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Regis University
School for Professional Studies Graduate Programs
Final Project/Thesis

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A NOVEL APPROACH TO SCIENCE

by

Nathan Horton

A Research Project Presented in Partial Fulfillment
of the Requirements for the Degree
Master of Education

REGIS UNIVERSITY

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ABSTRACT

A Novel Approach to Science

The purpose of this project is to provide a unit plan that focuses on concepts and theories utilized by an interdisciplinary approach. In the traditional system of education many students will go from class to class without ever realizing that what they learn in science could be applied to English or art. Also, educators are always searching for fresh ways to present information in order to keep their students motivated. Thus, the following project utilizes the novel *Hoot* as a focal point to help students understand various concepts related to the environment around them. This unit will attempt to also reach students who might not see science as their strongest subject by relaying the information in a creative way. The following Research Project contains an introduction, review of literature, methods, results and discussion sections.

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Chapter 1

INTRODUCTION

Currently, in the United States, many students in secondary education are behind their counterparts throughout the world in science achievement (Dillon, 2006). Overall, students appear to improve in primary grade levels, but they then taper off when they progress to high school. What can be done then to improve students' scores and motivation in science? Science is an important aspect of society, a highly rewarding profession, and an exciting subject. Yet many students would perform better on an examination that tested their knowledge of movie quotes rather than the aspects of energy. While everyone will point the finger to someone else for this dilemma, irregardless, teachers in science need to look at other ways to try help to motivate these students. One way to accomplish this is to make the topics they learn more meaningful in order to demonstrate the connectedness of the variety of subjects that they encounter during a school day.

Statement of the Problem

In traditional secondary education, students move from one classroom to another without ever realizing that what they learned in science could be applied to art, social studies, mathematics, or English and vice versa. It is this lack of connectedness among subjects that prevents students from being able to understand that all subjects are interrelated in one form or another. Consequently, if the goal of educators is to model and prepare students for the real world, then students need to understand that subject

connect, and what they learn in one subject could be applied in another subject, similar to the real world.

Purpose of the Project

The purpose of this project was to develop a curricular unit that could be used by science teachers to integrate popular novels into science. When novels are used in science, the following can be achieved: (a) meet the Standards (Colorado Department of Education, 2006) for reading and writing in Colorado; (b) help students to see the connectedness between science and English; (c) motivate students who might not be motivated in a science class; and (d) help students to look at science from a different perspective.

Chapter Summary

In summary, it is this researcher's position that an interdisciplinary approach to teaching many topics in science will help to motivate students to learn more about science because they will see the connectedness to other subjects. This should result in a more motivated student. In Chapter 2, Review of Literature, the researcher will present information about: (a) interdisciplinary and traditional curricula (b) limitations of each approach (c) the support for an interdisciplinary curriculum, and (d) how to institute an interdisciplinary curriculum. In Chapter 3, Methods, the procedures for the development of this project will be detailed.

Chapter 2

REVIEW OF LITERATURE

The way students receive information in many schools has become stagnant and bland. The purpose of this project will be to bring a fresh approach to a science unit by the utilization of popular novels in science. The current system in education, there are many problems and ideas in regard to the best methods to educate students in the United States. The literature is saturated with opinions as to which are the best approaches to help students reach their fullest potential. However, the two common methods seen today are the traditional method which is predominantly used in secondary school systems and a less frequently used curriculum that is gaining in popularity known as an interdisciplinary curriculum. If the goal of education is to motivate and prepare students for the real world, then educators need to seek out and use the best approach that will enable students to achieve the superior results desired. However this is not an easy task, according to Sponder (1993), because educators face numerous major barriers that include: (a) larger classrooms (b) unequal resources in districts and schools (c) stress on teachers due to reduced funds and increased pressure for students to perform well on tests, and (d) students' social life in school and at home. Consequently, the goal is to find the best method(s) that makes material meaningful in this high stakes era in order for students to achieve their fullest potential.

Why Use an Interdisciplinary Approach?

Although educators, who use both traditional and interdisciplinary curricula have the same goals, how they achieve these goals differs. According to Mason (1996), historically, education has been centered on the information and understanding of: (a) mathematics, (b) philosophy, (c) the sciences, (d) the arts, and (e) social studies or subjects built around humanities. In a traditional setting, these subjects are separate entities but, within these subjects, according to Mason, students are introduced to the “forms of discourse and inquiry associated with the disciplines and the subject matter areas [which] can provide them with valuable mechanisms for making sense out of a complex world” (p. 264). However, Mason added that some regard these “artificial partitions” (p. 264) as obsolete to the educational system today. Consequently, educators have searched for other approaches to break down these barriers to accommodate current student’s needs. As a result, many believe the connectedness of an interdisciplinary curriculum should be used to bridge the gap to meet current students’ needs.

What Is Traditional Education?

According to Kysilka (1998), a traditional curriculum involves teaching content “in its separate state and any integration” (p. 204), and it is up to the student to decipher it. Hence, the teacher does not consciously seek out a connection of material but rather leaves it up to the student to discern. In this type of model, classes are seen as separate entities. Mason (1996) described a traditional curriculum as a hallway where students go from class to class without ever realizing the connectedness of subjects. In essence, the school is similar to a factory where students receive specialized instruction in isolation,

but the some of the parts should make up the whole in the end. While this curriculum was seen as necessary many years ago, many believe it has reached its expiration date with current students who deal with a world that is so much more complex.

Limitations and Problems of a Traditional System

There are many arguments to why a traditional system is antiquated and limited in the current educational system (Brandt, 1991; Cordogan, 2001; Mason, 1996; Schubert & Melnick, 1997; Sponder, 1993). One argument that seems to become apparent in the literature is that the real world is not broken up into separate components but rather connected and, thus, educators need to bring that same connectedness into the classroom.

Traditional Education Does Not Reflect the Real World

According to Struthers (1995), “the world is not the sum of individual cells of information functioning autonomously, but a mesh of integrated components” (p. 3). Gardner (2006) described a world that is increasingly *globalized* and that the issues of “poverty reduction, anti-terrorism, privacy, prevention of disease, energy conservation, ecological balance” require the synthesis from many “disciplinary knowledge and methods” (p. 221). Thus, to prepare students for the real world, they need to develop the skills that would allow them to look at a solution from a variety of different angles. Vars (1991) wrote that educators look for ways to assist students to make sense of life experiences with bits of pieces of information in a separated compartmentalized system. Thus, according to Mason (1996), and Paulson (1992), Schubert and Melnick (1997), it is this exacerbated isolation, and educators who ignore the natural relationship of disciplines that has led to feelings of frustration and ideas and skills that fail to inspire students to engage.

Amount of Information

Another limitation to the traditional system is the amount of information that is available and constantly accruing. According to Sponder (1993), the amount of information doubles every 5 years, and it is difficult for educators to determine what information is relevant and what is not. Also, Brandt (1991) observed that, although the traditional school day has remained the same, the amount of knowledge has grown. Thus, teachers need to look for alternate ways to present the information because much of the essential information is not being presented to students.

Motivation

Another limitation of the current traditional system is the need to motivate students. Brandt (1991) observed that students are unmotivated in many ways. The result of this lack of motivation is that students drop out, wherein they physically choose to not come to school or they drop out mentally and become passive and unresponsive while in class. This non-motivation can partially be attributed to the traditional system. According to Mason (1996), with an increased emphasis on rote learning and content coverage, students are not motivated in a traditional system because of lack of choice and opportunities to produce interest.

Psychological and Developmental

According to Mason (1996), research findings from developmental and cognitive psychologists, like Brooks and Brooks (1993, as cited in Mason), “suggests individuals learn best when [they are] encountering ideas connected to one another” (p. 264). Thus, in order for students to have a deep understanding, they need to see subjects in a more

connected way. Furthermore, Mason stated that “the traditional subject matter divisions are not meaningful for children and may interfere with their learning” (p. 265).

What Is Interdisciplinary Education?

The difficulty with the method of interdisciplinary education is the inordinate number of definitions that describe this approach. For example, Gardner (2006) stated that interdisciplinary work occurs not only when one seeks to apply more than one discipline but, also, when one tries to “combine and synthesize these stances” (p. 152) into engaging practices. Thus, one needs to do more than just combine two subjects, but the *practice* should be relevant to both subjects. Also, the combination must be purposeful not accidental. In order to minimize the semantics involved with the plethora of definitions, Mason (1996) made the distinct point that one should look at interdisciplinary and integrated curriculums in the same light and acknowledge that both come from different point of views; however, both are interchangeable because they “represent the same general approach to curriculum design” (p. 264). Finally, for this paper, the definition used by Kysilka (1998) appears to be the most universal. According to Kysilka, an interdisciplinary curriculum is when “the teacher assumes responsibility for developing meaningful experiences and connections for students” while there is “a deliberate effort to find [a] relationship between the various content areas and between the content areas and real life situations which enhance the learning of the students” (p. 205).

Support for an Interdisciplinary Approach

There are many reasons why some educators are turning to an interdisciplinary

approach to reach students. These reasons range from the idea that school should be a reflection of society to motivational issues.

Interdisciplinary Curriculum Prepares Students for Society

The major and overwhelming reasons for the use of an interdisciplinary curriculum are: (a) that life is complex, (b) it requires students to look at a problem from a variety of different scopes, and (c) students need to develop these skills for the future. According to Paulson (1992), when students have the “opportunities to connect knowledge and input from many sources” (p. 3) and when they realize that there is a more than one way to solve a complex problem, then educators are preparing students for decisions in the real world. Also, Struthers (1995) reported that, the advantage of interdisciplinary study is that it enables the instructor to show students how “different fields impact one another” (p. 3), and this is similar to the real world. Mason (1996) maintained that students will encounter problems in the real world that require them to have the knowledge from several disciplines to solve a problem. In contrast, Sponder (1993) acknowledged the need for individual classes, but added that education needs to be more than just the parts that make up the whole. In Sponder’s opinion, academics are most successful when students recognize the value of overlap among subjects. This is because, when students see the connection of separate concepts, it helps them to build a foundation for living and functioning in an “interconnected and complex world” (p. 3). Also, according to Cordogan (2001), an interdisciplinary curriculum has a greater relevance to life and gives students the opportunity to discover how they would learn in society.

Deeper Understanding

In an interdisciplinary curriculum, students gain a deeper understanding of the material because they can make sense of a topic the best way they know how by using all of their previous experiences from a variety of different areas which should, in turn, help them to better understand a subject. The reason for this deeper understanding, according to Mason (1996), is that, from a constructivist perspective, an interdisciplinary curriculum provides students with an opportunity to “construct knowledge holistically” (p. 265) from their prior experiences. This enables the student to make sense out of the subject from a variety of different sources that the student has encountered in the past. Based on this theory, the student does not use one experience at a time, but the whole, to figure out the problem. Consequently, in the interdisciplinary curriculum, students are challenged to think in a way that they naturally process information which gives them a deeper understanding.

Schubert and Melnick (1997) suggested that students obtain a greater understanding when one uses an interdisciplinary curriculum is used. Furthermore, an interdisciplinary curriculum “turns students on to school” and makes learning easier as they learn to understand the “importance of the relationship between subjects” (p. 13). Consequently, the students begin to see the relevance of each subject.

Increased Motivation

Another reason why an interdisciplinary curriculum is successful is that students are more motivated. For example, Mason (1996) suggested that the decreased emphasis on rote learning might result in an increase in motivation. Furthermore, Melle and Wilson (1984) concluded that an integrated program “has proven to be highly motivating,

relevant to the interests and needs of children, and effective in providing opportunities for movement, interaction and problem solving” (p. 63). Thus, students gain a deeper understanding because they have an increased motivation to learn the subject matter.

Increased Performance, Self-Concept and Positive Attitudes

An increased self-concept is the third reason that supports an interdisciplinary curriculum. According to Schubert and Melnick (1997), “One area that was substantiated by teachers and administrators repeatedly was an increase in students’ self-concept and [a] positive attitude toward school” (p. 10). Furthermore they added that students *suddenly* blossomed when the regular curriculum was switched to a more integrated approach. Thus, as students gain a more positive self-concept, they begin to see school in a more positive light. For example, Schubert and Melnick described a student whose reputation was seen in a somewhat negative light. However, when classes were switched to a more interdisciplinary approach, he contributed more to the class. This may be because he felt more confident about his knowledge of a subject. Consequently, because of the integration program, he began to flourish and became a better student. Also, Schubert and Melnick described a student who was described as “taciturn” and “withdrawn” (p. 11) prior to integration of the new curriculum. However, following the integration the student became more vocal about wanting to stay on task. The teachers reported that this was the most words he had ever spoken at one time. This change in behavior was a result of the “spark” (p. 4) that Struthers (1995) described. Also, teachers and administrators reported that: (a) students assumed leadership roles, (b) attendance improved, (c) ESL students were seen as equals, and (d) many students retained the information that they had been taught.

Along with improved attitudes and self-concept, students improved academically and behaviorally (Cordogan, 2001; Schubert and Melnick, 1997). For example, Melnick and Schubert reported, that in their study, there was a 34% decrease in absenteeism for the same group of students from the previous year. Cordogan reported that interdisciplinary students had consistently lower absence rates and lower suspension rates than the discipline based students.

According to Schubert and Melnick (1997), students' overall attitudes improved during the year, students had fewer negative comments about school. Cordogan (2001) had similar results with students in the interdisciplinary program who reported positive reactions to the curriculum.

Performing as well or better on standard assessments and academic performance measures further supports an interdisciplinary curriculum (Cordogan, 2001). According to Cordogan, freshman students in the interdisciplinary track had similar or higher scores on the Iowa Test of Educational Development. This showed that the use of an interdisciplinary curriculum did not lower students' scores. Consequently, the curriculum was as effective as the discipline based curriculum. Also, Cordogan showed that students in the interdisciplinary tract were superior in the following: (a) they had overall superior cumulative Grade Point Averages (GPA), (b) a higher percentage of students took the ACT test with slightly higher scores, (c) students were more likely to graduate their senior year, and (d) the attrition rate of students was much lower. Vars (1991) reported that nearly all students in the integrative/interdisciplinary programs scored higher on standardized tests than did students in more traditional programs. Mason (1996) suggested that these results might be linked to students' ability to gain a deeper

understanding with the interdisciplinary methods, but he acknowledged that other factors could affect the results. However, Mason stated, “few studies conclusively show that . . . interdisciplinary teaching enhances student learning in measurable ways” (p. 266).

Other Reasons That Support the Effectiveness

While the quantitative data on the effectiveness of an interdisciplinary approach are mixed, there is other evidence to support its usefulness. Gardner (2006) reported that, of the seven students who were awarded Rhodes and Marshall Scholarships at Harvard University, all seven were in an interdisciplinary study as undergraduates. What Gardner suggested is that many higher thinking individuals choose to undertake an interdisciplinary approach. According to Struthers (1995), Leonardo da Vinci insisted “that the painter be universal, neglecting no aspect of nature; that he should be a scientist and understand the inner nature of what he paints” (p. 6). Thus, a deeper understanding of science may assist a student in reaching his or her fullest potential as an artist which might be accomplished through an interdisciplinary approach. Jacobs (1993) observed that literary critics, as well as creative writers, use the same skills as scientists. “The method of looking at events, enumerating them in detail, then deriving their significance can be employed by the essayist as well as the poet. It is also the scientific method we know as induction” (p. 112). Hence, the poet, artist, and scientist can all learn from one another and benefit from their overlap.

Teachers Benefit From an Interdisciplinary Curriculum

While students benefit from an interdisciplinary curriculum, also, many teachers find rewards from the use of this curriculum as well. According to Brandt (1991), an interdisciplinary curriculum helps to reduce the redundancy of subjects being taught

because teachers know what other teachers are teaching. As result, students are less likely to have a subject, such as the rain forest, repeated over and over again, and make the education processes more efficient. Lastly, according to Brandt, teachers no longer feel isolated, especially in secondary education because teachers can collaborate and work together.

