# Water Teacher Assessment Spring 2013

## Assessment given to elementary, middle, and high school science teachers in the spring of 2013


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## Teacher Assessment Spring 2013

### Survey Questions

1. For the Water Teaching Experiment (TE), please mark the best answer:
    a. I did not teach the Water TE at all.
    b. I taught one or two of the core Water TE lessons (e.g., mapping surface types, measuring evaporation and transpiration, measuring infiltration, measuring slope).
    c. I taught about half of the core Water TE lessons (e.g., mapping surface types, measuring evaporation and transpiration, measuring infiltration, measuring slope).
    d. I taught most of the core Water TE lessons.
    e. I taught all of the core lessons and several or all of the extension lessons (e.g. substances in water activities).
    f. I taught only extension lessons (e.g. substances in water activities).
2. For the Water Teaching Experiment (TE), please mark all that apply
    a. I participated in professional development for the Water TE during the Summer workshop.
    b. I participated in professional development for the Water TE during school year workshops.
    c. I participated in professional development for the Water topics other than the TE during school year workshops.
    d. I received help from project personnel in planning my implementation of the Water TE
    e. I received help from project personnel during my implementation of the Water TE
    f. I completed the Water TE Teaching Log
3. How many years have you taught the water teaching experiment?

### Curricular Goals for Water

1. The water strand focuses on tracing water and substances in water through environmental systems at multiple scales from atomic-molecular through landscape. Briefly state at least two learning goals that you hope your students will achieve when they study water movement through environmental systems.

Learning Goal 1:

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Learning Goal 2:

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Learning Goal 3:

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Is there anything commonly included in textbook water units that is NOT important to you in teaching your students about water pathways?

NOT IMPORTANT:

**Soccer Game Questions**

Your soccer game gets canceled at half time due to a massive down pouring of rain. As you run for cover, you notice that there are large puddles forming on the grass covered playing field, but no puddles forming in the sand covered playground just a few steps away.

2. Why are there puddles on the grass and not on the sand?

3. Students were asked the following 2-part question related to the scenario about the soccer game.
    a. Where could the water landing on the sandy playground be going?
    b. How does the water on the sandy playground get to where it is going?

   One student answered:
    a. "The water on the sandy playground is probablly (sic) being consumed down into the ground.
    b. Beacuse (sic) sand easily consumes water and it just sinks down."

   Which one of the following descriptions do you think comes closest to the way this student is making sense of what happens to water on a sandy playground?

   Choose one:
   A. Water on sand disappears.
   B. Sand pulls water into it.
   C. Water is pulled downward by gravity into permeable materials.
   D. Water is food for sand.

Please explain your choice.

4. In order to respond to this student's ideas, which of the following would you choose as a next step in instruction? Choose one:
   A. Use an infiltrometer to measure infiltration rates on different surfaces (e.g., concrete, sand, grass-covered soil).
   B. Explain that the sand does not eat the water.
   C. Pour water through a clear glass funnel filled with sand (with a filter at the bottom) and observe what happens.
   D. Introduce definitions to the science terms "permeable" and "infiltration."

Why do you think the next step you chose is the best one for this student?

**Fertilizer Questions**

5. If the playing fields were treated with fertilizer, do you think that some of the fertilizer could get into the river?

(Circle one) YES NO

If you think yes, describe how and why the fertilizer could get into the river. If you think no, describe why fertilizer would not get into the river.

6. Below are 6 student responses to this question. The responses are sorted into three groups. Answer the questions below to explain how you think the three groups demonstrate different levels of sophistication in student reasoning.

**Group 1:**
Student A: Yes. The fertilizer can run-off into the stream when it rains.
Student B: Yes. The fertilizer would get to the river from under the dirt. It would soak up under the grass and move to the river.

**Group 2:**
Student C: Yes. I think the fertilizer would get in the river because of the water-cycle. So when it rains the water will soon do the water-cycle!
Student D: No. It would seep into the soil and become food for plants.

**Group 3:**
Student E: Yes. The fertilizer would soak into the ground with the water, and eventually seep into the river in the water.
Student F: Yes. It would seep through the ground when the field was watered and runoff into the river.

What characteristics in reasoning and language do Group 1 responses have in common?

Is Group 1 the highest, middle, or lowest group? (circle one)
Please explain your ranking for Group 1.

What characteristics in reasoning and language do Group 2 student responses have in common?

