

Literature Based Integrated Unit on Four Ecosystems;
With a Focus on Differentiation and Scaffolding Techniques

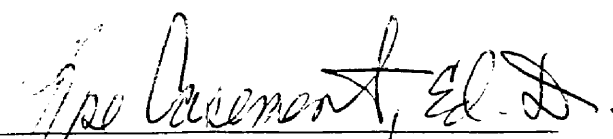
By

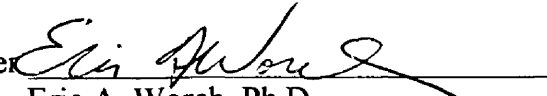
Dianne Corcoran

Presented to the Education Department Graduate Faculty
at the University of Michigan-Flint
in partial fulfillment of the requirements for the

Master of Arts
in
Education

May 30, 2003

First Reader 
Rose Casement, Ed. D.

Second Reader 
Eric A. Worch, Ph.D.

Dedicated to my family
who are patient, kind, and understanding.

Table of Contents

DEDICATION.....	ii
CHAPTERS	
1. Introduction.....	1
Purpose.....	1
2. Literature Review.....	2
Main Body	2
Table	30
Reference	31
Appendix.....	35
3. Methods	36
Budget	38
Timeline	38
References.....	39
4. Polar Unit.....	40
Part 1: Geography and Climate.....	40
Part 2: History and Culture.....	45
Part 3: Frozen Features.....	49
Part 4: Who Lives There?.....	53
Assessment	55
References	57
Appendix A.....	61

Appendix B	77
5. Ocean/Coral Reef Unit.....	89
Ocean Physical Description.....	89
Animals of the Sea and Shore.....	89
Plants.....	89
Food Chains.....	90
Human Impact.....	91
Coral Reef Physical Description.....	92
Plants and Animals.....	93
Food Chains.....	93
Human Impact.....	94
References	95
Appendix A.....	96
Appendix B.....	100
Appendix C.....	102
Appendix D.....	105
Appendix E.....	114
6. Wetlands.....	120
Physical Description.....	120
Plants and Animals.....	121
Food Chains.....	122
Human Impact.....	122
References	125

Appendix A.....	126
Appendix B.....	135
Appendix C.....	138
Bibliography.....	140

CHAPTER 1

INTRODUCTION

This thesis creates a curriculum that is literature-based and integrated using scaffolding and differentiated techniques. Scaffolding tools are used as forms of support provided by teachers or other students to help students progress from their current ability to the intended goal. They bridge gaps between what students are capable of doing on their own and what they are capable of doing with help. Differentiated instruction means changing the pace, level, or kind of instruction teachers provide in response to individual learners' needs, styles, or interests. It specifically responds to students' progress on the learning continuum- what they already know and what they need to learn. The two techniques complement each other and are supported with theory and literature from a constructivist point of view.

Purpose

The purpose of this thesis is to develop a six-week literature-based project on four ecosystems. This project is integrated through three content areas with a focus on differentiated instruction using scaffolding and differentiation methods. The content areas that will be focused on are social studies, science, and language arts.

The four ecosystems that are targeted are polar, oceans, coral reef, and wetlands. The study of the four ecosystems will last approximately six weeks.

The project includes a literature review, curriculum, and assessment instruments for some methods used. Unit references can be found at the end of each unit, with an extensive bibliography at the end of the thesis.

Literature Review

The stage and cast are set, no audition necessary, the director takes her/his place. The audience is silenced as the curtain opens and reveals a brand new year. The actors come to the stage with different abilities and talents; it is the director's job to draw out those abilities and talents and help the actors take the necessary risks to reach new heights. The audience holds their breath and waits to watch the show unfold.

This metaphor represents a brand new school year, a slice in a human being's life. Where each child came from and what he or she knows are the mysteries that need to be solved in order for that teacher to help that student construct new knowledge.