Multiple Intelligence Theory

According to Goodnough (2001), the use of multiple intelligence (MI; Gardner 1983, as cited in Goodnough) theory helps to provide a framework for teachers to make educated decisions about how to best develop a curriculum. Gardner's theory of MI is based on the assumption that everyone learns best by the expression or use of their eight intelligences, which are: (a) Verbal-Linguistic, (b) Logical-mathematical, (c) Musical-Rhythmic, (d) Bodily-Kinesthetic, (e) Visual-Spatial, (f) Interpersonal, (g) Intrapersonal, and (h) Naturalist. Thus, when a teacher plans a curriculum, the teacher should consider the following: (a) that learning is personalized; (b) students have diverse learning needs; (c) and that students have differences in interest, learning style, disability, and language. Furthermore, "students need to engage all of their intelligences, to explore their own intelligences and how they impact their learning" (p. 182). Consequently, in an interdisciplinary curriculum, the teacher attempts to bring in other subjects and skills, one can infer that, in an interdisciplinary curriculum, one attempts to bring in other intelligences not usually seen in one particular discipline. According to Schubert and Melnick (1997), current curricula do not meet the needs of all students but rather, only those students who prefer linguistic and mathematical intelligences. Consequently, students, who use other methods to make sense of information, are not able to use their

strengths such as an artistic component to comprehend information. Furthermore, the authors believe that a curriculum in regular classrooms that includes an artistic component would benefit students who do not receive the opportunity to use their intelligences in a non art based classroom. Also, Schubert and Melnick pointed out that visual arts are beneficial to English as a Secondary Language (ESL) learners, as well as students who can use an artistic aspect of a class to improve their “oral and written work” (p. 9). Furthermore, teachers find it beneficial because it blends subjects and reduces the “fragmentation” (p. 9) of information given to students.

Problems and Limitations of an Interdisciplinary Approach

No method is without its faults, and there are many limitations to the use of an interdisciplinary approach. For instance, an interdisciplinary curriculum is not believed to be a viable method for secondary students by some. Gardner (2006) maintained that, prior to college, students are not ready for an interdisciplinary approach because they have not yet mastered the individual disciplines. However, one might argue that students in college have not yet met the level of mastery in their studies either. Also, the term, mastery, is vague and how does one know when a student has achieved complete mastery of a subject.

Lack of Standards and Assessments

Since the interdisciplinary curriculum is still evolving, one of the major limitations is the lack of standards. According to Gardner (2006), what is amazing is the lack of standards in order to measure what is sufficient and suitable for interdisciplinary work. In addition, the rubrics used for grading are marginal at best. Also, Paulson (1992) raised concerns about assessments such as: (a) how to measure the process rather

than an assessment at the end, (b) those who believe an assessment is not required at all, (c) the assessment needs to be flexible to plan for unanticipated outcomes, and (d) a new type of assessment needs to be developed to be specific to a students' needs. According to Mason (1996), many of the interdisciplinary content and curricular standards still remain within the subjects rather than branching across these borders.

Trying to Use Current Assessments

Along with the lack of standards and assessments, also, one must acknowledge the difficulty in trying to use current assessment tools to measure this evolving curriculum. According to Kysilka (1998), in the current educational situation of standardized tests, students are required to demonstrate specific skills. Nonetheless, "What if, in attempt at helping students make meaning out of the curriculum through a more integrated approach to learning, students 'fail to achieve' on the standardized test?" (p. 207). Hence, a teacher might be apprehensive that students may not be able to use the information or skills on a standardized test. According to Mason (1996), standardized testing is based on the traditional system. This results in the use of an ineffective measure for students who learn through the interdisciplinary curriculum. Thus, the conundrum is how to assess with current assessments or use assessments that have not yet been fully developed.

Lack of Time for Instructors

One of the major issues that teachers face is time or the lack thereof. According to Kysilka (1998), many teachers are unenthusiastic about trying to change the curriculum because of time. Mason (1996) added that there just might not be enough time in the day to make sure students develop all the skills required to make some

assignments meaningful. According to Melle and Wilson (1984), when teachers attempted to implement an interdisciplinary curriculum, many of the teachers struggled with the time constraint. Along with time, the actual planning of an interdisciplinary curriculum is difficult (Struthers, 1995).

Inexperience in Other Fields

Many secondary teachers are comfortable in their own field but, when they venture into other fields, they become less confident or do not want to give up their expertise (Brandt, 1991; Melle & Wilson, 1984,). Kysilka stated that (1998), “If teachers are going to be expected to ‘blend’ content areas, then they need to be more broadly and deeply educated” (p. 208). Mason added that teachers in secondary education are “specialists” with a deep knowledge in their own discipline, but have limited exposure to other disciplines which would result in only a “superficial exposure to ideas, concepts, and teaching methods” (p. 267) in the other disciplines. This lack of exposure might result in a plan that is too complex for the instructors and the students (Paulson, 1992).

Inexperience in Use of Interdisciplinary Methods

Even with the best intentions, teachers make many mistakes when they try to use an interdisciplinary approach. Brophy and Alleman (1991) observed that, some activities planned by teachers “lack educational value” and are “pointless busywork” such as “alphabetizing state capitals” (p. 66). Also, according to Mason (1996), many teachers trivialize or use concepts that “fail to enhance student understanding of important ideas” (p. 266). A lesson that is beneficial for the development of students in one subject might not have any merit in another. Thus, some topics are best left in one discipline, such as “number theory in math” (p. 266). Furthermore Brophy and Alleman observed that, an

activity that is artistic in nature might have only limited benefit in another subject such as having students carve pumpkins that look like a president rather than having students draw a map of the school in social studies class. Thus, the project might be too time consuming in comparison to the actual benefits that students receive.

Brophy and Alleman (1991) observed that some activities are too complicated or confusing for students. They pointed out that some students might not be prepared to do a task because of lack of knowledge or the task is too ambiguous for students to understand the connection. Mason (1996) suggested that students should only “attempt interdisciplinary work after they have mastered some elements of the disciplinary knowledge” (p. 267). Cordogan (2001) argued that the attempt to make connections comes at the cost of the content. As a result, teachers need to be careful about what they select and how they present interdisciplinary subjects.

Reluctance by Administrators and Parents

Mason (1996) reported that, many of the problems that educators face, when they try to develop an interdisciplinary curriculum, is due to lack of experience when they try to break down the “barriers erected between departments” and abandon “the safe haven of subject-matter expertise” by “secondary faculty” (p. 267). This isolation of departments has been a factor in traditional education for a long period of time. Therefore, attempts to break down these barriers is difficult for many faculty and administrators because they would have to abandon the historical *patriarchal system* that is in place. It may be difficult for many faculty to give up the power and responsibility that they have achieved over time. As a result, they might be more confrontational about changes in a system that they have worked in for so long. Furthermore, Paulson (1992)

concluded that an interdisciplinary education would not appear to be “supported by schools or teacher preparation programs” (p. 15). If teachers cannot be trained in this method, then their rate of success appears to diminish. Thus, teachers need to be exposed to this type of approach in their preservice coursework so they will be more comfortable with it in student teaching and in their own classroom.

Administrators and faculties are not the only people who are reluctant to abandon the traditional system. According to Kysilka (1998), parents can have a major influence over what is taught in schools and stated that “Parents are very resistant to change. They want their children to achieve – and most parents’ notions of achievement are to duplicate what they did when they were at school” (p. 208). Thus, even though society has changed and what is expected of students has changed, many parents still want to see their children go through the same steps they experienced. Thus, any attempt to think outside of the box might meet resistance from parents.

How to Make an Interdisciplinary Curriculum Flourish

When an interdisciplinary unit or an interdisciplinary curriculum is established, there are many matters that one needs to take into consideration in order to assure success. According to Jacobs (1991), initially, teachers need to write down what they are going to teach for the year and align subjects in order to determine when students study certain topics. This accomplishes two things, first, it makes it easier for the teachers to plan and identify possibilities when they can “target units of study for performance” (p. 27) and, second, it reduces the possibility of repetition. Then, according to Brandt (1991), teachers need to gather information and not rush into a large unit. Instead, they should start out small with just one “well-designed, interesting and meaningful unit of

study” (p. 26). Mason (1996) suggested topics should be selected that are powerful as well as concepts that are easier to organize into an interdisciplinary unit. Thus, it is not enough to just select a topic but, rather, it is important to make sure that it is one that will lead to a deep understanding by the student. According to Brophy and Alleman (1991), the activities should be noteworthy even if they did not integrate the topic later on in the unit.

Once a topic has been chosen, then one must make sure that there is enough planning time so that teachers can collaborate (Mason, 1996). If this is not done, it can lead: (a) to “trivialization” (p. 269) of the content, (b) teachers who do not buy in to the unit, and (c) teachers who do not fully comprehend what will be taught and how it will be taught. The next step is to formulate assessments. Mason suggested the use of an assessment that is either authentic or curriculum based in order to “monitor student progress in multiple subject areas simultaneously” (p. 269).

In order to prevent mistakes in the future and with other teachers who should attempt to use an interdisciplinary approach, Mason (1996) suggested that programs should be focused on disciplinary and interdisciplinary knowledge. The reason for this is that teachers need to learn how to make connections but, also, understand the skills in various disciplines in order for an interdisciplinary unit to be successful. Furthermore, Mason asserted that educators need to make sure they pay attention to the complexity of connections because students might find it difficult to grasp. According to Sponder (1993), “Continuous integration does not add anything new to the total knowledge base but better reinforces what students have already learned” (p. 12). Hence, it is important to realize that the information involved in interdisciplinary education is not necessarily

new to the students but it is reinforced by the method. Furthermore, Struthers (1995) noted that it is important to remember that the curriculum approach should never interfere with the content of the subject.

Chapter Summary

The criteria for traditional and interdisciplinary curricula were outlined in this chapter. Also, the reasons for why a traditional and interdisciplinary curriculum are supported and not supported were discussed in this chapter as well as why an interdisciplinary curriculum may not be successful. Also, the author discussed how to incorporate a successful interdisciplinary curriculum. Finally, in Chapter 3, the researcher will describe the method, target audience, goals, and procedures for the development of this project.

Chapter 3

METHOD

The purpose of this project was to develop an interdisciplinary approach to include literature into a science class in order to facilitate and motivate students to further pursue subjects in science as well see the connection that the subjects taught in school are not independent. The current generation of students live in a complex world, and they need to develop a skill set that will enable them to look at problems and make decisions from a variety of different perspectives. Also, science is a dynamic subject with a plethora of topics that correspond to art, English, mathematics, social studies, music, etcetera. When literature is incorporated into the science classroom, there are many beneficial possibilities for student such as: (a) students who enjoy literature will be more connected to the science curriculum; (b) students will see that science is not independent of other classes; (c) students will look at science from an original perspective; and (d) students will not only develop their scientific skills, but also their English skills.

Target Audience

This project was designed for the use of instructors who teach Grades 6-8 science classes. However, the project could be easily adapted for other grades if an instructor chooses. This project is for teachers who want to bring a fresh approach to the science classroom in order to help students look at topics in science from a different perspective as well as show students that what they learn in science can be applied to

their English classrooms. Also, this project should aid in the further development of students' skills in science and English such as reading comprehension and analytical skills.

Goals and Procedures

The goal of this project was to provide teachers with an example for how to incorporate literature into a science classroom. The project provided teachers with a review of literature that describes how an interdisciplinary unit can be an effective way to teach students as well as ways to initiate a curriculum successfully. Presented in Chapters 4 are the unit plan, lesson plans, and graphic organizers for use in the integration of literature into a science classroom.

Peer Assessment

The assessment for the unit plan came from three colleagues through informal feedback, as well as suggestions for improvement and recommendations for what should be added and/or excluded. All colleagues were given a copy of the unit plan, and they were asked to look at how easy it is to follow and implement the lessons, whether use of the unit plan is relevant to both English and science, whether the unit will increase the knowledge of students for both science and English, and their overall impression of the unit. Each colleague made their editing comments and suggestions on the actual copy they receive.

Chapter Summary

Currently, there is a need to revamp how information is presented in classrooms. The provision of an interdisciplinary curriculum can assist students to perceive the connections between subjects as well as help them gain a deeper understanding. In this

chapter, the author described the methods that will be used for this project, the target audience, the goals and procedures, and how and who assessed the project. In Chapter 4, the author presents the interdisciplinary unit for the incorporation of literature in the science classroom. Also, this author reflects on his project as well as provide the reviews by colleagues in Chapter 5.

Chapter 4

RESULTS

The purpose of this project is to develop a unit that includes lessons that use an interdisciplinary approach in science. Throughout the educational system educators are always looking for ways to present information in an original way. The goal of this unit is to show students that science is not an isolated discipline where the skills learned in it are solely used in science, but rather the skills developed in science could contribute to the skills used in English as well. This unit utilizes the novel *Hoot* as piece of literature to help students experience the different types of environments and how humans affect those environments. *Hoot* is a novel about two boys who fight to protect the burrowing owl from being destroyed by an overzealous company. This researcher developed individual lessons around the dilemmas, descriptions and subplots presented in *Hoot*.

The unit plan and individual lesson plans are based on the template provided by Regis University. This template allows educators to organize material in an easy to follow manner. Graphic organizers for the lesson plans are located in the appendices. The following pages are the unit plan, individual lesson plans, and the chapter summary.

Unit Plan for Hoot

Element	Description
Unit Title	Hoot and Science
Content Area	This unit is designed to help students look at issues involving the environment using a novel written by Carl Hiaasen titled <i>Hoot</i> .
Grade Level	The unit is designed for 7 th graders.
Amount of Time	13 days
Standard(s) Addressed	<p>Science Standards Addressed</p> <p>Standard 1: Students understand the process of scientific investigation and design, conduct, communicate about, and evaluate such investigations.</p> <ul style="list-style-type: none"> - Identifying and evaluating alternative explanations and procedures. - Creating a written plan for investigation. - Giving examples of how collaboration can be useful in solving scientific problems and sharing findings. <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <ul style="list-style-type: none"> - 3.1: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with the environment. - Describing the importance of plant and animal adaptations, including local examples. - Explaining the interaction and interdependence of nonliving components within ecosystems. <p>Standard 5: Students know and understand interrelationships among science, technology, and human activity how they can affect the world.</p> <ul style="list-style-type: none"> - Describing advantages and disadvantages that might accompany the introduction of a new technology. - Describing how the use of technology can help solve an individual or community problem. - Describing how people use science and technology in their professions. <p>Mathematics Standards:</p> <p>Standard 2: Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems</p> <ul style="list-style-type: none"> - Represent, describe, and analyze patterns and relationships using tables, graphs, verbal rules, and

	<p>standard algebraic notation.</p> <p>Standard 3: Students use data collection and analysis, statistics, and probability in problem solving situations and communicate the reasoning used in solving these problems.</p> <ul style="list-style-type: none"> - Read and construct displays of data using appropriate techniques (for example, line graphs, circle graphs, scatter plots, box plots, stem-and-leaf plots) and appropriate technology. <p>Reading and Writing Standards:</p> <p>Standard 1: Students read and understand a variety of materials</p> <ul style="list-style-type: none"> - Using a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels in addition to the types of reading material mentioned above. Students extend their thinking and understanding as they read stories about people from similar and different backgrounds. <p>Standard 2: Students write and speak for a variety of purposes and audiences.</p> <ul style="list-style-type: none"> - Writing stories, letters, and reports with greater detail and supporting material; - choosing vocabulary and figures of speech that communicate clearly; - drafting, revising, editing, and proofreading for a legible final copy; - applying skills in analysis, synthesis, evaluation, and explanation to their writing and speaking; - incorporating source materials into their speaking and writing <p>Standard 3: Students write and speak using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling.</p> <ul style="list-style-type: none"> - Using correct pronoun case, regular and irregular noun and verb forms, and subject-verb agreement involving comparisons in writing and speaking; - using simple, compound, complex, and compound/complex sentences in writing and speaking; - punctuating and capitalizing titles and direct quotations, using possessives, and correct paragraphing in writing; - expanding spelling skills to include more complex words; - using prefixes, root words, and suffixes correctly in writing and speaking; - demonstrating use of conventional spelling in their published works; and - using resources such as spell checkers, dictionaries, and
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	<p>charts to monitor their spelling accuracy.</p> <p>Standard 4: Students apply thinking skills to their reading, writing, speaking, listening, and viewing.</p> <ul style="list-style-type: none"> - Using resources such as spell checkers, dictionaries, and charts to monitor their spelling accuracy. - making predictions, drawing conclusions, and analyzing what they read, hear, and view; - recognizing, expressing, and defending a point of view orally in an articulate manner and in writing; and <p>Standard 6: Students read and recognize literature as a record of human experience.</p> <ul style="list-style-type: none"> - Reading, responding to, and discussing literature that represents points of view from places, people, and events that are familiar and unfamiliar.
Enduring Understandings/ Essential Questions	By the end of this unit students should understand how humans affect the environment and the species in it and what can humans do to help the environment.
Pre-Assessment	Pre-assessment
Design Unit Plan	Accommodations needed to be made after pre-assessment.
Unit Overview and Rationale	Along with the enduring understanding they will learn what they can do to help the environment. Students will realize that many people who write novels need to understand many aspects of science to write an accurate novel and that science and English are not separate entities but rather connected. They will also learn that the skills one uses in science is not just for science but for other subjects as well.
Materials/Resources	Instructors will need the book <i>Hoot</i> , <i>Hoot</i> reading guide, pen, pencil, markers, LCD, computers, overhead, chalkboard, notebook paper, dice, and internet.
Daily Lessons & Activities	See individual lesson plans.
Assessment / Data Collection	Students will receive a pre and post assessment that is identical to measure the students' growth. Students will also have a final project that will entail the main topics of study in this unit. Also students will have many assignments throughout the unit to monitor their progress such as the reading guide, presentations, written assignments and graphic organizers.
Summarize, Evaluate & Reflect	

