.
9. Blow bubbles, record your observations:

How hard is it to add "oxygen"? (Easy, moderate, hard)	What happened to the "eggs"?

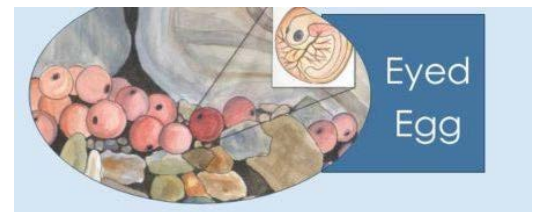
The way humans change land surfaces can cause sediment to get into water. How could each of the following affect a stream or river? How could humans fix it?

Examples	How can it affect water?	How can humans solve the problem?
<u>Structures:</u> Buildings, Bridges		
<u>Roads/Trails</u> Paved, gravel, or dirt roads or paths		
<u>Agriculture</u> Crops, Farm animals, Garden, Meadow, Lawn		
<u>Other</u> Research investigations, Picnics, playing games		

Reflection

What can you do to improve brook trout habitat?

What are some life needs for the eggs in the brook trout life cycle?



Student Directions

1. Bend a straw and place the bent end into the pint container.
2. Measure **125 mL** of gravel into a beaker. Pour the gravel over the bent straw.
3. Sprinkle **5** marble "eggs" on the gravel.
4. Measure **200mL** of water into the **WET beaker**. Pour the water into the container.
5. GENTLY blow bubbles. Record your observations:
(How hard is it to add "oxygen"? Can you see the "eggs"? Yes or No)
6. Use a beaker to add **100mL** of sand.
7. GENTLY blow bubbles. Record your observations:
(How hard was it to blow bubbles? What do you see?)
8. Measure **75mL** of clay into a beaker. Add this to the pint container.
9. GENTLY blow bubbles. Record your observations:
(How hard is it to add "oxygen"? Can you see the "eggs"? Yes or No)

CLEAN UP

- 1) Pull out straw and throw away.
- 2) Dump the contents of the container into the strainer over a [bucket](#) labeled "straining".
- 3) Strain the water into the bucket.
- 4) Dump the rock mixture into a black rectangle bin.
- 5) Rinse the pint container and beakers in a white rinse bucket.
- 6) Stack your pint containers and beakers under the teacher table.
- 7) Wipe your area and leave it clean

Thank you!!!