

TE 861B: Interview Report

I. Initial Interviews Plans

Interview Topic and Informants

I interviewed students age 3-4 years old, who are currently enrolled in my childcare program. I focused on the learning which has taken place thus far in the lesson sequence. Specifically, questions focus on student observations, perception of patterns, explanation of patterns, and predictions using patterns. In addition, I included questions on student opinions about scientists and science work. I am curious about both the thoughts and feelings about science and wonder what students perceive as a scientific experience. I also question whether students recognize the parallels between what they do and the work of scientists.

Ideas about Questions

Interview Questions about Nature of Science:

The interview questions that I have chosen are separated into five groups.

1. What did you notice about the water on our science walks? How did you know this?
2. What did you notice when you left the ice/water out of the freezer? What did you notice when we put water/ice into the freezer? Can you show me with pictures?
3. Where was the water when it changed into ice? Where was the ice when it changed into water? What was different about those places?
4. What do you think will happen if I put this water in the freezer right now? What if I put it outside right now? What if we put it outside on the fourth of July? Why do you think that will happen?
5. What do scientists do? Is what you did like what scientists do? Why do you think that?

II. Interview Final Report

I have rewritten my interview questions to include more questions about my lesson sequence instead of focusing solely on student opinions about science. These questions, listed above, will assist me in assessing students understanding for the first two portions of the lesson sequence. The following paragraphs describe each group of questions and their purpose.

The first group of questions focuses on student observations. First, I want to know what if students understand that they use their five senses to observe the world around them. Then, I want them to describe what they actually observed during our science walks. I would like to see students using their science journals to recall what they saw, heard, smelled, and touched. I also expect students to offer verbal descriptions to go along with their journal pictures. This group of questions will be asked following lesson 6 of the lesson sequence during one on one conferencing time.

The next topic focuses on the group experiment described in the lesson 9 of the lesson sequence. The goal of this group of questions is to allow students to share their results and ensure that their observations parallel what actually happened. Students should be able to verbally describe what they noticed when the ice was left out of the freezer and when the water was put into the freezer. It may be necessary for some students to allow for picture explanations followed by teacher prompting. This group of questions will be asked during our daily science talk where each student will “show and tell” about their results.

The third group of questions focuses on the patterns that students “notice” about the experiment. The questions included guide students in discovering the variable of temperature in our group experiment. However, the goal is for students to recognize this fact, and, also, describe it on their own using oral communication or pictures. This group of questions will be asked during the same science talk described previously following the group experiment during lesson 9.

The fourth group of questions will also be asked during this one on one conferencing time. These questions require students to use what they’ve learned about temperature and its effect on water to make and explain predictions about similar situations. I expect that students will be able to correctly predict what would happen to the water based on their knowledge of the months and seasons, as well as, the relationship between temperature and the changing states of water.

The final group of questions was designed to assess what students know about scientists. We incorporate the word science and scientist into our daily schedule and routine through activities and daily science talks. These questions were asked during the same one on one conferencing following lesson 9 as the third and fourth groups. The goal is to determine student knowledge, since this has not been adequately addressed in previous lessons.

Interview Questions and Results

1. What did you notice about the water on our science walks? How did you know this?

Students were very eager to share their science journal entries during the conference in which I asked this initial group of questions. All three students opened up their journals after the questions. However, upon reaching the first entry, which recorded what they saw, students simply began listing everything they saw on our first nature walk. At this point, I redirected students to tell me just what they recorded about the water. One student then pointed out that she saw a mud puddle on the first walk. The other two students utilized their journals and pointed to the picture of water on the first page. When asked to tell me what else they noticed about water, all three students began to look through their science journals searching for pictures of water. However, none of the three heard any water or smelled any water, so were unable to detect any observation of water from the second and third journal entries. The fourth journal entry, which recorded what students felt, was a bit more helpful to the students. Here, the students each described how they felt water on the grass.

After this question, students were asked how they knew there was a puddle during the first walk and how they knew there was water on the grass during the fourth walk. The first student quickly responded, "I used my five senses". I then asked which of the five senses she used for each of her observations. She was able to describe that she saw the puddle and felt the water on the grass with her feet ("because it came in through my sandals"). The other two students required more questioning to reveal that they used their sense of sight and touch to notice the water, but were, in the end, able to acknowledge that they used their five senses to make observations.

2. What did you notice when you left the ice out of the freezer? What did you notice when we put water into the freezer? Can you show me with pictures?

