



5-2007

# Interactive and Textbook Lessons in Science Instruction: Combining Strategies to Engage Students in Learning

Christina Puentes

*Dominican University of California*

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Interactive and Textbook Lessons in Science Instruction:  
Combining Strategies to Engage Students in Learning

Christina Puentes

Submitted in Partial Fulfillment of the Requirements for the Degree

Master of Science in Education

School of Education  
Dominican University of California

San Rafael, CA

May 2007

### Acknowledgements

I would like to take a moment to thank all of those who have helped me get to this point. All of my teachers at Dominican University have helped to guide me throughout my educational journeys at Dominican. I have had many wonderful teachers that inspired me to view each experience as a learning experience. They taught me that there is always something that can be learned in every situation.

In addition to my teachers, I would also like to thank my family. For as long as I can remember they told me that I can do whatever I put my mind too. Thank you for pushing me to do my best. I would never have made it without all of your comic relief, love, and support.

I would also like to thank all of my friends. New friends and old, you have all helped me along the way. On the days when I thought I would not make it you assured me that we would. All of the papers and assignments would somehow get finished. You were right, everything worked out. Thank you for helping me see the light at the end of the tunnel.

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Abstract

Students in elementary classrooms are not receiving science instruction that is engaging and challenging. The review of the literature indicates that the way that the information is presented has more of an impact on the students than simply whether they comprehend the information. Studies show that hands-on science instruction allows success beyond the classroom, hands-on activities excite students about learning and science in general, and that the hands-on activities create confidence in the children. Research also indicates that students who receive textbook based lessons earn scores similar to students who learn through hands-on lessons. This study explores the effects of different instructional strategies on student engagement in science instruction. Findings indicated that teachers felt science is taught only in limited fashion, as a result of high stakes testing with its focus on language arts and mathematics improvement. Teachers, even with limited instructional time for science instruction, reported that hands-on and inquiry based science methods had positive effects on child engagement in learning.

## Introduction

I have been observing in elementary classrooms for several years now and I have seen many changes occur. The focus in the classroom has moved to language arts and mathematics, leaving little time for science instruction. I understand that these are very important concepts for the children to master, but there is more to a great education than language arts and mathematics. Science is often neglected in the elementary classroom. I have been in many classes where science is not taught on a regular basis. Teachers may incorporate a few quick sciences activities throughout the year.

Being an educator myself I am always trying to think of activities for my students that will get them excited about learning. To do this I often find myself thinking back to my own days as an elementary student. The activities that immediately come to mind are always interactive hands-on activities. I loved the sciences. When we did a hands-on science lesson I was in my element.

The problem with science in the classrooms is not only the test driven curriculum, but fear of teaching science felt by the teachers. Many teachers may be fearful about teaching science and therefore do not teach it. Further research on the area of science instruction may lead to an emphasis on science teaching, specific ideas on which methods work the best. This may lead to increased confidence in teachers about teaching science, leading to increased confidence in their methods of science instruction.

### *Statement of Problem*

Teachers do not teach science in the elementary classroom. Curriculum demands to emphasize language arts and mathematics leave little time for science instruction. Additionally, teachers may not feel confident teaching science because they have limited

knowledge of effective instructional strategies. Which instructional strategy is beneficial to students; interactive lessons, or textbook lessons? Science instruction in elementary schools is limited.

### *Purpose Statement*

The purpose of this study is to explore different instructional strategies in order to create a science curriculum unit for third grade students that is educational and enjoyable for students and teachers. Strategies include how a teacher presents material in the classroom. The term educational refers to the concept that instruction will improve student academic knowledge. Enjoyable refers to the child's attitude and level of engagement in learning.

### Theoretical Rationale

Pestalozzi decided to build on Rousseau's ideas of education, which were to educate the whole child. Rousseau believed in applying the scientific method on the world. He felt that the greatest service that the educational world could give would be to teach one to use their reason. He felt that exploring nature with multiple intelligences was the sole way to achieve success in education. Pestalozzi developed a method of teaching that is commonly referred to as, "Pestalozzi's Method". This method was first implemented in 1805 in a school at Yverdon. Pestalozzi too believed in educating the whole child. In order to do this he educated through the hands, heart, and head (Egan, 1999).

Pestalozzi's hands-on theories were developed mostly through his idea of concrete concepts. He would teach math using manipulative in order for the children to see and

touch the objects that they were adding and subtracting. This idea of using concrete objects to assist learning soon flooded all areas of learning. (Egan, 1999)

Although Pestalozzi played a major role in the development of modern schools as we know them, a more recent advocate for interactive science instruction was John Dewey. According to Pine, Aschbacher, Roth, Melanie Jones, McPhee, Martin, Phelps, Kyle and Foley, Dewey supported inquiry based science education. Because Dewey was so important in the world of educational theory, having him on the side of inquire based science instruction popularized the idea. (Pine, et al., 2006)

### *Assumptions*

It is my assumption that the best way to teach elementary students science is through a combination of interactive lessons and textbook based lessons. I think that the interactive lessons will excite the students about the topic and then the textbook lessons will cover more information on the same topic. Once the students are excited about the topic they will be engaged for the textbook lesson. I also assume that the teachers who I interview are going to feel that science is underrepresented in their classrooms. I think that teaches are going to say that they want to do more interesting and interactive science lessons in their classrooms, but they just do not have the resources or the time.

### *Background and Need*

The method of science instruction is very important for the students. Many studies have been done to determine the effect of science instruction on the student. Science lessons within the traditional classroom can vary greatly. There are hands-on lessons, teacher demonstrations, seat work, and textbook lessons. In 2006, a study was conducted



to see if using hands-on science instruction would increase student performance and their attitudes about science. There were 55 students in the study from an urban area in Bolu. There were given pre and post tests to determine their achievement. The students were divided into experimental and control groups. The experimental group received their lessons using hands-on activities while the control group received their lessons through teacher demonstration and lecture. After the 15 week study both groups showed an increased achievement, but the experimental groups scored significantly higher than the control group. In the attitude test, again, both groups' attitudes did increase, but the experimental group showed a scientifically higher increase. (Bilgin, 2006)

Teaching science within the traditional classroom is only one way to teach science. There are many other settings that science can be taught. In 1997, Ramey-Gassert reported that, "... when used properly, they (field trips) are an effective hands-on science teaching method" (1997, p. 438). Ramey-Gassert noted that "Museum learning has many potential advantages: nurturing curiosity, improving motivation and attitudes, engaging the audience through participation and social interaction, and enrichment" (1997, p. 434). Teaching in an informal science environment is one of many positive ways to teach science. (Ramey- Gassert, 1997)

### Review of the Literature

There are different ways to teach science to children. The instructional strategies used have a much greater effect on the children than simply whether or not they are able to retain the information. In this review of literature many different articles will be

presented. The articles will cover the different effects that the instructional strategies and learning environments have had on the students.

*Review of the Previous Research*

In 2006 researchers, Pine, Aschbacher, Roth, Melanie Jones, McPhee, Martin, Phelps, Kyle and Foley decided to compare students' science knowledge based on the instructional strategy they received. The two instructional strategies being evaluated were hands-on and textbook strategies.