Is Group 2 the highest, middle, or lowest group? (circle one)
Please explain your ranking for Group 2.

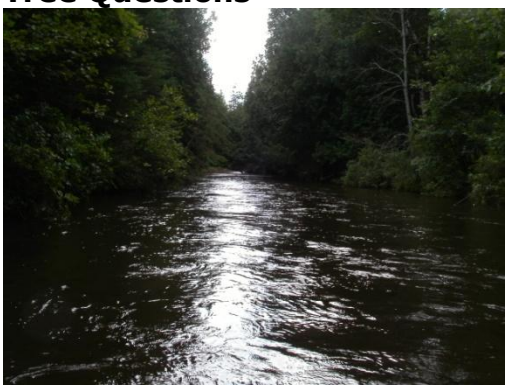
What characteristics in reasoning and language do Group 3 student responses have in common?

Is Group 3 the highest, middle, or lowest group? (circle one)
Please explain your ranking for Group 3.

If you disagree with the teacher's grouping, please explain how you would change the groupings and why.

Which group of responses would you expect to be most common in your class and why?

**Tree Questions**



Like many rivers, the Sturgeon River in northern Michigan has lots of large trees growing along its banks.

7. What would happen to the amount of water in the Sturgeon River if all of the trees died or were cut down? Be sure to give reasons for your answer.

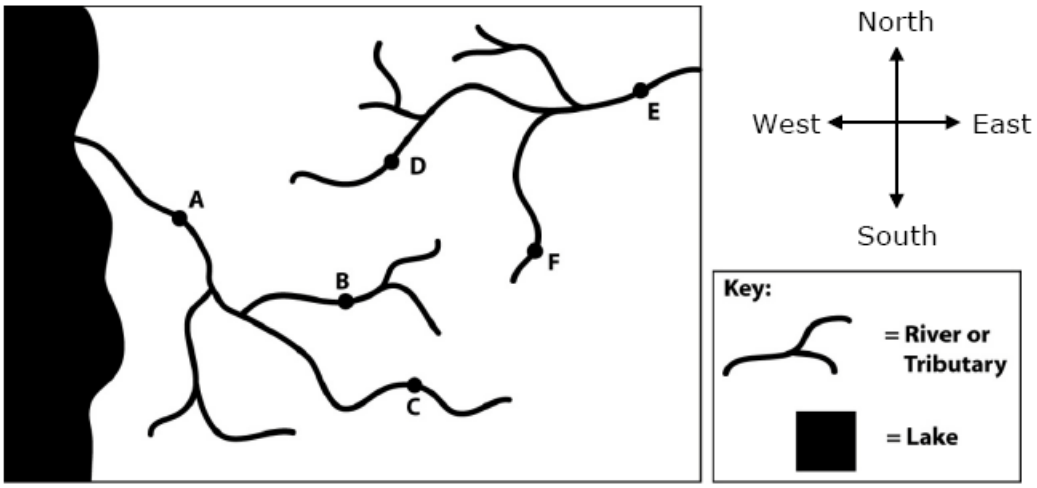
Here is an example student response to this question.
"The water would probably exceed its limits because the water may be used to feed the trees, and once the trees are gone, there will be extra water."

8. How does this student think about or make sense of the relationship between trees and water?

9. What would be your goal for this student to learn about trees and water?

10. What would be your next instructional move for this student to support this student in meeting your goal?

**River Maps Questions**




11. Can pollution in the river water at point B get to point C? (circle one)

    Yes No

    Please Explain why or why not.

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12. When asked which way the water at point F flows, a student said, "I believe that the direction of the river is flowing toward point D." Why might this student give this answer? In other words, what ideas about flowing water could this student have?

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13. In order to respond to this student's ideas, which of the following would you choose as a next step in instruction? Choose one:
    a. Explain that water moves from highest to lowest points.
    b. Explain that water moves from smaller bodies of water to larger bodies of water.
    c. Explain that tributaries flow into each other.
    d. Have students pour water on a stream table or a tarp and trace the directions it flows.
    e. Have students trace direction of water flow on a topographic map.

Why do you think the next step you chose is the best one for this student?

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14. Describe how you used formative assessments when teaching the school yard pathways lessons.

15. Explain how formative assessment helps you in your teaching about water.

16. Describe how you used the water learning progression when teaching the school yard pathways lessons.

17. Explain how the water learning progression helped you in your teaching about water.