

# **Mentor Evaluation of Wonderwise Kits in the Classroom**

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**October 1997**

## **Wonderwise Learning Kits**

Funded by the Howard Hughes Medical Institute  
Produced by the University of Nebraska State Museum

## **Evaluation Report**



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## **Evaluation Report: Executive Summary**

### **Mentor Evaluation of Kits in the Classroom**

Wonderwise, a program funded by the Howard Hughes Medical Institute, is 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 include a CD-ROM. The five kits are targeted toward fourth to sixth grade students.

To disseminate these kits throughout the state of Nebraska and encourage their use, 19 individuals from around the state of Nebraska, one from each of the Educational Service Units (ESU's) in Nebraska, were selected to participate in a Wonderwise Mentors Workshop during Summer, 1996. When these individuals agreed to participate in the workshop and become "Wonderwise Mentor Teachers" they agreed to return to their ESU's and conduct workshops for their peers about the Wonderwise kits. Each mentor teacher was expected to conduct three workshops of at least 10 teachers each.

Because the mentor teachers were among the first in the state to use the kits in their classrooms, they were also the best resource to find out how well the kits were actually working for students and teachers in classrooms. The primary purpose of this evaluation was to find out how well the kits worked in the mentors' classrooms. Many of the questions about the kits parallel those asked of the mentors following the summer Mentor Workshop and of teachers following the Wonderwise workshops given by the mentors. In this evaluation, however, three of the five the kits had been used in the classrooms by the mentors and the focus is not on how well the teachers anticipate the kits working but how well they have worked. Data were collected by interviewing 16 of the mentor teachers over the phone in early 1997, midway through the school year. Each interview focused on only one kit, with seven mentors responding to questions about the Sea Otter Biologist kit, five responding to the Pollen Detective kit, and four responding to the Parasite Sleuth kit.

At the time of these interviews, dissemination of the kits was limited primarily to mentor classroom use and workshop demonstrations. Thirteen of the 16 mentors interviewed reported that they had already conducted some workshops for their peers by January of 1997. Almost all 16 mentors interviewed had used both the Sea Otter Biologist and Pollen Detective kits with their students. The mentors who had not used these two kits planned on doing so during the Spring semester. About half the mentors had used the Parasite Sleuth kit and the other half said they planned on using it that Spring as well. The Rainforest Ecologist kit was just being made available at the time of the interviews. However, seven of the 16 mentors reported that they either planned on using this kit or hoped to use it during the Spring semester. Although the three available kits were used extensively in the mentor classrooms, as of January 1997, only 5 of the 16 mentors had loaned out their kits to other teachers.

The versatility of the kits is evident in the variety of ways the mentors incorporated them into their curricula, the many grade levels in which they were used, and the amount of class time spent on them. All of the kits were targeted for fourth to sixth graders. However, mentors reported using the kits with students ranging from 1<sup>st</sup> to 8<sup>th</sup> grade. The kits were designed as one-week units but were also intended to be a versatile element that could be readily incorporated into existing classroom curricula. Mentors used the kits both as stand-alone units and in conjunction with existing science and social studies units. Mentors also spent varying amounts of class time on the kits--from one to four weeks on each kit with many of them

reporting that they spent about two weeks of total class time per kit.

Mentors' feedback about the Sea Otter Biologist kit was very positive. All seven of the 16 mentors interviewed reported that they definitely would use this kit again the following school year. They all thought the kit was "about right" in terms of its complexity for their students, and said that the students liked the video and were engaged by it. Most of the teachers reported that the kit activities fit very well into their science units and more than half of the seven teachers said their students were more engaged during the activities compared to other classroom science activities they had done. None of the teachers said their students were less engaged than usual during the kit activities. Finally, most of the teachers also said they used the biography with their students, but reactions to it were not as positive as to the other components of the kit.

Teachers' reactions to the Pollen Detective kit were similar to those of the Sea Otter Biologist kit. All five teachers interviewed said that they would definitely use the kit again the following year, that the kit was about right for the grade level(s) they taught, and that the students were enthusiastic about the video. Almost all the teachers (grades 4-6) thought the kit activities fit very well into their science units, although a couple of teachers noted that the "Flower Engineer" activity was too simplistic for 6th-8th graders. Teachers overwhelmingly said their students were enthusiastic about the kit activities. Three of the five teachers interviewed about this kit reported that they had used the biography, and again, student reactions to it were not as positive as they were to other components of the kit.

Mentors' reactions to the Parasite Sleuth kit were generally positive as well. All four mentors thought this kit was about right in terms of the complexity for the grade level(s) they taught and three of the four teachers said they definitely would use the kit again next year. The one exception was a multi-grade teacher who said the reason she did not plan on using the kit again next year was that she would have the same students again. Three of the four teachers also thought the video was about right in complexity for the grade level they taught while one teacher thought it was too complex for 3<sup>rd</sup> grade. Three of the four teachers also thought the activities fit very well into the science units they taught while one thought they fit somewhat well. All the teachers thought the students were engaged with the kit activities and two of the four thought the students were more engaged than usual, especially during the dissection. Three of the four teachers reported that they used the biography while one said she did not due to time constraints. One teacher thought the biography was "a little wordy" for 4<sup>th</sup> grade, and another commented that the students were not bored but that they were not overly "wowed" either.

Almost all the mentors reported that the workshops they had conducted were positive experiences and went well. Mentors said that they had fun and that the participating teachers were enthusiastic about and impressed by the kits. Teachers expressed to the mentors that they thought the Wonderwise kits were affordable and that they were easier to use than other kits on the market.

# Mentor Evaluation of Kits in the Classroom

## 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 include a CD-ROM. The five kits are targeted toward fourth to sixth grade students, but have been used with students from grades 1 through 8. The kits were designed as one-week units but were also intended to be a versatile element that could be readily incorporated into existing classroom curricula.

At the time this evaluation was conducted in January 1997, the five kits were in different stages of completion as illustrated below:

Table 1. Completion of Wonderwise kits as of January 1997.

Kit	Video	Activity Book	Biography	CD-ROM
Sea Otter Biologist Kit	completed	completed	completed	completed
Pollen Detective Kit	completed	completed	completed	N/A
Parasite Sleuth Kit	completed	completed	completed	in progress
Rainforest Ecologist Kit	completed	in progress	in progress	in progress
African Plant Explorer Kit	in progress	in progress	in progress	N/A

As of September 1997, all five kits were completed. However, the CD-ROM's for the Pollen Detective and African Plant Explorer kits will be produced during Phase 2 of the project, beginning in October 1997, and revision of some other kit components will also be completed in Phase 2.

To disseminate these kits throughout the state of Nebraska and encourage their use, nineteen individuals (3 males, 16 females) 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. Each ESU serves a different geographic region of the state and serves its school districts in a variety of ways, including professional development and materials to the teachers in their ESU region. Selecting these teachers by ESU region helped to ensure that dissemination would be statewide, because the 19 ESU's collectively cover the entire state. Most of the mentors were elementary level teachers and were selected by Wonderwise staff because of their interest and experience in science teaching. When these individuals agreed to participate in the workshop and become "Wonderwise Mentor Teachers" they agreed to return to their ESU's and conduct workshops for their peers about the Wonderwise kits. Each mentor teacher was expected to conduct three workshops of at least 10 teachers each.

Because the mentor teachers were among the first in the state to use the kits in their classrooms, they were also the best resource to find out how well the kits were actually working for students and teachers in classrooms. The purpose of this evaluation was to find out how well the kits worked in the mentor classrooms and how the Mentor workshops were going. Many of the questions about the kits parallel those asked of the mentors immediately following the Mentor workshop and of the teachers participating in the Wonderwise workshops given by the mentors. In this evaluation, however, three of the five kits have been used in the classrooms

by the mentors and the focus is not on how well the teachers anticipate the kits working but how well they have worked.

## Audiences

Judy Diamond, project director; her staff at the University of Nebraska State Museum;  
and other interested staff and affiliates at the museum.

Howard Hughes Medical Institute, the funding agency of the program.  
The scientists featured in the Wonderwise kits.

The project director and staff are interested in understanding how well the kits worked in classrooms and how the mentor teachers used these kits. The evaluation may provide guidance about how to introduce or market the kits to potential users, or if some possible revision of the design could be helpful.