The study was conducted using 1000 fifth grade students. The students came from 41 classrooms in nine different school districts throughout California, Arizona, and Nevada. The subjects were selected on a voluntary basis. The students were placed into four different groups; there was the hands-on high socioeconomic group, the hands-on low socioeconomic group, the textbook high socioeconomic group, and the textbook low socioeconomic group. The socioeconomic status of the students depended on the percent of students who receive free lunch. Each group had 250 students. (Pine, et al., 2006, ¶ 8)

The authors note that the students who were receiving their instruction from a textbook approach used textbooks from; Macmillan/McGraw Hill, Harcourt, and Silver-Burdett. The students who were receiving hands-on instruction were using Full Option Science System (FOSS), Science and Technology for Children (STC), and Insights. (Pine, et al., 2006, ¶ 9)

The authors report that the students were given a cognitive abilities test at the beginning of the investigation along with a Third International Math and Science Study (TIMSS) test. The results from the cognitive abilities test showed that there was a not a

significant difference in the high socioeconomic group, but there was a significant difference in the low socioeconomic groups. These differences were corrected with the TIMSS test. Although there were again differences in socioeconomic results, there was not a significant difference in hands-on and textbook students overall. (Pine, et al., 2006, ¶ 13)

It is noted that the students then participated in four performance assessments. The assessments were; Spring, Paper Towels, Ice Cubes, and Flat Worms. Overall, there was not a significant difference in student performance based on hands-on and textbook instruction. The only assessment that students using hands on experiences did better than the textbook students was the flat worm. On close examination of the results of the flat worm assessment the differences were insignificant. (Pine, et al., 2006, ¶ 32)

The authors did find that there was a slight gender difference in one of the tasks. They found that female students did better on the flat worm task than male students. Again, when looking at this task along with the other assessments there is a not significant difference. (Pine, et al., 2006, ¶ 33)

Although it was believed that hands-on science methods would be beneficial to students in developing their abilities to perform scientific inquiry the findings did not support this. In addition, they noted that although students using hands-on activities did not perform better than their textbook counterparts in scientific inquiry, they were not outperformed either. It was stated that both groups did perform relatively low in all assessment tasks. “Clearly there is a need for improvement” (Pine, et al., 2006, p. 480).

In addition to retaining information, there are also other effects on children depending on how information is presented. Presenting material to children in a way that

excites them is something that most teachers strive to do. Three researchers, Paris, Yambor, and Packard (1998) decided to conduct a study that assessed the effects of a hands-on science on students' interest and learning.

The authors report that the study included 184 elementary students from a Midwestern city. Participants include the following:

Grade	Students	Males	Females
3 <sup>rd</sup>	58	29	29
4 <sup>th</sup>	61	30	31
5 <sup>th</sup>	66	33	33

There were three classes per grade. The majority of the students were Caucasian, 103.

There were 27 African American students. There were 41 Asian American students. And there were 13 students who belonged to another ethnic group. (Paris, et al., 1998, Methods, ¶ 1)

The authors state that the school was located in a middle class neighborhood that had low income housing and international students who attended a near by university. There were many students in the school who did not understand the ways of American school. Ninety two of the students in this study were English language learners. (Paris, et al., 1998, Methods, ¶ 2)

The authors note that the curriculum that was presented to the students included four components. They were; weekly activities, living exhibits, a resource library, and projects that culminated in a family biology night. Each class had three forty five minute

sessions in the lab. Their lessons were structured around structure, growth and movement, and change. (Paris, et al., 1998, Methods, ¶ 3)

The authors report that there were 14 university students who served as docents in the lab. There were usually two to five docents in each lab period and the students and docents explored and worked together around the lab. (Paris, et al., 1998, Methods, ¶ 9)

The authors reported that the attitudes about science increased significantly from the beginning of the project to the end. This was true for all grade levels involved. They also noted that the interest in curriculum decreased with increasing age of the students. (Paris, et al., 1998, Results, ¶ 1&2)

There are many articles looking at the affect of science instruction on students, teachers, and schools. Jorgenson (2005) made a few strong points about science instruction. The first is that students involved in hands-on programs are more excited about learning science. Second, that a lot goes into creating a hands-on science classroom, and finally that students who use hands-on science programs are showing a remarkable improvement in standardized test scores compared to others who experience traditional textbook instruction.

When the students are actively involved in an activity they seem to be more excited and interesting in a project. “They begin to see science as ‘fun’ rather than a chore” (Jorgenson, 2005, ¶ 6). When the children want to do science and are showing interest in the subject it makes it more enjoyable for the teachers too. (Jorgenson, 2005)

Creating a hands-on classroom environment is not an easy task. There is a lot that goes into it. About forty years ago teachers in the Seattle, Washington area started creating “box kits.” These were helpful because they contained everything that a teacher

needed to teach a hands-on unit of study. This opened the door for many teachers who did not feel very confident in science. All they had to do was open the box. Teachers were not responsible for coming up with the experiments themselves or gathering all the materials. Teachers and students in schools where the box kits are used report an increase in enthusiasm. These kits are very expensive and although it may not be too expensive to continue a program, starting one creates a price that most schools turn away from.

(Jorgenson, 2005)

Something that these inquiry based programs offer is integration within subjects. Many of the projects involve lab notebooks. These notebook can be used for observations or recoding thoughts about the project. (Jorgensen, 2005)

A study of schools in El Centro, a high poverty, high ethnicity, traditionally low performing district... who where engaged in inquiry science for four years scored approximately 35 percent higher in math and 28 percent higher in reading, on average, that their classmates who had not been exposed to inquiry centered science instruction. (¶ 13)

One of the main groups that hands-on inquiry centered science reaches is English language learners (ELL Students). ELL students respond well to these programs because it offers, “meaningful context for complex science vocabulary that appears on standardized tests... involves extensive use of lab notebooks” (Jorgenson, 2005).

Although hands-on science benefits all students some believe that it many help close the achievement gap between underprivileged children and advantages children. (Jorgenson, 2005)

Jorgenson stated many points about how hands-on science instruction can affect aspects of a child’s education. Not only is their science knowledge affected, but other

academic areas as well. Although there were many positive aspects of hands-on inquiry centered instruction, its exclusive use is not recommended. Jorgenson, along with others believe it is all about finding the right balance of instructional methods.

Ucak, Huseyin, and Usak (2006) are looking to find that balance as well. They decided to look at the effects of using Howard Gardener's multiple intelligences theory in the science classroom. Gardener understood that not every child is the same and children do not learn in the same way. The multiple intelligence theory identifies seven intelligences; Linguistic intelligence, Logical-mathematical intelligence, Musical intelligence, Bodily-kinesthetic intelligence, Spatial intelligence, Interpersonal intelligence, and Intrapersonal intelligence. The idea of bringing the multiple intelligence theory into the classroom is that the teacher needs to present the material using many of the different intelligences. Traditionally, Linguistic intelligence and Logical-mathematical intelligence are the dominant intelligences that instruction is based on, but that gives the students who have linguistic intelligence and logical-mathematical intelligence an advantage in the classroom. The researchers thought that by bringing the multiple intelligence theory into the science classroom children would improve academic achievement in science as well as increase their attitudes about science. (Ucak, et al., 2006)

The study included 54 primary school students at the Kinikli Boyama Primary School, 28 females and 26 males. The students ranged from ages 12 to 14. The children were divided into two classes, each with 27 students. One was the control group, who received lessons in the traditional format, and one was the experimental group who received lessons using the multiple intelligence theory. (Ucak, et al., 2006)

The science achievement was measured using the Chemistry Achievement Test and the students' attitude about science was measured using the Science Attitude Scale. Both tests were given as a pretest and post-test. The study was conducted in a four week period. (Ucak, et al., 2006)

At the conclusion of their study, the researchers found that there was a significant difference in the achievement between the two groups. Both groups did improve academically from the pretest to the post-test, but the experimental group did much better academically than the group who received their instruction in the traditional manner. Although there was a significant difference in the academic achievement of the students in the experimental group, there was not a significant difference in the attitudes of the children. Both groups did show an improvement in their attitudes about science after the four week unit of study, but there was not a significant difference from the experimental group to the control group. (Ucak, et al., 2006)

This study supports the research hypothesis that bringing the multiple intelligence theory to the science classroom increases academic achievement. The results did not support their idea that the multiple intelligence theory would increase the students' attitudes about science. (Ucak, et al., 2006)

There are different ways to give science instruction. A dominant view from the literature is that science instruction needs to incorporate different aspects of instruction. One topic that has come up several times is the idea of using science notebooks or journals.



Baxter, Bass, and Glaser (2001) looked at notebook writing in the fifth grade science classroom. They wanted to know if the notebooks were actually effective and what it took to make them effective learning tools.

