

Classroom Observation Description

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Wonderwise Learning Kits

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Evaluation Report



Wonderwise Evaluation: Classroom Observation Description with Student and Teacher Feedback

Introduction and Description of Project

Wonderwise, a program funded by the Howard Hughes Medical Institute, is a series of five learning kits produced by the University of Nebraska State Museum in Lincoln, Nebraska. Each Wonderwise kit portrays a woman scientist through three mediums: a video, a written biography, and five classroom activities related to the scientist's field of study. Three of the kits also contain a CD-ROM. The five kits are targeted toward fourth to sixth grade elementary students, and are intended to be a versatile element that can be readily incorporated into existing classroom curricula in Nebraska elementary classrooms.

To disseminate these kits throughout the state of Nebraska and encourage their use, nineteen individuals from around the state of Nebraska, one from each Educational Service Unit (ESU), were selected to participate in a Wonderwise Mentors Workshop during Summer, 1996. Most of these individuals were elementary level teachers. These teachers were the first in the state to acquire copies of the kits and to use them in their classrooms with their students.

The primary purpose of this evaluation was to find out how the kits were used in the classroom by the mentors, to see how students reacted to the kit materials, and to learn what the mentors thought about the kits after using them with their own students. This was not meant to be a comprehensive evaluation, but instead to provide some sense of how the kits were actually implemented in classrooms in their final, completed form. This evaluation was designed to learn about some of the kinds of modifications that teachers made to the kit activities when they implemented them, how the materials were presented to students, and how students responded to the content and format of the kits. Data were collected by observing students and teachers in classrooms using a kit activity, asking students and mentor teachers to complete a brief survey, and conducting two focus groups consisting of students from the classrooms.

Evaluation Questions

The primary questions guiding this evaluation were:

- 1) How were the kits implemented in the classroom?
- 2) What were the students' reactions to the kit activities?
- 3) What did the mentor teachers think about the kits as they implemented them in their classrooms?

Methods

Three class sessions (75 students total), taught by two different mentor teachers, were observed during late Spring, 1997. A third site was also selected to be included, but because of logistical difficulties was unable to participate. The sites selected for this study were rural, because the development team was particularly interested in gathering information about the use of kits in rural settings. Each observation occurred during the use of one of the Wonderwise kit activities. At the end of each class period, students and teachers completed a brief survey about the activity (see Table 1 for a list of instruments and respondents, and see Appendix A for a copy of the surveys and interview protocol). Following one of the classroom observations, two focus groups were

conducted independently by two of the evaluators. These interviews were structured to focus on the kit as a whole, and specifically the video and curriculum activities.

Table 1. Instruments used and response rates for observation study.

	Rural classroom 5 th -6 th Grade Kit: Parasite Sleuth Two teachers (a Wonderwise Mentor and a colleague) team-teaching in a single classroom.	Rural classroom 6 th Grade Kit: Rainforest Ecologist One teacher (a Wonderwise Mentor) instructing two different classes in succession.
Classroom Observation	31 students (14 boys, 17 girls; 15 5 th graders, 16 6 th graders)	44 students (18 boys, 26 girls)
Student Activity Survey	31 students	44 students
Teacher Activity Survey	was completed by both teachers	was not completed
Student Focus Group Interview	none	6 students, all girls (6 th grade)
Teacher Video Survey	was completed by both teachers	was not completed

Limitations of the Evaluation

The small number of classrooms included, as well as the limited number of activities observed, limits the generalizations that can be made from this evaluation study. However, this study does provide an initial look at how teachers implement the kits and how students react to them as part of their science studies.

Results

Classroom Observations

Rainforest Activity

Two classes of students were observed doing different rainforest activities. The first class was completing the “Frogs Up Close and Personal” activity which requires students to design a three-dimensional paper “background” to camouflage a poison frog. The students worked in groups of three to four and many had already made considerable progress on their paper environment for their model frog in a prior science class session. Students were mostly putting the finishing touches on their work, by cutting out additional pages from magazines and crumpling, cutting, and gluing or taping these sheets to a construction paper base. Each group had a different color frog that sat in its unique environment and students took turns carrying their projects across the room to see if others could locate the frog within the camouflaged environment. Some of the projects were remarkably well-done, with the frog disappearing into the background very easily, while other projects were less successful in camouflaging their model frogs. Most students appeared to be involved in their group work and were interested in their project. After about fifteen or twenty minutes, the teacher instructed the students to bring their environment up to the front of the room to hand them in.