For the funding sponsor, this evaluation provides an opportunity to see how well the kits actually work in the classrooms.

## Evaluation Questions

- 1) Which kits were used by the mentors, how were they integrated into the existing curricula, and how much class time was spent on them?
- 2) How well did the various components of the kits work in the classrooms?
- 3) What were the students reactions to the various kit components?
- 4) What did the mentors find most appealing about the kits?
- 5) What were the difficulties with the kits/what would they change about the kits?
- 6) Would the mentors use the kits again?

## Methods

The mentors were interviewed by phone during January and February, 1997. The interview protocol included both rating scale items and open-ended questions. (See Appendix A for an example of the protocol used for the Sea Otter Biologist kit. The protocols used for the other kits were identical except listed the activities of the other kits). The interview was structured to focus on one kit as a whole, and on the three completed components: the video, biography, and curriculum activities.

## Respondents

Sixteen teachers (3 males, 13 females) were involved in this evaluation. Three of the 19 mentors were not teaching or giving classroom demonstrations of the Wonderwise kits and consequently were not interviewed. The majority of teachers were currently teaching grades four, five, and/or six. However, six of the teachers taught multiple grade levels that ranged from K-8. About half the teachers interviewed had self-contained classrooms and about a third of them had multi-age classrooms. Two of the mentors were not classroom teachers but gave demonstrations of the kits to students in their school districts.

Each interview focused on only one kit, with seven mentors responding to questions about the Sea Otter Biologist kit, five responding to the Pollen Detective kit, and four responding to the Parasite Sleuth kit. Although each interview focused on one kit, mentors sometimes

volunteered information about other kits and these are included in the results. One to two mentors responded to questions about two or more of the kits.

## **Limitations of the Evaluation**

In order to limit the interviews to about 20 minutes, mentors were asked in-depth questions about one kit, and cursory questions about other kits they had used. For some of the mentors, several months had elapsed between the time of the interviews and their use of one or more of the kits. Consequently, in some cases, the mentors had difficulties recalling specific details regarding use of the kit. However, because the interview focused primarily on one kit, the mentors often chose the one they had used most recently to provide more detailed information about their use. Also, only three of the five kits were completed and accessible at the time the interviews were conducted so no classroom information was available about the use of the last two kits.

Finally, only three of the 16 interviewed mentors were males which limits the generalizability of the findings. To avoid identifying specific individuals the term "she" will be used throughout the report.

## **Results**

### **Dissemination of Kits**

At the time of these interviews, dissemination of the kits was limited primarily to mentor classroom use and workshop demonstrations. Thirteen of the 16 mentors interviewed reported that they had already conducted some workshops for their peers by January of 1997. Almost all 16 mentors interviewed had used both the Sea Otter Biologist and Pollen Detective kits. The mentors who had not used these two kits planned on doing so during the Spring semester. About half the mentors had used the Parasite Sleuth kit and the other half said they planned on using it that Spring as well. The Rainforest Ecologist kit was just being made available at the time of the interviews. However, seven of the 16 mentors reported that they either planned on using this kit or hoped to use it during the Spring semester.

Although the three available kits were used extensively in the mentor classrooms, as of January 1997, only 5 of the 16 mentors had loaned out their kits to other teachers. Of those that had loaned their kits, one mentor reported that 3 or 4 teachers from other schools had borrowed them, another mentor said that all nine 4<sup>th</sup> and 5<sup>th</sup> grade teachers at her school had borrowed them, and a third mentor said one teacher at the same grade level had borrowed them.

### **Implementation of Kits in the Classroom**

The versatility of the kits is evident in the variety of ways the mentors incorporated them into their curricula, the many grade levels in which they were used, and the amount of class time spent on them. All of the kits were targeted for fourth to sixth graders. However, mentors reported using the kits with students ranging from 1<sup>st</sup> to 8<sup>th</sup> grade. As noted earlier, the kits were designed as one-week units but were also intended to be a versatile element that could be readily incorporated into existing classroom curricula. As will be described in more detail below, mentors used the kits both as stand-alone units and in conjunction with existing science and social studies units. Mentors also spent varying amounts of class time on the kits--from one to four weeks on each kit with many of them reporting that they spent about two weeks of total class time per kit.

### Sea Otter Biologist Kit

Thirteen mentors had used the Sea Otter Biologist kit. Eight of them gave descriptions of the amount of time they spent on the kit, the grade level(s) of their students, and the way in which they incorporated the kit into their curriculum. Mentors spent between one and four weeks on this kit and used it with students from grades 4-8. Three of the eight responding mentors reported that they spent two solid weeks on the kit as a stand-alone unit and two others reported that they spent about one week. Three other mentors said they spent 3-4 weeks: one said it took 4 weeks when combined with social studies, another said it took 3-4 weeks as a stand alone lesson, and a third teacher said it took about 3 weeks to complete some of the activities. Most of the teachers did not specify where this kit fit into their specific curriculum but a couple teachers reported that they worked it into other units including scientific processes, and light and sound.

Most of the responding mentors used all three available components of the kit. All seven teachers who were interviewed about the Sea Otter Biologist kit reported that they had used the video. Teachers generally showed the video at the beginning and then again during the activity "Otters in Action." As Table 2 shows, 9 out of the 11 responding teachers said they completed at least four of the five activities. Teachers reported that most of the activities took from one to three 45-minute class periods or about 1½ hours on average to complete. Most of the 11 teachers had students work in pairs or small groups during the activities most said they were actively involved with their students during the activities.

Most of the teachers also used the biography and did so in a variety of ways—either reading aloud 2 or 3 pages each day before the activities and discussing it, using it as an introduction to the video, or having students read it as part of literature class. The two teachers who did not use the biography in class cited time constraints as the main reason they did not use it. However, they did use it as background information for themselves.

Table 2. Number of teachers using 1-5 activities from each kit.

Kit	Number of Activities Used				
	1	2	3	4	5
<b>Sea Otter Biologist (n=11)</b>	<b>0</b>	<b>1</b>	<b>1</b>	<b>4</b>	<b>5</b>
<b>Pollen Detective (n=10)</b>	<b>1</b>	<b>2</b>	<b>2</b>	<b>1</b>	<b>4</b>
<b>Parasite Sleuth (n=6)</b>	<b>1</b>	<b>2</b>	<b>1</b>	<b>1</b>	<b>1</b>

### Pollen Detective Kit

The 13 mentors who had used the Pollen Detective kit did so in various ways as well. Nine teachers gave descriptions of the way they implemented the kit activities. Mentors spent between one and three weeks on this kit and used it with students from grades 1-8. Five of the nine responding teachers reported that they used the kit as a two-week unit, two teachers each spent one week on it, and one teacher combined it with another science unit and spent three weeks on it. One teacher also used parts of this kit with other parts of her curriculum for 3-5<sup>th</sup> and 6-8<sup>th</sup> graders. Teachers used this kit in a variety of curriculum areas. One teacher mentioned that the kit tied in well with her 5<sup>th</sup> grade health unit and another said the kit tied into a 5<sup>th</sup> grade social studies unit on land migration and geology. The activity "Pollen Tracks" fit well with the study of dinosaurs at the 3<sup>rd</sup> and 4<sup>th</sup> grade levels and "Flower Engineers" worked well with 1<sup>st</sup> graders.

Most of the mentors used all three available components of this kit. All five teachers interviewed about this kit reported that they used the video and almost all said they showed the video to introduce the kit and then again at some point closer to the end of the kit activities. Teachers said they used it to model the scientist's behavior, for class discussion, and as a wrap-up. Compared to the Sea Otter Biologist kit, teachers used fewer of the activities in this kit. As Table 2 shows, only five of the 10 teachers responding used at least four of the five activities. All the teachers reported that each of the activities took a little more than one class period to complete. Most of the teachers had students work in pairs or small groups during the activities and the five responding teachers varied in their level of involvement with their students during these activities. Two of the five teachers mostly observed, two others assisted students with problems and one said she was actively involved.

Three of the five teachers used the biography with this kit. Two of the three teachers read it together with their classes and another teacher used it in reading class. Of the two teachers who reported not using the biography, one said she didn't have enough time and the other said it was because of the particular group of students but that she would use it next year.