The study included 83 fifth grade students from three classes and two schools in an urban school district. The students participated in four units of science study throughout the year and the study included the notebooks from the fourth and final study of the year. The fourth study was on circuits. (Baxter, et al., 2001)

The students started the unit by writing about what they knew about circuits and questions that they wanted answered about circuits. Once they had formulated their questions they started working in a series of ten activities that would help generate answers to their questions. The activities included things such as observing, predicting, assembling circuits, and simply experimenting with different circuit combinations. (Baxter, et al., 2001)

The notebooks were used for students to note the directions, their ideas, drawings, thoughts, observations, questions, and what they discovered. At the end of each study the notebooks were collected by the teacher and photocopied for the study. The teachers then assessed the notebooks and returned them to the students. (Baxter, et al., 2001)

When students completed the unit and the notebooks were collected the researchers examined student entries for general structure, the presence, content, and quality of information. There were minor differences from the different classes. In general the notebooks, "... began with an introduction to the unit...followed by a sequence of investigations..." (Baxter, et al., 2001, p. 133). It was noted that there was

an absence of teacher feedback, and when there was, it was very brief. (Baxter, et al., 2001)

In conclusion, it was found that, “Notebook writing in science is an important tool for recoding observations, generalizing, hypothesizing, and theorizing...” (Baxter, et al. 2001, p. 138). They found that it was very important that the teachers provided some structure for the notebooks in order for them to be really beneficial to the students. (Baxter, et al., 2001)

In studies of interactive science there is an emphasis on using investigation journals. They have been proven to be helpful in improving the children’s performance in the academic field of science as well as other areas such writing.

Yopp (2006) introduced the idea of incorporating informational text into science lessons which has generated interesting ideas. When the students were excited to find an answer to something, they were motivated to read about the topic verses when they were simply told to do so. Not only does using informational texts in the classroom improve their science knowledge, it also helps improve their reading skills. Combining hands-on learning and investigations with informational texts created a fun lesson for the children that they were excited about.

This study was conducted using the students in a third grade class. The teacher created a lesson that incorporated hands-on activities, inquiry learning and the use of informational texts. The lesson started out with each child receiving a mystery bag. In the bag there was a pine cone and the children had to use their senses to figure out what was in the bag. After a period of time if they had not figured out what was in the bag the students open the bag.

The students then generated a list of questions that they had about the pine cone. Once students compiled a list of questions, they proceeded to answer them. The teacher provided informational texts about pine cones for the children to use.

The teacher found that when the children created their own questions and then had to find the answers themselves they were motivated to read about the content. “The interest generated by the exploration of the pine cone transferred to the text that were provided, and the students were highly engaged as they read” (Yopp, 2006, p. 33). In addition to the students finding the answers to their questions as they explored the text, they also found more information on pine cones as they read.

Using the informational texts in the science classroom helped the children answer the questions that they had generated themselves. This activity not only helped them build their science knowledge, but also strengthen their reading skills. For students who need to work on their literacy skills this is a great way to, “motivate students to read” (Yopp, 2006, p. 33). When children read informational texts in search of information they are also building their vocabulary. Scientific terms may be difficult for children to remember, but when they are excited about it and are reading about it there is a better chance that they will remember the information. (Yopp, 2006)

Having a lesson that is fun for the students is the goal for the teacher. “The students who participated in this lesson demonstrated a curiosity about and enthusiasm for the content” (Yopp, 2006, p. 33). Informational texts are an addition to the science content that benefit children’s science knowledge and their literacy development.

In class lessons are one way to teach something or reinforce it. Getting out in the field and really experiencing it is another way. Teachers have been taking their classes on

field trips for years. Little documentation exists on the effect of field trips on student learning. Two researchers conducted a study in order to gather information on the long term effects of field trips.

In 2004 Pace and Tesi found that teachers have been taking their students on these “educational” field trips for years, not really knowing the long-term impact that they had on their students. The authors noted that their study focused on a few different areas. They looked at the memory retention, long term impact, novelty factor, entertainment verses educational, social aspects, advantages of hands-on experiments, perceptions of museums, and exposure to careers and culture (Pace & Tesi, 2004, Introduction and Purpose ¶ 2)

The study included 8 adults ranging from the age of 25 to 31 years old, 4 males and 4 females. The participants were all from the New York Metropolitan area and they were selected to participate in the study based on their availability, not randomly. (Pace & Tesi, 2004, Design of Study ¶ 2)

The researchers conducted eight interviews with their participants. Each interview, conducted individually, was about 35 minutes in length. Three of the interviews were done over the telephone and five were done face to face. All of the interviews were transcribed verbatim by the interviewer. The interview was designed with six basic questions. Based on the answers that the participants gave, additional questions could be asked. The six base questions are as follows:

1. Could you tell me something about field trips you took part in K-12 grades?
2. What impact do you think these experiences had on your overall education? What impact did it have on your life?

3. What was your favorite and why?
4. Have you returned to any of the places you visited on a field trip since?
5. If someone were to ask you what field trips their children should take part in, where would you tell them to go?
6. Is there anywhere you would have wanted to go on a field trip that your school did not take you to? Why or why not?

(Pace & Tesi, 2004, Design of Study ¶3)

The researchers found that 7 out of 8 participants thought that having a hand-on activity during the field trip was necessary. The participants felt that having the hands-on activity gave them a better understanding on the subjects and helped maintain interests while on the trip. Only 3 of the 8 participants felt that their field trips were educational. However, they did note that the trips were a nice break from their regular classroom routine. Participants also stated that their field trips provided social learning for them as well as exposure to different cultures and careers. (Pace & Tesi, 2004, Summary of Findings ¶ 1.)

Pace and Tesi conclude that field trips have different effects on students. Sometimes students got a lot out of the field trips, and other trips were not that beneficial. Pace and Tesi did discover that, “hands-on activities were noted as being one of the most important factors of a field trip. ... This indicates that hands-on activities may be a beneficial asset in reinforcing subject matter from the classroom” (Pace & Tesi, 2004, Conclusion ¶ 1.).

Based on the findings of the study and my own experience as a teacher and student, I feel that field trips have a place in the educational curriculum. Some trips may be there for social reasons, others because they help with state standards. I hope that

teachers think about why they are taking their students on the trip and then how to prepare the students and have follow up activities for them. Often, a one day trip will mean very little if there are not pre and post trip activities.

### *Summary of Major Themes*

In examining the effects of different methods of science instruction, many ideas have surfaced:

1. Are hands-on methods more effective than textbook lessons?
2. Will a child who receives hands-on lessons be more excited about science?
3. What is the effect of field trips?
4. Is it better to teach science using the multiple intelligence theory?
5. Does inquiry based science effect more academic areas than just science?

It was previously thought that students who receive interactive science instruction would outperform students who receive textbook lessons. Based on a study conducted in 2006, this is not so. One thousand, fifth grade students were evaluated on five tasks and overall, there was no significant difference in the children's performance. What was noted was that both groups of students performed rather low. The researchers felt that there is room for improvement in both areas of instruction. (Pine, Aschbacher, Roth, Jones, McPhee, Martin, Phelps, Kyle, & Foley, 2006).

Interactive science lessons offer more than just science facts to students. Paris, Yambor, and Packard (1998) examined the effects that interactive science programs have on children. They found that children who participated in their program were overall more excited about science than students who received the traditional textbook lessons.

The students in the interactive program were interested in learning and investigating on their own.

In class lessons are not the only type of lessons that can be beneficial to science students. Pace and Tesi (2004) note that field trips that incorporate hands-on activities have been very helpful in teaching and reinforcing science ideas. Field trips also provide a great break in everyday classroom routines. They can expose the students to different cultures and careers in science. Ramey-Gassert (1997) agrees that a well planned out field trip can be very beneficial to students.

As Howard Gardener's multiple intelligence theory, as stated by Armstrong, not every child learns in the same way (Armstrong, 2000) This idea was tested in the sciences. Ucak, et al., (2006) found in their study that students who received their science instruction based on the multiple intelligence theory out-performed their classmates academically then those who received their lessons in a traditional textbooks manner.

Jorgenson (2005) found in that students who were receiving hands-on lessons increased their science achievement scores as well as there scores on standardized test such as math, reading, and writing.

#### *How Present Study Will Extend Literature*

By interviewing currently practicing teachers we will gain insight into the effect of science instruction on students' interest in the topic overall and information retention.

Examining how science instruction is delivered can help teachers learn more than simply student ability to retain information. If children are interested in science their

excitement increases as well some approaches to teaching science also helped boost self confidence.

### Methods or Procedures

Survey research was the methodology for collecting information from teachers about science instruction in elementary grades. Survey questions were developed based on a review of the literature.