Daily Lesson Plan 1: Let's Get Started

Element	Description
Duration	50 minutes
Learner Outcomes / Benchmarks	Students will begin the book <i>Hoot</i> and they will understand that this novel is from a scientific perspective.
Transition	First 10 minutes: When students enter the classroom they will pick up a pre-assessment that is located by the door. Students are expected to sit down in their assigned seats and read the directions on the overhead. The directions on the overhead will direct students to take out a pencil and clear off their desks of everything but their pencils and the pre-assessment. When students are sitting quietly the instructor will read directions of the pre-assessment and then go through the questions on the pre-assessment. The instructor will then tell students they have 20 minutes to work on the pre-assessment. When students are finished they are to turn their tests into the appropriate place in the classroom and sit quietly or read a fun book.
Standards	Reading and Writing Standards: Standard 1: Students read and understand a variety of materials Standard 3: Students write and speak using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling.
Daily Materials Needed	Pencil, pen, pre-assessment, <i>Hoot</i> book, <i>Hoot</i> reading guide, and overhead. Differentiated Learning Needs: Students will receive differentiated reading guide
Anticipatory Set	5 minutes: Instructor will pass out the book <i>Hoot</i> and the <i>Hoot</i> Reading Guide. The instructor will then ask students what they think the book is going to be about. Then, as a class they will read aloud the back of the cover which gives a summary of the book.
Pre-Assessment	<i>Hoot</i> pre-assessment Differentiated Learning Needs: Students will be given extra time if needed.
Teaching the Lesson	20 minutes: After going over the summary of the book the instructor will then go through the reading guide starting with the directions. Instructor should point out that answers need to be in complete sentences. If there is extra time the students will begin reading chapter 1 silently. 2 minutes: Instructor will tell students that they need to read chapters 1-3 of the book and answer all the questions for chapters 1-3 in the <i>Hoot</i> reading guide. Differentiated Learning Needs: Students with special needs will

	receive differentiated reading guide.
Guided Practice / Instructional Strategies	Pre-assessment and <i>Hoot</i> reading guide. Differentiated Learning Needs: Students will receive differentiated reading guide and students will be given extra time if needed.
Post-Assessment	<i>Hoot</i> reading guide questions for chapters 1-3. Differentiated Learning Needs: Students will receive differentiated reading guide
Closure	Final 3 minutes: The instructor will ask the students what the book is about and from what perspective is the book written? The instructor will then have students put their belongings away and dismiss them.
Independent Practice	<i>Hoot</i> reading guide Differentiated Learning Needs: Students will receive differentiated reading guide and be given extra time.
Summarize, Evaluate & Reflect	

Daily Lesson Plan 2: Brazilian Pepper

Element	Description
Duration	100 minutes (2 class periods)
Learner Outcomes / Benchmarks	Students will begin to understand how scientists classify organisms. Students will understand what an invasive species is and why the Brazilian pepper is an example of an invasive species
Transition	<p>First 5 minutes: Students will enter class and sit in their seats, take out a piece of notebook paper and begin answering the questions on the board. The questions on the board will be questions #2, #4 #10, #11, #12 and #14 from the reading guide. When students are finished they will turn in their questions to the appropriate place in the classroom. Students need to take out <i>Hoot</i>, and reading guide.</p> <p>10 minutes: Instructor will go through all questions with students in chapters 1-3. The instructor will make sure to emphasize the questions on the board. Students need to make corrections with a pen in their reading guide. Following instruction, the instructor will pass out the Brazilian pepper graphic organizer.</p>
Standards	<p>Science Standards Addressed</p> <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <ul style="list-style-type: none"> - 3.1: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with the environment. - Describing the importance of plant and animal adaptations, including local examples. - Explaining the interaction and interdependence of nonliving components within ecosystems. <p>Reading and Writing Standards:</p> <p>Standard 1: Students read and understand a variety of materials</p> <ul style="list-style-type: none"> - Using a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels in addition to the types of reading material mentioned above. Students extend their thinking and understanding as they read stories about people from similar and different backgrounds.
Daily Materials Needed	<p>Pencil, pen, <i>Hoot</i>, <i>Hoot</i> reading guide, overhead, LCD projector, Internet, Brazilian peppers graphic organizer, notebook paper, colored pencils or markers.</p> <p>Differentiated Learning Needs: Students will receive</p>

	differentiated reading guide.
Anticipatory Set	5 minutes: Instructor will ask everyone turn to page 50 in <i>Hoot</i> and read through page 50 making sure to pay attention to the description of where Roy is. Then the instructor will ask why there would be a Brazilian pepper in Florida?
Pre-Assessment	See anticipatory set question.
Teaching the Lesson	<p>15 minutes: Go through the Introduction and directions on the first part of the graphic organizer. Have students read through page 50 again and draw what they think the image looks like based on the description. Then students need to select 3 words that they thought helped with the visual image they drew from the passage. After all students have written down their words, then have a few students share their work with the class, and then ask students what words they chose. Words that students might choose include: tangled, dark, thicket, impenetrable, scraped, and thrashed. Ask students what they think these words mean and how they helped them with this image.</p> <p>10 minutes: Have students take out a piece of notebook paper for the following lecture. Tell students that they are going to learn why they should care about the Brazilian-pepper. Then tell students that before they get started on learning about the importance of the Brazilian-pepper they need to learn how scientists classify plants and animals.</p> <p><u>Notes on Classification:</u></p> <p>1. Definition of Taxonomy- The science or principles of classification.</p> <p>Here is an example of how we classify things.</p> <p>Phylum Class Order Family Genus Species</p> <p>For now we are only going to focus on the Genus and Species</p> <p>Rules for taxonomy of Genus and Species-</p> <p>1) Family is capitalized and in normal font 1) The Genus is always capitalized and italicized. 2) The species is all lower case and italicized.</p>

Example		
<u>Genus</u>	<u>Species</u>	<u>Common name</u>
1) <i>Homo</i>	<i>sapiens</i>	Humans
2) <i>Phyllomedusa</i>	<i>callidryas</i>	Red-eyed tree frog

20 minutes: Read through the directions on the Brazilian Pepper section of the graphic organizer. Then have students go to the website that is in the directions of the graphic organizer. Have students work in groups and assign questions to groups. Before students work independently go through question 1 in this section and do it as a class using the website. Then have students work on their own making sure to walk around class to answer questions. When students are finished have them present their answers so other students can fill in their organizers.

15 minutes: Have students take out their notes again and start lecture on Invasive species and why we care about the Brazilian-peppers and invasive species

Lecture notes:

What is an Invasive Species? It is a species that invades an area that is outside of the range from where it normally lives. They are also known as exotic species and nonnative species.

How do we get Invasive Species? Usually species are introduced to an area by humans. For example, European settlers brought certain animals and plants to the united states that were nonnative. Flooding can also bring nonnative species to an area.

Are all Invasive species bad? No not always, but usually they will reduce the biodiversity of an area.

When are Invasive species bad? Invasive species are bad when they can out compete the native species for a resource i.e. food or they do not have a predator to keep them check.

Brazilian-peppers- Are dense brushy, thickets that have competed with native vegetation which has lead to the plant covering much of Florida.

25 minutes: Go through directions of independent practice section of the graphic organizer and then have students begin working on their research using the internet. When students are finished they will turn in their graphic organizers.

2 minutes: Tell students they need to read chapters 4 and 5 and

	<p>answer the questions in their reading guide. Then have them clean up their belongings.</p> <p>Differentiated Learning Needs: Students will receive extra time if needed.</p>
Guided Practice / Instructional Strategies	<p>Brazilian pepper graphic organizer.</p> <p>Differentiated Learning Needs: Students will receive extra time if needed.</p>
Post-Assessment	<p>Brazilian pepper graphic organizer and closure questions.</p> <p>Differentiated Learning Needs:</p>
Closure	<p>Last 3 minutes: Ask students the following questions:</p> <ol style="list-style-type: none"> 1) What are the rules for naming genus and species? 2) What is an invasive species and how does it effect the environment? 3) What are some invasive species in Colorado and where did it come from? <p>Dismiss students</p>
Independent Practice	<p>Guided reading, graphic organizer</p> <p>Differentiated Learning Needs: Students will receive differentiated reading guide and be given extra time</p>
Summarize, Evaluate & Reflect	

Daily Lesson Plan 3: Invasive Species Game

Element	Description
Duration	50 minutes
Learner Outcomes / Benchmarks	Students will understand what an invasive species is and how an invasive species can quickly overtake an area.
Transition	<p>First 5 minutes: Students will enter class and sit in their seats, take out a piece of notebook paper and begin answering the questions on the board. The questions on the board will be questions #16, #17 #18, #20, and #21 from the reading guide. When students are finished they will turn in their questions and their Brazilian pepper graphic organizers to the appropriate place in the classroom. Students need to take out <i>Hoot</i>, and reading guide.</p> <p>10 minutes: Instructor will go through all questions with students in chapter 4 and 5. The instructor will make sure to emphasize the questions on the board. Students need to make corrections with a pen in their reading guide. Following instruction, the instructor will pass out the Invasive Species Game graphic organizer.</p>
Standards	<p>Science Standards Addressed</p> <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <ul style="list-style-type: none"> - 3.1: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with the environment. - Describing the importance of plant and animal adaptations, including local examples. - Explaining the interaction and interdependence of nonliving components within ecosystems. <p>Reading and Writing Standards:</p> <p>Standard 1: Students read and understand a variety of materials Using a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels in addition to the types of reading material mentioned above. Students extend their thinking and understanding as they read stories about people from similar and different backgrounds.</p>
Daily Materials Needed	Pencil, pen, <i>Hoot</i> , <i>Hoot</i> reading guide, overhead, LCD projector, Internet, Invasive Species Game graphic organizer, notebook paper, graph paper or Excel, dice, colored pencils or markers.

	Differentiated Learning Needs: Students will receive differentiated reading guide.
Anticipatory Set	5 minutes: Read the introduction of the Invasive Species Game with the students and then review what an invasive species is again with students. Then go through directions with students and actually play a game of 5 roles with them so they can see what is going on. When students are ready they can pick up the 5 dice they will need for the game.
Pre-Assessment	Pre-assessment
Teaching the Lesson	<p>25 minutes: Students will play the game in pairs or threes if needed. When students are finished with the game they need to graph their results. As a class go over which data will be on the x-axis (years/roles), the y-axis (total number of species), and the title.</p> <p>2 minutes: Students will clean up and be reminded that their homework is read chapters 6 and 7 and answer their questions in the reading guide for those chapters.</p> <p>Differentiated Learning Needs: Instructor will give students extra time if needed.</p>
Guided Practice / Instructional Strategies	Invasive Species Game and graph.
Post-Assessment	Closure questions, Invasive Species Game graphic organizer, and reading guide questions.
Closure	<p>Last 3 minutes: Ask students the following question:</p> <p>1) What are some factors that might help an invasive species take over and area?</p>
Independent Practice	<p>Invasive Species Game graphic organizer and reading guide questions.</p> <p>Differentiated Learning Needs: Students will receive differentiated reading guide and be given extra time</p>
Summarize, Evaluate & Reflect	

Daily Lesson Plan 4: Invasive Species Graph

Element	Description
Duration	50 minutes
Learner Outcomes / Benchmarks	Students will understand what an invasive species is and how an invasive species can quickly overtake an area. Students will make a graph that displays how an invasive species can takeover an area.
Transition	<p>First 5 minutes: Students will enter class and sit in their seats, take out a piece of notebook paper and begin answering the questions on the board. The questions on the board will be questions #22, #23 #25, #27, and #29 from the reading guide. When students are finished they will turn in their questions to the appropriate place in the classroom. Students need to take out <i>Hoot</i>, and reading guide.</p> <p>10 minutes: Instructor will go through all questions with students in chapters 6-7. The instructor will make sure to emphasize the questions on the board. Students need to make corrections with a pen in their reading guide. Following instruction, the instructor will have students continue their graphs and questions.</p>
Standards	<p>Science Standards Addressed</p> <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <ul style="list-style-type: none"> - 3.1: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with the environment. - Describing the importance of plant and animal adaptations, including local examples. - Explaining the interaction and interdependence of nonliving components within ecosystems. <p>Mathematics Standards:</p> <p>Standard 2: Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems</p> <ul style="list-style-type: none"> - Represent, describe, and analyze patterns and relationships using tables, graphs, verbal rules, and standard algebraic notation. <p>Standard 3: Students use data collection and analysis, statistics, and probability in problem solving situations and communicate</p>

	<p>the reasoning used in solving these problems.</p> <ul style="list-style-type: none"> - Read and construct displays of data using appropriate techniques (for example, line graphs, circle graphs, scatter plots, box plots, stem-and-leaf plots) and appropriate technology. - <p>Reading and Writing Standards: Standard 1: Students read and understand a variety of materials Using a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels in addition to the types of reading material mentioned above. Students extend their thinking and understanding as they read stories about people from similar and different backgrounds.</p>
Daily Materials Needed	<p>Pencil, pen, <i>Hoot</i>, <i>Hoot</i> reading guide, overhead, LCD projector, Internet, Brazilian peppers graphic organizer, notebook paper, colored pencils or markers.</p> <p>Differentiated Learning Needs: Students will receive differentiated reading guide.</p>
Anticipatory Set	<p>5 minutes: Instructor will ask students what they think their graphs will look like and why?</p>
Pre-Assessment	<p>See Anticipatory Set</p>
Teaching the Lesson	<p>25 Students will take out their Invasive Species Game graphic organizers and finish working on their assignments. When students are finished they are to turn in their Invasive Species Game graphic organizer and begin reading chapter 8 in <i>Hoot</i> and answer their questions in the reading guide.</p> <p>3 minutes: Students will clean up and be reminded of their homework which is to read chapters 8, 9, and 10 and answer the questions in the reading guide.</p> <p>Differentiated Learning Needs: Students will receive differentiated reading guide. Students will receive extra time if needed.</p>
Guided Practice / Instructional Strategies	<p>Invasive Game graphic organizer and reading guide questions.</p> <p>Differentiated Learning Needs: Students will receive differentiated reading guide. Students will receive extra time if needed.</p>
Post-Assessment	<p>Invasive Game graphic organizer and reading guide questions</p> <p>Differentiated Learning Needs: Students will receive differentiated reading guide. Students will receive extra time if needed.</p>
Closure	<p>Last 2 minutes: Ask students the following question: 1) I would like someone to come up and draw me what the graph looked like when an invasive species came in and took over an</p>

	area. Dismiss students
Independent Practice	Invasive Game graphic organizer and reading guide questions Differentiated Learning Needs: Students will receive differentiated reading guide. Students will receive extra time if needed.
Summarize, Evaluate & Reflect	

Daily Lesson Plan 5: Endangered Species

Element	Description
Duration	50 minutes
Learner Outcomes / Benchmarks	Students will understand how the endangered species act affects the animals and the issues facing the endangered species act.
Transition	<p>First 5 minutes: Students will enter class and sit in their seats, take out a piece of notebook paper and begin answering the questions on the board. The questions on the board will be questions #30, #31 #32, #36, #39 and #41 from the reading guide. When students are finished they will turn in their questions to the appropriate place in the classroom. Students need to take out <i>Hoot</i>, and reading guide.</p> <p>10 minutes: Instructor will go through all questions with students in chapters 8-10. The instructor will make sure to emphasize the questions on the board. Students need to make corrections with a pen in their reading guide. Following instruction, the instructor will pass out the Endangered Species graphic organizer.</p>
Standards	<p>Science Standards Addressed</p> <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <ul style="list-style-type: none"> - 3.1: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with the environment. - Describing the importance of plant and animal adaptations, including local examples. - Explaining the interaction and interdependence of nonliving components within ecosystems. <p>Mathematics Standards:</p> <p>Standard 2: Students use algebraic methods to explore, model, and describe patterns and functions involving numbers, shapes, data, and graphs in problem-solving situations and communicate the reasoning used in solving these problems</p> <ul style="list-style-type: none"> - Represent, describe, and analyze patterns and relationships using tables, graphs, verbal rules, and standard algebraic notation. <p>Standard 3: Students use data collection and analysis, statistics, and probability in problem solving situations and communicate the reasoning used in solving these problems.</p> <ul style="list-style-type: none"> - Read and construct displays of data using appropriate