In the past the students adapted to the curriculum or they were in danger of being left behind. Recent research, however, emphasizes that the curriculum needs to be adapted so the role of the student is to construct knowledge linking prior knowledge to new information (Pinnell, 2002; Good & Brophy, 2000; Palincsar, David, & Brown, 2000). This role reversal reflects the influence of developmental and cognitive psychologists who support constructivist views of learning and teaching.

Constructivists believe that students learn through a process of active construction that involves making connection between new information and existing networks of prior knowledge. They stress the importance of relating new content to the knowledge that students already possess as well as providing opportunities for students to process and apply the new learning. Constructivists support the idea that before knowledge becomes truly generative--usable for interpreting new situations,(solving problems, thinking and reasoning, and learning generally)--students must elaborate and question what they are

told, examine the new content in relation to more familiar content, and build a new knowledge structure (Resnick and Klopfer, 1989). If the knowledge structure is not built, it will remain inert, only recallable when cued by questions or test items but not applicable when used for everyday life (Goode & Brophy, 2000).

These constructivist ideas can be traced to John Dewey, Jean Piaget, Lev Vygotsky, and even as far back as Socrates. Examples of educational movements with constructivist ideas that have historical significance are open education, inquiry learning, and discovery learning as well as the contemporary movements of whole-language teaching and portfolio assessment. The most common currently held view, teaching for understanding, includes a variety of theoretical rationales and suggested teaching methods, but they all involve some subset of the following key idea that students develop new knowledge through a process of active construction (Fosnot, 1996; Phillips, 1995). Students must try and make sense out of the new knowledge and relate it to what they already know, or think they know, about a topic. They must make it their own by paraphrasing it into their own words. This may or may not include a complete and accurate reconstruction of what the teacher or textbook author intended to convey. Ongoing assessment assists the teacher in keeping track of what students are actually learning.

Two different philosophical views about the nature of knowledge are empirically oriented constructivist and radical constructivist. Empirical constructivists believe that knowledge is anchored in the external environment and exists independently of learners' cognitive activities, so they speak of helping learners to construct accurate conceptions

(Case, 1982). The radical constructivist believes that knowledge resides only in the constructions of learners. Teachers face the problem that they cannot teach precise representations of “truth” but can only negotiate shared meanings with students and provide them with opportunities to construct useful understanding by overcoming obstacles or contradictions that arise as they engage in purposeful activity (Cobb, 1986).

Whatever their underlying philosophical views are, all constructivists emphasize that teachers need to go beyond information transmission model (teachers or texts tell, student memorize) and move toward knowledge construction models of teaching and learning. This involves the teacher using meaning and content to structure reflective discussions and provide opportunities for students to use the content in inquiry, problem solving, or decision making (Brooks, 1990)

In recent years, the theory of the knowledge construction model of teaching and learning has been stressed in the curriculum and instruction guidelines released by the American Association of the Advancement of Science, the National Council of Teachers of Mathematics, the National Research Council for the Social Studies, the National Council of Teachers of English, and the National Research Council (science education standards) (Good & Brophy, 2000, p. 417).

When looking at knowledge as socially constructed some constructivists, who are influenced by the developmental psychologist Jean Piaget, depict learning as a solitary activity in which a child’s development of knowledge is carried out through exploration, discovery, and reflection of everyday life experiences. However, most constructivists

adhere to views that come from social constructivism. In addition to emphasizing that learning is a process of active construction of meaning, they emphasize that the process works best in social settings in which two or more individuals are engaged in discussion about a topic. This is helpful to learners in several ways: 1) exposure to new input from others makes students aware of things that they do not know and leads to expansion of their cognitive structure; 2) exposure to ideas that contradict students' own beliefs may cause them to examine those beliefs and restructure them and; 3) the opportunity to articulate their ideas to others requires clarity and develops connections between concepts, resulting in differentiated and better organized cognitive structures (Good & Brophy, 2000, p.420).

This social constructivist's philosophy is the position that this project has adopted.

Social constructivist ideas have been heavily influenced by the writings of Russian developmental psychologist Lev Vygotsky. He was considered a genius because of his ideas about psychology and special education. Vygotsky was concerned with the whole child and stressed that teaching must lead development forward not lag behind (Daydov, 1995).