### *Sample and Site*

The population included current practicing teachers in a San Francisco Bay Area suburban elementary school district. The teachers teach in grades kindergarten through fifth grade. The teachers were not chosen at random. They participated on a voluntary base.

### *Access and Permissions*

The researcher volunteered at the school and knew much of its staff before this survey was sent out. Permission first had to be granted from the university review board and then from the principle of the school. Once permission was granted from both, the surveys could be sent to individual teachers.

### *Data Gathering Strategies*

The surveys were sent out to all teachers at the school through teacher mailboxes. These mailboxes are used frequently for the passage of important information securing the fact that the teachers would retrieve the survey from their box. Attached in the packet of papers was a self addressed envelope so that the teachers could easily return the



needed information. There was also an option of returning the survey via the internet, if it were more convenient for the teachers.

### Data Analysis Approach

Once surveys were returned, I analyzed them in terms of preferred methods of science instruction, how they preferred to teach, and whether or not they expressed enjoyment in teaching science. I then checked the grades that they taught and examined their opinions on the emphasis on science instruction receiving the attention it deserved in their curriculum.

### *Ethical Standards*

This study adheres to Ethical Standards in Human Subjects Research of the American Psychological Association (Publication Manual of the American Psychological Association, 2001). Additionally, the project was reviewed and approved by the Dominican University of California Institutional Review Board, Number 5060.

### Findings

The surveys revealed that currently practicing teachers feel that there is not enough time for science in the classroom. They feel that with all the stress put on language arts and math, science is over looked. The teachers note that they love teaching science and the children really enjoy it as well. It was stated by the teachers that they feel teaching science through hands-on experiments and exploration was the best way. They felt that the students were excited about the lessons and learned a lot as well. On the topic of field trips, the teachers said that they felt they were very beneficial to students. Field

trips were experiences that they would remember for years to come. One teacher did comment on the importance of preparing the students for a field trip. When the students have background information to build from they can really take more information away from a field trip and really engage in the trip.

#### *Description of Site, Individuals, Data*

The participants in this study were all currently practicing teachers. They work in a local elementary school district and have between five and twenty five years teaching experience. The sample was selected on a voluntary base. All teachers at the school received the survey and they completed it if they wanted to participate.

#### *Analysis of Themes*

Current practicing teachers who participated in this study reported that they enjoyed teaching science and that their students enjoyed learning about science. In reporting approaches to teaching science, they felt that interactive and hands-on science instruction was more effective than traditional textbook methods.

### Discussion

#### *Summary of Major Findings or Results*

Major ideas expressed by these teachers include that there is not enough emphasis on science in the classroom. Both teachers and students enjoy doing science in the classroom. All teachers felt that hands-on and exploration were the right way to teach science to elementary students. Finally, they felt that with pre and post lessons, field trips can be very beneficial to students.

### *Comparison of Findings/Results with Existing Studies*

The research literature indicates that teachers need a variety of methods in teaching science. Teachers who participated in this study stated a strong preference for using hands-on activities in science, especially given the limited amount of time for science in the current curriculum.

### *Limitations of the Study*

This study included a small sample of teachers in one elementary school. Participants were selected forming a sample of convenience. Therefore generalizations to the overall population should be made with caution.

### *Implications for Future Research*

Further research should address science needs at specific grade levels. Additionally research should explore hands-on approaches in depth. Many studies were for short periods of time. A recommendation is that a study be designed to trace the effect of hands-on science instruction over a longer period of time than was possible in the present study.

### *Overall Significance of the Study*

One of the main details that I discovered when reading about science instruction is that children who have hands-on lessons and children who receive textbook lessons score about the same on standardized tests. It was believed that students who had hands-on lessons would be more apt to perform better in scientific inquiry. As I continue my research I am interesting in finding other effects of instruction on students. Getting this information from the teachers was very important to my study Information from currently

practicing teachers is helpful. Their ideas about science in the elementary classroom reflect information found in the research literature. This helped me shape the curriculum unit that follows in the second part of this project

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Appendix

Entering the Redwood Forest: A Curriculum for Third Grade Students

## Entering the Redwood Forest - A Third Grade Unit on Redwood Forests

Week 1, Day 1

### Activity 1 - Introduction to forests

**Subject:** Science/ English Language Arts

**Goal:** The learner will understand that there are different types of forests and different types of trees in those forests.

#### Procedures:

- The teacher will tell the students to take their science books out. (Harcourt) they will read as a class the section on forests. The teacher will be asking comprehension question as they read to make sure that the students understand what they are reading. The teacher will also be pointing out key ideas throughout the reading. When they are finished reading about the forests, they will be divided into four groups, each taking on a forest. They will receive a handout with question about the different types of forest. Each group will be responsible for answering the questions about their forest on a poster. When the children have created their posters, they will share them with the class. The students who are not presenting will be filling in their worksheets as the group talks about their forest.

#### Materials:

- Science book
- Forest handouts
- Poster paper
- Markers

**Length of time:** This lesson will take 40 minutes

**Standards:**

Science

Life Science

3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

English- Language Arts

*Reading*

2.0 Reading comprehension

2.2 Ask questions and supports answers by connecting prior knowledge with literal information found in, and inferred from, the text.

2.3 Demonstrate comprehension by identifying answers in the text.

**Assessment:** The students will be assessed using informal methods. The teacher will be asking the students questions about the text they are reading. The forest facts posters that the students will be making will be a great way to see if they understood which characteristics went with each forest. This information will be used over the next three weeks so there will be many different forms of informal assessment thought that time.

**Students with special needs:** Students with special needs should be okay with the reading portion of this activity. There are pictures, and the text will be read aloud so they should be able to follow along with the reading. When they complete the group portion of this project they should be put in a group so someone who is able and willing to help them if possible.



**English Language Learners:** English language learners would benefit from having key ideas translated if possible. There are pictures, and the text will be read aloud so they should be able to follow along with the reading. When they complete the group portion of this project they should be put in a group so someone who is able and willing to help them if possible.

# Forests

Name \_\_\_\_\_

## Deciduous forest

- Name some animals in a deciduous forest

\_\_\_\_\_

- Name some plants in a deciduous forest

\_\_\_\_\_

- What happens to the leaves on the trees in a deciduous forest?

\_\_\_\_\_

## Tropical Rain Forest

- Where do the tropical rain forests grow?

\_\_\_\_\_

- What happens to the leaves on the trees in the tropical rain forest?

\_\_\_\_\_

- What is the climate in the tropical rain forest?

\_\_\_\_\_

## Coastal Forest

- What is the climate in the coastal forest?

\_\_\_\_\_

- Do the coastal forests have a lot of rain?

\_\_\_\_\_

- What types of trees are in the coastal forest? (short or tall)

\_\_\_\_\_

## Coniferous forest

- What is a conifer?

\_\_\_\_\_

- What are three common conifers?

\_\_\_\_\_

- What is the most common shape of a conifer?

\_\_\_\_\_

## Entering the Redwood Forest - A third Grade Unit on Redwood Forests

Week 1, Day 2

### Activity 2- KWL Chart

**Subject:** Science/ English Language Arts

**Goal:** The learner will create a KWL chart

**Procedures:**

- The teacher will then lead a short discussion on the different types of forests that the children read about in the previous lesson. The teacher will tell the students that they are starting a unit on the redwood forest. The teacher will explain that they need to learn about the redwood forest so that they will be ready for their field trip to Muir Woods in a few weeks. Then, as a class they will create a KWL (what you **know**, **what** to know, and what you **learned**) chart. Because this is the beginning of the unit, only the first two sections will be completed at this time.

**Materials:**

- Poster paper
- markers

**Length of time:** This lesson will take 25 minutes

**Standards:**

English-Language Arts

1.0 Listening and Speaking Strategies

1.1 Retell, Paraphrase, and explain what has been said by a speaker.

1.2 Connect and relate prior experiences, insights, and ideas to those of a speaker.

Science

Life Science

- 3. A Students know plants and animals have different structures that serve different functions in growth, survival, and reproduction.
- 3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.
- 3. C students know living things cause change in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

**Assessment:** The students will be assessed informally as the teacher asks them questions about the different facts types of forests.