### Parasite Sleuth Kit

Five of the seven mentors who had used the Parasite Sleuth kit described how they had implemented the kit in their classroom. Teachers generally spent one to two weeks on this kit and used it as a single unit. One of the five teachers spent one week on it, another spent 2 weeks, and two others spent about 1 ½ weeks. One other teacher pulled out lessons for her 6-8<sup>th</sup> graders. The students in these classrooms ranged from 4<sup>th</sup>-8<sup>th</sup> grade. The teachers integrated this kit into a variety of science units including 5<sup>th</sup> grade health, entomology, and the digestive system.

Most of the responding teachers used all three available components of the kit. All four teachers interviewed reported using the video and said they showed it to their students just once. Two of the four teachers used the video as an introduction to the kit and discussed the video before moving on to the activities. One teacher related the scientist part to health-related careers and another used the video as a segue from an entomology unit. Of the six responding teachers, only two reported that they had used at least four of the kit activities. Table 2 shows that compared to the Sea Otter Biologist and Pollen Detective kits, teachers used fewer of the activities in this kit. All the teachers reported that each of the activities took about one or two class periods and that students worked in small groups during the activities. Teachers varied in their level of involvement with the students during the activities--two of the five teachers responding said they were actively involved during the activities while three said they assisted students with problems.

Three of the four teachers reported that they had used the biography while one said she did not due to time constraints. The three teachers each used the biography in different ways: in one classroom, the students read it together; in another, they used it to introduce the unit after viewing the

video and then they discussed it; and in a third class, the teacher integrated the biography into reading class.

### **Mentor Satisfaction with Kits**

#### Sea Otter Biologist Kit

Mentors' feedback about the Sea Otter Biologist kit was very positive. All seven of the 16 mentors interviewed reported that they definitely would use this kit again the following school year. They all thought the kit was "about right" in terms of its complexity for their students, and said that the students liked the video and were engaged by it. Most of the teachers reported that the kit activities fit very well into their science units and more than half of the seven teachers said their students were more engaged during the activities compared to other classroom science activities they had done. None of the teachers said their students were less engaged than usual during the kit activities. Finally, most of the teachers also said they used the biography with their students, but reactions to it were not as positive as to the other components of the kit.

#### Pollen Detective Kit

Teachers' reactions to the Pollen Detective kit were similar to those of the Sea Otter Biologist kit. All five teachers interviewed said that they would definitely use the kit again the following year, that the kit was about right for the grade level(s) they taught, and that the students were enthusiastic about the video. Almost all the teachers (grades 4-6) thought the kit activities fit very well into their science units, although a couple of teachers noted that the "Flower Engineer" activity was too simplistic for 6th-8th graders. Teachers overwhelmingly said their students were enthusiastic about the kit activities. Three of the five teachers interviewed about this kit reported that they had used the biography, and again, student reactions to it were not as positive as they were to other components of the kit.

#### Parasite Sleuth Kit

Mentors' reactions to the Parasite Sleuth kit were generally positive as well. All four mentors thought this kit was about right in terms of the complexity for the grade level(s) they taught and three of the four teachers said they definitely would use the kit again next year. The one exception was a multi-grade teacher who said the reason she did not plan on using the kit again next year was that she would have the same students again. Three of the four teachers also thought the video was about right in complexity for the grade level they taught while one teacher thought it was too complex for 3<sup>rd</sup> grade. Three of the four teachers also thought the activities fit very well into the science units they taught while one thought they fit somewhat well. All the teachers thought the students were engaged with the kit activities and two of the four thought the students were more engaged than usual, especially during the dissection. Three of the four teachers reported that they used the biography while one said she did not due to time constraints. One teacher thought the biography was "a little wordy" for 4<sup>th</sup> grade, and another commented that the students were not bored but that they were not overly "wowed" either.

### **Evaluation of Workshops**

In addition to gathering information about the mentors' classroom experiences with the kits, we took this opportunity to inquire about the dissemination of the kits. Most of the mentors had conducted workshops for their peers, and a few questions about these workshops were included in the interview.

*What was your overall impression of how your workshops went?*

Almost all the mentors reported that the workshops they had conducted were positive experiences and went well. Mentors said that they had fun and that the teachers were enthusiastic about and impressed by the kits. Teachers told the mentors that they thought the kits were affordable and that they were easier to use than other ones on the market.

The mentors conducted the workshops in a variety of settings. One mentor said that she included the kits in the PEERS Academy workshop that she had conducted. Other mentors conducted workshops at NATS and by grade level in their community rather than at the Educational Service Unit. One mentor said that all the 4<sup>th</sup> and 6<sup>th</sup> grade teachers at her school got release time from class to attend her workshop.

Three of the 16 mentors offered suggestions for improving the workshops, or concerns about the workshop formats. One mentor reported that her two hour workshop could have been shortened and that she found that not everyone has to do all of the activities presented. Another mentor, however, thought she needed more than 2 hours for her workshop. Lastly, one mentor reported that she had to travel a considerable distance to conduct a workshop and because of this she had to find a substitute teacher to cover her classes. She said setting up for workshop takes ½ day and the workshop itself takes 2 hours. She said one of the workshops she conducted was less effective because there were too many teachers (30) and that prior to the workshop they had been at computers all day.

#### **Additional Comments about the Kits or the Workshops**

Mentors emphasized that the “kits are wonderful” and that they are satisfied with them. One mentor said that when teachers see the videos they want the kits. A couple mentors also said they were disappointed that they could not show the CD-ROMs at their workshops.

Two of the mentors offered additional observations about the kits. One mentors said that she appreciated that a lot of the materials in the kits could be purchased outside of the kits so they can be easily refurbished. However, she pointed out that some items are difficult to find at certain times of the year. For example, nuts and shells for the Rainforest Ecologist kit are difficult to find after the Christmas season.

Another mentor emphasized how important it is to know how the kits are tied into the curriculum. She said that elementary teachers don’t focus on science so the more you can do to help them see how to use them in the curriculum the more they’ll use them. She suggested having the mentors briefly present information at staff meetings or pay science specialists to examine the curriculum in each district and determine where the kits fit into each one. This would result in much more usage, she thought. For example, in her district, the Pollen Detective kit can be used in 1<sup>st</sup>-3<sup>rd</sup> grades and the Rainforest Ecologist kit can be used in 2<sup>nd</sup> grade. She also thought all of the kits could be broadened to social studies to discuss things like gender bias and careers. One mentor also said she would use the Rainforest Ecologist kit with both levels 3-5 and 6-8.

## Appendix A

### Interview Protocol (Sea Otter Biologist Kit) Mentor Feedback on Using Wonderwise Kits in the Classroom

#### Overall Summary

Grades currently teaching: \_\_\_\_\_

self-contained classroom? no yes: \_\_\_\_\_

multi-age classroom? no yes: \_\_\_\_\_

Have other teachers in your school borrowed these kits and used them? no yes

If yes, how many?

Did these teachers attend the Wonderwise workshop you conducted/attended? no yes

1) Which kits have you used with your class? (circle all that apply, select one for discussion)

Sea Otter Biologist Kit	Pollen Detective Kit	Parasite Sleuth Kit	Rainforest Ecologist Kit	African Plant Explorer Kit
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2) What grade level did you use these with? \_\_\_\_\_

3) How many times did you use these kits? \_\_\_\_\_

#### Strengths/Weaknesses of the Kits

##### Sea Otter Biologist Kit

4) Did you use the video? If yes, how many times did you show it? \_\_\_\_\_

5) 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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6) 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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7) 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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8) 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?)

9) 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?)

10) Will you use the video again? no yes If not, why not?

11) Which activities did you use?

<b>Sea Otter Biologist Kit</b>	<b>length</b>	<b>structure</b>	<b>Difficult to use</b>	<b>use again?</b>
Otters in Action				
Kelp Critters				
Fragile Waters				
Otter Smorgasbord				
Tracking Otters				

12) How involved were you with the students during the activity? Did you mostly observe, assist students when problems arose, or were you actively involved with the groups?

mostly observed	assisted students with problems	actively involved
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13) Would you say these activities fit not at all well, somewhat, or very well into your science units?

not at all well	somewhat	very well
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14) Were students less engaged, about the same, or more engaged in scientific inquiry during these activities compared to other activities used?

less engaged	about the same	more engaged
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15) What were your students' reactions to the activities? (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?)