	<p>techniques (for example, line graphs, circle graphs, scatter plots, box plots, stem-and-leaf plots) and appropriate technology.</p> <p>Reading and Writing Standards: Standard 1: Students read and understand a variety of materials Using a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels in addition to the types of reading material mentioned above. Students extend their thinking and understanding as they read stories about people from similar and different backgrounds.</p>
Daily Materials Needed	<p>Pencil, pen, <i>Hoot</i> book, <i>Hoot</i> reading guide, overhead, LCD Internet and computers, Endangered Species graphic organizer, notebook paper, colored pencils or markers.</p> <p>Differentiated Learning Needs: Students will receive differentiated reading guide.</p>
Anticipatory Set	<p>5 minutes: Ask students what they think an endangered species is and why they think it is important. Have students write the answer on the top of their Endangered Species graphic organizer.</p>
Pre-Assessment	<p>See anticipatory set</p>
Teaching the Lesson	<p>25 minutes: Students are to partner up and go to a computer and go to the website listed in the directions of the Endangered Species graphic organizer. Go through the directions with the students and then as a class go through the first question together. When students are finished they are to turn the Endangered Species graphic organizer into the instructor and begin reading chapter 11 in <i>Hoot</i>.</p> <p>2 minutes: Tell students they need to read chapters 11-13 and answer the questions in their reading guide. Then have them clean up their belongings.</p> <p>Differentiated Learning Needs: Students will receive extra time if needed. Students will also receive a differentiated endangered species graphic organizer.</p>
Guided Practice / Instructional Strategies	<p>Endangered Species graphic organizer and reading guide questions.</p>
Post-Assessment	<p>Endangered Species graphic organizer and reading guide questions.</p> <p>Differentiated Learning Needs: Students will receive extra time if needed. Students will also receive a differentiated endangered species graphic organizer and reading guide.</p>
Closure	<p>Last 3 minutes: Ask students the following questions:</p>

	1) What is the difference between a habitat and an ecosystem? 2) What is an endangered species? Dismiss students.
Independent Practice	Endangered Species graphic organizer and reading guide questions. Differentiated Learning Needs: Students will receive extra time if needed. Students will also receive a differentiated endangered species graphic organizer and reading guide.
Summarize, Evaluate & Reflect	

Daily Lesson Plan 6: A Tale of Two Species: Grizzly Bear

Element	Description
Duration	Duration 50 minutes
Learner Outcomes / Benchmarks	Students will understand what the following are: ecosystem, habitat, biodiversity, extinction, endangered species, threatened species, nonnative species and native species. Students will learn how we can protect habitats of the grizzly bear, and what the endangered species act is.
Transition	<p>First 5 minutes: Students will enter class and sit in their seats, take out a piece of notebook paper and begin answering the questions on the board. The questions on the board will be questions #44, #45 #46, #47, and #48 from the reading guide. When students are finished they will turn in their questions and endangered species graphic organizer if they have not already turned it in to the appropriate place in the classroom. Students need to take out <i>Hoot</i>, and reading guide.</p> <p>10 minutes: Instructor will go through all questions with students in chapters 11-13. The instructor will make sure to emphasize the questions on the board. Students need to make corrections with a pen in their reading guide. Following instruction, the instructor will pass out the A Tale of Two Species: Grizzly Bear graphic organizer.</p>
Standards	<p>Science Standards Addressed</p> <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <ul style="list-style-type: none"> - 3.1: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with the environment. - Describing the importance of plant and animal adaptations, including local examples. - Explaining the interaction and interdependence of nonliving components within ecosystems. <p>Reading and Writing Standards:</p> <p>Standard 1: Students read and understand a variety of materials Using a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels in addition to the types of reading material mentioned above. Students extend their thinking and understanding as they read stories about people from similar and different backgrounds.</p>
Daily Materials	Pencil, pen, <i>Hoot</i> , <i>Hoot</i> reading guide, overhead, LCD, Internet and computers, Tale of Two Species: Grizzly Bear graphic

Needed	organizer, notebook paper, colored pencils or markers. Differentiated Learning Needs: Students will receive extra time if needed.
Anticipatory Set	5 minutes: Ask the students why they think the Grizzly Bear was on the endangered species list?
Pre-Assessment	See Anticipatory Set question
Teaching the Lesson	<p>5 minutes: Instructor will go through directions of the Tale of Two Species: Grizzly Bear graphic organizer with students and have students answer the questions that relate to the article.</p> <p>20 minutes: Instructor will lead a discussion about all the questions on the organizer making sure students fill in the answers with a pen they did not find. The instructor will then have students present their ideas about questions 5 and 6 on the graphic organizer. Students are to take notes on the different perspectives and then write a summary of why we should take the grizzly bear off or keep it on the endangered species list using their notes. Students need to write at least a half page on a separate piece of notebook paper.</p> <p>2 minutes: Tell students they need to read chapters 14-16 and answer the questions in their reading guide. Then have them clean up their belongings.</p> <p>Differentiated Learning Needs: Students will receive extra time if needed.</p>
Guided Practice / Instructional Strategies	Tale of Two Species: Grizzly Bear graphic organizer and reading guide questions.
Post-Assessment	<p>Tale of Two Species: Grizzly Bear graphic organizer, summary and reading guide questions.</p> <p>Differentiated Learning Needs: Students will receive differentiated reading guide and be given extra time.</p>
Closure	<p>Last 3 minutes: Ask students the following questions:</p> <ol style="list-style-type: none"> 1) Who thinks we should we take the Grizzly Bear off of the endangered species list and why? 2) Who thinks we should we keep the Grizzly Bear on the endangered species list and why? <p>Dismiss students</p>

Independent Practice	Tale of Two Species: Grizzly Bear graphic organizer, summary and reading guide questions. Differentiated Learning Needs: Students will receive extra time if needed.
Summarize, Evaluate & Reflect	

Daily Lesson Plan 7: Tale of Two Species: Burrowing Owl

Element	Description
Duration	50 minutes
Learner Outcomes / Benchmarks	Students will understand what the following are: ecosystem, habitat, biodiversity, extinction, endangered species, threatened species, nonnative species and native species. Students will learn how we can protect habitats of the burrowing owl, and what the endangered species act is.
Transition	<p>First 5 minutes: Students will enter class and sit in their seats, take out a piece of notebook paper and begin answering the questions on the board. The questions on the board will be questions #51, #53 #54, #55, and #56 from the reading guide. When students are finished they will turn in their questions, Tale of Two Species: Grizzly bear graphic organizer and summary to the appropriate place in the classroom. Students need to take out <i>Hoot</i>, and reading guide.</p> <p>10 minutes: Instructor will go through all questions with students in chapters 14-16. The instructor will make sure to emphasize the questions on the board. Students need to make corrections with a pen in their reading guide. Following instruction, the instructor will pass out the A Tale of Two Species: Burrowing Owl graphic organizer.</p>
Standards	<p>Science Standards Addressed</p> <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <ul style="list-style-type: none"> - 3.1: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with the environment. - Describing the importance of plant and animal adaptations, including local examples. - Explaining the interaction and interdependence of nonliving components within ecosystems. <p>Reading and Writing Standards:</p> <p>Standard 1: Students read and understand a variety of materials Using a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels in addition to the types of reading material mentioned above. Students extend their thinking and understanding as they read stories about people from similar and different backgrounds.</p>
Daily Materials	Pencil, pen, <i>Hoot</i> , <i>Hoot</i> reading guide, overhead, LCD, Internet and computers, Tale of Two Species: Burrowing Owl graphic

Needed	organizer, notebook paper, poster board colored pencils or markers. Differentiated Learning Needs: Students will receive extra time if needed.
Anticipatory Set	5 minutes: Ask the students how they think the burrowing owl might be different from the other owls that they are familiar with?
Pre-Assessment	See anticipatory set
Teaching the Lesson	<p>25 minutes: Go through the introduction and directions on the first part of the graphic organizer. Then send students to a computer and have them go to the website that is listed in the directions. Then have students take out <i>Hoot</i> go to the pages listed on the graphic organizer and have them reread those pages and find the information on those pages. Go through page 123 with them as an example. On page 123, the author describes the burrowing owls as living in a “grassy hole in the ground.” Have the students look up the burrowing owl in Get the Facts section of the website and see if this is true. Do burrowing owls live in burrows in the ground? Yes should be the answer. Have the students write out the description the author uses and then the description the website uses. One page 123, the author also says that the owl would eat red meat. Ask the students if they think this is possible. Then have them look at the website to see if this might be true. Then have students work on the remaining pages. When students are done with this section they then will look up all the information on that is required on the graphic organizer for the burrowing owl on the website and then choose another animal on the endangered species list and get the same information for that animal. Students will then take this information and put it on a poster and present it to the class.</p> <p>2 minutes: Tell students they need to read chapters 17-19 and answer the questions in their reading guide. Then have them clean up their belongings.</p> <p>Differentiated Learning Needs: Students will receive extra time if needed.</p>
Guided Practice / Instructional Strategies	Tale of Two Species: Burrowing Owl graphic organizer and reading guide
Post-Assessment	<p>Tale of Two Species: Burrowing Owl graphic organizer, reading guide and two species poster.</p> <p>Differentiated Learning Needs: Students will receive extra time if needed.</p>
Closure	<p>Last 3 minutes: Ask students the following questions:</p> <p>1) Describe the habitat of the burrowing owl and the grizzly bear?</p>

	2) Describe the ecosystem of the burrowing owl and the grizzly bear? Dismiss students
Independent Practice	Tale of Two Species: Burrowing Owl graphic organizer and reading guide
Summarize, Evaluate & Reflect	

Daily Lesson Plan 8: Tale of Two Species: Burrowing Owl Poster

Element	Description
Duration	50 minutes
Learner Outcomes / Benchmarks	Students will understand what the following are: ecosystem, habitat, biodiversity, extinction, endangered species, threatened species, nonnative species and native species. Students will learn how we can protect habitats of the burrowing owl, and what the endangered species act is.
Transition	<p>First 5 minutes: Students will enter class and sit in their seats, take out a piece of notebook paper and begin answering the questions on the board. The questions on the board will be questions #58, #59, #60, #62, and #64 from reading guide. When students are finished they will turn in their questions and Tale of Two Species: Burrowing owls graphic organizer to the appropriate place in the classroom. Students need to take out <i>Hoot</i>, and reading guide.</p> <p>10 minutes: Instructor will go through all questions with students in chapters 17-19. The instructor will make sure to emphasize the questions on the board. Students need to make corrections with a pen in their reading guide. Following instruction, the instructor will ask students to take out their supplies for their posters and continue working on them.</p>
Standards	<p>Science Standards Addressed</p> <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <ul style="list-style-type: none"> - 3.1: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with the environment. - Describing the importance of plant and animal adaptations, including local examples. - Explaining the interaction and interdependence of nonliving components within ecosystems. <p>Reading and Writing Standards:</p> <p>Standard 1: Students read and understand a variety of materials Using a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels in addition to the types of reading material mentioned above. Students extend their thinking and understanding as they read stories about people from similar and different backgrounds.</p>
Daily Materials	Pencil, pen, <i>Hoot</i> , <i>Hoot</i> reading guide, overhead, LCD, Internet and computers, Tale of Two Species: Burrowing owl graphic

Needed	organizer, notebook paper, poster board colored pencils or markers. Differentiated Learning Needs: Students will receive extra time if needed.
Anticipatory Set	5 minutes: Ask students what was one interesting thing that they learned about the burrowing owl so far?
Pre-Assessment	See anticipatory set
Teaching the Lesson	25 minutes: Students are to finish their posters. 2 minutes: Tell students they need to read chapters 20-end of book and answer the questions in their reading guide. Then have them clean up their belongings.
Guided Practice / Instructional Strategies	Tale of Two Species: Burrowing Owl graphic organizer and reading guide
Post-Assessment	Tale of Two Species: Burrowing Owl graphic organizer, reading guide and two species poster.
Closure	Remind students that they need to have their posters ready for tomorrow because they will be presenting them.
Independent Practice	Tale of Two Species: Burrowing Owl graphic organizer, reading guide and two species poster.
Summarize, Evaluate & Reflect	

Daily Lesson Plan 9: Tale of Two Species Presentations

Element	Description
Duration	50 minutes
Learner Outcomes / Benchmarks	Students will understand what the following are: ecosystem, habitat, biodiversity, extinction, endangered species, threatened species, nonnative species and native species. Students will learn how we can protect habitats of the burrowing owl, and what the endangered species act is.
Transition	<p>First 5 minutes: Students will enter class and sit in their seats, take out a piece of notebook paper and begin answering the questions on the board. The questions on the board will be questions #66 and #67 from reading guide. When students are finished they will turn in their questions to the appropriate place in the classroom. Students need to take out <i>Hoot</i>, and reading guide.</p> <p>10 minutes: Instructor will go through all questions with students in chapters 20-end of book. The instructor will make sure to emphasize the questions on the board. Students need to make corrections with a pen in their reading guide. Following instruction, the instructor will ask students to take out their posters.</p>
Standards	<p>Science Standards Addressed</p> <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <ul style="list-style-type: none"> - 3.1: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with the environment. - Describing the importance of plant and animal adaptations, including local examples. - Explaining the interaction and interdependence of nonliving components within ecosystems. <p>Reading and Writing Standards:</p> <p>Standard 1: Students read and understand a variety of materials Using a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels in addition to the types of reading material mentioned above. Students extend their thinking and understanding as they read stories about people from similar and different backgrounds.</p>
Daily Materials Needed	<p>Pencil, pen, <i>Hoot</i>, <i>Hoot</i> reading guide, overhead, and Tale of Two Species: posters.</p> <p>Differentiated Learning Needs: Students will receive extra time</p>

	if needed.
Anticipatory Set	5 minutes: Ask students who wants to go first in presenting their poster.
Pre-Assessment	Pre-assessment
Teaching the Lesson	25 minutes: Students will have 2 minutes to present their poster. They need to state their name and the animal they choose. 2 minutes: Tell students they have no homework unless they need to make up work. Then have them clean up their belongings.
Guided Practice / Instructional Strategies	Reading guide Differentiated Learning Needs: Students will receive differentiated reading guide and be given extra time
Post-Assessment	Tale of Two Species: poster, and reading guide
Closure	Last 3 minutes: Ask students the following question: 1) Do you guys think that we will ever be able to save all of the animals you have presented today?
Independent Practice	Tale of Two Species: poster, and reading guide Differentiated Learning Needs: Students will receive differentiated reading guide and be given extra time
Summarize, Evaluate & Reflect	

Daily Lesson Plan 10: Final Assignment

Element	Description
Duration	100 minutes (2 classes)
Learner Outcomes / Benchmarks	Students will select a final project for <i>Hoot</i> . Students will review concepts that will be on the final.
Transition	First 5 minutes: Students will enter class pick up the final project graphic organizer and sit in their seats. Students need to take out <i>Hoot</i> and reading guide. The instructor will ask the students if there is anything in the book needs clarifying regarding the reading guide. The instructor will pass back all work to students. The instructor will tell students that their final will be over all the material they have gone over since they started <i>Hoot</i> . This includes all assignments. Students are to review all assignments to help them with the final test and final project.
Standards	<p>Science Standards Addressed</p> <p>Standard 1: Students understand the process of scientific investigation and design, conduct, communicate about, and evaluate such investigations.</p> <ul style="list-style-type: none"> - Identifying and evaluating alternative explanations and procedures. - Creating a written plan for investigation. - Giving examples of how collaboration can be useful in solving scientific problems and sharing findings. <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <ul style="list-style-type: none"> - 3.1: Students know and understand the characteristics of living things, the diversity of life, and how living things interact with each other and with the environment. - Describing the importance of plant and animal adaptations, including local examples. - Explaining the interaction and interdependence of nonliving components within ecosystems. <p>Standard 5: Students know and understand interrelationships among science, technology, and human activity how they can affect the world.</p> <ul style="list-style-type: none"> - Describing advantages and disadvantages that might accompany the introduction of a new technology. - Describing how the use of technology can help solve an individual or community problem. - Describing how people use science and technology in their professions.