Next, the students sat down and watched as the teacher explained, using an overhead, the next activity, "Rainforest in Your Room." Students were organized in groups of seven to eight students. Each group got three paper sacks. The teacher explained, using the diagrams on the overhead from the activity book, how to cut the sacks and roll them into tree trunks. As the majority of students completed each step, the teacher would attempt to stop all the students and direct their attention to the overhead to explain the next step. Some students were working ahead of the teacher, and paging through the overheads at the projector to see what was next. Others were behind where the teacher was instructing them. The students began work on this but did not make a lot of progress before the class period was over.

At this point the teacher moved to another classroom to teach a different class the "Rainforest in Your Room" activity. This time, the teacher explained several of the overheads right at the beginning, instead of waiting to explain as the students progressed. Many students began working immediately and were cutting and rolling the bags into tree trunks. Some students appeared confused, looking around to see what others were doing. At any given time, about half the students were working, and the other half were watching others work. Most appeared engaged and interested.

Both of the observed activities were originally designed to be completed by students in groups of two. Here, the classroom teacher modified the activities to use larger groups of students. In addition, while every activity includes a review worksheet at the end, to emphasize the key learning points of the lesson, neither of the classrooms observed referred to or used the worksheets during the observation periods.

Parasitology Activity

Students from both 5th and 6th grade crowded into one classroom to work on the Traveling Tapeworm activity ("Just How Long Is It" and "Showing Off Your Digestive Track" segments). In the activity book, this project is designed for groups of four students, and there are several stages. These students were completing the second and third parts of the activity putting together the digestive tract.

"Just How Long Is It" is the section of this activity where students cut out and color copies of the small and large intestines, the mouth and the esophagus and then glue these parts together to form the human digestive tract. Prior to this observation the students had spent two 40-minute science class periods working on this project, coloring the veins and arteries and cutting them out. In addition, students had been allowed to work on their projects outside of their science periods so some of them were further ahead than others. Students worked in pairs or groups of four with some mixed sex groups. Every group had a copy of the activity book, and the teacher instructed them to refer to their books to complete the project and reminded them to connect the veins and arteries correctly. All the students were actively involved during the activity and throughout the class period, the teacher encouraged them to use the activity books rather than instructing them directly. Students repeatedly referred back to the diagram in the workbook when assembling their digestive track and the teacher appeared to have minimal interaction with the students other than to provide supervision. Students appeared to rush to finish this section of the activity in order to go on to "Showing Off Your Digestive Track" where they glued the digestive track they had made onto a large sheet of cardboard. They labeled the various parts of the tract and used a large plastic bag to hold the intestines. All of the drawings and labels for this project were photocopied from the activity book and there were no workbook questions for students to answer in these two sections of the activity. The observed class period was extended from 40 to 60 minutes on this particular day.

Teachers' Reactions

Two teachers completed surveys about the parasitology activity “Traveling Tapeworm” and video. The teachers said that the video was about the right complexity and length for their students and that it fit very well into their existing science units. They reported that they used the video as an introduction to the kit and that the students were “very interested” and wanted to know more after watching the video. Not surprisingly, they said that they would use the video again.

The same two teachers also said that the parasitology activity “Traveling Tapeworm” was about right for their grade level and that the students were very engaged during the activity. The teachers commented that they had seen an attitude change since they started using the kits. The most appealing aspect of the activity to them was that it was very student oriented and that the students could take over the activity themselves. The only thing they would change about the activity is that they would set aside a longer period of time for the students to work on it. Asked what the most important things were that their students learned from the activity, they said “digestive system” and “how a parasite can affect their organs.” Both teachers reported that they probably would use this activity again next year and one commented that it was a “great activity—it ties into our curriculum.”

Teacher reactions to the rainforest video and activity were not completed. For more detailed information about the mentor teachers’ reactions to the kits see the evaluation report *Mentor Evaluation of Kits in the Classroom*.

Students' Reactions

The students in the observed classrooms completed a brief survey after their science lesson, and were instructed to respond with respect to the activity they had just completed. The data were analyzed using chi-square tests of independence and tested for significance at the .05 alpha level. In other words, a finding was considered statistically significant if the likelihood of it happening by chance was less than one in twenty. Because of the small sample sizes involved, the responses of one or two persons can impact the significance of a finding. Given the exploratory nature of this evaluation, differences of interest are discussed even if they are not always significant, but statistical significance is noted where it occurs.