16) Did you use the biography? If so, how was it used?

17) What were your students' reactions to the biography? (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?)

18) Did you use any of the components of the kit with more than one classroom? no yes  
If yes, which ones?

19) Overall, would you say this kit was too simplistic, about right or too complex for the grade level you teach?

too simplistic	about right	too complex
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20) Overall, were all students engaged with the kit activities?

21) What do you think were the most important things that your students learned by using this kit?

22) What, if anything, does this kit provide your students that is not otherwise available? (in what way is this kit a unique resource?)

23) What did you find most appealing about the kit?

24) What would you change about the kit?

25) Will you use this kit again next year?	definitely will not	probably not	possibly	probably will	definitely will
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26) Why or why not?

27) Are there certain parts of the kit that you will not use again?  
Why?

28) Any additional comments about the kit or your students' reactions to the kit?

**Part II--Evaluation of Workshop--Mentors**

29) What was your overall impression of how the workshops went?

30) Any additional comments about the kits or the workshops?

## Appendix B

**Table B1: Summary of video evaluations across kits**

Is the video is too simplistic, about right, or too complex for the grade level you teach?	too simplistic	about right	too complex
Otter Video	-	89%	11%
Pollen Detective Video	-	100%	-
Parasite Sleuth Video	-	75%	25%
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
Otter Video	14%	86%	-
Pollen Detective Video	-	80%	20%
Parasite Sleuth Video	-	67%	33%
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
Otter Video	14%	29%	57%
Pollen Detective Video	-	60%	40%
Parasite Sleuth Video	-	25%	75%
Will you use the video again?	no	maybe	yes
Otter Video	-	-	100%
Pollen Detective Video	-	-	100%
Parasite Sleuth Video	33%	-	67%

**Table B2: Summary of the written biography evaluations across kits**

Did you use the biography?	no	yes
Otter Biography	29%	71%
Pollen Detective Biography	40%	60%
Parasite Sleuth Biography	25%	75%

**Table B3: Summary of curriculum activity evaluations across kits**

How involved were you with the students during the activity?	mostly observed	assisted students w/ problems	actively involved
Otter Activities	33%	-	67%
Pollen Detective Activities	40%	40%	20%
Parasite Sleuth Activities	-	50%	50%
Were students more actively involved/engaged in scientific inquiry during these activities compared to other activities used?	less engaged	about the same	more engaged
Otter Activities	-	43%	57%
Pollen Detective Activities	-	50%	50%
Parasite Sleuth Activities	-	75%	25%
Would you say these activities fit not at all well, somewhat, or very well into your science units?	not at all well	somewhat	very well
Otter Activities	14%	14%	71%
Pollen Detective Activities	-	20%	80%
Parasite Sleuth Activities	-	25%	75%

**Table B4: Summary of Overall Kit Evaluations**

Overall, would you say this kit was too simplistic, about right or too complex for the grade level you teach?	too simplistic	about right	too complex
Otter Kit	-	100%	-
Pollen Detective Kit	-	100%	-
Parasite Sleuth Kit	-	100%	-

Will you use this kit again next year?	definitely will not	probably not	possibly	probably will	definitely will
Otter Kit	-	14%	-	-	86%
Pollen Detective Kit	-	20%	-	-	80%
Parasite Sleuth Kit	-	25%	-	-	75%

## Appendix C1

### **Sea Otter Biologist Kit**

#### **Summary of Sea Otter Biologist Kit Results**

##### **Implementation**

Thirteen mentors had used the Sea Otter Biologist kit. Eight of them gave descriptions of the amount of time they spent on the kit, the grade level(s) of their students, and the way in which they incorporated the kit into their curriculum. Mentors spent between one and four weeks on this kit and used it with students from grades 4-8. Three of the eight responding mentors reported that they spent two solid weeks on the kit as a stand-alone unit and two others reported that they spent about one week. Three other mentors said they spent 3-4 weeks: one said it took 4 weeks when combined with social studies, another said it took 3-4 weeks as a stand alone lesson, and a third teacher said it took about 3 weeks to complete some of the activities. Most of the teachers did not specify where this kit fit into their specific curriculum but a couple teachers reported that they worked it into other units including scientific processes, and light and sound.

Most of the responding mentors used all three available components of the kit. All seven teachers who were interviewed about the Sea Otter Biologist kit reported that they had used the video. Teachers generally showed the video at the beginning and then again during the activity "Otters in Action." As Table 2 on page 4 shows, 9 out of the 11 responding teachers said they completed at least four of the five activities. Teachers reported that most of the activities took from one to three 45-minute class periods or about 1½ hours on average to complete. Most of the 11 teachers had students work in pairs or small groups during the activities most said they were actively involved with their students during the activities.

Most of the teachers also used the biography and did so in a variety of ways—either reading aloud 2 or 3 pages each day before the activities and discussing it, using it as an introduction to the video, or having students read it as part of literature class. The two teachers who did not use the biography in class cited time constraints as the main reason they did not use it. However, they did use it as background information for themselves.

##### **Mentor Satisfaction**

Mentors' feedback about the Sea Otter Biologist kit was very positive. All seven of the 16 mentors interviewed reported that they definitely would use this kit again the following school year. They all thought the kit was "about right" in terms of its complexity for their students, and said that the students liked the video and were engaged by it. Most of the teachers reported that the kit activities fit very well into their science units and more than half of the seven teachers said their students were more engaged during the activities compared to other classroom science activities they had done. None of the teachers said their students were less engaged than usual during the kit activities. Finally, most of the teachers also said they used the biography with their students, but reactions to it were not as positive as to the other components of the kit.

## Detailed Results of Sea Otter Biologist Kit

### Video

Seven of the 13 mentors responded to questions about the Sea Otter Biologist video. Mentors were first asked about the video to assess the appropriateness of its length and complexity for their students, how well it fit into the existing science units, how the video was incorporated into their curricula, what the students' reactions were to it, and whether the teacher would use it again the following year.

*Did you use the video?*

All seven teachers who were interviewed about the Sea Otter Biologist kit reported that they had used the video. When asked how many times they showed the video to their students, one teacher reported showing it once, six of the seven teachers showed it three to five times, and one other teacher showed just segments of it because the district restricts teachers from showing complete videos at the elementary level.

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

All seven teachers thought the video was about the right level in terms of complexity. One teacher qualified her response by adding that the video was about right for grades 5-8 but too complex for grades 3-4. Another teacher thought some parts were tough for 5<sup>th</sup> grade, and a couple teachers commented that the video--especially observing the otter behaviors--was tough for 2<sup>nd</sup> through 4<sup>th</sup> graders. One teacher said that her 5<sup>th</sup> grade students were frustrated the first time they did the otter observations. The teacher solved this problem by splitting up the class into groups of four and having each student observe 1 or 2 otter behaviors. Students within each group then combined their data and compared it with other groups' data.

*Would you say the video was too short, about the right length, or too long for the topic presented?*

Six of the seven teachers said that the video was about the right length while one teacher thought the video was too short and that there was not enough information about the otters. Another teacher commented that it wasn't too long because of the flexibility in use.

*Does the video fit not at all well, somewhat well, or very well into the science units you teach?*

More than half the teachers responded positively to this question. Four of the seven teachers reported that the video fit very well into the science units they taught. Two of the seven teachers reported that it fit somewhat well, and one teacher reported that it did not fit at all but she/he adjusted the curriculum to make it fit. Another teacher remarked that she could "make anything fit."

*How did you use the video?*

Most of the seven teachers used the video as an introduction and during the activity "Otters in Action." Some of the teachers also used it at the end to sum up the kit and others used it with the biography as well.

*What were your students' reactions to the video?*

All of the teachers reported that the students liked the video and were engaged by it. Several of the seven teachers noted that the students were intrigued by the sea otters. Several teachers also said that the students asked a lot of questions about the scientist and the jobs necessary for a research project, and about oil spills. Some students shared zoo experiences and what they had seen on television. One teacher reported that a couple of the girls "went off and tried to do a report like a scientist." Another teacher said the students were fascinated by seeing the location. She felt that the students' reactions depended on the teacher's expertise—that is, the students could be bored without the teacher previewing the tapes and giving context and additional information to the students. Finally, one teacher also thought the video went so fast they couldn't glean much information on any one topic.