	<p>Reading and Writing Standards:</p> <p>Standard 1: Students read and understand a variety of materials</p> <ul style="list-style-type: none"> - Using a full range of strategies to comprehend technical writing, newspapers, magazines, poetry, short stories, plays, and novels in addition to the types of reading material mentioned above. Students extend their thinking and understanding as they read stories about people from similar and different backgrounds. <p>Standard 2: Students write and speak for a variety of purposes and audiences.</p> <ul style="list-style-type: none"> - Writing stories, letters, and reports with greater detail and supporting material; - choosing vocabulary and figures of speech that communicate clearly; - drafting, revising, editing, and proofreading for a legible final copy; - applying skills in analysis, synthesis, evaluation, and explanation to their writing and speaking; - incorporating source materials into their speaking and writing <p>Standard 3: Students write and speak using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling.</p> <ul style="list-style-type: none"> - Using correct pronoun case, regular and irregular noun and verb forms, and subject-verb agreement involving comparisons in writing and speaking; - using simple, compound, complex, and compound/complex sentences in writing and speaking; - punctuating and capitalizing titles and direct quotations, using possessives, and correct paragraphing in writing; - expanding spelling skills to include more complex words; - using prefixes, root words, and suffixes correctly in writing and speaking; - demonstrating use of conventional spelling in their published works; and - using resources such as spell checkers, dictionaries, and charts to monitor their spelling accuracy. <p>Standard 4: Students apply thinking skills to their reading, writing, speaking, listening, and viewing.</p> <ul style="list-style-type: none"> - Using resources such as spell checkers, dictionaries, and charts to monitor their spelling accuracy. - making predictions, drawing conclusions, and analyzing what they read, hear, and view; - recognizing, expressing, and defending a point of view orally in an articulate manner and in writing; and
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	<p>Standard 6: Students read and recognize literature as a record of human experience.</p> <p>Reading, responding to, and discussing literature that represents points of view from places, people, and events that are familiar and unfamiliar.</p>
Daily Materials Needed	Pencil, pen, <i>Hoot</i> , <i>Hoot</i> reading guide, overhead, LCD, Internet and computers, notebook paper, poster board colored pencils or markers.
Anticipatory Set	See Transition
Pre-Assessment	Pre-assessment
Teaching the Lesson	<p>80 minutes: Instructor will go through all questions with students on the final project sheet and answer any questions they may have. Following instruction, the instructor will let students plan what they are going to do for their project and organize their materials. Students need to have selected their topic and begin working on it.</p> <p>2 minutes: Tell students when their final project is due. Students who are doing projects that are presentations and or community service projects will be allotted more time. Also the final test is tomorrow. Then have them clean up their belongings.</p>
Guided Practice / Instructional Strategies	<p><i>Hoot</i> final assignment sheet</p> <p>Differentiated Learning Needs: Students will receive extra time if needed.</p>
Post-Assessment	Final project and post assessment
Closure	Final 3 minutes: Ask the students what they need to bring tomorrow.
Independent Practice	Final project and post assessment
Summarize, Evaluate & Reflect	

Daily Lesson Plan 11: Final Day of Hoot

Element	Description
Duration	50 minutes
Learner Outcomes / Benchmarks	Students will take their post assessment and they will turn in their final projects and reading guides.
Transition	First 5 minutes: Students will enter class turn in their final projects, <i>Hoot</i> , and reading guides and sit in their seats. The instructor will pass out the post assessment. The instructor will go through the directions with the students. The instructor will tell students they have 20 minutes to take their post assessments.
Standards	<p>Science Standards Addressed</p> <p>Standard 1: Students understand the process of scientific investigation and design, conduct, communicate about, and evaluate such investigations.</p> <p>Standard 3: Life Science: Students know and understand the characteristics and structure of living things, the process of life, and how living things interact with each other and their environment.</p> <p>Standard 5: Students know and understand interrelationships among science, technology, and human activity how they can affect the world.</p> <p>Reading and Writing Standards:</p> <p>Standard 3: Students write and speak using conventional grammar, usage, sentence structure, punctuation, capitalization, and spelling.</p> <p>Standard 4: Students apply thinking skills to their reading, writing, speaking, listening, and viewing.</p>
Daily Materials Needed	Pencil, pen, <i>Hoot</i> , <i>Hoot</i> reading guide, overhead, LCD, Internet and computers, notebook paper, poster board colored pencils or markers.
Anticipatory Set	See transition
Pre-Assessment	Pre-assessment
Teaching the Lesson	<p>20 minutes: Students will have 20 minutes to take post assessment. If they need more time they will given more time.</p> <p>20 minutes: When students are done with the post assessment the teacher will have student's present final projects that require a presentation.</p> <p>3 minutes: The teacher will make sure all work is turned in and have students clean up their stuff. The instructor will inform the</p>

	<p>students that they will not have any homework.</p> <p>Differentiated Learning Needs: Students will receive extra time if needed.</p>
Guided Practice / Instructional Strategies	<p>Post assessment and final project</p> <p>Differentiated Learning Needs: Students will receive extra time if needed.</p>
Post-Assessment	Final project and post assessment
Closure	<p>Last 2 minutes: The instructor will ask the following questions to the students:</p> <p>1) How do we affect the environment and the species in it?</p> <p>2) What can we do to help the environment?</p>
Independent Practice	Final project and post assessment
Summarize, Evaluate & Reflect	

Chapter Summary

The purpose of this chapter was to present the novel *Hoot* using an interdisciplinary approach. The project combined skills used in both English and science. The goal of the project was to present material in an original way to help students better understand the environment using the novel *Hoot*. The following chapter 5 will provide a discussion about the limitations of the project, objectives achieved, evaluations of the project and recommendations for future curricular development after the project has been reviewed by experts in the field of education.

Chapter 5

DISCUSSION

Assessment and Strengths of the Research Project

The following chapter describes the opinions and suggestions of 3 experts who read through the interdisciplinary project. All teachers met with the author of this project and discussed strengths of the project, weaknesses of the project and improvements for the project.

All teachers who participated in this study agreed that the project and materials were thorough and showed an understanding of how middle school students learn. Teacher 1 stated that the project was very in depth and attempted to meet all of the intelligences of students. Furthermore, Teacher 1 stated that the project was an excellent use of reading across curriculum and integrating language arts and science. Teacher 2 stated that project did a great job of bringing two different subjects together to make the material meaningful. In addition, Teacher 1 stated the project is meaningful because the material presented was linked with where they lived. Also, Teacher 1 stated that the project does a good job of addressing differentiation with students and bringing technology into the classroom.

The three teachers stated that the project was very solid but could be improved. Teacher 1 stated that many of the questions could be refined while Teacher 3 added that many of the graphic organizers could be altered to make them flow better for students. Teacher 2 believed that the time frame could be extended.

All three teachers described strengths of the project. Teacher 1 stated that the project was a fresh way to present information and that the fresh approach might help to

motivate students who lack motivation in science. Teacher 2 stated that the variation in activities would only further help to keep students motivated and interested.

Limitations of the Research Project

One of the major limitations of this research project is the novel. Many students might not be able to read at the level that the book requires and hence might be better served with a novel that is closer to their reading level. Even though the researcher was careful to differentiate many of the activities it is impossible for the researcher to differentiate the novel. Thus, even with the differentiated guides and activities a student might fail to make the connections because they are unable to comprehend the material in the novel. Another limitation of the project is that students fail to see the connections that the researcher is trying to make using the novel. Finally, students need to have access to the Internet for many of the assignments.

Recommendations for Additional Research

Educators might benefit from research that focuses on how novels brought into a science classroom could raise student's scores in science and reading sections of the Colorado Student Assessment Program (CSAP) as well as to whether increases motivation. Also, one could research how the use novels in other subject areas such as Math might help motivate students and thus increase students' scores on standardized tests.

Research Project Summary

In many instances educators will come across students who do not find their subject interesting and thus struggle in their classrooms because of lack of motivation. Consequently, educators need to look to alternative ways to reach their students. By

taking an interdisciplinary approach a teacher will attempt to reach a broader spectrum of student's interests. Also, students will see the subjects they are learning are not independent of each other. This will aid students in coming to the realization that the skills developed in one class are transferable to other classes.

Using a novel in science is a fresh idea and could help to reach those students who might favor a more literary approach. A novel can be used as a focal point from which lessons and ideas can be extrapolated. However, an instructor needs to make sure the information that students are taught from the novel is meaningful and not trivial.

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APPENDIX A

Pre Assessment for Hoot

Date: _____

Directions: Answer all of the following questions to the best of your ability.

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APPENDIX B

Hoot Reading Guide, Differentiated Hoot Reading Guide and Hoot Reading Guide Key

Name: _____
Period: _____
Date: _____

Hoot Reading Guide

Directions: Answer the following questions as you read the book Hoot. Answers need to be in complete sentences making sure to restate the question.

Chapter 1 (pages 1-12)

1. What was odd about the boy running along the sidewalk?

2. Describe how Curly was prevented from “clearing or gradin.”

3. Would you charge the trespassers with vandalism or something else? Support your answer.

4. Using Officer Delinko’s question on page 8, what conclusions can you make about the owls when construction actually begins.

Chapter 2 (pages 13-24)

5. What does Roy do when he sees the boy from the bus?

6. Explain why Roy does not catch the Boy.

7. Defend whether you think Roy should get suspended for breaking Dana's nose, support your answer.

8. Why do you think the red headed girl told Roy to mind his own business?

Chapter 3 (pages 24-36)

9. Besides removing the stakes describe what else did the vandals did to the construction site.

10. Explain why you think someone is doing all these acts to Curly and do you consider it vandalism, explain your answer. (Hint look up the definition for vandalism)

11. What was put in the latrines at the construction site?

12. Give a reason how Roy's parents might have found about the problem between Roy and Dana?

13. Which of the reasons that Officer Delinko proposes about vandalism do you consider accurate, explain your answer?

14. List other reasons why the vandalism occurred.

Chapter 4 (pages 37-48)

15. Who is the girl with curly blond hair?

16. What did Officer Delinko see at the construction site early in the morning?

17. Explain why Officer Delinko didn't catch the vandals.

Chapter 5 (pages 49-57)

18. List three types of plants that the author describes on pages 50-52.

19. Propose a plan that will help Roy get out of the situation when he empties the contents of the third bag. Write your proposal in the space below.

20. On pages 50- 56, Roy is confronted with two deadly animals. Describe how you would handle these animals.

21. What is the name of the boy who saves Roy from the moccasins?

Chapter 6 (pages 58-70)

22. Defend in two sentences whether you think the punishment for Officer Delinko fits the crime.

23. Describe Mullet Fingers' campsite when Roy returns.

24. Who stole Roy's bike and why?

Chapter 7 (pages 71-84)

25. Where did Beatrice take Roy and why?

26. Who is the shoeless boy related to?

27. On page 78 the word "squall" is used. Define "squall" in your own words based on the sentence in the book. Then look the word up in the dictionary and write down the actual definition.

28. How did Mullet Fingers' get his name?

29. Explain why Mullet Fingers does not live at home.

Chapter 8 (pages 85-97)

30. On page 85 the word “tropical wave” is used. Define “tropical wave” in your own words based on the sentence in the book. Then look the word up in the dictionary and write down the actual definition.

31. Who is Chuck Muckle?

32. List the measures that Curly uses to make the construction site safer. Which do you consider the safest and most effective, explain why?

33. On pages 92-93 the author describes ospreys in Florida and Montana. Provide an explanation about how ospreys could be common in both Florida and Montana.

Chapter 9 (pages 98-110)

34. Roy appears to have a continued problem with Dana. Provide an explanation how you might deal with Dana?

35. Determine the best way to identify water moccasins.

36. Why did the handler take back the guard dogs?

Chapter 10 (pages 111-124)

37. Who really saved Roy from Dana?

38. Why did Beatrice need bandages?

39. Describe in two sentences what happened to Beatrice's brother.

40. How did Mullet Fingers make sure no one would get hurt by the snakes?

41. What is Mullet Fingers using the red meat for?

Chapter 11 (pages 125-138)

42. What is significant about the piece of green cloth Officer Delinko finds at the construction site, explain your answer? (There is no right or wrong answer)

43. Why does Mrs. Eberhardt run out of the house while Mr. Eberhardt is talking with Officer Delinko?

Chapter 12 (pages 139-152)

44. Who is actually hurt in the emergency room?
45. To their surprise what has happened when the Eberhardts visit the room of Mullet Fingers?

Chapter 13 (pages 153-162)

46. What do you believe is the motivation behind Mullet Fingers actions?
47. In your opinion what is the best way to clear the land? (With a bulldozer?) Explain your answers in two sentences.
48. In your own opinion evaluate whether Mr. Eberhardt is accurate when he argues that the pancake house owns the property and they can do whatever they want.

Chapter 14 (pages 163-179)

49. On page 172, Mother Paula's company wrote a response to Beatrice. Reread the letter. Suggest ways you think Mother Paula's company is helping the environment or how they might be hurting the environment.

50. On page 173, Roy states that Mullet Fingers will only slow down Mother Paula's company, but it won't stop them. Decide whether you think this answer is true or not. Make sure to support your answer in 2-3 sentences?

51. On page 176, the words "dilapidated," "barnacles" and "tarpon" are used. Define "dilapidated," "barnacles" and "tarpon" in your own words based on the descriptions in the book. Then look the words up and write out the actual definitions.

Chapter 15 (pages 180-196)

52. Who does Officer Delinko take to jail for the vandalism of the construction site?

Chapter 16 (pages 197-210)

53. What did Curly forget at the construction site the night before?

54. Describe how the vandals stopped construction this time?

55. On page 205 the word "saw-grass" is used. Define "saw-grass" in your own words based on the sentence in the book. Then look the word up in the dictionary and write down the actual definition.

56. Who should Roy call if he needs to check if a company has all the legal documents for construction?

Chapter 17 (pages 211-228)

57. List 3 possible reasons as to why Chuck Muckle is so insistent that the owl burrows are abandoned.

58. Give 2 conclusions that Officer Delinko could come up with after dropping the rubber alligator in Dana's lap while questioning him?

59. What is the Latin name for the burrowing owl?

60. Explain in 2 sentences why Roy goes to Coconut Cove City Hall and think of a way he may use this information.

Chapter 18 (pages 229-248)

61. What does officer Delinko see while guarding the construction site?

62. What 2 conclusions can you make about the statement that Burrowing Owls are protected?

63. Explain how burrowing owls make their homes.

Chapter 19 (pages 249-258)

64. Who got the pictures for Roy?

Chapter 20 (pages 259-274)

65. Choose 4 people who show up for the ground breaking and describe why they are there?

66. Evaluate in 3 sentences whether Roy's plan was successful or not.

Chapter 21 & Epilogue (pages 274-292)

67. What is Mullet Finger's real name?

Name: _____
Period: _____
Date: _____

Differentiated Hoot Reading Guide

Directions: Answer the following questions as you read the book Hoot. Answers need to be in complete sentences making sure to restate the question.

Chapter 1 (pages 1-12)

1. What was odd about the boy running along the sidewalk?

Pages 1-2

2. Describe how Curly was prevented from “clearing or gradin.”

Pages 4-5

3. Would you charge the trespassers with vandalism or something else? Support your answer.

Page 7

4. Using Officer Delinko’s question on page 8, what conclusions can you make about the owls when construction actually begins.

Page 8

Chapter 2 (pages 13-24)

5. What does Roy do when he sees the boy from the bus?

Pages 14-15

6. Explain why Roy does not catch the Boy.

Page 17

7. Defend whether you think Roy should get suspended for breaking Dana's nose, support your answer.

Page 20

8. Why do you think the red headed girl told Roy to mind his own business?

Page 27

Chapter 3 (pages 24-36)

9. Besides removing the stakes describe what else did the vandals did to the construction site.

Page 24

10. Explain why you think someone is doing all these acts to Curly and do you consider it vandalism, explain your answer. (Hint look up the definition for vandalism)

11. What was put in the latrines at the construction site?

Page 27

12. Give a reason how Roy's parents might have found about the problem between Roy and Dana?

13. Which of the reasons that Officer Delinko proposes about vandalism do you consider accurate, explain your answer?

Page 29

14. List other reasons why the vandalism occurred.

Chapter 4 (pages 37-48)

15. Who is the girl with curly blond hair?

Page 39

16. What did Officer Delinko see at the construction site early in the morning?

Pages 41-42

17. Explain why Officer Delinko didn't catch the vandals.

Page 43

Chapter 5 (pages 49-57)

18. List three types of plants that the author describes on pages 50-52.

Pages 50-52

19. Propose a plan that will help Roy get out of the situation when he empties the contents of the third bag. Write your proposal in the space below.