**Students with special needs:** Students with special needs should be just fine in this activity.

**English Language Learners:** English language learners should be just fine for this activity.

What I know about the  
redwood forests

What I want to know  
about the redwood forest

What I learned about the  
redwood forest

## Entering the Redwood Forest - A Third Grade Unit on Redwood Forests

Week 1, Day 3

### Activity 3 - Forest layers and communities

**Subject:** Science/ language Arts

**Goal:** The learner will understand the different layers in a redwood forest. The learner will understand the different communities within a redwood forest.

**Procedures:**

- The teacher will have the students take out their science books and open to the appropriate page. (page 88 in the Harcourt book) The teacher will talk about the different layers (canopy, understory, and forest floor) of the forest and which animals live there and why. The teacher will then talk about the different communities of the forest (edge, riparian, and core) and the animals that live in those communities and why they live there. The teacher will also talk about a few of the different plants that live in each community.

**Materials:**

- Science book
- Whiteboard
- Markers

**Length of time:** This lesson will take 30 minutes

**Standards:**

English- Language Arts

2.0 Reading comprehension

2.2 Ask questions and supports answers by connecting prior knowledge with literal information found in, and inferred from, the text.

2.3 Demonstrate comprehension by identifying answers in the text.

Science

Physical Science

2. A Students know sunlight can be blocked to create shadows

Life Science

3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

**Assessment:** The students will be assessed throughout this lesson using informal methods. The teacher will be asking the students questions as they discuss the different layers and communities of the forest to check for understanding.

**Students with special needs:** Students with special needs should be fine in this lesson. Because there is going to be a lot of information given out, handout with all in information might be helpful for these students as a reference page.

**English Language Learners:** English language learners may have trouble with all the information being discussed. Having a handout with the key points of communities and forest layers may be helpful for these students.

## Layers of the forest

### Canopy

- The canopy is the area of the forest where the crown (branches and leaves) of the trees meet. The canopy is high from the forest's floor and usually becomes the home for the birds and squirrels. These animals make their homes up in the trees because they are safer there. There are not very many animals that can get up to the tops of the trees, so they have fewer predators there. Up in the canopy there is the most sunlight. There are no or very few branches to block it.

### Understory

- The understory is the section of the forest in between the canopy and the forest floor. There are shrubs and small trees in this layer of the forest. There are many animals that live in the understory. There are deer and foxes and bobcats. The understory usually has patchy sunlight depending on where in the forest (community) you are. Because the canopy usually blocks the light, only filtered sun reaches the understory.

### Forest floor

- The forest floor is the floor of the forest. There are many different animals who live here. There are slugs and beetles, there are worms and snakes. Most of what is found on the forest floor is dead foliage. The leaves and sticks fall from the trees and other plants and land on the forest floor to be decomposed. Because the canopy blocks some of the sun and then the understory blocks some more, there is little light that actually reaches the forest floor. The plants and animals that live there do not require much light. The forest floor does receive more sunlight the closer to the edge of the forest you go.



## Forest Communities

### Riparian community

- The area near water
- Common plants
  - Red alder
  - Lady ferns
  - Horse tail ferns
- Animals in the water
  - Salmon
  - Crayfish
  - Raccoons
- Temperature
  - Medium compared to the core
    - Can vary on very cold days and very hot days
- Sun light
  - Receives moderate amounts of sunlight. The canopy is not as thick so more sun can get through

### Core community

- **THE PART OF THE FOREST WHERE THE REDWOOD TREES GROW**
- Common plants
  - Redwood sorrel
  - Sword fern
- Common animals
  - Spotted owl
  - Broad-footed mole
- Temperature
  - The coldest of the communities
- Sunlight
  - The thick canopy blocks out most of the sun, keeping the temperature low

### Edge community

- Common plants
  - Douglas fir
  - Coastal live oak
  - Madrone
- Common animals
  - Gray fox
  - Bobcat
  - Deer
- Temperature
  - The edge is usually the warmest because of the thin canopy layer
- Growth
  - Things grow well in the edge community because there is a lot of light in the all the levels

## Entering the Redwood Forest - A Third Grade Unit on Redwood Forests

Week 1, Day 4

### Activity 4 - Word problems

**Subject:** Math/ Science

**Goal:** The learner will understand how to solve two and three digit addition and subtraction problems.

**Procedures:**

- The teacher will explain and demonstrate how to solve two and three digit addition and subtraction math problems on the board for the students. The teacher will do several examples explaining each step of the problem. There will be time for the students to ask questions if they are unclear about the lesson. The teacher will then pass out the worksheets to the students to begin work on. The teacher will roam around the classroom to answer any question that may come up. The teacher will also be able to give extra assistance to those students who need it.

**Materials:**

- Math worksheet
- Whiteboard
- Markers

**Length of time:** This lesson will take 45 minutes

**Standards:**

Mathematics

2.0 Students calculate and solve problems involving addition, subtraction, Multiplication, and division

2.1 find the sum or difference of two whole numbers between 0 and 10,000.

Science

Life Science

3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

**Assessment:** The students will be assessed using informal methods. The teacher will be collecting the worksheet that the students complete to check them for understanding. There will not be a grade for the class work, but the worksheet is important to see who understands the concepts.

**Students with special needs:** If there are students with special needs in the classroom the teacher will be able to assist them when the class starts working on their worksheets. The student may also be paired with another student who can assist the special needs students.

**English Language Learners:** in this lesson there are plenty of visual aids during the instruction, but the student may have trouble reading the word problems. If this is the case an alternative worksheet can be given that works on two and three digit addition and subtraction math problems. The students may also work with a classroom volunteer or another student to help with the language.

## Redwood Math

1. If there were 343 birds in the canopy of the redwood forest, and 158 flew away. How many birds would there be in the canopy?
2. If redwoods can live to be 2,200 years old, and the giant sequoias can live to be 4,000 years old. How much longer can a giant sequoia live than a redwood?
3. The last fire on the canyon floor in Muir Woods was in 1800. The last fire on the slopes at Muir Woods was in 1850. How many years after the fire on the forest floor was the fire on the slope?
4. If it takes 123,000 seeds to make one pound. How many seeds would there be in 2 pounds?
5. If there were 254 Coho salmon and 489 steelhead trout in redwood creek. How many Coho salmon and Steelhead trout are there together?
6. If there were 132 salamanders, 54 crayfish, and 487 mosquitoes in the riparian community. How many creatures are there in this area of the riparian?

7. if you look at a tree stump and see 74 rings that show large growth meaning that there was plenty of water, and 92 rings that were very small meaning there was very little water, and then 38 rings that were uneven looking like something was leaning on one side of the tress, how old is this tree?

8. As a construction worker in the forest the ants build their homes. If there were 3,762 ants in one colony and 6,918 ants in another colony, how many ants are there all together in the two colonies?

9. Another construction worker in the forest is the beaver. They have to collect sticks to build their homes with. Beaver homes are called dams. If the dad beaver collected 287 sticks and the mom beaver collected 159 sticks, how many sticks would they have together to build their dam with?

10. It is very important to follow the rules in the National Parks. One rule is no littering. Some people think that if only throw one of two pieces if trash it would not be a big deal. That is NOT true. If twenty people visit a park and each person throws two pieces of trash on the floor, how many pieces of trash would be on the floor?

## Entering the Redwood Forest - A Third Grade Unit on Redwood Forests

Week 1, Day 5

### Activity 5 - Tree Rings

**Subject:** Science/ Math

**Goal:** The learner will understand how to use tree rings to tell the age and environmental changes that have occurred in a trees life.

**Procedures:**

- The teacher will introduce the idea of tree rings. The teacher will show the children overheads of different pictures of tree rings. The students should be able to see how the different patterns in the rings tell the story of the trees life. After the students have an understanding of how to read the tree rings, they will complete a worksheet about tree rings. In addition to the worksheet there will also be real tree rounds in the classroom that the students can look at. The teacher needs to label the rounds with a number or letter so that they students can try and determine the "story" of each tree.

**Materials:**

- Tree ring overheads
- Overhead projector
- Tree ring worksheet
- Real tree rounds

**Length of time:** This lesson will take 40 minutes

**Standards:**

Mathematics

2.0 Students calculate and solve problems involving addition, subtraction, Multiplication, and division

2.1 find the sum or difference of two whole numbers between 0 and 10,000.