*Will you use the video again?*

All seven teachers reported that they would use the video again.

### **Activities**

Thirteen of the mentors said they had used the Sea Otter Biologist kit and all of these teachers responded to questions about the activities including which ones they used, how long each one took to complete, how they structured their classrooms during the activities, how difficult they were to use and whether they would use them again. The seven teachers who responded to questions about the other components of the kit, also answered additional questions about the activities. These questions were similar to those asked about the video such as what were the students' reactions to the activities and how well did the activities fit into the existing science units? Teachers were also asked how involved they were with the students during the activities. This question was included because the activities are designed to be student-directed and we wanted to assess to what extent this was accomplished in the classrooms.

*Which activities did you use, how long did each activity take to complete, how did you use them, were they difficult to use, and would you use them again?*

As Table 2 on page 4 indicates, nine of the 11 teachers using the Sea Otter Biologist kit used either four or five of the classroom activities; two teachers used two or three activities. (Two of the 13 teachers responding were not regular classroom teachers and their use of the activities in classroom demonstrations is not included in Tables 2 or C1.) Table C1 shows the number of teachers who used each of the activities. All 11 teachers reported that they used "Otters in Action" and 10 of the 11 used "Fragile Waters." Most of the 11 teachers used the other three activities as well.

Teachers were also asked to describe how much time each activity took to complete and how their classrooms were structured during the activities. Teachers reported that most of the activities took from one to three 45-minute class periods or about 1½ hours on average to complete. The one exception was "Kelp Critters" which took anywhere from one class period to one week. A couple teachers had students do this activity during their spare time, in addition to other activities. Most of the 11 teachers had students work in pairs or small groups during the activities.

When asked if the activities were difficult to use, the 11 teachers had a variety of comments to share. One teacher thought "Fragile Waters" was "time consuming but worth it"

and another thought it was hard to set up due to the number of bottles required. Another teacher thought “Otter Smorgasbord” was too difficult for 4<sup>th</sup> graders and would not use it again for that reason. A couple teachers did not use “Fragile Waters” and “Tracking Otters” due to time constraints. One teacher tried “Tracking Otters” outside and said it worked alright; another commented that the students like this activity the best and that it could be incorporated into various units. Another teacher said “Kelp Critters” fit well with the 6<sup>th</sup> grade curriculum. One teacher said gathering the materials took time and the students were not ready for self-directed activities. Finally, one teacher thought it was difficult to graph the feeding behaviors in “Otters in Action” because very little of this behavior occurred in the video.

Table C1. Number of teachers using each Sea Otter Biologist kit activity.

Sea Otter Biologist Kit	
Activity	Number of Teachers (n=13)*
Otters in Action	<b>11</b>
Kelp Critters	<b>8</b>
Fragile Waters	<b>10</b>
Otter Smorgasbord	<b>9</b>
Tracking Otters	<b>8</b>

\*Actual number responding=11.

*How involved were you with the students during the activity? Did you mostly observe, assist students when problems arose, or were you actively involved with the groups?*

Most of the teachers reported that they were actively involved during the activities. Specifically, five of the seven responding teachers reported that they were actively involved during the activities they used, while two of the seven teachers said they mostly observed after giving the instructions. Another teacher commented that her/his level of involvement depended on the activity. “Otter Smorgasbord” for example required less involvement than “Tracking Otters.”

*Would you say these activities fit not at all well, somewhat, or very well into your science units?*

Five of the seven teachers said that the kit activities fit very well into their science units. One teacher said they fit somewhat well, and another said they fit not at all although she changed the curriculum to make them fit. One teacher noted that you “need to be willing to take side trip” to incorporate the kits into curriculum. One teacher also said Sea Otter Biologist Kit fit fairly well into 4<sup>th</sup> grade social studies.

*Were students less engaged, about the same, or more actively involved/engaged in scientific inquiry during these activities compared to other activities used?*

Five of the seven teachers thought their students were more engaged during the kit activities compared to other activities they’d used in their classroom. The remaining two teachers thought that the students were about as engaged as they normally were during activities. Teachers’ comments about the students’ involvement included that they were “very interested,” “any hands-on activities are engaging”, and that her “students are pretty engaged all the time anyway.”

*What were your students' reactions to the activities?*

All seven teachers reported that their students were interested and engaged during the kit activities. One teacher said that the students were "sad when it was over." Other teachers noted that the students were interested in the sea otters, that a lot of discussion occurred, and that the students always like group work. One teacher also noted that some of the kids had a hard time counting behaviors on the video but the kids still liked the hands-on activities. Finally, one of the teachers reported that a girl in her class borrowed the video and biography to show her sister who is interested in marine biology. The teachers reported that the students "really like [the kits] due to interactive nature of them; they feel like scientists and this is the strength of the kits."

*Other comments about the kit activities:*

One of the seven teachers thought some of the activities were too simplistic for 6<sup>th</sup> grade while another thought that this kit fit very well into 6<sup>th</sup> grade. Another teacher noted that the activities could be used in the 2<sup>nd</sup> to 8<sup>th</sup> grade.

**Biography**

Seven of the teachers were asked about their use of the biography. Specifically they were asked whether they used the biography and if so, how, and what their students' reactions were to it.

*Did you use the biography? If so, how was it used?*

Five of the seven teachers reported that they used the biography. The two teachers who did not use the biography in class cited time constraints as the main reason they did not use it. However, they did use it as background information for themselves. One of the seven teachers thought the biography was redundant with the video and that "students read enough already."

The five teachers used the biography in a variety of ways. One teacher read 2 or 3 pages each day and said if the students had had copies of it she would have made it a reading assignment. A couple teachers also read parts of it aloud to the students before the activities and discussed the viability of students becoming scientists. One teacher made copies for all her students and they all read it as an introduction to the video and activities. Finally, one teacher had the students read it in literature class; students worked in small groups sharing a copy and discussed it. Then the students generated questions and learned vocabulary from it.

*What were your students' reactions to the biography?*

All five teachers reported that their students liked the biography but did not show more interest than usual. One of the five teachers reported that the students liked the fact that the scientist was a farmgirl like many of them. Another teacher said the video brought more life to the biography so the combination of the two was good.

**Overall Sea Otter Biologist Kit**

*Did you use any of the components of the kit with more than one classroom?*

*If yes, which ones?*

Teachers who taught science to more than one classroom used the kits in all of them. One teacher who taught science in grades 3-8 used the kit just for grades 5-8.

*Overall, would you say this kit was too simplistic, about right or too complex for the grade level you teach?*

All seven teachers thought the Sea Otter Biologist kit was about right in terms of complexity for the grade level they taught.

*Overall, were all students engaged with the kit activities?*

Teachers overwhelmingly thought the kit activities engaged the students. Several of the seven teachers said that most, but not all, of the students were engaged and that hands-on activities are engaging to students.

*What do you think were the most important things that your students learned by using this kit?*

The seven teachers' responses fell into four main categories:

- 1) Actual scientists—"Scientists are real people and were kids at one time; neat things to do as scientists—breaks stereotypes of what scientists do."
- 2) Environmental issues—oil spills, change in food supply, ecosystem interdependency, awareness of environment.
- 3) Process Skills—working as a scientist in observing the sea otters.
- 4) Content knowledge about sea otters.

*What, if anything, does this kit provide your students that is not otherwise available?*

While several of the seven teachers said the hands-on activities, including the activities on oil spills, were important, unique resources, the responding teachers identified several different components or aspects of the kit as being unique. A couple teachers mentioned that the actual scientists as role models for girls were not otherwise available. Several teachers also mentioned the sea otter footage in the video and the behavioral observation activity that made the video interactive. One of the seven teachers identified the materials—sea shells and clams. Lastly, one teacher mentioned the biography and video components of the kit.

*What did you find most appealing about the kit?*

Three themes emerged from the seven teachers' responses:

- 1) The ease of use and completeness of the kits. The teachers said "everything was handy" and the lessons were well laid out.
- 2) The activities. "Activities are planned out for you."
- 3) The role models for girls—the actual scientists.