Page 51

20. On pages 50- 56, Roy is confronted with two deadly animals. Describe how you would handle these animals.

Pages 50-56

21. What is the name of the boy who saves Roy from the moccasins?
Page 56

Chapter 6 (pages 58-70)

22. Defend in two sentences whether you think the punishment for Officer Delinko fits the crime.
Page 63

23. Describe Mullet Fingers' campsite when Roy returns.
Page 68

24. Who stole Roy's bike and why?
Page 70

Chapter 7 (pages 71-84)

25. Where did Beatrice take Roy and why?
Page 72

26. Who is the shoeless boy related to?
Page 76

27. On page 78 the word "squall" is used. Define "squall" in your own words based on the sentence in the book. Then look the word up in the dictionary and write down the actual definition.
Page 78

28. How did Mullet Fingers' get his name?
Page 80

29. Explain why Mullet Fingers does not live at home.

Chapter 8 (pages 85-97)

30. On page 85 the word “tropical wave” is used. Define “tropical wave” in your own words based on the sentence in the book. Then look the word up in the dictionary and write down the actual definition.

Page 85

31. Who is Chuck Muckle?

Pages 87-88

32. List the measures that Curly uses to make the construction site safer. Which do you consider the safest and most effective, explain why?

Pages 90-91

33. On pages 92-93 the author describes ospreys in Florida and Montana. Provide an explanation about how ospreys could be common in both Florida and Montana.

Pages 92-93

Chapter 9 (pages 98-110)

34. Roy appears to have a continued problem with Dana. Provide an explanation how you might deal with Dana?

Pages 99-100

35. Determine the best way to identify water moccasins.

Page 105

36. Why did the handler take back the guard dogs?

Page 107

Chapter 10 (pages 111-124)

37. Who really saved Roy from Dana?

Page 111

38. Why did Beatrice need bandages?

Page 117

39. Describe in two sentences what happened to Beatrice's brother.

Page 118

40. How did Mullet Fingers make sure no one would get hurt by the snakes?

Page 122

41. What is Mullet Fingers using the red meat for?

Page 123

Chapter 11 (pages 125-138)

42. What is significant about the piece of green cloth Officer Delinko finds at the construction site, explain your answer? (There is no right or wrong answer)

Page 127

43. Why does Mrs. Eberhardt run out of the house while Mr. Eberhardt is talking with Officer Delinko?

Pages 137-138

Chapter 12 (pages 139-152)

44. Who is actually hurt in the emergency room?

Pages 139-140

45. To their surprise what has happened when the Eberhardts visit the room of Mullet Fingers?

Page 149

Chapter 13 (pages 153-162)

46. What do you believe is the motivation behind Mullet Fingers actions?

Page 154

47. In your opinion what is the best way to clear the land? (With a bulldozer?) Explain your answers in two sentences.

Page 156

48. In your own opinion evaluate whether Mr. Eberhardt is accurate when he argues that the pancake house owns the property and they can do whatever they want.

Page 156

Chapter 14 (pages 163-179)

49. On page 172, Mother Paula's company wrote a response to Beatrice. Reread the letter. Suggest ways you think Mother Paula's company is helping the environment or how they might be hurting the environment.

Page 172

50. On page 173, Roy states that Mullet Fingers will only slow down Mother Paula's company, but it won't stop them. Decide whether you think this answer is true or not. Make sure to support your answer in 2-3 sentences?

Page 173

51. On page 176, the words "dilapidated," "barnacles" and "tarpon" are used. Define "dilapidated," "barnacles" and "tarpon" in your own words based on the descriptions in the book. Then look the words up and write out the actual definitions.

Page 176

Chapter 15 (pages 180-196)

52. Who does Officer Delinko take to jail for the vandalism of the construction site?

Chapter 16 (pages 197-210)

53. What did Curly forget at the construction site the night before?

Page 201

54. Describe how the vandals stopped construction this time?

55. On page 205 the word "saw-grass" is used. Define "saw-grass" in your own words based on the sentence in the book. Then look the word up in the dictionary and write down the actual definition.

Page 205

56. Who should Roy call if he needs to check if a company has all the legal documents for construction?

Chapter 17 (pages 211-228)

57. List 3 possible reasons as to why Chuck Muckle is so insistent that the owl burrows are abandoned.

Pages 213-214

58. Give 2 conclusions that Officer Delinko could come up with after dropping the rubber alligator in Dana's lap while questioning him?

59. What is the Latin name for the burrowing owl?

Page 223

60. Explain in 2 sentences why Roy goes to Coconut Cove City Hall and think of a way he may use this information.

Chapter 18 (pages 229-248)

61. What does officer Delinko see while guarding the construction site?

Page 232

62. What 2 conclusions can you make about the statement that Burrowing Owls are protected? List below.

Page 243

63. Explain how burrowing owls make their homes.

Page 245

Chapter 19 (pages 249-258)

64. Who got the pictures for Roy?

Page 252

Chapter 20 (pages 259-274)

65. Choose 4 people who show up for the ground breaking and describe why they are there?

Page 259

66. Evaluate in 3 sentences whether Roy's plan was successful or not.

Chapter 21 & Epilogue (pages 274-292)

67. What is Mullet Finger's real name?

Name: _____
Period: _____
Date: _____

Key for Hoot Reading Guide

Directions: Answer the following questions as you read the book Hoot. Answers need to be in complete sentences making sure to restate the question.

Chapter 1 (pages 1-12)

1. What was odd about the boy running along the sidewalk?
- No shoes, backpack or books p.1-2
2. Describe how Curly was prevented from “clearing or gradin.”
- The stakes used for markers were pulled out p.4-5
3. Would you charge the trespassers with vandalism or something else? Support your answer.
- Trespassing and malicious mischief. p.7
4. Using Officer Delinko’s question on page 8, what conclusions can you make about the owls when construction actually begins.

Chapter 2 (pages 13-24)

5. What does Roy do when he sees the boy from the bus?
- He gets off the bus and chases him. p. 14-15
6. Explain why Roy does not catch the Boy.
- He is hit by a golf ball in the forest where he chases the boy. p. 17
7. Defend whether you think Roy should get suspended for breaking Dana’s nose, support your answer.
-No p. 20
8. Why do you think the red headed girl told Roy to mind his own business?
- p. 27

Chapter 3 (pages 24-36)

9. Besides removing the stakes describe what else did the vandals do to the construction site.

- They let air out of the tires of the equipment. p. 24

10. Explain why you think someone is doing all these acts to Curly and do you consider it vandalism, explain your answer. (Hint look up the definition for vandalism)

11. What was put in the latrines at the construction site?

- Alligators p. 27

12. Give a reason how Roy's parents might have found about the problem between Roy and Dana?

- Blue marks on his neck p. 29

13. Which of the reasons that Officer Delinko proposes about vandalism do you consider accurate, explain your answer?

- Boredom and convenience

14. List other reasons why the vandalism occurred.

- p.34

Chapter 4 (pages 37-48)

15. Who is the girl with curly blond hair?

- Beatrice Leep p. 39

16. What did Officer Delinko see at the construction site early in the morning?

- Owls p. 41-42

17. Explain why Officer Delinko didn't catch the vandals.

- He fell asleep and the vandals spray painted his windows so he couldn't see what was going on p. 43

Chapter 5 (pages 49-57)

18. List three types of plants that the author describes on pages 50-52.

19. Propose a plan that will help Roy get out of the situation when he empties the contents of the third bag. Write your proposal in the space below.

p. 51

20. On pages 50- 56, Roy is confronted with two deadly animals. Describe how you would handle these animals.

21. What is the name of the boy who saves Roy from the moccasins?

- Mullet Fingers p. 56

Chapter 6 (pages 58-70)

22. Defend in two sentences whether you think the punishment for Officer Delinko fits the crime.

- Desk duty p. 63

23. Describe Mullet Fingers' campsite when Roy returns.

- It is gone p. 68

24. Who stole Roy's bike and why?

- Beatrice p. 70

Chapter 7 (pages 71-84)

25. Where did Beatrice take Roy and why?

- Junk Yard p. 72

26. Who is the shoeless boy related to?

-Beatrice p. 76

27. On page 78 the word "squall" is used. Define "squall" in your own words based on the sentence in the book. Then look the word up in the dictionary and write down the actual definition.

28. How did Mullet Fingers' get his name?

- He can catch a mullet fish p. 80

29. Explain why Mullet Fingers does not live at home.

Chapter 8 (pages 85-97)

30. On page 85 the word “tropical wave” is used. Define “tropical wave” in your own words based on the sentence in the book. Then look the word up in the dictionary and write down the actual definition.

31. Who is Chuck Muckle?

- The Vice President who yells at Curly p. 87-88

32. List the measures that Curly uses to make the construction site safer. Which do you consider the safest and most effective, explain why?

-Dogs and fence p. 90-91

33. On pages 92-93 the author describes ospreys in Florida and Montana. Provide an explanation about how ospreys could be common in both Florida and Montana.

Chapter 9 (pages 98-110)

34. Roy appears to have a continued problem with Dana. Provide an explanation how you might deal with Dana?

-p. 99-100

35. Determine the best way to identify water moccasins.

- shinny tails p. 105

36. Why did the handler take back the guard dogs?

- All of the snakes p. 107

Chapter 10 (pages 111-124)

37. Who really saved Roy from Dana?

- Beatrice p. 111

38. Why did Beatrice need bandages?

- For her stepbrother p. 117

39. Describe in two sentences what happened to Beatrice’s brother.

- He was bitten by a dog and he needs a Tetanus shot p. 118

40. How did Mullet Fingers make sure no one would get hurt by the snakes?

- tape their mouth shut p. 122

41. What is Mullet Fingers using the red meat for?

- feed the owls p. 123

Chapter 11 (pages 125-138)

42. What is significant about the piece of green cloth Officer Delinko finds at the construction site, explain your answer? (There is no right or wrong answer)
- p. 127
43. Why does Mrs. Eberhardt run out of the house while Mr. Eberhardt is talking with Officer Delinko?
- Roy is in the emergency room p. 137-138

Chapter 12 (pages 139-152)

44. Who is actually hurt in the emergency room?
Mullet Fingers p. 139-140
45. To their surprise what has happened when the Eberhardts visit the room of Mullet Fingers?
-He is gone p. 149

Chapter 13 (pages 153-162)

46. What do you believe is the motivation behind Mullet Fingers actions?
- Save the owls p. 154
47. In your opinion what is the best way to clear the land? (With a bulldozer?) Explain your answers in two sentences.
- p. 156
48. In your own opinion evaluate whether Mr. Eberhardt is accurate when he argues that the pancake house owns the property and they can do whatever they want.
-p. 156

Chapter 14 (pages 163-179)

49. On page 172, Mother Paula's company wrote a response to Beatrice. Reread the letter. Suggest ways you think Mother Paula's company is helping the environment or how they might be hurting the environment.
-p.172
50. On page 173, Roy states that Mullet Fingers will only slow down Mother Paula's company, but it won't stop them. Decide whether you think this answer is true or not. Make sure to support your answer in 2-3 sentences?
- p. 173
51. On page 176, the words "dilapidated," "barnacles" and "tarpon" are used. Define "dilapidated," "barnacles" and "tarpon" in your own words based on the descriptions in the book. Then look the words up and write out the actual definitions.

Chapter 15 (pages 180-196)

52. Who does Officer Delinko take to jail for the vandalism of the construction site?
- Dana p. 195-196

Chapter 16 (pages 197-210)

53. What did Curly forget at the construction site the night before?
- .38 gun p. 201
54. Describe how the vandals stopped construction this time?
- No seats- hard to drive equipment
55. On page 205 the word "saw-grass" is used. Define "saw-grass" in your own words based on the sentence in the book. Then look the word up in the dictionary and write down the actual definition.
56. Who should Roy call if he needs to check if a company has all the legal documents for construction?
- Building Department City Hall p. 207

Chapter 17 (pages 211-228)

57. List 3 possible reasons as to why Chuck Muckle is so insistent that the owl burrows are abandoned.
- p. 213-214
58. Give 2 conclusions that Officer Delinko could come up with after dropping the rubber alligator in Dana's lap while questioning him?
- Rubber alligator- if he was afraid of alligators he would never have been able to put them in the latrines.
59. What is the Latin name for the burrowing owl?
- Cuniculara floridana p. 223
60. Explain in 2 sentences why Roy goes to Coconut Cove City Hall and think of a way he may use this information.

Chapter 18 (pages 229-248)

61. What does officer Delinko see while guarding the construction site?
- No, permits and inspection notices- try to stop the construction legally

62. What 2 conclusions can you make about the statement that Burrowing Owls are protected? List below.

- p. 243

63. Explain how burrowing owls make their homes.

- Armadillos and tortoises p. 245

Chapter 19 (pages 249-258)

64. Who got the pictures for Roy?

- Roy's Dad p. 252

Chapter 20 (pages 259-274)

65. Choose 4 people who show up for the ground breaking and describe why they are there?

- p. 259

66. Evaluate in 3 sentences whether Roy's plan was successful or not.

p. 265

Chapter 21 & Epilogue (pages 274-292)

67. What is Mullet Finger's real name?

- Napoleon Bridger p. 291

APPENDIX C

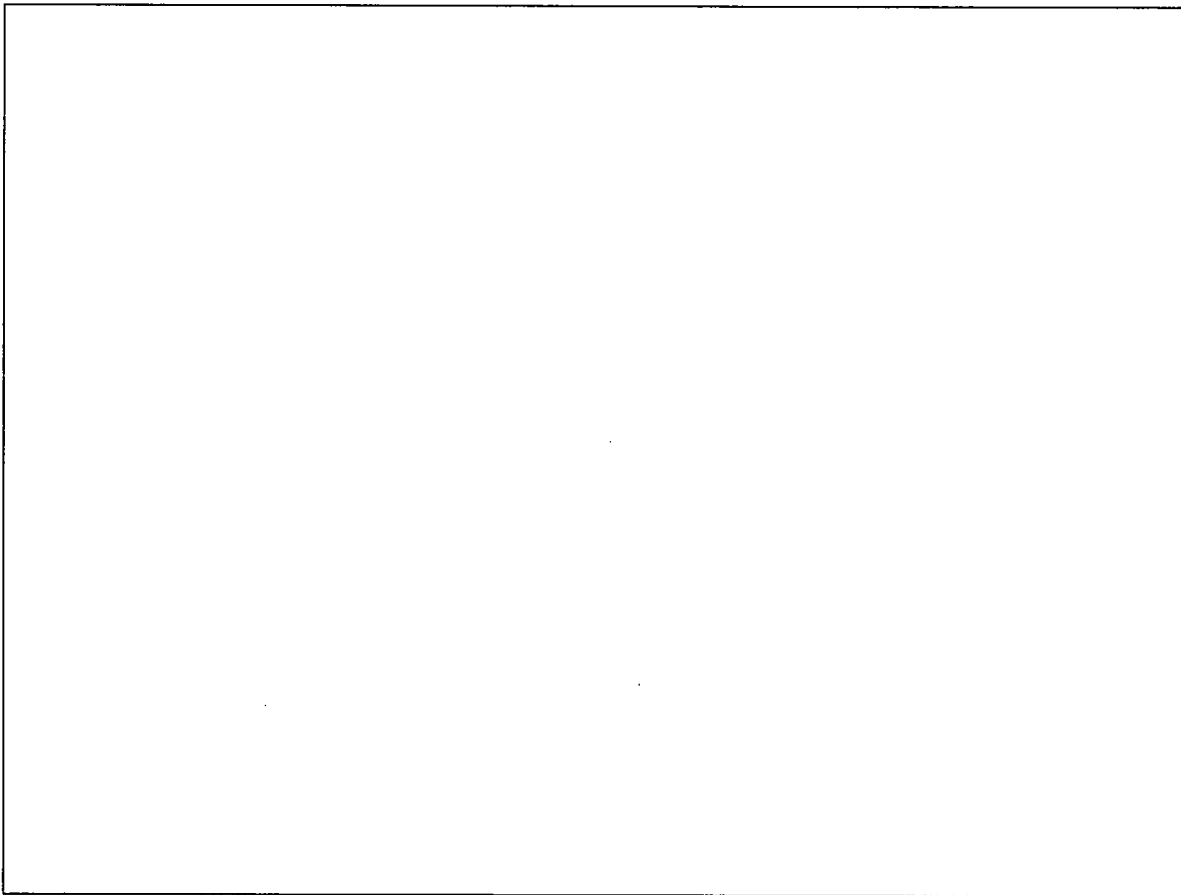
Brazilian Pepper Graphic Organizer

Name: _____
Date: _____

Brazilian-Pepper Chapter 5

Introduction: As Roy goes further and further into his journey we begin to learn about the type of environment in Florida which he is living. On page 50 in *Hoot* we begin to get a visual image of the vegetation surrounding him. However, the vegetation around him is not from Florida.

Directions: Reread page 50. Draw a picture of what you think the place that Roy is walking around in looks like. In your drawing label the following: Brazilian-pepper, Australian pine and ground scrub. Under your drawing write down 3 words used on page 50 that helped you with the image you drew.