Science

Life Science

3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

**Assessment:** The students will be assessed using informal methods. The teacher will be asking questions orally throughout the lesson. The students will also be completing a worksheet to check for understanding.

**Students with special needs:** Students with special needs may need to work with a partner or aid to complete this assignment. There are visuals and concrete objects used in this project so it may help to check in with this student when the class starts on the worksheet, going over the ideas using the real tree rounds.

**English Language Learners:** English Language Learners may have trouble with the language in the worksheet. They may need to work with another students or an aid. The other portions of this lesson have visual aids and hands-on objects to assist.



## Tree Rings

Tree rings are very interesting. They can tell a lot about a tree. They can tell how old the tree is and they can tell you what is happening around the tree.

- A. In the first image of the tree rings you will notice that the rings are very close together. This was most likely caused by a lack of water. What does this tell us about the environment? Well we can tell that there was probably a drought going on, or low amounts of rain fall. We can tell when this happened by counting the rings from the outside in. that will tell us how many years ago the drought accrued
- B. In the second picture you can see that the rings are very large. This usually means that there was lots of water and a warm, but not too hot weather. The bigger the rings are the more water the tree was getting.
- C. This image is a little different from the first two. In this picture, the rings are not growing even. They are larger on one side of the tree than the other. This could have been caused by something leaning on one side of the tree. This usually happens when a tree above this tree on a hill falls down and rolls down the hill hitting this tree. The fallen log then rests against this tree until something caused it to move.
- D. You can see the black spot on this tree very clearly. This was caused by a fire. Even though the tree was burn in this spot it was still able to heal itself and go on living.

The age of the tree can be determined by looking at the rings. You count from the center out and each year has two rings. The light color ring is the growth that happened in the spring, and the

dark ring is the growth that happened in the summer. The center of the tree is called the heartwood and it is the oldest. The wood on the outer layer is called the sapwood. As the tree gets older, the amount of heartwood increases.

This tree is only eleven years old. What do you think is happening to the tree and around it in the environment?

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The young tree continues to grow. If you noticed there is one side of the tree that is unable to grow at the same rate. What might be causing this to happen?

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As the time goes on the tree lives on. How do the rings look now? What could have caused this to happen?

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This same tree is always growing and always changing. What is something that you notice about the changes in this tree? What has happened to the tree to cause that?

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Trees are very good at telling people what is happening in the environment. What is happening in the environment of this tree? How can you tell?

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## Entering the Redwood Forest- A Third Grade Unit on Redwood Forests

Week 2, day 1

### Activity 6 – Redwood Vs. Doug Fir

**Subject:** Science/ Language Arts

**Goal:** The learner will understand the difference between the redwood tree and the Douglas fir tree.

**Procedures:**

- The teacher will pass out a handout that explains the difference between the Redwood tree and the Douglas fir tree. The students will take turns reading the handout. The teacher will then ask comprehension questions to the students. When the teacher feels that the students have a good understanding of the differences they will be split into groups and given a pile of cones and sprays. The students will be responsible for separating the different cones and sprays into two groups depending on which tree they came from. The teacher will be walking around helping the students if they need assistance.

**Length of time:** This lesson will take 40 minutes

**Standards:**

English- Language Arts

2.0 Reading comprehension

2.2 Ask questions and supports answers by connecting prior knowledge with literal information found in, and inferred from, the text.

2.3 Demonstrate comprehension by identifying answers in the text.

Science

Physical Science

2. A Students know sunlight can be blocked to create shadows

Life Science

3. A Students know plants and animals have different structures that serve different functions in growth, survival, and reproduction.

3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

3. C students know living things cause change in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

**Assessment:** The students will be assessed using informal methods. The teacher will be asking questions orally to the students throughout the lesson and activity.

**Students with special needs:** Students with special needs many need to be in a group for the activity with someone who is willing and ready to go over the difference using the real cones and sprays as examples.

**English Language Learners:** English language learners may have trouble with the vocabulary of the hand out. The differences will be read aloud so they will be able to follow along. The activity will be clearer because you can see the difference. The student may need to be paired with a student who can help.

## The redwood and the Douglas fir

These two trees are very similar trees. Many people have a great deal of trouble telling these two trees apart. If you even find yourself trying to figure out if the tree is a redwood or a Douglas fir you, you should look at the needles. There are a few major differences between the trees. The needles of the Douglas fir come from the sides of the stem and the needles on the redwood sprout out all around the stem. If you were to pull one little needle from the redwood tree it would pull part of the stem with it. On the Douglas fir if you were to pull a single needle off, it would simply come off all on its own.

There are also a few other differences between the two trees. The redwood is taller than the Douglas fir and grows in the core of the forests. The Douglas fir, being a little smaller than the redwood usually grows in the edge community.

## Entering the Redwood Forest- A Third Grade Unit on Redwood Forests

Week 2, day 1

### Activity 7 - Animal Reports

**Subject:** Science/English language Arts/Art

**Goal:** The learner will read about animals that live in the redwood forest and write a report on that animal and draw a picture of the animal.

#### **Procedures:**

- The teacher will tell the students that they are going to be writing animal reports about the animals that live in the redwood forest. The teacher will give the instructions/guidelines for the report and then let the children choose their animal. (Teacher should provide several animals to choose from) the students will then go to the computer lab to locate information on the animals. (teacher should have websites that contain animals before the students enter the lab) The students will find their animals on the internet and print out relevant information that will help them write their reports. (they know that they are looking for) The students will be working on this activity for a few days. They need to write the report and include a picture of the animal that they have drawn. The teacher should be walking around the classroom to help the students as they need it. When they are finished with the reports the students should have the option of sharing with the class. The reports should be displayed in the classroom.



**Length of time:** This lesson will take three 40 minutes periods

**Standards:**

Science

Life Science

- 3. A Students know plants and animals have different structures that serve different functions in growth, survival, and reproduction.
- 3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.
- 3. C students know living things cause change in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

Art

2.0 Creative Expression

- 2.4 Create a work of art based on the observation of objects and scenes in daily life, emphasizing value changes.

English Language Arts

1.0 Writing Strategies

- 1.1 Create a single paragraph
  - a. Develop a topic sentence
  - b. Include simple supporting facts and details
- 1.3 Research - Understand the structure and organization of various reference materials (e.g., dictionary, thesaurus, atlas, encyclopedia)
- 1.4 Evaluation and Revision- Revise drafts to improve the coherence and logical progression of ideas by using and established rubric.

**Assessment:** The students will be assessed using informal methods. The teacher will be collecting the animal reports and reviewing them to check on the students' progress in writing and research.

**Students with special needs:** Students with special needs many need assistance finding and reading the information on their animal. When it comes to the writing a template may be useful. The student may also need to work on a computer or other device.

**English Language Learners:** English language learners may have trouble with the research and writing in this activity. If the student is literate in their first language they may need to write in their first language and then have the report translated at a later time.

## Animal Reports

- Blue Jay
- Great Horned Owl
- Pileated Woodpecker
- Raven
- Red-tailed Hawk
- Ant
- Honeybee
- Mosquito
- Bobcat
- Brown Bear
- Chipmunk
- Elk
- Squirrel
- White-tailed deer
- Grizzly Bear
- Beaver
- Black Bear
- Raccoon
- Red Fox
- Black Widow Spider
- Deer tick
- Ladybug

## Animal reports

Now that we are learning about the redwood forest we need to learn about the animals that live there. You are going to be responsible to choose an animal that lives in the redwood forest to tell the class about.

Your report needs to have:

- Name of your animal
- Description of your animal
- What it eats
- Where it lives
- Any other interesting facts about it

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## Entering the Redwood Forest- A Third Grade Unit on Redwood Forests

Week 2, day 2

### Activity 8 – Redwood Forest mural

**Subject:** Science /Art

**Goal:** The learner will create a mural on one of the classroom walls of a redwood forest.

#### **Procedures:**

- The teacher will ask the students to recall some of the facts about redwoods forests and the plants and animals that live there. They will talk about the different layers and communities of the forest as well. The teacher will then break the students up into three groups, the edge, the core, and the riparian. The students in each group will be responsible for creating items for the mural that represent those areas of the forest.