Rainforest Activity

When asked specifically if the “Frogs Up Close and Personal” activity they had just completed was fun, about 70% of the students agreed that it was fun while about 20% said it was not fun. When asked to select among a set of descriptors of the activity, about a third of the students said the activity was interesting, almost half said it was fun, a third said it was okay, less than 10% said it was confusing and stupid, and about 15% said it was boring (see Table 2).

Table 2. Percent of students selecting specific descriptors about “Frogs Up Close and Personal”

	interesting	fun	okay	boring	stupid	yucky	confusing
3. How would you describe the activity to a friend? (circle all that you agree with)	32%	46%	34%	16%	9%	0%	9%

Most of the students (64%) said they would like to do more activities like the Wonderwise one while 16% said they did not want to. Almost all students said the activity was different from other science activities they did in school.

Girls and boys were similar in many of their responses. However, a somewhat higher, though not statistically significant, percentage of boys than girls said the activity was fun. All girls thought the activity was different from other science activities they'd done in school while 83% of the boys thought this.

When asked what they learned from this activity the most common response (about half the students) involved camouflage. Students said things like: "I learned how frogs camouflage themselves in the wild" and "That frogs blend into their surrounding to hide and protect themselves from predators." About 15% of the students also mentioned other details about frogs, such as, "That colorful kinds of frogs are different, some are poisonous and some are just plain colorful," "How many different kinds of frogs there are" and "I learned that some pretty looking frogs can be deadly." Small percentages (about 10%) of students also mentioned the rainforest, that the activity was fun, and that they learned how to get along and work in groups. Almost 20% of the students, primarily girls, also said they learned little or nothing from this activity. Typical comments from this group were: "I pretty much already knew this so I didn't learn much" and "Not much because I didn't get the point of the project."

Parasitology Activity

Overall, about 70% of the students agreed the activity "Traveling Tapeworm" was fun and 13% said it was not fun. When asked to select among a set of descriptors, about a third of the students said it was interesting and fun, half said it was okay, less than 10% said it was boring and confusing, and 13% said it was stupid (see Table 3.) Half the students said they would like to do more activities like the Wonderwise one while 13% said they would not like to. Most of the students (84%) said the activity was different from other science activities they'd done at school.

Table 3. Percent of students selecting specific descriptors about "The Traveling Tapeworm."

	interesting	fun	okay	boring	stupid	yucky	confusing
3. How would you describe the activity to a friend? (circle all that you agree with)	36%	29%	48%	7%	13%	0%	7%

In general, 5th grade students responded more positively than 6th graders. Almost 90% of the 5th graders thought the activity was fun compared to 56% of the 6th graders. The 5th graders were somewhat but not significantly more likely to select positive descriptors such as "fun" and less likely to select negative descriptors, such as "boring," "confusing," or "stupid." The 5th graders were also more likely than the 6th graders to say they'd like to do more activities like the Wonderwise one. In addition, all of the 5th graders thought the activity was different from other science activities they'd done in school compared to 69% of the 6th graders. This was a statistically significant difference.

Across both 5th and 6th grades, more of the girls thought the activity was fun compared to the boys, although this difference was not statistically significant. In describing the activity, significantly more girls said it was interesting. Other differences found between boys and girls across both grade levels were not significant, but were consistent in that more girls said the activity was fun and was different from other science activities they had done in school, and fewer girls said it was stupid or confusing compared to boys. More girls also said they would like to do more activities like the Wonderwise activities.

When asked what they learned from this activity, a third of the students mentioned the intestines with comments like “How the intestines look and the veins. I also know now how long they are, what they’re called and what they look like,” “That there is a lot of intestines in your body” and “How the intestines are so smushed together.” About 20% of the students, primarily girls, mentioned the digestive system saying things like “How the human body digestive system works.” Almost 20% said they learned about the human body: “What the inside of the human body looks like.” Fifteen percent mentioned tapeworms or parasites: “How the tapeworm lives.” A couple of boys said they learned that science was fun or important and one boy said he learned that it would be cool to be a scientist.

Focus Group Interviews

Interviews were conducted by the two investigators with two separate groups of students from the classes completing the Rainforest activity. Students from the observed class were asked to volunteer to participate. Three girls were included in each of the two focus groups. No boys volunteered to participate. The girls were informally asked about the Rainforest video and the activity they completed.