Vygotsky believed that children's thought (cognition) and language (speech) begin as separate functions but become connected during the pre-school years as children learn to use language as a mechanism for thinking. More and more of their learning especially cultural knowledge (conversations with others, parents, and teachers) is mediated through language. Children then elaborate on this knowledge and connect it to other knowledge through inner speech, thinking mediated through language, or self-talk

(Good & Brophy, 2000; Berk & Winsler, 1995; Davydov, 1995).

Examples of Vygotskian views of cultural knowledge that are socially constructed are literacy, numeracy, and knowledge in the subjects taught at school. This happens most efficiently when children are exposed to teaching in the zone of proximal development (Brown, 2000; Good & Brophy, 2000; Beed, Hawkins, & Roller, 1991; Palincsar & Brown, 1984). The zone of proximal development refers to the range of knowledge and skills that students are not yet ready to learn on their own but can learn with help from the teacher, or other knowledgeable person.

Zone theory was developed out of this philosophy. Zone theory assumes that a student's readiness for learning depends on his or her accumulated prior knowledge about the topic rather than on maturation of cognitive structures (Good & Brophy, 2000; Rosenshine & Meister, 1992; Lehr, 1985). Also through teaching in the zone of proximal development, advances in knowledge will be stimulated most rapidly primarily through social construction that occurs during sustained discourse.

Features that social constructivists stress when helping students construct new knowledge include discussion in which participants pursue a topic in depth, exchanging views, negotiating meanings and implications as they explore its ramifications. Another integral part stressed of the social constructivist theory is cooperative learning, which includes whole-class discussions, students working in pairs and small groups. (Good & Brophy, 2000; Graves, 1996; Rosenshine & Meister, 1992; Beed, Hawkins, & Roller, 1991).

To help teachers put this theory into practical application terms, teaching in the

zone clusters around scaffolding, which allows for gradual transfer of responsibility. Scaffolding, with its theoretical roots in both cognitive psychology and social constructivism, is the tool for teaching in the zone (Brown, 2000; Palincsar, 1986; Bruner, 1986). Scaffolds are forms of support provided by teachers or another student to help students progress from their current abilities to the intended goal. Instructional scaffolding is a general term for simplifying strategies and for assistance with specific tasks that the teacher will use to bridge the gap between what students are capable of doing on their own and what they are capable of doing with help (Graves, 1996; Rosenshine & Meister, 1992; Beed, Hawkins, & Roller, 1991; Applebee & Langer, 1983). Instructional scaffolding does not alter the task for students; rather, it holds the task constant while adjusting the nature of students' participation through graduated assistance (Englert, Raphael, Anderson, Anthony, & Stevens, 1991). An example of instructional scaffolding is demonstrated in cognitive modeling, in which the teacher demonstrates task performance while articulating the thinking that guides it. This strategy is very effective with students when used in writing development. The use of inner dialogue (talking to oneself about one's writing), talking to others, and listening to one's writing being read aloud, helps students to observe what goes on in the mind of a writer (Englert, Raphael, Anderson, Anthony, & Stevens, 1991). This can also be carried over into other subject matters as students learn how to use inner dialogue while solving complex problems.

Vygotsky emphasizes that inner speech is an important action in planning and regulating one's activity. Inner speech emerges first in a social dialogue between a more

knowledgeable language user and a learner. The adult models much of the inner dialogue while completing most of the required actions in the cognitive process. As learners become adept in whatever is being modeled, the adult gradually releases responsibility and the learner assumes responsibility for the dialogue or actions for which they are capable. Once the learner engages in the ongoing social dialogue, it becomes internalized as private speech spoken aloud to direct one's cognitive activity. Finally, this private speech leads into inner, self-guiding speech, which is automatic and requires little conscious thought (Englert et al. 1991).