A couple teachers also said the most appealing aspect of the kit was the flexibility: "lots of possibility for integrating into different subjects at elementary level" and you "can use the activities individually or in sequence."

*What would you change about the kit?*

Responses from the seven teachers varied from no suggested changes to substantial changes in resources provided for teachers. A couple teachers said nothing needed to be changed while others had minor comments including: "some of the wording" in the Otter Smorgasbord activity was too difficult for 4<sup>th</sup> graders, and more graphing and math should be

incorporated. Other teachers suggested more substantive changes to the kits including: explaining how the kit will correspond to the curriculum in the various districts for each grade level and adding more structure in the activities. One teacher felt that adding more structure would be helpful for assessing the activities. As this teacher noted, "it's hard to go two weeks without grading the students and the activities are hard to grade." Another teacher also mentioned needing more assessment and said that in the future she would organize her classroom differently during some of the activities.

*Will you use this kit again next year?*

Six of the seven teachers reported they would use the kit again next year. One teacher said she would probably not use it because she had the same students again next year. However, she also said she will use parts of the kit that she didn't use this year. Another teacher commented that she would use the kit even though she would have to refurbish the kit.

*Are there certain parts of the kit that you will not use again? Why?*

Four of the seven teachers said there were no parts of the kits they would not use again. One teacher said she would not use the Kelp Forest activity due to space and time limitations. Another teacher said she would not use the Kelp Forest activity because of its duplication in the Rainforest activity. She also said the biography would be available to the students but that they would not use it unless she created questions about it for extra activities. Again, one multi-grade teacher noted that she would not be using the kit next year because she would have the same students again. One teacher also commented that she had to revamp the oil spill map. She had her students draw in the progression of the oil spill using different colors and develop their own key because they had not had much exposure to maps.

*Any additional comments about the kit or your students' reactions to the kit?*

The seven responding teachers gave many positive comments especially that this kit works well and the students' reactions are positive. The teachers were also excited to conduct the workshops and to receive the other kits and the CD-ROMs. One teacher mentioned that this kit worked well with their curriculum. Another teacher said that it was important to get the ESU's involved in developing ways of showing teachers how to use the kits in the curriculum of their specific district.

## Appendix C2

### Pollen Detective Kit

Five teachers were interviewed about the Pollen Detective kit. However, one of the teachers was not a regular classroom teacher and thus could not respond to the question regarding the students' level of engagement compared to other classroom activities.

#### **Summary of Pollen Detective Kit Results**

##### **Implementation**

The 13 mentors who had used the Pollen Detective kit did so in various ways as well. Nine teachers gave descriptions of the way they implemented the kit activities. Mentors spent between one and three weeks on this kit and used it with students from grades 1-8. Five of the nine responding teachers reported that they used the kit as a two-week unit, two teachers each spent one week on it, and one teacher combined it with another science unit and spent three weeks on it. One teacher also used parts of this kit with other parts of her curriculum for 3-5<sup>th</sup> and 6-8<sup>th</sup> graders. Teachers used this kit in a variety of curriculum areas. One teacher mentioned that the kit tied in well with her 5<sup>th</sup> grade health unit and another said the kit tied into a 5<sup>th</sup> grade social studies unit on land migration and geology. The activity "Pollen Tracks" fit well with the study of dinosaurs at the 3<sup>rd</sup> and 4<sup>th</sup> grade levels and "Flower Engineers" worked well with 1<sup>st</sup> graders.

Most of the mentors used all three available components of this kit. All five teachers interviewed about this kit reported that they used the video and almost all said they showed the video to introduce the kit and then again at some point closer to the end of the kit activities. Teachers said they used it to model the scientist's behavior, for class discussion, and as a wrap-up. Compared to the Sea Otter Biologist kit, teachers used fewer of the activities in this kit. As Table 2 on page 4 shows, only five of the 10 teachers responding used at least four of the five activities. All the teachers reported that each of the activities took a little more than one class period to complete. Most of the teachers had students work in pairs or small groups during the activities and the five responding teachers varied in their level of involvement with their students during these activities. Two of the five teachers mostly observed, two others assisted students with problems and one said she was actively involved.

Three of the five teachers used the biography with this kit. Two of the three teachers read it together with their classes and another teacher used it in reading class. Of the two teachers who reported not using the biography, one said she didn't have enough time and the other said it was because of the particular group of students but that she would use it next year.

##### **Mentor Satisfaction**

Teachers' reactions to the Pollen Detective kit were similar to those of the Sea Otter Biologist kit. All five teachers interviewed said that they would definitely use the kit again the following year, that the kit was about right for the grade level(s) they taught, and that the students were enthusiastic about the video. Almost all the teachers (grades 4-6) thought the kit activities fit very well into their science units, although a couple of teachers noted that the "Flower Engineer" activity was too simplistic for 6th-8th graders. Teachers overwhelmingly said their students were enthusiastic about the kit activities. Three of the five teachers interviewed about this kit reported that they had used the biography, and again, student reactions to it were not as positive as they were to other components of the kit.

## Detailed Results of Pollen Detective Kit

### Video

*Did you use the video?*

All five teachers interviewed about this kit reported that they used the video. Two of the five showed it once and three teachers showed it two times: at the beginning and the end of the kit.

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

All five teachers reported that the video was about right for the grade level they taught.

*Would you say the video was too short, about the right length, or too long for the topic presented?*

Teachers responded very positively to this question. Four of the five teachers thought the video was about the right length while one teacher thought it was slightly too long for 5<sup>th</sup>/6<sup>th</sup> grade.

*Does the video fit not at all well, somewhat well, or very well into the science units you teach?*

Reactions to this question were somewhat mixed. Two of the five teachers thought the video fit very well into the science units they teach, and three of the five teachers thought the video fit somewhat well.

*How did you use the video?*

Almost all five teachers showed the video to introduce the kit and then again at some point closer to the end of the kit activities. Teachers used it to model the scientist's behavior, for class discussion, and as a wrap-up. One of the five teachers first showed the video in its entirety to the students and then showed parts of it during discussions during other units.

*What were your students' reactions to the video?*

Teachers reported that students' reactions to the video were generally positive. Two of the five teachers reported that their students' loved the video and asked questions about the scientist. A couple teachers said the students were interested but that the video was redundant with the biography. One of the five teachers said she had a "bad" class this year but that the students were amazed at acid pollen and seeing the scientist gear up to work in the lab. One of the five teachers also said the students were attentive but not particularly enthusiastic.

*Will you use the video again?*

All five teachers said they would use the video again.

## Activities

*Which activities did you use, how long did each activity take to complete, how did you use them, were they difficult to use, and would you use them again?*

Thirteen of the mentors interviewed had used this kit. (Two of the teachers responding to these questions were not regular classroom teachers and their use of the activities in classroom demonstrations is not included in Tables 2 or C2.) As Table 2 on page 4 indicates, five of the 10 teachers using the Pollen Detective kit used either four or five of the classroom activities, four teachers used two or three activities, and one teacher used one activity. Table C2 shows the number of teachers that used each of the activities. (One teacher did not report which activities she used.)

Teachers were also asked to describe how much time each activity took to complete and how their classrooms were structured during the activities. All 11 teachers reported that each of the activities took a little more than one class period to complete. Most of the teachers had students work in pairs or small groups during the activities.

When asked if any of the activities were difficult to use the teachers responded in a variety of ways. Two of the 11 teachers said they did not use "Flower Engineers" because it was too simplistic for 6<sup>th</sup> grade. One teacher was unsure if she would use "Medical Mystery" again because it was simplistic, although she noted that the students enjoyed it. One of the 11 teachers also commented that "Medical Mystery" took longer than anticipated but that it was worth it. Another teacher said "Pollen Tracks" took a lot of prep time. One of the 11 teachers did not do "Pollen Tracks" due to time constraints and another teacher said she modified "Pollen Tracks" for the upper grades by including more mathematics concepts. One teacher reported using Pollen Tracks with classrooms of 3-5 graders and 6-8 graders. According to one teacher, the "Pollination" activity and parts of the flower were too simplistic for 7th and 8<sup>th</sup> graders so she expanded on them. One teacher also reported that her students did not do "Pollination" because of the lack of live flowers.

Table C2. Number of teachers using each Pollen Detective kit activity.