Three words that helped you with the drawing

1. _____
2. _____
3. _____

Brazilian-pepper

Directions: Go to google.com and search for Brazilian Pepper. Then look for the website and double click on it www.floridagardener.com/pom/Schinusterebinthifolius.htm. The instructor will assign groups questions to answer. After, groups will be called on to give their answers. Answers do not need to be in complete sentences.

1. What are the family, genus and species of this plant?
2. What can you derive from the fact that the Brazilian Pepper produces a dense forest canopy in regards to other natural life?
3. There is a famous saying about poison ivy that if it grows in three let it be, describe how one would know if they came upon the Brazilian-pepper?
4. If one looks down and sees that they have severe dermatitis (skin rash) while walking in Florida what conclusions could they make?
5. What is the common name of the Brazilian-pepper?
6. List 2 ways the Brazilian-pepper may have come to Florida.
7. Explain how the Brazilian-pepper may have spread across Florida.
8. Explain how the Brazilian-pepper prevents other plants from growing.
9. Develop a plan that will help the state of Florida control the spread of the Brazilian-pepper any further.

Independent Practice

Directions: Choose one of the nonnative species from Colorado's Most Wanted. Answer the following questions. Use the space below the square to answer the questions.

Some of Colorado's Most Wanted:

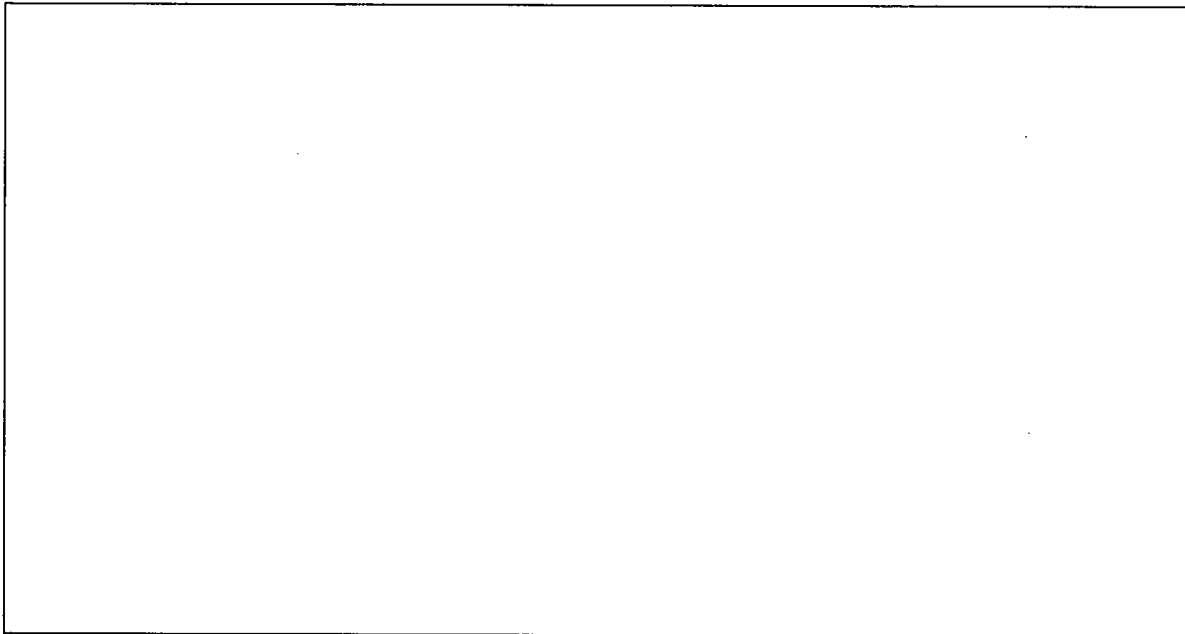
- ✓ **Canada thistle**
- ✓ **Diffuse knapweed**
- ✓ **Field bindweed**
- ✓ **Hoary cress**
- ✓ **Jointed goatgrass**
- ✓ **Leafy spurge**

A) What is the genus and species?

B) Where did the species originate and where does it reside in Colorado? (i.e. the mountains, in a pasture etc...)

C)

- Draw and write a description of what species looks like.
- Then describe how the species may have spread.
- List possible ways it may have come to Colorado.
- Develop a plan that might help to prevent the spread of the species.



Description: _____

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

APPENDIX D

Invasive Species Game

Name : _____
Date: _____
Period: _____

Invasive Species Game

Introduction: Recently, you learned that an invasive species can have a detrimental effect on a native species. You are going to play the following game to further your understanding of invasive species.

You are a small farmer on the plains. You just had a bumper crop of 100 bushels for wheat for 1 acre of land, but you think that you can do better next year. However, the farmer next to you has been having a problem with a rare invasive plant that has been hurting his crop. One day you are walking around your land and you see that one of these invasive plants has grown onto your land. You think it is pretty so you leave it alone. Play the following game to see how long it will take for the invasive species to take over your farm.

Materials:

- ✓ 2 dice
- ✓ graph paper
- ✓ your brains

Directions:

- ✓ The native species will have one die while the invasive species will have 2 die.
- ✓ Each turn will represent a year of growth which is on the table below.
- ✓ Both species will role their dice at the same time.
- ✓ Whatever number is rolled that number will be added to the totals on the table below. For example, if the native species roles a 3 on the first role then 3 will be added to 100 which is 103. So the native species will write 103 in the table for year 1. If on the second role the native species roles a 4, then they will add 4 to the 103 which is 107.
- ✓ When the invasive species reaches a certain number then the math will change. For example, when the invasive species reaches a total of 10, for every role after that the native species needs to subtract 10 from their role for the rest of the game.
- ✓ See the rules below for the changes in math when the invasive species reaches numbers of 10, 20, 50 and 80.
- ✓ The game is over when either the native species goes below 10 or the invasive species goes over 200. If the native species can last for 20 years then they are the

winner, otherwise if the game ends before 20 roles the invasive species is the winner.

Role rules: Refer to the following rules when the invasive species get to the following numbers.

	<u># of species</u>	<u>Rule</u>
Invasive species:	10 or over	The invasive species are beginning to compete for resources with the native species (wheat) which is leading to many of the native species slowly dieing. From now on subtract 10 from every role of the native species.
	20 or over	The invasive species are starting to grow higher and cover the native species (wheat). This prevents the wheat from getting enough sun. Multiply every role from this point forward for the invasive species by 2 and then add it to the total of the invasive species from now on.
	50 or over	The native species (wheat) can no longer get enough water or sun. Subtract 20 from the native species on every role from this point forward
	80 or over	The invasive species are getting most of the water and sun. Multiply every role by 3 and add it to the total of the invasive species.

Invasive Species Game Table

Year	Native Species (wheat) Total	Invasive Species Total
0	100	1
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
12		
13		
13		
14		
15		
16		
17		
18		
19		
20		

Observations and Inferences

Directions: Using a separate piece of graph paper graph the points from the table above. You need determine which axis the year will be on and which axis the totals for the native and invasive species will be on. Make sure to have a title on the graph and label your axis. When you have graphed your table answer the following questions below with your partner?

Conclusions

1. Based on your data and graph, how long did it take for the invasive species to takeover the acre of land? (i.e. What year did the invasive species win?)
2. Using your graph to answer the following question. In what year did the native and invasive species have about the same number of species?

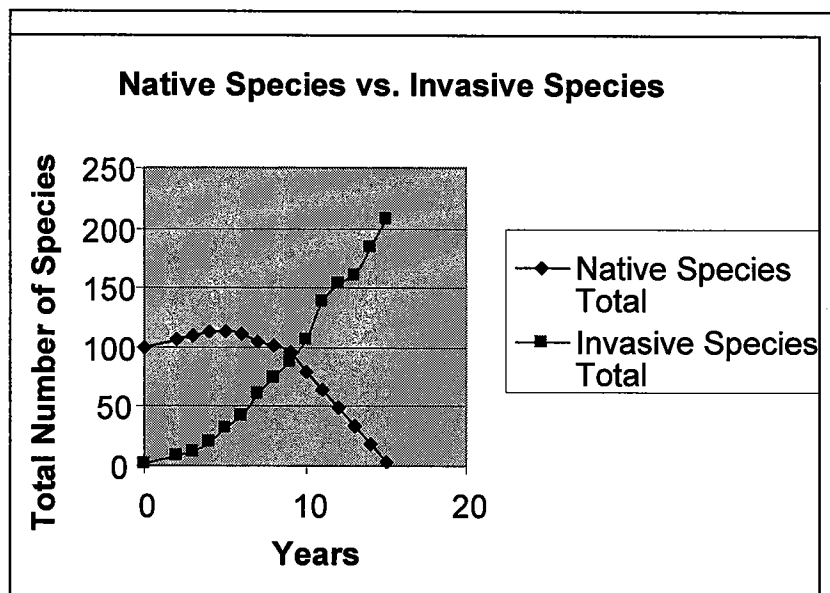
3. Give 2 reasons why the invasive species might have been able to take over the land.

4. Use your graph to write a conclusion that either defends or criticizes the farmer for leaving the invasive species alone.

5. List 2 ways to help the farmer in years 1, 10 and 15 with how he might control the invasive species.

Example of Results of Game:

Year	Native Species Total	Exotic Species Total
0	100	1
1	107	8
2	110	11
3	113	21
4	113	32
5	112	42
6	105	60
7	101	74
8	96	88
9	80	106
10	65	139
11	49	154
12	34	160
13	18	184
14	4	208
15		
16		
17		
18		
19		
20		



APPENDIX E

Endangered Species Graphic Organizer, Endangered Species Differentiated Graphic Organizer
and Endangered Species Graphic Organizer Key

Name : _____
Date: _____
Period: _____

Endangered Species

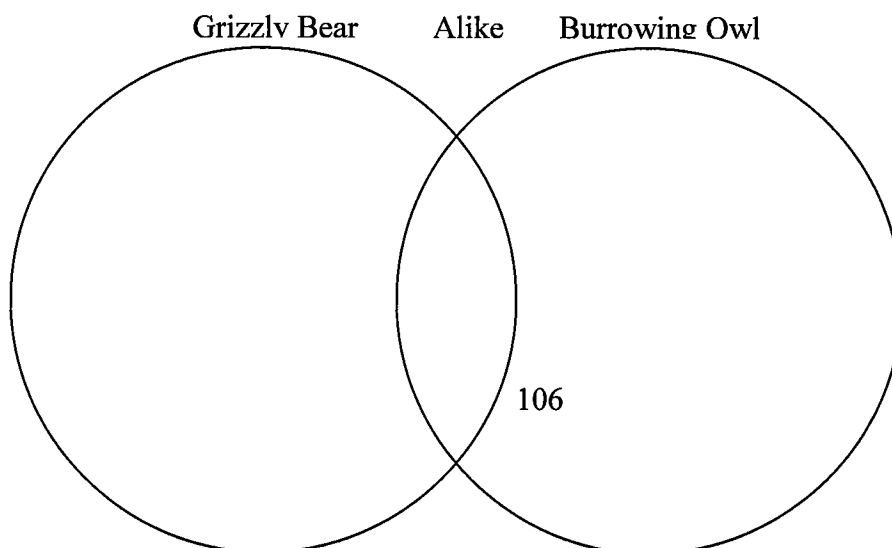
Directions: Go the following website: <http://www.fws.gov/endangered/whatwedo.html> and then click on the Kids Corner section on the left side of the screen. Scroll down to the **Endangered Means There Is Still Time Slide Show**. Go through the slide show and answer the following questions. Answers do not have to be in complete sentences.

1. What is the purpose of the Endangered Species Act?
2. What is the definition of an ecosystem?
3. Which ecosystems do you consider the most important in the United States, explain your answer?
4. How might one distinguish an ecosystem from a habitat?
5. What is biodiversity?
6. Create a list of ways that humans protect biodiversity and how they hinder it.
7. Evaluate whether you believe the United States will retain their ranking in biodiversity, support your answer.
8. What is the best estimate for the total number of species in the world?
9. How many species have gone extinct in North America since 1620?
10. Describe a world without biodiversity.
11. Think of a ways that animals are connected and write how our actions may affect that connection.

12. Why are more species going extinct today?
13. What are the definitions of threatened, endangered, and extinct?
14. Explain how species become threatened or endangered.
15. Give 3 reasons for how species in the Book *Hoot* may become threatened or endangered.
16. Think of 2 ways that non-native species crowd out native species.
17. When was the Endangered Species Act passed by Congress? Did the law go too far or not far enough defend your answer in 4 sentences.
18. What is Illegal under this act?
19. Propose a plan to restore and protect habitats.

Independent Practice Questions

20. Compare and contrast using the Venn Diagram the ecosystems and habitats of the grizzly bear and burrowing owls using the book *Hoot* ?



21. Explain in 2 sentences how if we lose one plant species it will result in the loss of 30 other plant species.

Information from: US Fish and Wild Life Service at: <http://www.fws.gov/endangered/kids/pdf/presentation.pdf>

Name : _____
Date: _____
Period: _____

Endangered Species Differentiated

Directions: Go the following website: <http://www.fws.gov/endangered/whatwedo.html> and then click on the Kids Corner section on the left side of the screen. Scroll down to the **Endangered Means There Is Still Time Slide Show**. Go through the slide show and answer the following questions. Answers do not have to be in complete sentences.

1. What is the purpose of the Endangered Species Act?
Slide 3

2. What is the definition of an ecosystem?
Slide 4

3. Which ecosystems do you consider the most important in the United States, explain your answer?
Slide 4

4. How might one distinguish an ecosystem from a habitat?
Slide 7 & 8

5. What is biodiversity?
Slide 12

6. Create a list of ways that humans protect biodiversity and how they hinder it.

7. Evaluate whether you believe the United States will retain their ranking in biodiversity, support your answer.
Slide 15 & 16

8. What is the best estimate for the total number of species in the world?
Slide 16

9. How many species have gone extinct in North America since 1620?
Slide 18

10. Describe a world without biodiversity.
Slides 18-20

11. Think of a ways that animals are connected and write how our actions may affect that connection.

12. Why are more species going extinct today?

Slide 19

13. What are the definitions of threatened, endangered, and extinct?

Slide 21

14. Explain how species become threatened or endangered.

Slides 24-25

15. Give 3 reasons for how species in the Book *Hoot* may become threatened or endangered.

16. Think of 2 ways that non-native species crowd out native species.

Slide 27

17. When was the Endangered Species Act passed by Congress? Did the law go too far or not far enough defend your answer in 4 sentences.

Slide 28

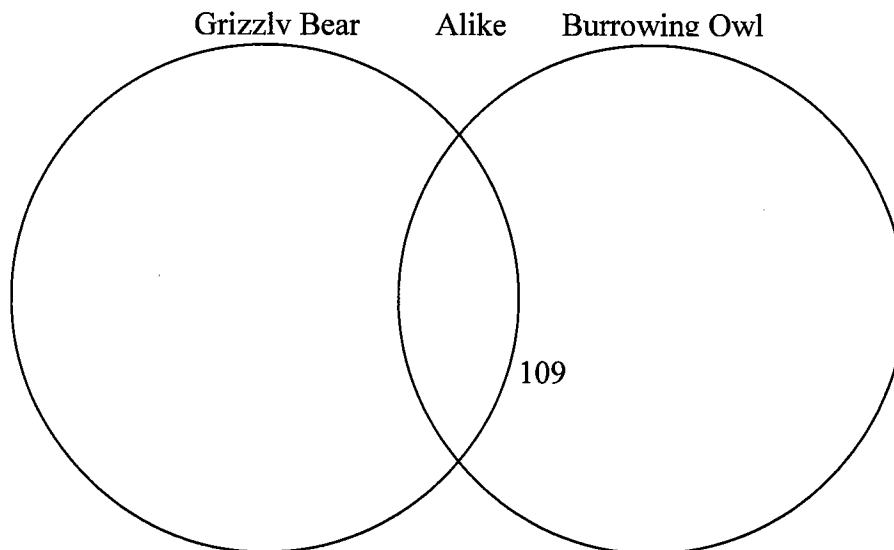
18. What is Illegal under this act?

Slide 30

19. Propose a plan to restore and protect habitats.

Independent Practice Questions

20. Compare and contrast using the Venn Diagram the ecosystems and habitats of the grizzly bear and burrowing owls using the book of *Hoot* ?



21. Explain in 2 sentences how if we lose one plant species it will result in the loss of 30 other plant species.

Information from: US Fish and Wild Life Service at: <http://www.fws.gov/endangered/kids/pdf/presentation.pdf>

Name : _____
Date: _____
Period: _____

Endangered Species Key

Directions: Go the following website: <http://www.fws.gov/endangered/whatwedo.html> and then click on the Kids Corner section on the left side of the screen. Scroll down to the **Endangered Means There Is Still Time Slide Show**. Go through the slide show and answer the following questions. Answers do not have to be in complete sentences.