Good strategy instruction in writing uses social speech and conversation among teachers and students in the context of composing text. To demonstrate this strategy the teacher performs a "think aloud" while composing a written piece in front of her students. This allows students to view the cognitive process related to planning, drafting, and revising text. These demonstrations give students a glimpse of the normally invisible actions and hear the normal inaudible inner dialogue that the skilled writer used to direct and monitor their writing behavior (Englert et al. 1991; Rosenshine et. al. 1992; Good et al., 2000). Just as important, students then need to be invited to participate in collaborative social dialogue, as they take on more responsibilities for their own inner speech and actions in the writing process. It is through these collaborative discussions with teachers that students begin to internalize processes that are key to Vygotsky's concept of cognitive development as the social collaboration gives way to internal collaboration with oneself (Englert et al. 1991).

Vygotsky views the discourse students need to be successful in school as different from everyday interactions. In school, words serve not only as a means of communication but also as objects of study, as students talk about reading and writing. Instruction becomes the means for students to become aware of and develop the capacity to consciously manipulate and control the symbolic systems of their culture. A student's success is determined by their mastery of the written language (Berk & Winsler, 1995, p.114). Vygotsky further emphasizes that written expression must be more precise and expanded than verbal expression because it cannot rely upon tone of voice and gesture to clarify meaning. Students must come to appreciate language as a system and its use as a tool for thought.

In Vygotsky-based classrooms, a strong emphasis is placed on literacy as well as writing. Literacy activities play a major role in promoting students' conscious awareness of their thinking. The classroom environment is a highly literate setting in which many different types of symbolic communication can be used, integrated with one another, and mastered by students (Berk et al. 1995, p.114). Reading, writing, and quantitative reasoning are not taught in isolation but rather are integrated throughout the curriculum using the knowledge construction model.

Providing assistance to students according to the relationship between their zone of proximal development (ZDP) and the scaffolded instruction is a new concept in North American classrooms. Western sociocultural theory, which is not new but has been reborn after Perestroika, tells us that without sensitive intervention adapted to individual

an student's ZPD, the student will learn at less-than optimum rates (Berk et al. 1995, p.114). With the development of emergent balanced literacy programs that take into consideration oral language, oral reading, writing, comprehension, and student's attitudes and perceptions, educators hope to change the way they think towards a constructivist point of view. As young readers' interactions with text change and develop teachers need to change their instruction to nurture students' new abilities and promote continued progress. This will includes providing text that supports and extends this progress (Brown, 2000). The goal of educators is to reach all students at their instructional level and by doing so that they can make informed decisions about their students and their teaching from a constructive point of view.

The method to use to accomplish this goal is instructional scaffolding. Applebee and Langer (1983) tell us that instructional scaffolding can occur in two ways, either in direct interaction with students or in-group oriented instruction. Teachers must first determine the difficulties that a new task is likely to pose for particular students. Then teachers need to select strategies that can be used to overcome the specific difficulties anticipated, and finally structure activities as a whole to make those strategies explicit (through questioning and modeling) at appropriate places in the task sequences. A more recent term used for the method mentioned above is procedural facilitation. Procedural facilitation means to use concrete prompts. These concrete prompts are scaffolds specific to the method being taught but general enough to allow application to a variety of different contexts (Rosenshine & Meister, 1992). An example is to use a "think sheet" when helping students to improve their writing. "Think sheets" consist of prompts to

activate writing strategies for planning, organizing, drafting, editing, and revising (Rosenshine et al., 1992; Englert et al., 1991). They help cue students to consider their audience (“Who am I writing for?”), and to organize their ideas into categories (“What is being explained?” “What are the steps?”) The 5 W cards and “Fast Facts” that are used in this curriculum project emphasizes this strategy. Procedural facilitation can help students execute strategies even though they may not be aware of where these strategies fit into a cognitive framework. So, procedural facilitation can help to cue strategy use and help students imitate the performance of mature writers, in spite of their less advanced developmental levels (Englert et al., 1991).

The scaffolding allows the student to perform new tasks while learning strategies and patterns that will eventually help the student to carry out similar tasks independently. The student may internalize the essence of the thinking, knowledge or strategy and be able to carry through similar tasks without assistance (Beed et al., 1991).

