

COMMUNITY WATERS SCIENCE UNIT

4TH GRADE

Testing solutions

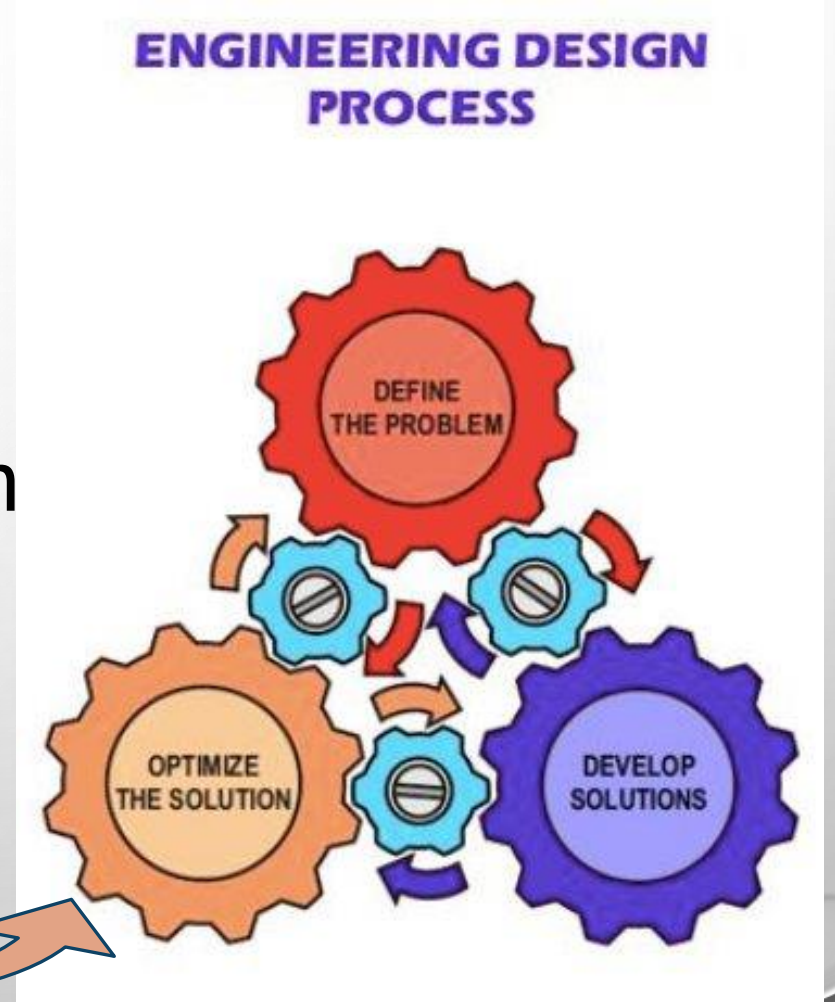
Community Waters Science Unit:
Lesson 9



TESTING SOLUTIONS

Focus Question: How can we improve our solution?

Learning Target: I can run an investigation to improve my solution.



Measuring Stormwater Runoff Investigation Procedure

Purpose of investigation: To (eventually) test how effective our solution is in solving the problem of too much stormwater runoff.

Criteria tested: Reduction of stormwater runoff.

Materials: tub set up to model the site, bucket, large and small pad, trowel, 2 spoons, and rain jar (with holes in lid).

Set Up:

- Materials Manager brings over materials.
- Measurer fills rain jar to 500 ml (milliliter) mark & screws on lid.
- Place the large pad on the table with absorbent side up.
- Put the tub with the site model on the large pad with the drain hole over the edge of the table.
- Place the small pad on the floor with the plastic side down and put the bucket on the pad under the drain hole so that the bucket will catch any water that comes out of the drain hole.

Get Ready:

1. Materials Manager removes the drain plug from the tub and holds it ready to replace in hole.
2. Rain Maker checks that the rain jar lid is screwed on **tightly!**
3. Bucket Holder holds bucket under drain hole.

During:

1. Rain Maker holds the rain jar upside down over the model and shakes the bottle to make it "rain" on the model. Do not squeeze the bottle. Move the rain jar around to all parts of the model so that rainfall is evenly distributed.
2. Materials Manager: Unplugs the drain hole in the model if it gets plugged.
3. Rain Maker continues shaking the rain jar over the model until only the lid has water in it.
4. Materials Manager: As soon as the Rain Maker is done, return the plug into the hole (preventing remaining water from continuing to drain into the bucket).

Afterwards:

- Measurer empties any water left in the rain jar and uses the jar to measure the amount of water in the bucket. Then rinses out rain jar.
- Observer records any important observations of what happened to the water in the model and the amount of water that ended up in the bucket.
- Bucket Holder drains any remaining water into the bucket, then empties the bucket and places it back under the drain hole.
- Restore any parts of the model or solution that were changed by the water.

GROUP ROLES

1. **Materials Manager**
Brings materials, clears drain blocks, and plugs drain hole when rain maker done.
2. **Measurer**
Fills rain jar to 500 ml and measures runoff afterwards.
3. **Rain Maker**
Shakes rain jar evenly around tub.
4. **Bucket Holder**
Holds bucket under drain hole to collect runoff. Rinses out bucket afterwards.
5. **Observer - Recorder**
Notes what happens during procedure and records group data on data sheet.

Why is it important to follow the procedure exactly?

In your engineering team, look over the solution you modeled. Are there any adjustments you want to make before running the test?

Run the test and record your observations on your [data table](#).

ANALYZE TEST RESULTS

Questions to consider:

- How did your results compare to the results from the teacher model?
- Did you reduce the amount of ml? If so, by how much? (Add this to #1 at the bottom of the data table.)
- What did you observe during the procedure?
- Does anything you observed help explain the results of the trial?
- Does anything you learned earlier in the unit help explain your results?
- Are there changes you could make that would help your solution work better?

PERSONAL REFLECTION



Answer questions 2 & 3 on your **Measuring Stormwater** [Data Sheet](#):

2. If we were to make changes to our model, I would...
3. A lesson from our investigation to share with the class is...