When I stir the cup the humus, clay, and sand rise. When I slow down the sand sinks down. The pebbles drop first. I think this happens because they’re bigger and solid. Humus sinks last because it takes a while for the air to drain out.
Comparing Streams

Type: Basic Stream
Lesson 4
Date: 10/5

At the top of our model the water pooled and made river channel. Next we noticed that it sort it to steady out and make a lot of river. Finally when the water got out on to the end it start it to get the end dracker and when the water was gone the sand on the end go soft.
FQ. What is the difference between an observation, an inference, and an opinion?

<table>
<thead>
<tr>
<th>Name of Object</th>
<th>Field of Vision</th>
<th>Observation</th>
<th>Inferences</th>
<th>Opinions</th>
</tr>
</thead>
<tbody>
<tr>
<td>burlap</td>
<td></td>
<td>brown, falls apart easily, looks like small ropes woven together</td>
<td>touched a lot, older, uncomfortable</td>
<td>rough, itchy, some material as a gunny sack</td>
</tr>
<tr>
<td>Wire screen</td>
<td></td>
<td>silver in color, closely woven, thin, looks like thin wires, scratchy</td>
<td>made out of metal, woven out of small, thin wire</td>
<td>cold, scratchy, uncomfortable, flimsy</td>
</tr>
<tr>
<td>yarn</td>
<td></td>
<td>red, fuzzy, soft, worn</td>
<td>yarn, it's been touched a lot, think it's bigger</td>
<td>small, ants makes comfy rugs</td>
</tr>
<tr>
<td>pencil shavings</td>
<td></td>
<td>small, smells like pencils, thin</td>
<td>pencil shaving fresh shavings</td>
<td>pesky, disgusting, people leave them around too much</td>
</tr>
</tbody>
</table>
Fifth Grade, Sample A—Land and Water Unit: Kimberly R.

- To construct their understanding of how the properties of different soil components affect how they behave in water, students pour humus, clay, and sand into a cup of water, then stir the water. In their notebook entries, students are to describe what happened when they stirred the water, then explain why they think the soil component behaved as it did.

- Kimberly uses “When clauses” as a structure for describing what happens when the water is stirred and when the water slows down. “I think this happens because” introduces her inference about which properties are affecting the soil’s behavior. Without this structure, a typical entry would be: “When the water slows down, the sand sinks down because the particles are bigger and solid.” In this case, students might have had enough experience to make that inference, but often students are simply making statements without explaining their reasoning and/or evidence. This is what Kimberly does in the last sentence, which makes it a less effective statement than the sentence preceding it.

Fifth Grade, Sample B—Land and Water Unit: Nancy

- In this unit, students make a model stream system out of a plastic tub. At one end (“the top”) is a cup with a hole in it. Students pour water into the cup, then the water flows across the soil in the tub down to “the end,” where the water drains out a hole. After students have had some experience observing water flowing over the soil, the teacher introduces the terms source, stream channel, delta, and mouth.

- To help students organize their observations and writing, the teacher divides the tub into three parts and has students use the words “At the top” at the beginning, “Next” for the middle section, and “Finally” for the end of the model. These words help focus students’ observations, then give them a way to talk about their observations, then provide a structure for their writing.

- Using this structure, Nancy makes accurate and important observations in her entry. The water does pool at first, then flows down the model, carving out a river or stream channel. At the end, the water deposits soil it has carried, which makes the water darker. When the water drains out of the tub, the sand that is left in the delta is soft.

- Nancy is served in both the Special Education and English Language Learners Programs. She is successful in science and science writing and able to share strong scientific observations because of her concrete experiences in science and the scaffolding of the discussions and the writing.
Fifth Grade, Sample C—Microworlds Unit: Emily

- This unit provides a lesson in which students explore the differences between observations, inferences, and opinions. When units do not provide such lessons, it is especially critical that you provide opportunities for students to learn the difference between an observation and an inference. (Opinions tend to be less of a problem in most elementary science investigations.)

- When you look at this entry, has Emily written appropriate entries in each of the three columns?

- As a fifth grader, Emily has an unusually good understanding of the three categories. Her categorization of observations is strong. Although students often will include inferences in this column, she has included only one: “worn.” She needs to report what she has observed that makes her infer that the object is worn. Her column of inferences is quite strong as well. She has included one opinion: the burlap is “uncomfortable.” The opinions column is exceptional for a student of this age because fifth graders typically include as many inferences in this column as opinions. Emily includes only one inference: “same material as a gunny sac.”