Another advantage of scaffolding is that it can also be used to examine how effective teachers are in helping students learn to read and write. Using the natural language learning process, in which a more skilled language user provides a scaffold that allows a novice to carry out a more complex task, Applebee and Langer (1983) created criteria for judging the appropriateness of the instructional scaffolding, teachers provide while instructing students in reading and writing. The five criteria are: intentionality, appropriateness, structure, collaboration, and internalization. Descriptions of each are provided below.

1. **Intentionality:** The task has a clear overall purpose driving any separate activity that may contribute to the whole. Eventual evaluation of students' success can be cast in terms of what they intended to accomplish.
2. **Appropriateness:** Instructional tasks pose problems that can be solved with help but which students could not successfully complete on their own.

The most appropriate tasks will be those that involve abilities that have not yet matured but are in the process of maturation or in Vygotsky's terms, abilities that are not so much "ripe" as "ripening."
3. **Structure:** Modeling and questioning activities are structured around a model of appropriate approaches to the task and lead to a natural sequence of thought and language.
4. **Collaboration:** The teacher's response to student work recasts and expands upon the students' effort without rejecting what they have accomplished on their own. The teacher's primary role is collaborative rather than evaluative.
5. **Internalization:** External scaffolding for the activity is gradually withdrawn as the patterns are internalized by the students. (Applebee & Langer, 1983, p.170)

Each criteria are generic and are to be used as a framework to help students integrate subject-area content with their thinking and language skills in order for them to express

their new knowledge. The processes of learning to read and to write become intertwined in natural supportive language activities.

For further support of this philosophy, we look to the textual scaffolding framework where teachers are taught to reframe for students the original question about text. The question changes from “which is best,” to “which type of text is best suited to achieve what purposes with whom, and when?” Framing the question this way helps teachers address the wide range of student abilities that are not likely met by “one-size-fits-all” text (Brown, 2000). By using leveled books that feature the same curriculum material, students of all abilities can have collaborative discussions about the same topic. This project uses textual scaffolding, with students’ development, which allows the teacher to work in the readers’ changing zones of proximal development. It serves as the bridge between what they know about the reading process and what they still need to learn (Brown, 2000).

Not all researchers support the use of instructional scaffolding in schools. The question that they ask is, “Who is in control of the language?” (Searle, 1984) They are concerned that teachers will misuse and impose a prescribed structure on students instead of supporting the child in achieving an intended outcome. An example of this is found in Applebee and Langer (1983), where they advocate “instructional scaffolding” in which teachers scaffold students’ science experiment reports by providing a sheet of questions that outline the required steps. While students will gain knowledge of the skill of experiment reporting, the question that still needs to be answered is will they really learn the purposes and nature of scientific writing?

To understand scaffolding more completely we turn to Jerome Bruner. He was the first to use the term 'scaffold' as a metaphor for the temporary frameworks adults create to support children in their attempts to use language successfully (Lehr, 1985). He explained that effective scaffolding may include the following features: semantic domain, predictable structures, role-reversibility, variability, and playfulness (Bruner & Ratner, 1978). Bruner further stresses that scaffolds give support to situations that allow children to interact and learn from their use of language. Other researchers have picked up this idea and use scaffolding to intervene and provide the cueing, questioning, coaching, corroboration, and the information that is needed for students to complete a task before they are able to complete it independently (Graves, 1983; Cazden, 1979; Scollon, 1976). Donald Wood and his colleagues (1976), who were the first to use the term in its educational sense, define scaffolding as "a process that enables a child or novice to solve a problem, carry out a task, or achieve a goal which would be beyond his or her unassisted efforts (p.90)."

Bruner's original statement that "the adult works to support the child in achieving an intended outcome entering only to assist or scaffold the action" helps us to understand the child-adult interactions from a linguistic point of view-language leading the development (Searle, 1984). Graves further claimed "scaffolding follows the contours of child growth" (Searle, 1984, p. 480). The child initiates language, stays in control of the language, and experiences the language, while the adult operates in response to the child. This responsive scaffolding can and does occur in schools during discussions, show and tell sessions, field trips and other informal school activities.