1. What is the purpose of the Endangered Species Act?

Slide 3

- To conserve and protect threatened and endangered species and the ecosystems they depend on to survive.

2. What is the definition of an ecosystem?

Slide 4

- An ecosystem is a web of living and nonliving parts that is connected and maintained by energy from the sun and nutrient flow.

3. Which ecosystems do you consider the most important in the United States, explain your answer?

Slide 4

4. How might one distinguish an ecosystem from a habitat?

Slide 7 & 8

- An ecosystem is a web of living and nonliving parts that is connected and maintained by energy from the sun and nutrient flow.

- The places where animals or plants live that include the essential elements needed to survive.

5. What is biodiversity?

Slide 12

- The term for the variety of life and the natural processes of living things are a part.

6. Create a list of ways that humans protect biodiversity and how they hinder it.

7. Evaluate whether you believe the United States will retain their ranking in biodiversity, support your answer.

Slide 15 & 16

8. What is the best estimate for the total number of species in the world?

Slide 16

- 14 million

9. How many species have gone extinct in North America since 1620?

Slide 18

- More than 500 species

10. Describe a world without biodiversity.

Slides 18-20

11. Think of a ways that animals are connected and write how our actions may affect that connection.

12. Why are more species going extinct today?

Slide 19

- Because we are altering the air, water and land faster than species can adapt.

13. What are the definitions of threatened, endangered, and extinct?

Slide 21

- A plant or animal species that is likely to become endangered if it is not protected.

- A plant or animal species that is in immediate danger of becoming extinct and needs protection to survive.

- A plant or animal species that is no longer living on earth

14. Explain how species become threatened or endangered.

Slides 24-25

- Habitat loss

15. Give 3 reasons for how species in the Book *Hoot* may become threatened or endangered.

16. Think of 2 ways that non-native species crowd out native species.

Slide 27

- They do not have to deal with predators and diseases to keep them in check.

17. When was the Endangered Species Act passed by Congress? Did the law go too far or not far enough defend your answer in 4 sentences.

Slide 28

- 1973

18. What is Illegal under this act?

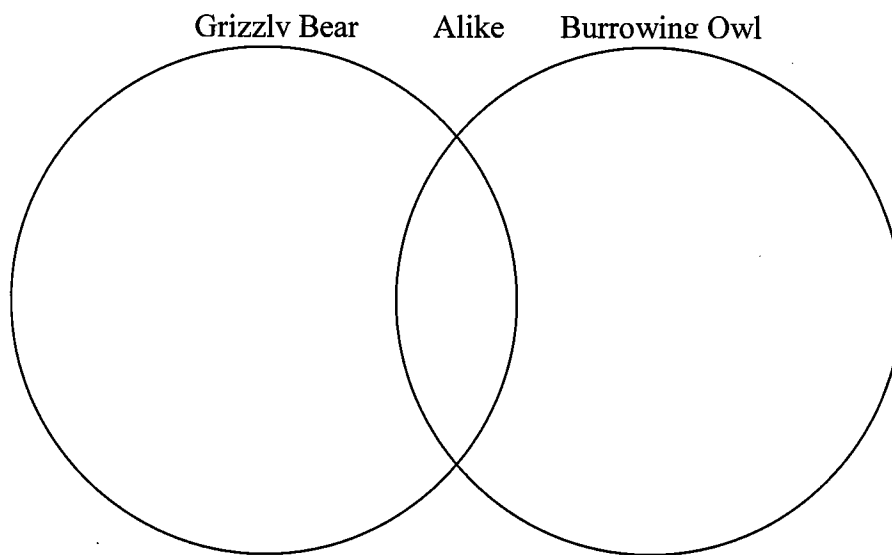
Slide 30

- Import, export, or sell listed animals and plants across State lines.
- Kill, harm, harass, possess, or take protected animals from the wild without a species permit.

19. Propose a plan to restore and protect habitats.

Independent Practice Questions

20. Compare and contrast using the Venn Diagram the ecosystems and habitats of the grizzly bear and burrowing owls using the book of *Hoot* ?



21. Explain in 2 sentences how if we lose one plant species it will result in the loss of 30 other plant species.

Information from: US Fish and Wild Life Service at: <http://www.fws.gov/endangered/kids/pdf/presentation.pdf>

APPENDIX F

A Tale of Two Species: Grizzly Bear

Name : _____
Date: _____
Period: _____

A Tale of Two Species: Grizzly Bear

Introduction: In the book *Hoot* we have learned about many animals, but there are two animals in the book that can provide a great insight into how the Endangered Species Act works. On page 52, Roy describes a story of how he went off the path in the mountains of Montana only to run into a Grizzly Bear. Thirty years ago Roy most likely would not have run into Grizzly because of habitat destruction and hunting of the bear. Read the news article below about the dilemma facing the Grizzly Bear from CNBC and answer the questions for a class discussion.

U.S. to lift safety net for Yellowstone grizzlies Activists split on whether it's time to see if the population can survive



This grizzly bear was spotted inside Yellowstone National Park last June, one of an estimated 600 inside or just outside the park.

MSNBC staff and news service reports
Updated: 2:07 p.m. MT Nov 16, 2005

WASHINGTON - Noting that the grizzly bear population in the Yellowstone area has thrived in recent years, the Bush administration on Tuesday announced that it plans to remove federal protections for the animals in the areas around the national park.

“A population that was once plummeting towards extinction is now recovered,” Interior Secretary Gale Norton said in making the announcement. “These bears are now no longer endangered” and should be removed from the Endangered Species Act listing.

The Interior Department, through the Fish and Wildlife Service, implements the Endangered Species Act. “We are sure that these bears will have the habitat that they need,” Norton added.

Significant recovery

Federal wildlife officials estimate that more than 600 grizzly bears live in the region surrounding Yellowstone in Idaho, Montana and Wyoming. They also describe as healthy an annual growth rate over the past decade of 4 to 7 percent.

Those numbers represent a significant recovery. Only 200 or 250 grizzlies were in that region in 1975, when grizzly bears in the lower 48 states were listed as threatened under the Endangered Species Act.

Once in the hundreds of thousands, the bear population dwindled in the West early in the last century in large part because of hunting and destruction of the animals’ habitat.

If the grizzlies are removed from the list, the three states would assume management responsibilities from federal wildlife officials and have greater flexibility in dealing with bears. Stripping the bears of protection could eventually clear the way for hunting grizzlies in that region.

While grizzlies inside and outside Yellowstone and Grand Teton national parks would be delisted, bears within the parks would remain federally protected and could not be hunted.

Four other grizzly populations in other parts of the lower 48 states will continue to be protected as threatened species under the Endangered Species Act. Alaskan grizzly bears, which number about 30,000, were never listed under the act.

Activists split

The Interior Department on Tuesday also announced a 90-day comment period before a final decision is made.

But any delisting could be delayed by a court battle, since some conservation groups oppose the move.

Tom France, regional director for the National Wildlife Federation, said his organization believes removing bears from federal protection in the Yellowstone area is long overdue.

“All of the recovery goals for grizzly bears in Yellowstone have been met or exceeded,” he said in a statement Tuesday.

“A sound foundation is in place to ensure that grizzlies continue to thrive after they are released from the emergency room care of the Endangered Species Act,” he added. “Part

of that foundation is extensive monitoring so that if problems arise, corrective action can be taken.”

But other environmentalists say the bears still do not have adequate protections to ensure their long-term success.

“The agencies are in a state of denial about what’s happening on the landscape,” said Louisa Willcox, of the Natural Resources Defense Council.

Willcox said bear habitat is being chipped away by development, oil and gas drilling, logging and road building. She feared that delisting grizzlies would loosen restrictions on those activities, reducing habitat further and increasing the likelihood of bear-human conflicts.

Republicans call for changes

Three Republican senators who attended the Interior news conference Tuesday used the event to call for changes in the endangered species law that would enable more animals to be removed from the list. The House passed a bill in September that would lessen the government’s role in protecting plant and animal habitat.

Less than 20 species have been removed from the endangered list since the law was signed by President Nixon was signed in 1973.

“This is the exception, not the rule to the Endangered Species Act,” Sen. Larry Craig, R-Idaho, said of removing the bears from the list.

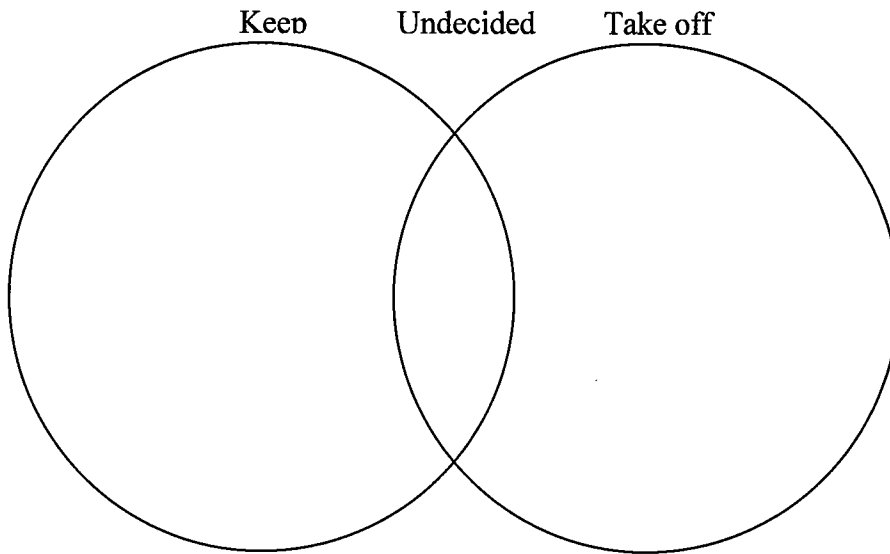
Sens. Mike Enzi and Craig Thomas of Wyoming, both Republicans, also called for changes to the law.

MSNBC.com's Miguel Llanos and The Associated Press contributed to this report.

Directions: Answer the following questions before your class Socratic Seminar in complete sentences.

1. What is the major problem that this article highlights?
2. How many grizzly bears were in Yellowstone in 1975? How many grizzly bears are there currently?

3. Fill in the Venn diagram below comparing and contrasting the arguments for keeping or taking the grizzly bears on or off the Endangered Species List.



3 a) Choose which argument you support and explain why.

4. Come up with 2 conclusions about the number species that have been removed from the Endangered Species List since the Endangered Species Act was signed into law by President Nixon.

5. Is the Endangered Species Act effective, explain your answer in 3-4 sentences?

6. You be the judge... is the grizzly bear a success story and would you take it off of the list? Explain your answer in 4-5 sentences.

Directions: During the Socratic Seminar take notes (below) on the reasons why people would take the grizzly bear off of the Endangered Species or why they would keep the grizzly bear on the list.

Cornell Notes for Socratic Seminar/Class Discussion

[illegible]

Independent Practice:

Directions:

- ✓ Following the seminar look over all of the arguments from your notes.
- ✓ Write a summary of why we should take the grizzly bear off or keep it on the list.

- ✓ Make sure to present the problem, both sides of the argument and your opinion (did your opinion change from question 3).
- ✓ You need to write at least a half of page on a separate piece of paper.

Information from: MSNBC.com's Miguel Llanos and The Associated Press

APPENDIX G

A Tale of Two Species: Burrowing Owl

Name : _____
 Date: _____
 Period: _____

Tale of Two Species: Burrowing Owl

In the book *Hoot*, Roy and Mullet Fingers are fighting to save an animal that is on the Endangered Species list. While their methods might differ their passion is still the same.

Directions:

- ✓ In the book *Hoot* the author makes many descriptions of how the owl eats, where it lives and that it is on the Endangered Species list.
- ✓ Go to the following website www.kidsplanet.org and verify if the following information presented by the author is true about the burrowing owls.
- ✓ When you go to the website click on “Get the Facts” to get the information you will need.
- ✓ On pages 123, 213-214, 223, 243, and 245 the author lists many qualities of the owl. Reread these pages and verify that the information on these pages is accurate using the website in the directions.
- ✓ Write out what the attribute that is in the book and if it is true based on the information from the website below.

Page Number	Attribute in Hoot	Is it true or false?
Page 123	Burrowing Owls eat red meat	
Pages 213-214		
Page 223		
Page 243		
Page 245		

Directions: You are going to write out the following information listed below about the burrowing owl on a poster and then present it to the class. Along with your burrowing owl information you will choose any animal on the Endangered Species list and put that information on the same poster. All the information you will need is on the website, www.kidsplanet.org.

List of information required:

- ✓ Status
- ✓ Description
- ✓ Size
- ✓ Population
- ✓ Lifespan
- ✓ Range
- ✓ Habitat
- ✓ Food
- ✓ Behavior
- ✓ Offspring
- ✓ Protection
- ✓ Pictures
- ✓ Latin Name
- ✓ How we can protect it?

APPENDIX H

Hoot Final Assignment

Name : _____

Hoot Final Assignment

Directions: Choose one of the following assignments for your final project from the list below. Also, you may do a project that is not on the list, check with your instructor for approval.

1. Environmental Situations:

Situation 1: You are in charge of an environmentalist group and you find out that Wal-Mart wants to build on an open patch of land. The land has a lot of prairie dogs however. Wal-Mart believes that it is too expensive to remove the prairie dogs and they believe that there are already too many prairie dogs in the world. They decide to have all of the prairie dogs killed using poison. Your job is to decide if this is an appropriate approach that Wal-Mart plans to use. Explain your reasoning as to why you agree or disagree with the plan. Then write a plan on how you would deal with the situation.

Situation 2: Consider the same situation as situation 1. However, instead of prairie dogs the open patch of land that Wal-Mart wants to build on has white tailed rabbits, hummingbirds, and swift foxes.

2. Write a song/rap/poem about *Hoot* and the environment. The song/rap/poem must include 5-10 of the scientific descriptions used in the book and 2-3 dilemmas Roy faces throughout the book.

3. Write an original short story about the environment. The story needs to be 3-10 pages in length. The story needs to include scientific principles in your story similar to the way the Mr. Hiaasen did in *Hoot*.

4. Write a research paper about the Endangered Species Act. State your belief about the effectiveness of the act. Then research and write about 2 other environmental laws and state an argument about whether these laws are effective or not.

5. Compare and contrast the environments described in Montana and Florida using *Hoot*. Include illustrations. Make sure to include landscape, habitat, animals, plants, etc...

6. Interview a local businessperson about their environmental practices. Include a short biography about the company.

Suggested questions might include:

- ✓ How do they help the environment?
- ✓ How can they improve what they already do?
- ✓ Why do they help the environment?
- ✓ Do they have practices that might hurt the environment?

Write a 2-4 page paper summarizing your interview and the company.

7. Initiate a community project that will help our endangered species and present what you did to the class.

8. Paint a landscape or scene illustrating a dilemma in *Hoot*. Write a 2-3 page paper why your painting is representative of the dilemma.

9. *Hoot* is based on a true story of about two boys in Florida saving the burrowing owls. Research the story and compare how the true story was the same and different from the fictional story that Mr. Hiaasen wrote.

Rubric:

Knowledge of Topic	Spelling and Grammar	Originality
10 The student project involves the environment and displays a complete knowledge about the subject matter.	10 The project does not have any mistakes.	10 The project is very original and shows that the student put a lot of time and thought into it.
6 The student project involves the environment and displays some knowledge about the subject matter.	6 The project has a few mistakes.	6 The project is somewhat original and shows that the student put in some time and thought into it.
5 The student project involves the environment and displays some knowledge about the subject matter.	5 The project has a few mistakes.	5 The project is somewhat original and shows that the student put in some time and thought into it.
3 The student project involves the environment and displays very little knowledge about the subject matter.	3 The project has many mistakes.	3 The project is not very original and shows that the student did not put a lot of time and thought into it.
2 The student project involves the environment and displays very little knowledge about the subject matter.	2 The project has many mistakes.	2 The project is not very original and shows that the student did not put a lot of time and thought into it.
0	0	0

Total Points _____
30

APPENDIX I

Hoot Post Assessment

Name: _____

Date: _____

Post Assessment for Hoot

Directions: Answer all of the following questions to the best of your ability.

1. What is an environmentalist and describe what role they play in society?
2. Explain how a nonnative species can destroy a native species in an ecosystem?
3. What is the Environmental Protection Act and defend how it helps animals?
4. Compare and contrast the types of ecosystems one would see in Montana and Florida.
5. List 3 conclusions can you make about the following statement; "Burrowing Owls are protected."
6. Describe 3 animals that are on the Endangered Species List and describe one way to protect them?