The first two questions proved to be confusing for all three students. Each student inaccurately described what happened to ice and water during the experiment. They verbally corroborated that water turned to ice when you took it out of the freezer, and ice turned to water when it was put into the freezer. At this point, I asked students to close their eyes and visualize taking an ice cube out of the freezer and placing it on the counter. I asked one student to draw a picture of what the ice cube looked like. He did so by drawing a rectangle on our large sheet of paper. I then asked students to recall what they saw happen to that ice cube as we kept checking on it during our experiment. When asked to draw what she noticed, the student drew another rectangle surrounded by a squiggly circle. She explained that the ice cube got smaller and some of it had melted into water. Finally, students were asked to visualize what they saw in the cup at the end of the experiment. The last student drew a free form shape (similar to a puddle), and, without prompting, explained that the ice cube had melted and now there was just water. After the visualization, I asked again, "What happens when we take ice out of the freezer?" All students agreed that ice changed into water when we took it out of the freezer.

Then, I asked, “What happens if we put water into the freezer?” All students agreed that the water turned into ice when we put it in the freezer. However, I found it interesting that although students placed the water into a plastic cup before placing in the freezer, they drew the water in the shape of an ice cube as a result of putting it into the freezer. They did not accurately show what the ice looked like (took on the shape of the cup); only that it had changed from water into ice.

3. Where was the water when it changed into ice? Where was the ice when it changed into water? What was different about those places?

These questions were very thought provoking for my three students. I was required to rephrase and repeat the question several times during our group science talk. In the end, it was the visual cues of pictures that helped students recall the correct answers. After posing the question several times and getting no response from the students, I asked one to draw a picture of where we put the water. He drew a picture that resembled two rectangles on top of one another and then told us it was a refrigerator. I had to ask him to clarify whether we put the water in the refrigerator or the freezer. He then put a circle around the top rectangle and said, “We put the cup of water in the freezer. After a little bit, the water changed into hard ice.” I restated his response by saying “So, the water turned into ice when we put it in the freezer?” All three students shouted an emphatic “Yes!” I then re-asked the second part of the question about where the ice was when it changed into water. One student responded “Out of the freezer.” I then asked, “Where outside of the freezer?” Another student shouted “On the counter!” So, I restated this answer, “So, the ice was on the counter when it changed into ice?” Again, all students agreed. Once this was established, I had a student draw a picture of the counter next to the freezer and I labeled them. We then had to brainstorm how these two places were different. After much discussion, I prompted them to think about what it feels like inside a freezer. At this point all students responded simultaneously, “Cold”. I then asked “And was it cold or warm on the counter?” Student responded, “warm.” Finally, I restated what students had recognized, “So, when we put water in the freezer, it was cold and then it changed into ice. When we took ice out of the freezer, it was warm and then it changed into water.”

4. What do you think will happen if I put this water in the freezer right now? What if I put it outside right now? What if we put ice outside on the fourth of July? Why do you think that will happen?

This group of question was posed to individual students. However, their answers were very similar. I believe that the way in which knowledge of relationship between temperature and water changes was obtained colored student responses to these questions. All students were able to tell me that if we put water in the freezer it would turn into ice because it is cold. The other questions were a bit more challenging because they needed to think about what the temperature would be in these different situations. In fact, in response to placing the water outside (where the temp. was about 29 deg.) one student stated, “Well, I know it was cold this morning, but I don’t know if it’s as cold as a freezer outside now. I mean, the sun is up and that is warm.” He needed some additional assurance that it was cold outside before he would

reveal that the water would in fact turn to ice. However, he, as well as the other two students was more secure in their response to the question about the fourth of July. The students were reminded of the holiday and knew it took place in the summer when it is hot enough for them to swim. When asked what would happen to an ice cube left outside on this holiday, students revealed that they knew it would melt because ice melts when it is hot.

5. What do scientists do? Is what you did like what scientists do? Why do you think that?

This final group of questions was asked to discover what students think about science and scientists and the nature of their work. I felt compelled to ask these questions because science is such a large part of my curriculum. We engage in discovery and inquiry every day and have (almost) daily discussions which are entitled “science talks”. However, I realized that we had never really discussed scientists or science on their own as a group. It is interesting to note that although we have not discussed this topic implicitly, students still had a fairly good idea of the answers to the above questions. In response to the first question in this group, student’s answers were as follows: “Students make discoveries.” “Scientists do science” “Scientists do experiments.” When asked if these things were similar to what we, as students, do, all responses confirmed that yes, we do. Students revealed that we do make discoveries, we do science, and we do experiments, so we must be scientists, too. So, since we do some of the same things, we are like scientists.