The second type of scaffolding is more structured and controlled. It is sometimes referred to as strategic scaffolding. The two types of scaffolding are similar in all the essential characteristics except one-- that of honoring the intention of the learner. While strategic scaffolding honors the intention of the child in the larger sense, it is often necessary for the adult to teach the child a strategy as an intermediate step in achieving the child's intention (Beed et al., 1991). Examples include borrowing in subtraction or determining latitude and longitude on a map. The adult must instruct the child in the steps of the subtraction algorithm in order for the child to be success in subtraction. As the child practices the steps they become proficient in how to subtract and they no longer need the assistance of the adult.

True scaffolding efforts will not be successful unless the teacher is willing to turn over more control to the students. The teacher must teach from a constructivist point of view that stresses that scaffolding should not be used to justify making students restructure their experience to fit the teacher's structure. Instead the student should be encouraged to adapt his/her own language resources to achieve new purposes that he/she sees as important (Searle, 1984).

Researcher, G. Wells is skeptical that this type of language learning can be achieved in a school setting, differing greatly from the home environment. He feels that schools are poor environments for how Bruner originally conceived scaffolding to work by "supporting the child in achieving an intended outcome" (Searle, 1984, p. 480). Students have had little say in determining what counts as knowledge and how

knowledge should be shaped in schools. Much reform needs to be in place before true scaffolding is an effective teaching practice, according to (Searle, 1984).

Researchers who have been hard at work in creating that reform are Palinscar and Brown, (1984). With their development of the reciprocal teaching method, they have given teachers a framework for guiding and assisting students to make sense out of new content while applying the student's prior knowledge. This generic model can be used across subject areas and helps to integrate reading, writing, and language activities.

Underlying the model of reciprocal teaching is the idea that expert-led social interactions play an important role in learning and can provide a major stimulus to cognitive development. This theory, which was inspired by and found in the writings of Vygotsky, Dewey, and Piaget, emphasizes the role of guided learning in social contexts as a key to developmental change. Reciprocal teaching is an example of socially mediated instruction, sometimes referred to as scaffolded instruction, in which the teacher and students engage in the critical element of dialogue, for the purpose of constructing meaning from text (Palinscar, David, & Brown, 2000).

With the redefinition of reading in 1986 as an interactive process of constructing meaning from written text which involves the interaction of the reader, task, context, and materials, the reader interprets the text on the basis of background knowledge, the purpose of reading and the context in which reading occurs (Anderson, Hiebert, Scott, & Wilkinson, 1986). Reciprocal teaching was originally designed to help older elementary children who were at risk for academic difficulties to improve reading comprehension (Palinscar et al. 2000; Berk et al. 1995; Brown & Campione, 1986; Palinscar & Brown,

1984). First, instruction focuses on helping the student to understand the factors that interact and influence their comprehension of text. Second, students are taught to apply the strategies in meaningful contexts. Third, students are encouraged to use the strategies that will assist in their comprehension of new knowledge. The strategies are taught as a means for enhancing comprehension rather than as an end in themselves (Palincsar et al., 2000). Because reciprocal teaching has produced sizable gains in reading comprehension in several studies, the method has been extended to younger children and other subject matters such as social studies and science (Good et al., 2000; Berk et al., 1995; Rosenshine & Meister, 1994; Palincsar & Brown, 1989).

Reciprocal teaching takes place in cooperative learning groups that feature guided practice in applying simple concrete strategies to the task of text comprehension (Brown et al. 1986). The procedure is best characterized as a dialogue between teacher and students in that group. The term “reciprocal” describes the nature of the interactions: each person acts in response to the other. The teacher and students take turns assuming the role of dialogue leader; the goal is to help the student understand a text passage and acquire new knowledge from it (Palincsar et. al., 2000). The role of the teacher is to scaffold students involvement in the discussion in ways that eventually leads to full participation in the dialogue, as well as mastery of the text being read (Berk et al. 1995).