<b>Pollen Detective Kit</b>	
<b>Activity</b>	<b>Number of Teachers (n=13)*</b>
Pollination	7
In Search of Pollen	8
Medical Mystery	7
Flower Engineers	5
Pollen Tracks	8

\*Actual number responding=10.

*How involved were you with the students during the activity? Did you mostly observe, assist students when problems arose, or were you actively involved with the groups?*

The five teachers varied somewhat in their responses to this question. One of the five teachers said she was actively involved, two of the teachers said they assisted students with problems and two others mostly observed. One teacher commented that it "depends on the activity and student" and that it requires minimum involvement during the activity but she is more involved after the activity when they are drawing conclusions.

*Would you say these activities fit not at all well, somewhat, or very well into your science units?*

Four of the five teachers (grades 4-6) reported that the activities fit very well into their science units. One 5<sup>th</sup> grade teacher said they fit somewhat well. One teacher commented that “Flower Engineers” is similar to something that the 2<sup>nd</sup> grade students do in their district and “Medical Mystery” fit into the 5<sup>th</sup> grade health unit.

*Were students less engaged, about the same, or more actively involved/engaged in scientific inquiry during these activities compared to other activities used?*

The four teachers were equally split in their responses to this question. Two of the four teachers thought the students were more engaged during these activities compared to other activities while two others thought the students were about equally engaged. One teacher commented that her “students are used to hands-on program” and that she “does a lot of hands-on--a typical classroom of students would be more engaged [with these activities than usual]”.

*What were your students’ reactions to the activities?*

Teachers overwhelming said that the students were enthusiastic in their response to the activities. Teachers reported that there was lots of student involvement and that the students wanted to do more. One teacher said the students “thought it was cool that a scientist was from Nebraska,” and another said the “students were amazed they can still find pollen that old” in the Pollen Tracks activity. Students in one class loved “Pollen Tracks” but thought the “Flower Engineer” activity was childish. Another class of students brought in extra flowers to dissect and so this activity, like many other ones, took two days rather than one. Lastly, as an extension of this kit, one class of students buried artifacts and had an archeologist visit their class to show them how to properly dig. According to the teacher, “all the kids decided they wanted to be archeologists.”

## **Biography**

*Did you use the biography? If so, how was it used?*

Three of the five teachers used the biography with this kit. Two of the three teachers read it together with their classes and another teacher used it in reading class. This teacher thought it was too difficult for 4<sup>th</sup> grade and not as exciting as other reading materials they have available. However, she said she may use the Sea Otter Biologist biography. Of the two teachers who reported not using the biography, one said she didn’t have enough time and the other said it was because of the particular group of students—that she would use it next year.

*What were your students’ reactions to the biography?*

None of the three teachers who used the biography had particularly positive reactions to report. One of the three teachers said the students were “not real excited” and that the biography was redundant with the video. Another teacher said the students reacted the same way they do to “anything they read in class--after awhile it’s lengthy” however, she said she would use it again.

## **Overall Pollen Detective Kit**

*Overall, would you say this kit was too simplistic, about right or too complex for the grade level you teach?*

All five teachers said the kit was about right for the grade level they taught although one teacher noted that the “Flower Engineer” activity was too simplistic and some of the other

activities were too easy for 6<sup>th</sup> grade. A couple teachers said that the appropriateness of the kit for any grade level depended on how it was taught. To these teachers the more important question is where do the kits fit into the curriculum?

*Overall, were all students engaged with the kit activities?*

All five teachers responded positively to this question with comments such as, "yes, very" and "very much so."

*What do you think were the most important things that your students learned by using this kit?*

Teachers focused on the role models provided by the scientists and the content of the kits as the most important things their students learned from the kit. Four of the five teachers said one of the most important things students learned from this kit was the role models that the scientists provided and the career awareness aspect of the kit. One teacher said the kit helped the students "realize contemporary scientists exist." Another said it made the kids "look at doing science differently" and the "kids thought about women in science" whereas many had thought of women only in traditional careers. The same teacher also said that hands-on, exploratory activities showed that "anyone can do [science]" and that "every student is successful." One other teacher mentioned that the students learned about careers, stating "paleobotany as a career was new to them," and the kit increased awareness that "things happen in Nebraska." Three of the five teachers also mentioned the content of the kits—for example, the importance of pollen in our lives and the parts of the flower. One teacher also said that her students understood the physical parameters of asthma better, which was of particular interest because one of the students in her class suffers from asthma.

*What, if anything, does this kit provide your students that is not otherwise available?*

Teachers' views of what this kit uniquely provides their students varied. Two of the five teachers mentioned the female role model of the scientist, two others mentioned the hands-on activities and the possibilities of extending the activities, and one teacher mentioned having everything in one package. One teacher also added that the use of pollen to study history amazed her students.

*What did you find most appealing about the kit?*

The five teachers' responses were split between two main aspects of the kit. Two of the five teachers said the ease of use and completeness of the kit was the most appealing aspect of the kit, two others said the contemporary scientist that the kids can identify with was the most appealing part, and one teacher said the ownership of learning by kids and the student-directed hands-on activities were the most appealing aspect of the kit.

*What would you change about the kit?*

Teachers' comments varied in response to this question. Two of the five teachers focused on materials: one suggested that materials be made more available, and the other said she needed microscope slides to make the activities more scientific. One of the five teachers suggested including a teacher's manual, especially with answers to questions at the end of each activity. One teacher said "some of the wording," in the activity book was too difficult for students to use without help from the teacher. One teacher also suggested no changes; another suggested providing alternative challenging activities for 6<sup>th</sup> grade.

*Will you use this kit again next year?*

Four of the five teachers reported that they would use this kit again next year. One teacher reported that she probably would not use the kit next year because she teaches multiple grade levels and will have the same students again.

*Are there certain parts of the kit that you will not use again? Why?*

Teachers' comments varied in response to this question. Two of the five teachers said there were no parts they would not use again. One teacher was not sure while another said it depended on the amount of available time. One teacher also said she was "not big on making flowers" and felt that the Medical Mystery was appropriate for 4<sup>th</sup> or 5<sup>th</sup> grade but not 6<sup>th</sup> grade.

*Any additional comments about the kit or your students' reactions to the kit?*

Overall, the five teachers were very positive, reporting that the students looked forward to the other kits and appeared to enjoy this kit. Two teachers also mentioned wanting to receive the CD-ROM.

## Appendix C3

### Parasite Sleuth Kit

Three teachers were interviewed specifically about this kit. However, one additional teacher volunteered responses to many of the questions on this kit, so her responses are also included in this summary and in the summary tables in Appendix B.

#### **Summary of Parasite Sleuth Kit Results**

##### **Implementation**

Five of the seven mentors who had used the Parasite Sleuth kit described how they had implemented the kit in their classroom. Teachers generally spent one to two weeks on this kit and used it as a single unit. One of the five teachers spent one week on it, another spent 2 weeks, and two others spent about 1 ½ weeks. One other teacher pulled out lessons for her 6-8<sup>th</sup> graders. The students in these classrooms ranged from 4<sup>th</sup>-8<sup>th</sup> grade. The teachers integrated this kit into a variety of science units including 5<sup>th</sup> grade health, entomology, and the digestive system.

Most of the responding teachers used all three available components of the kit. All four teachers interviewed reported using the video and said they showed it to their students just once. Two of the four teachers used the video as an introduction to the kit and discussed the video before moving on to the activities. One teacher related the scientist part to health-related careers and another used the video as a segue from an entomology unit. Of the six responding teachers, only two reported that they had used at least four of the kit activities. Table 2 on page 4 shows that compared to the Sea Otter Biologist and Pollen Detective kits, teachers used fewer of the activities in this kit. All the teachers reported that each of the activities took about one or two class periods and that students worked in small groups during the activities. Teachers varied in their level of involvement with the students during the activities--two of the five teachers responding said they were actively involved during the activities while three said they assisted students with problems.

Three of the four teachers reported that they had used the biography while one said she did not due to time constraints. The three teachers each used the biography in different ways: in one classroom, the students read it together; in another, they used it to introduce the unit after viewing the video and then they discussed it; and in a third class, the teacher integrated the biography into reading class.