#### **Materials:**

- Butcher paper
- Scissors
- Glue
- Construction paper
- Markers or crayons
- Plant and animal books to look at for ideas

**Length of time:** This lesson will take one hour

#### **Standards:**

Art

2.0 Creative Expression

2.4 Create a work of art based on the observation of objects and scenes in daily life, emphasizing value changes.

Science

Physical Science

2. A Students know sunlight can be blocked to create shadows

Life Science

3. A Students know plants and animals have different structures that serve different functions in growth, survival, and reproduction.

3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

3. C students know living things cause change in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

**Assessment:** The students will be assessed using informal methods. The teacher will walking around to see if the students are making things that truly do represent their areas of the forest.

**Students with special needs:** Students with special needs depending on physical restrictions to using scissors or placing cut outs in the wall this child may need assistance with creating objects and placing them on the wall. They may also have trouble thinking of objects to create. Having a handout that has the different plants and animals that live in each area of the forest may help.

**English Language Learners:** English Language Learners my find it helpful to use a handout with the different animals and plants in each section to remind them which plants and animals go where in the forest incase they had trouble following the discussions.



## Entering the Redwood Forest- A Third Grade Unit on Redwood Forests

Week 2, day 3

### Activity 9 – Jobs of the forest

**Subject:** Science /English Language Arts

**Goal:** The learner will understand that there are different creatures in the forest and they have similar jobs to what humans have.

#### **Procedures:**

- The teacher will pass out a handout about the different types of jobs in the forest. The students will take turns reading the paper out loud. The teacher will ask the students comprehension questions about the different jobs of the forest to check for understanding. Have the children try and brainstorm a few more animals or plants that have jobs in the forest.

#### **Materials:**

- Jobs of the forest handout
- Whiteboard
- Markers

**Length of time:** This lesson will 25 minutes

#### **Standards:**

English- Language Arts

##### *Reading*

##### 2.0 Reading comprehension

2.2 Ask questions and supports answers by connecting prior knowledge with literal information found in, and inferred from, the text.

2.3 Demonstrate comprehension by identifying answers in the text.

*Listening and Speaking*

1.0 Listening and Speaking Strategies

1.1 Retell, Paraphrase, and explain what has been said by a speaker.

1.2 Connect and relate prior experiences, insights, and ideas to those of a speaker.

Science

Life Science

3. A Students know plants and animals have different structures that serve different functions in growth, survival, and reproduction.

3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

3. C students know living things cause change in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

**Assessment:** The students will be assessed using informal methods. The teacher will ask the students comprehension questions to check for understanding.

**Students with special needs:** This material will be read aloud for the students and they will have the information to follow along with. Special needs students should not need any other assistance.

**English Language Learners:** This material will be read aloud for the students and they will have the information to follow along with. English language learners should not need any other assistance.

## Jobs of the forest

### Construction works

- Ants - build their homes
- Deer - make trails
- Beaver- build dams
- Birds- build their nest
- Worms- create tunnels in the ground

### Garbage collectors

- Worms- help with decomposing
- Turkey Vultures- scavengers, eat dead and decaying animals
- Banana Slugs- help with decomposing

### Doctors

- Trees and other plants in the forest give us medicine

### Factory works

- Plants make their own food
- Bees work together to make honey

### Musicians

- Leaves- the leaves rustle and crunch
- Crickets- they chirping
- Birds- the bird sing
- Storms- sometimes storms brings thunder
- Wind- as the wind blows it rustles leaves and branches

### Pest control

- Bats- the bats eat bugs that we often see as pests
- Birds- the birds eat bugs that we often see as pests

## Entering the Redwood Forest - A Third Grade Unit on Redwood Forests

Week 2, Day 4

### Activity 10 - Ranger Visit

**Subject:** Science

**Goal:** The learner will understand what they are going to be doing on their field trip.

**Procedures:**

- The teacher will gather the children however the Ranger wants them so that they can receive a presentation from the Ranger from Muir Woods.

**Materials:**

- Anything the Ranger asks for. Call to see what you need

**Length of time:** This lesson will take one hour

**Standards:**

English Language Arts

*Listening and Speaking*

1.0 Listening and Speaking Strategies

1.1 Retell, Paraphrase, and explain what has been said by a speaker.

1.2 Connect and relate prior experiences, insights, and ideas to those of a speaker.

Science

Life Science

- 3. A Students know plants and animals have different structures that serve different functions in growth, survival, and reproduction.
- 3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.
- 3. C students know living things cause change in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

**Assessment:** This visit is simply so that the children know what to expect when they go on the field trip. The ranger will go over information that they should know that they will have background knowledge when they go on the trip. There is really not assessment for this lesson. The teacher should list any information that the children did not know so that they can review it before the trip.

**Students with special needs:** N/A

**English Language Learners:** N/A

## Entering the Redwood Forest - A Third Grade Unit on Redwood Forests

Week 2, Day 5

### Activity 11 - Journals

**Subject:** Science/ Art

**Goal:** The learner will create a journal

#### Procedures:

- The teacher will explain to the student how they are going to need a journal on the trip. The teacher will give the requirements of the journal and do a demonstration on how to construct it. The students will then get all the materials and create their own journals for the trip. The students can then decorate the cover of their journal with a redwood forest scene. Journals then need to be collected and kept in a safe spot until the trip.

#### Materials:

- Journal supplies
  - Tag board
  - White paper
  - Yarn
  - Hole punch
- Markers/ crayons/ colored pencils

**Length of time:** This lesson will take 40 minutes

#### Standards:

Art

2.0 Creative Expression

2.3 Paint or Draw a landscape, Seashore, or cityscape that shows the illusion of space.

2.4 Create a work of art based on the observation of objects and scenes in daily life, emphasizing value changes.

## Science

### Life Science

3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

**Assessment:** The students will be assessed using informal methods. The journals will be collected to see if the students were able to construct their journals correctly.

**Students with special needs:** Students with special needs may need assistance in constructing their journals. Another child can help or the teacher.

**English Language Learners:** English Language Learners should be okay with this lesson. There was a visual demonstration to assist with the directions.

## Entering the Redwood Forest - A third Grade Unit on Redwood Forests

Week 3, Day 1

**Activity 12-** Go over KWL Chart

**Subject:** Science/ English Language Arts

**Goal:** The learner will understand find the answers to questions that are still unanswered from the KWL Chart that was created earlier in the unit.

**Procedures:**

- The teacher will bring the KWL chart that the class created together earlier in the unit over and go over it with the students. The teacher will ask the students to look at the questions that they had about the redwood forests. They will focus their attention on the questions that are still unanswered. The students will pick questions that they would like to try and answer. If there are not very many questions, put children in groups. Have the students use books, computers, and encyclopedias to find the answers to these questions. after they have had time to look for the answers have each group/ child report their finding verbally.

**Materials:**

- Redwood forest books
- Computers
- Encyclopedias
- Any other resource material that are available with information on redwood forests



**Length of time:** This lesson will take 50 minutes

**Standards:**

English-Language Arts

1.0 Listening and Speaking Strategies

1.1 Retell, Paraphrase, and explain what has been said by a speaker.

1.2 Connect and relate prior experiences, insights, and ideas to those of a speaker.

Science

Life Science

3. A Students know plants and animals have different structures that serve different functions in growth, survival, and reproduction.

3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

3. C students know living things cause change in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

**Assessment:** The students will be assessed informally as the teacher asks them questions about the different facts about the redwood forest.

**Students with special needs:** Students with special needs may need assistance in using reference sources looking for the answers to the questions. They may be groups with someone who is able and willing to help.

**English Language Learners:** English language learners may need assistance in using reference sources looking for the answers to the questions. They may be groups with someone who is able and willing to help.

## Entering the Redwood Forest - A third Grade Unit on Redwood Forests

Week 3, Day 2

### Activity 13- BINGO

**Subject:** Science

**Goal:** The learner will understand find the answers to questions that are still unanswered from the KWL Chart that was created earlier in the unit.

**Procedures:**

- Pass out the bingo cards that contain empty squares The teacher will pass out a list of "forest words". The children will then fill in their card as they wish. When the cards are filled in, the teacher will read descriptions of the words the children have. The students will mark the words that have been called.