The video had been viewed about a week prior to the interview, so it not surprising that the girls responding to the questions could not recall much detail from the video. One group of girls said that they did not find the video confusing. The other group said that they liked the video but found it somewhat confusing. This group thought it was interesting that the frogs used empty nuts to lay their eggs but they didn’t understand what the frogs were used for after they were collected by the researchers. In addition, these girls felt some of the things shown in the video were not explained or identified, and this was confusing to them. The students were also unfamiliar with the names of the insects referred to in the video. When asked what they found surprising about the video, one student said she was surprised to learn how many eggs frogs lay. Other students said they were surprised that frogs left their eggs in shells, that the insects would eat the eggs, and how the researcher counted the eggs. One student also said that she was sort of surprised that the scientist didn’t spend all her time in a laboratory because “most science work is done in the lab.” When asked what they learned from the video, one student said she learned about the layers of the rainforest and another student said she learned where things live in the rainforest. Because the video did not specifically address the layers of the rainforest, it is likely that these impressions were also drawn from the kit activities, one of which specifically has students explore the different layers of the rainforest. Other students said they learned how the scientists go into the forest by themselves and catch frogs with their hands, and that they don’t use hi-tech equipment. The best part of the video, according to the students, was the different colors of the frogs, the night searches, and the fact that the female frogs are bigger than the male frogs. When students were asked what they would change about the video, they said that they would have had the scientists wear gloves and explain more about what they did with the frogs.

When asked if the activities of the kit were the same or different from what they usually do in science class, all the students agreed that the activities were very different. As one student said, “We get to do more fun stuff. Usually we study of out a book and do worksheets . . . this is really different. We’re just doing fun stuff.” When asked to elaborate, the students explained that usually they do “units” in science that take one to two weeks, and in a unit, they might have one classroom activity. Mostly, their time is spent studying out of a book and completing worksheets. With the Wonderwise kit, they felt that they got to do more fun activities. When asked if they had completed any worksheets as part of the Wonderwise kit, they said they had not, but that they had had an oral

review of the material. One group was asked if working on the kit activities and seeing the video changed what they wanted to be when they grow up. All of the students in this group said it had not. However, two of the three students in the other focus group said they would like to do the work that the scientist in this video did when they grow up.

Students said what they liked best about the activities was the group work. When asked what they did not like as well, they said they did not like making the trees, because it was confusing, they did not like not being able to cover up the frogs in the “Frogs Up Close and Personal” activity, and they felt that they did not have enough class time to finish their work.

Summary

1) How were the kits implemented in the classroom?

Because only a small sampling of classrooms were observed, it is difficult to provide a complete description of how the kits were implemented. However, it appears from these observations that the teachers modified the activities in different ways to suit their own teaching styles and available resources. These modifications included changing the number of students working together in a group (from two per group to a larger number, three to seven or eight), instructing the class as a whole about the tasks required rather than providing the students with the instructions to work more independently, increasing the amount of time for students to work on an activity, and reviewing the lessons learned as a group classroom activity rather than having students complete the worksheets on their own.

Aside from these minor modifications, the activities appeared to be implemented very much as envisioned by the curriculum development team.

2) What were the students’ reactions to the kit activities?

For both of the kit activities observed, the majority of students agreed that the activities were fun. One-third to one-half of the students selected words describing the activity as interesting, fun and/or okay, while fewer than one-sixth of the students said it was confusing, stupid, or boring.

Most of the students said they would like to do more activities similar to those in the Wonderwise kit, and that the Wonderwise activity was different from other science activities they do at school. The observation of the parasitology activity included both 5th and 6th graders, who responded somewhat differently to the activity. A significantly higher percentage of 5th graders than 6th graders thought the activity was fun and was different from other science activities in school. This group of students also included significantly more girls than boys who thought the activity was interesting.

When asked what they learned from this activity, most students produced responses appropriate to the content of the activity, and a few students mentioned other kinds of learning, including learning to work with others and learning that science is important. In the observation, the students appeared interested and engaged in the activities and to be working together productively.

3) What did the mentor teachers think about the kits as they implemented them in their classrooms?

The two teachers surveyed about the Parasite Sleuth kit responded positively to both the video and activities. The video was about the right complexity and length for their 5th and 6th grade students and fit well into their existing science units. They used the video as an introduction to the kit and found that the students were “very interested” and wanted to know more after watching the video. Not surprisingly, they said that they would use the video again.