##### **Mentor Satisfaction**

Mentors' reactions to the Parasite Sleuth kit were generally positive. All four mentors thought this kit was about right in terms of the complexity for the grade level(s) they taught and three of the four teachers said they definitely would use the kit again next year. The one exception was a multi-grade teacher who said the reason she did not plan on using the kit again next year was that she would have the same students again. Three of the four teachers also thought the video was about right in complexity for the grade level they taught while one teacher thought it was too complex for 3<sup>rd</sup> grade. Three of the four teachers also thought the activities fit very well into the science units they taught while one thought they fit somewhat well. All the teachers thought the students were engaged with the kit activities and two of the four thought the students were more engaged than usual, especially during the dissection. Three of the four teachers reported that they used the biography while one said she did not due to time constraints. One teacher thought the biography was "a little wordy" for 4<sup>th</sup> grade, and another commented that the students were not bored but that they were not overly "wowed" either.

## Detailed Results of Parasite Sleuth Kit

### Video

*Did you use the video?*

All four teachers reported using the video and said they showed it to their students just once.

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

Three of the four teachers thought the video was about right for the grade level they taught while one teacher thought it was too complex for 3<sup>rd</sup> grade.

*Would you say the video was too short, about the right length, or too long for the topic presented?*

Two of the three teachers thought the video was about the right length and one teacher thought it was a little long.

*Does the video fit not at all well, somewhat well, or very well into the science units you teach?*

Three of the four teachers thought the video fit very well into the science units they taught while one teacher thought it fit somewhat well.

*How did you use the video?*

Two of the four teachers used the video as an introduction to the kit and discussed the video before moving on to the activities. One teacher related the scientist part to health-related careers and another used the video as a segue from an entomology unit

*What were your students' reactions to the video?*

All three teachers reported that the students loved the video, seemed intrigued by the activities of the scientist and wanted to know more. One teacher also said you "must be careful with 5<sup>th</sup> grade when showing the video so they'll eat meat again."

*Will you use the video again? If not, why not?*

Two of the three teachers responding said they would use the video again while one multi-grade teacher said she would not because she will have the same students again next year.

### Activities

*Which activities did you use, how long did each activity take to complete, how did you use them, were they difficult to use, and would you use them again?*

Six teachers reported that they had used this kit. As Table 2 on page 4 indicates, the number of activities that teachers reported using from the Parasite Sleuth kit was fairly evenly distributed between one and five. Table C3 shows the number of teachers who used each of the activities. (One teacher did not report which activities she used.)

Teachers were also asked to describe how much time each activity took to complete and how their classrooms were structured during the activities. All the teachers reported that each of the activities took about one or two class periods and that students worked in small groups during the activities.

The six teachers responded in a variety of ways when asked if any of the activities were difficult to use. One teacher commented that she didn't know how to do "Pet Parasite Detective"

in a classroom setting especially during winter, and another teacher said she didn't want to bring a pet into the classroom. In contrast, a different teacher said her class brought in a cat and fit this activity into a health unit. One other teacher said she modified the "Traveling Tapeworm" activity to have the students study the whole human body. Two of the six teachers said they ran out of time and because of this excluded activities like the "Traveling Tapeworm," "Pet Parasite," and "Classy Parasites."

Table C3. Number of teachers using each Parasite Sleuth kit activity.

Parasite Sleuth Kit	
Activity	Number of Teachers (n=6)
Classy Parasites	4
What is a Parasite?	5
Pet Parasite Detective	2
Parasite Sleuth	3
The Traveling Tapeworm	3

*How involved were you with the students during the activity? Did you mostly observe, assist students when problems arose, or were you actively involved with the groups?*

Teachers varied in their level of involvement with the students during the activities. Two of the five teachers responding said they were actively involved during the activities while three said they assisted students with problems. One teacher said it "depended on the group" and another said she "tried to let them do the activities."

*Would you say these activities fit not at all well, somewhat, or very well into your science units?*

Teachers thought the kit activities fit well into their existing science units. Three of the four teachers responding thought the activities fit very well into the science units they taught while one thought they fit somewhat well.

*Were students less engaged, about the same, or more actively involved/engaged in scientific inquiry during these activities compared to other activities used?*

Teachers' responses to this question varied. Two of the four teachers responding thought their students were as involved as they normally are in activities, and two other teachers thought that their students were more engaged, especially during the dissection. One teacher reported that she "always had hands-on in her classroom" and so her students were normally pretty engaged in science.

*What were your students' reactions to the activities?*

Teachers generally reported that their students enjoyed the activities and that most of the students were engaged during them. Two of the four teachers said that a lot of the kids were initially "grossed out" by the dissection but eventually became involved. One teacher reported that about half the students in the class preferred to watch the dissection rather than participate. Some of the kids loved the dissection and one teacher noted that the students who were normally disengaged were more into the activities than the book-oriented students, some of whom appeared bored.

## Biography

*Did you use the biography? If so, how was it used?*

Three of the four teachers reported that they used the biography while one said she did not due to time constraints. The three teachers each used the biography in different ways. In one classroom, the students read it together; in another, they used it to introduce the unit after viewing the video and then they discussed it; and in a third class, the teacher integrated the biography into reading class. Because students did not have copies of the biography, the teacher read parts of it aloud over the course of several days.

*What were your students' reactions to the biography?*

One of the three teachers responding thought the biography was “a little wordy” for 4<sup>th</sup> grade, and another commented that the students were not bored but that they were not overly “wowed” either. A third teacher said the biography did not elicit high interest in her classroom but that it would with a 7<sup>th</sup>/8<sup>th</sup> grade class of “better students,” suggesting that perhaps the biography was written at a higher reading level than the average 4-6<sup>th</sup> grade.

### **Overall Parasite Sleuth Kit**

*Overall, would you say this kit was too simplistic, about right or too complex for the grade level you teach?*

All four teachers said that this kit was about right in terms of the complexity for the grade level they teach. One teacher added that “you adapt it up or down depending on students.”

*Overall, were all students engaged with the kit activities?*

All three teachers responding thought their students were engaged with the kit activities.

*What do you think were the most important things that your students learned by using this kit?*

Teachers responses varied but all three teachers mentioned the scientific procedures that their students learned as being important elements of the kit. These procedures included the emphasis on cleanliness to avoid parasites, ways of handling worms, and having a separate lab area. One teacher also mentioned the students’ exposure to Judy Sakanari and the discussion of science careers. Another teacher said that having the dissecting kits, which some rural schools don’t have, was important. Finally, one teacher mentioned that the students exposure to the idea that there is not always a concrete answer in science was important.

*What, if anything, does this kit provide your students that is not otherwise available?*

Teachers mentioned the female scientists as role models and the hands-on activities that actively engage the students as being things this kit provides students that are not otherwise available. Specifically, two of the four teachers mentioned that the female scientists showed enthusiasm for science careers and the other two teachers mentioned the video, the hands-on activities and materials that got the students more involved and excited, and the ideas presented in the kits.

*What did you find most appealing about the kit?*

Teachers found different aspects of the kits most appealing. Two of the four teachers mentioned the ease of use, two mentioned the materials (including the inquiry method worksheets, video, and equipment that is not normally available at her school), and one teacher mentioned the actual scientists.

*What would you change about the kit?*

Teachers suggested little or no change to the kit. Two of the four teachers had no specific suggestions for change, although they felt there was room for improvement. One teacher thought some of the wording, especially in the activity book, was too complex for 5<sup>th</sup>/6<sup>th</sup> grade. Another teacher suggested that they include gloves for dissections and that the formaldehyde smell was tough for the students. One teacher also reported that she developed her own rubric on the scientific method and assessed the students' performance by their participation and a test at the end of the unit which included questions about the scientist in the video and the scientific method. She said that if tests were included in the kits she probably would not use them.

*Will you use this kit again next year?*

Three of the four teachers said they definitely will use the kit again next year, while one said she probably would not because she will have the same students again next year.

*Are there certain parts of the kit that you will not use again? Why?*

None of the four teachers said that there were parts of this kit that they would not use again.

*Any additional comments about the kit or your students' reactions to the kit?*

Teachers again said that they were eager to receive the CD-ROM and would like to see their district purchase two or three sets of the kits for the math/science resource center. One teacher liked that "sometimes there are no answers in activity book," however, she said that some of the participating teachers at her workshops did not like this.