**Materials:**

- Bingo cards
- Word list
- Definitions
- Place markers
- Prize

**Length of time:** This lesson will take 40 minutes

**Standards:**

English-Language Arts

1.0 Listening and Speaking Strategies

1.2 Connect and relate prior experiences, insights, and ideas to those of a speaker.

Science

Life Science

- 3. A Students know plants and animals have different structures that serve different functions in growth, survival, and reproduction.
- 3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.
- 3. C students know living things cause change in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

**Assessment:** The students will be assessed informally as they play the bingo game. It will be clear to the teacher who knows the words and who does not depending on who is able to mark the words that have been read.

**Students with special needs:**

**English Language Learners:**

## Forest Bingo

Fill in these words into your bingo card.

Riparian

Naturalist

Core

John Muir

Edge

Redwood

Construction workers

Douglas fir

Factory workers

Salmon

Garbage collectors

William Kent

Doctors

Logging

Musician

Ranger

Pest control

Burls

Canopy

Giant sequoias

Forest floor

Tree rings

Understory

Theodore Roosevelt

National park

## Bingo Cards

When you hear the definition of  
the word cover it up!

Free

The community where there is water

This is the lowest layer of the forest.

Which community do the red woods live in?

This layer is in the middle of the forest floor and the canopy.

Which community does the Douglas fir live in?

This is a place that people can go to see nature.

The deer, ants, worms, birds, and beaver belong to this job of the forest.

A person who loves nature and spends lots of time outdoors.

Bees work together to get things done and belong to which forest job?

A naturalist who fell in love with Yosemite and the Sierra Nevada mountains.

There workers go around in the forest decomposing things

A tree that can grow to be 300 feet tall and grows in the core community.

The trees provide medicine for humans. What is there forest job?

This tree looks very similar to the redwood, but it is not as tall.

An example of this job would be the leaves rustling together.

This fish lives part of it's like in the freshwater and then part in the salty ocean.

What forest job do the bird and then bats do?

This is the highest layer in the forest.

This man bought the land that is now Muir Woods and donated it to

the federal government so that it could become a national monument.

What is it called when people cut down the trees?

The people in the parks to protect the land, and help visitors understand the importance is protecting and preserving out national parks.

The insurance policy for the redwoods. When they are stressed out they send a signal to the\_\_\_\_\_.

The biggest living tree.

How you can tell what is going on with a tree throughout its life.

The president who declared Muir Woods and national monument.

## Entering the Redwood Forest - A third Grade Unit on Redwood Forests

Week 3, Day 3

### Activity 14- FIELD TRIP!!!

**Subject:** Science

**Goal:** The learner will attend a field trip to Muir Woods and participate in discussions.

**Procedures:**

- The teacher will go over the rules for the trip again before they leave. Make sure the students have everything they need. Once on the trip follow lead of ranger.

**Materials:**

- Journals
- Pencils
- Snacks
- Lunches
- First aid kits

**Length of time:** This lesson will take all day.

**Standards:**

English-Language Arts

1.0 Listening and Speaking Strategies

1.2 Connect and relate prior experiences, insights, and ideas to those of a speaker.

Science

Life Science

3. A Students know plants and animals have different structures that serve different functions in growth, survival, and reproduction.



3. B Students know examples of diverse life forms in different environments, such as oceans, deserts, tundra, forests, grasslands, and wetlands.

3. C students know living things cause change in the environment in which they live: some of these changes are detrimental to the organism or other organisms, and some are beneficial.

**Assessment:** The students will be assessed informally throughout the trip.

There will be many discussions they can participate in.

**Students with special needs:** students with special needs may need an aid on the trip to help keep them focused and safe. Being out in the field is different from the classroom. Make necessary arrangements.

**English Language Learners:** English Language learners should be ok because being in the field has so many visuals they will still get a lot out of the trip.

## Entering the Redwood Forest - A Third Grade Unit on Redwood Forests

Week 3, Day 4

**Activity 15** - What you enjoyed about the trip

**Subject:** English Language Arts/ Art

**Goal:** The learner will write a 10 sentence reflection on things that they enjoyed about the field trip.

### **Procedures:**

- The teacher will explain to the students that they are going to be writing a reflection on about their field trip. The teacher needs to make sure they understand that there needs to be 10 sentences in their reflection, not less. The teacher may want to brainstorm a few ideas of things that they did not the trip to get students thinking about the trip. Early finishers can draw a picture to go with their reflection. The teacher should walk around to answer a question that the students might have.

### **Materials:**

- Paper
  - Writing
  - Drawing
- Whiteboard for list of ideas

**Length of time:** This lesson will 40 minutes

### **Standards:**

English- Language Arts

*Writing*

1.0 Writing Strategies

1.1 Create a single paragraph

- c. Develop a topic sentence
- d. Include simple supporting facts and details

Art

2.0 Creative Expression

2.3 Paint or Draw a landscape, Seashore, or cityscape that shows the illusion of space.

2.4 Create a work of art based on the observation of objects and scenes in daily life, emphasizing value changes.

**Assessment:** The students will be assessed using informal methods. The reflections will be collected and read over by the teacher to see how the students are developing in their writing skills and if they followed the 10 sentence rule.

**Students with special needs:** Students with special needs may need assistance thinking of something to write about. The list should be helpful in that manner. If the student has trouble with writing they may need to work on the computer.

**English Language Learners:** English Language Learners might have trouble writing the reflection. If they are able to write in their first language they may chose to writ in their first language and have the paper translated at a later time.

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## Entering the Redwood Forest - A Third Grade Unit on Redwood Forests

Week 3, Day 5

**Activity 16** - water color

**Subject:** Art

**Goal:** The learner will create a watercolor picture of one aspect of Muir Woods

**Procedures:**

- The teacher will explain to the students that they are going to be creating a watercolor of their trip to Muir Woods. The students can pick any part of the trip to paint. The teacher should help the students brainstorm some ideas incase someone cannot thing of anything on their own. The wet paintings need to have a place to dry and then they should be displayed around the classroom.

**Materials:**

- Paper
- Watercolors
- Brushes
- Water jars
- Paper towels
- Whiteboard for list of ideas

**Length of time:** This lesson will take one hour

**Standards:**

Art

2.0 Creative Expression

2.3 Paint or Draw a landscape, Seashore, or cityscape that shows the illusion of space.

2.4 Create a work of art based on the observation of objects and scenes in daily life, emphasizing value changes.

**Assessment:** The students will be assessed using informal methods. The paintings will be displayed in the classroom and it will be clear if the students were able to follow directions.

**Students with special needs:** Students with special needs may need assistance in gathering supplies and thinking of something to paint. The list should be helpful in that manner and another student can help with gathering the painting supplies.

**English Language Learners:** English Language Learners should be okay with this lesson.

Here is a list of books and websites that may be helpful during this unit of study.

## **Books**

Eyewitness Books: Trees by David Burnie

The Ever Living Tree: The Life and Time of a Coast Redwood by Linda Vieira

Evergreen Trees by John F. Prevost

California Plants and Animals by Stephen Feinstein

Redwood Trees by John F. Prevost

Redwoods by Peter Murray

Who Grows up in the Forest by Theresa Longenecker

Animals That Live in Trees by Jane R. McCauley

Tree of Life: The Incredible Biodiversity of Life on Earth by Rochelle

Strauss

Ancient Ones: The World of the Old-Growth Douglas Fir by Barbara Bash

Ferns by Allan Fowler

Giant Sequoia Trees by Ginger Wadsworth

Redwoods Are the Tallest Tree in the world by David A. Adler

Fir Trees by Heiderose and Andreas Fischer- Nagel

First Field Guide Trees by Brian Cassie



## Websites

<http://kids.nationalgeographic.com/Animals/>

<http://www3.nationalgeographic.com/animals/index.html>

<http://www.nps.gov/muwo/>

[http://www.laspilitas.com/comhabit/California\\_Redwood\\_Forest.html](http://www.laspilitas.com/comhabit/California_Redwood_Forest.html)

<http://www.sfgate.com/getoutside/1996/apr/rwanimals.html>

<http://ladywildlife.com/animal/theredwoodforestanditswildlife.html>