To reach these goals, the dialogue is structured by the use of four strategies: *questioning, summarizing, clarifying, and predicting*. Systematic use of the four cognitive strategies ensures that the students will grasp new knowledge by linking it to previously acquired information, retain clear direction to the discussion, expand on their

ideas, and rethink what they have learned so it can be used to solve new problems (Berk et al., 1995). All four of these strategies enhance thinking about text as reading takes place. They also help students monitor their own comprehension.

- Summarizing: Summarizing is identifying, paraphrasing, and integrating important information in the text. Students ask themselves, “What is the gist of the text? What is the most important information?”. Most importantly, they then put the answers to these questions into their own words, assuring that they understand.
- Questioning: Students can be taught to create and ask questions about the text at many levels. Example: Question, Answer, and Response.
- Clarifying: Clarifying means attending to the many reasons why text is difficult to understand and asking oneself and one another for help. Students are taught to alert to new vocabulary, awkward structure, unclear referent words, and unfamiliar or difficult concepts that may get skipped over by word readers. They are taught to reread, read ahead, ask for help, discuss, or take any other steps needed to restore meaning. In the initial phase of instruction, teachers provide a
- Predicting: Predicting requires students to hypothesize about what the author might discuss next in the text. In order for them to be successful at predicting students must be able to recall what they already know about the topic. They then read to confirm or disprove their hypotheses. This helps students to link the new information they will encounter in the reading with what they already know.

Predicting also helps students learn to use the structure of the written work. Heading, subheading, and questions imbedded in the text are useful for anticipating what might occur next (Palinscar et al. 2000).

In the initial phase of instruction, teachers provide a great deal of support to students as they learn about the strategies and how to use the reciprocal teaching procedure.

Teachers scaffold student learning by providing considerable explanation and examples regarding the four strategies and how the strategies can be applied. The teacher supports students by modeling the application of the strategies, thereby making their own problem solving public. During the dialogues the teacher is making a conscious effort to gradually decrease the amount of support provided to students over time. Eventually the teacher will provide minimal support and will act in the role of a coach or facilitator providing feedback and prompting when needed (Palinscar et al. 2000).

The use of these strategies will help teachers to see an improvement in their students' reading comprehension. By combining key elements of teaching for understanding and self-regulated learning which includes modeling of strategic application of skills, scaffolded instruction that gradually releases responsibility to the students, provides the opportunity for students to learn cooperatively in small groups, and integrate Vygotsky's sociocultural framework into the classroom experiences (Good et al., 2000; Berk et al., 1995). The benefits that teachers gain from reciprocal teaching strategies are that they find themselves using a diverse array of conversational devices to support students' discussions, including cueing ideas, and paraphrasing students'

contributions, which will permit students to extend their knowledge and skills. The experience is cognitively demanding but stimulating and gratifying in the end.

The question still remains how does this all fit together in a heterogeneous classroom. To enable students of mixed abilities to work on similar project, teachers must solve the disparity in reading skills (Good et al., 2000, p. 342). In order to accomplish this, instruction must be differentiated to work in each student's zone of proximal development. The gist of this project is to help teachers differentiate students' reading needs while teaching a core curriculum to the whole class. Studies suggest that as the range of student ability increases, the role of whole-class teaching will need to decrease (Rosenshine & Meister et. al., 1992; Graves, et. al., 1986,). However, students in mixed-ability classrooms can still benefit from exchanging ideas in a whole class setting (Good et. al., 2000). Teacher benefits of whole-class instruction include simplifying the amount of managerial issues; unit introductions, reviews, and demonstrations of experiments can be performed only one time; the amount of equipment can be reduced; and certain other types of information exchange still lend themselves to whole-class presentations in mixed-ability classes (Good et al. 2000,p.342; Tomlinson, 1995).

Beed, Hawkins, and Roller (1991) created a strategic scaffolding method, contingent scaffolded instruction, which uses five levels of cueing responses that teachers can use to facilitate gradual release of responsibility to move students towards independence. The creators of this strategy took into account Vygotsky's social constructivist views of thought and language and Palinscar's reciprocal teaching methods. The five levels with brief explanation are listed below.