Response to Results

I chose to respond to each group of questions separately because I made realizations about how to alter the lesson sequence after each interview session. I found it beneficial to discuss these realizations as they relate to each question or group of questions.

From the first group of questions, I have learned that students are able to make observations using their five senses. The journal entries of each student were somewhat detailed and were described verbally by each student. Students were able to use their journal entries as picture cues to help them remember what they each saw, heard, smelled, and touched. I was happy that each of the students was able to recognize that they were using their five senses to tell about their world, but noticed that all students relied most heavily on their sense of sight. It was more difficult for them to make initial observations using other senses. Therefore, I believe it would be beneficial to offer even more opportunities to focus on each of the five senses to make observations. In this way, students will be able to improve their observation skills for future use. In addition, I would also like to change how the science journals were used during this conference. I liked that the students flipped through each page as a reminder, but feel that it would be better to have used only the final entry which combined observations from all of the five senses into to one “scene”. I feel that this would assist students in realizing that they need to use their senses simultaneously in order to get the most detailed observation possible. Not doing this reinforced the idea that we can only use our senses one at a time, which is an unrealistic theory, and one which is not efficient in the inquiry process.

The second group of questions revealed that students were able to accurately describe the changes that occurred during their experiment with ice and water. It also revealed that students perceive ice as taking on the shape of a cube, regardless of what shape container holding water is placed in the freezer. It would be interesting to expand this lesson sequence to include properties of water so students could gain an understanding of how water takes the shape of its container and has no true shape of its own.

In addition, once we did the visualization to recall our experiment, students did not need anymore prompting. In the future, I would complete a visualization prior to any questions being asked. I believe that in doing this, students will be able to draw and describe their results more accurately.

I was most interested in this third group of questions with regards to student learning. These questions would tell me whether students were able to recognize patterns in what they observed. However, the questioning didn't turn out quite how I had hoped. In the future, I would ask this group of questions to individual students. I realize now that this group should have been asked during the one on one conferencing time instead of during a group science talk. If it had been done in this manner, I think it would have been easier to draw out student responses to questions instead of using verbal prompting to help students recognize patterns. Unfortunately, as it happened, I really felt as though I "told" students the pattern of when water is cold it turns into ice, and when ice is warm it turns into water. In the future it will be necessary to act out where items were placed until students realize that temperature is the link responsible for the changes in water.

I will again voice my disappointment in the results of the third group of questions because I feel that the results of that questioning had a great impact upon the results of this fourth group. The goal was for students to be able to use what they knew about temperature and its effect on water to make predictions. On the positive side, students made accurate predictions using their knowledge. However, I feel they obtained the knowledge in an unsatisfactory manner. I will, in the future, be sure to allow time and opportunity for students to make their own realizations of patterns. I feel this is a key step in the inquiry process. Without it, I am not sure the evidence gathered in this part of my interview is a true reflection of what they know. However, for the purpose of this particular assignment, students did show an ability to predict the results of future experiments based upon the one which was previously conducted.

The final group of questions was focused on assessing student beliefs about science and scientists. I felt that students gave an accurate, yet limited account of what scientists do. They were not aware of the overall scope of what a scientist does. Each student listed one thing that made a scientist a scientist, and since they also had performed that task, they felt that they, too, were scientists. The result of this questioning has prompted me to include a more comprehensive look at how I present the science curriculum. I will begin by simply recognizing and restating what, specifically, we are doing and how that relates to the work of scientists. In this way, students will begin to realize that science is both about the topics and concepts that we are learning about, as well as, the process or the things that we do to acquire knowledge.

In conclusion, while I have previously used one on one conferencing to assess student learning. I have not focused on the steps of observations, patterns, and explanations prior to this class. Organizing lessons and assessments in this manner really focuses on student understanding. I can see how traditional lessons frequently focus on using the teacher (or text) as an all knowing source. This occurred in my lesson sequence, in spite of the fact, that my goal is always to avoid this. Careful planning of the interview or assessment phase is critical to address and assess student learning. Not only does an instructor need to create the right kinds of question, there is also a need to decide when and how to ask these questions. This process has certainly highlighted this fact for me, as a teacher, and helped me understand the importance of assessment in a new light.