The same two teachers also said that the activity “The Traveling Tapeworm” was about right for their grade levels and that the students were very engaged during the activity. The teachers commented that they had seen an attitude change since they started using the kits. The most appealing aspect of the activity to them was that it was very student oriented and that the students could take over the activity themselves. The only thing they would change about the activity is that they would set aside a longer period of time for the students to work on it.

Appendix A: Student Activity Survey

Student Survey on Activity

1. I am a BOY GIRL (circle one)
2. Was this activity fun? Yes Not Sure No
3. How would you describe the activities to a friend? (circle all that you agree with)
 interesting fun okay boring stupid yucky confusing
4. Would you like to do more activities like this? Yes Not Sure No
5. Was this the same or different from other science activities you do in school?
 Same Different
6. What did you learn from this activity?

Appendix A: Student Focus Group Interview

Topics/Questions for student focus groups

1. Did you like the video?
 2. Was the video hard to understand? Was it confusing?
 3. Was it interesting? Was it boring?
 4. Were you surprised by anything in the video?
 - That the scientist was a woman?
 - That she worked with a lot of other scientists (not alone)?
 - That she didn't spend all her time in a laboratory?
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1. What new things did you learn from the video?
 2. What was the best part of the video?
 3. What would you change about the video?
 4. What do you think you learned from watching the video?
 5. When you grow up, would you like to do the work that this scientist does?
 6. What surprised you about the activity?
 7. What did you like best about the activity?
 8. What did you not like about the activity?

Appendix A: Teacher Activity Survey

Wonderwise Kits: Teacher Feedback on Activities

Date: _____

Name: _____

1) Which curriculum activity from the kit did you use today?

2) Was this activity on target for the grade level you teach?

Too
simplistic

About
right

Too
complex

3) How engaged were your students in the activity?

Not at all
engaged

Somewhat
engaged

Very
engaged

Comments?

4) What were the most important things your students learned by doing this activity?

5) What did you find most appealing about the activity?

6) What would you change about the activity?

7) Will you use this activity again next year?

Definitely
Will Not

Probably
Not

Possibly

Probably
Will

Definitely
Will

8) Why or why not?

Appendix A: Teacher Video Survey

Wonderwise Kits: Teacher Feedback on Video

1. Did you use the video? If yes, how many times did you show it? _____

2. Would you say the video is too simplistic, about right, or too complex for the grade level you teach?

too simplistic	about right	too complex
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3. Would you say the video was too short, about the right length, or too long for the topic presented?

too short	about the right length	too long
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4. Does the video fit not at all well, somewhat well, or very well into the science units you teach?

not at all well	somewhat	very well
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5. How did you use the video? (For example, did you present the biography at the same time? Did you have a class discussion about the video?)

6. What were your students' reactions to the video? (Probes: Did the students react differently than usual; did they ask about being scientists; did they seem bored; did they ask more information about a topic; did they share personal experiences?)

7. Will you use the video again? no yes
If not, why not?

Wonderwise Kits: Teacher Feedback on Video

1. Which video did you recently view with your class? (circle one)

Sea Otter Biologist

Parasite Sleuth

Rainforest Ecologist

2. Would you say the video is too simplistic, about right, or too complex for the grade level you teach? (circle one)

too simplistic

about right

too complex

3. Would you say the video was too short, about the right length, or too long for the topic presented? (circle one)

too short

about the right length

too long

4. Does the video fit not at all well, somewhat well, or very well into the science units you teach? (circle one)

not at all well

somewhat

very well

5. How did you use the video? (For example, did you present the biography at the same time? Did you have a class discussion about the video?)

6. What were your students' reactions to the video?

7. Will you use the video again? no yes
If not, why not?

Percent of Students Responding in Each Category by Activity

		Yes	Not Sure	No
2. Was this activity fun?	Parasitology Total (n=31)	71%	16%	13%
	Rainforest Total (n=44)	71%	9%	21%

		interesting	fun	okay	boring	stupid	yucky	confusing
3. How would you describe the activities to a friend? (circle all that you agree with)	Parasitology	36%	29%	48%	7%	13%	0%	7%
	Rainforest	32%	46%	34%	16%	9%	0%	9%

		Yes	Not Sure	No
4. Would you like to do more activities like this?	Parasitology	48%	32%	13%
	Rainforest	64%	18%	16%

		Same	Different
5. Was this the same or different from other science activities you do in school?	Parasitology	16%	84%
	Rainforest	5%	93%