Level E: Teacher modeling, teacher models the complete performance, accompanied by verbal explanations.

Level D: Inviting student performance, modeling with verbal explanations, accompanied by some student participation.

Level C: Cueing specific elements, Verbal cueing concerning specific elements of strategy. The teacher identifies the elements of the strategy as the student completes the task.

Level B: Cueing specific strategies, Verbal cueing without reference to the specific elements of the strategy.

Level A: Providing general cues, General verbal cueing, which will extend to any context and provides the least teacher support.

The five cues can be used with individual students or with small groups. The five cues help teachers' function in a student's zone of proximal development with continuous assessment by teacher observation and conversation in order to adjust responses to students and finally, gradually withdraw support. The ultimate goal is to wean students from direct instruction and help them to become independent learners. This strategy moves students towards this goal. Just like a parent teaching a child to ride a bike, the teacher is first in front, then alongside, and finally left behind.

Another strategy for a mixed-ability classroom is to gather a wide assortment of materials written at varying levels of difficulties on a few core topics. Book publishers are now creating materials that are leveled to meet the needs of this type of classroom. Research has indicated that weak readers do not benefit from materials originally written

for more able readers but need modified versions that present the same concepts in language that yields lower readability scores. They found that teachers who used textbooks, or other materials, written at different readability levels made a deeper impact for weak readers (Pinnell, 2002; Good et. al., 2000). Memory and Uhlorn (1991) formulated four key points that teachers need to consider when choosing materials. First, teachers need to ask whether the easier books contain brief chapters with helpful comprehension questions at the end? Poor readers are unlikely to read for extended periods and follow-up questions encourage them to consider content and integrate it with their previous knowledge. The questions should foster comprehension and higher-order processing of the main idea and not just call for regurgitation of miscellaneous facts and unimportant information. Second, teacher should schedule comparable time for all students to work on reading assignment. There is social stigma if all students are expected to spend the same amount of time completing assignments. Third, teachers should outline key concepts that all students are expected to learn regardless of the difficulty of the text. Finally, study guides with opened questions should be used. They can alert students to significant content and help prepare class for discussion and unit test. Study guide questions should be prepared using the vocabulary of the text of the lowest level of reading difficulty (Good et al. 2000).

To help students extend themselves in reading, teachers should offer just the right level of support and challenge. When books are matched to readers, each reader can continue the successful processing that will help him/her self-extend, to keep learning (Pinnell, 2002; Clay, 1991). All students learn best with moderate challenge (Tomlinson,

1999). If the task is too difficult for a learner, the learner will enter a self-protection mode. On the other hand, if it is too simple it will suppress the learner's thinking and problem solving ability. The student enters a relaxation mode and nothing is accomplished. No matter where students are on the continuum of learning, for learning to continue they must believe that hard work is required, but the hard work often pays off with success. Ultimately teachers must remember that what is moderately challenging today won't offer the same challenge tomorrow. Challenges must grow as students grow in their learning (Tomlinson, 1999).

To help teachers bridge the gap between students' reading levels and their reading goals the scaffolded reading experience, a flexible framework designed to help students get the most out of each and every literacy experience was created (Graves, Graves, Braaten, 1996). This experience was invented to lead all children to success, whether they are struggling readers, average readers, or above-average readers. The framework is developed around three phases. First, the teacher considers three interrelated factors--the students, their purposes for reading, and the text to be read. Then, based on these three factors, the teacher selects a set of activities for each of the three phases of the reading experience: prereading, during-reading, and post-reading (Graves et. al., 1996). (See Appendix.) Modification can be made within each individual part to include or adjust activities so that they match what each student needs, thus making it differentiated.

Further research proves that good readers and poor readers differ notably in how they think before, during, and after reading activities. (See Table 1.) Teachers must help struggling readers develop the skills and strategies that good readers already possess—

comprehension strategies that will enable them to understand what they read and to take a more strategic active role in reading and studying. Struggling readers need to be taught to predict what they think they will learn, monitor what they are learning as they read, and eventually summarize their learning and compare their conclusions with their peers (Good et al., 2000, p.343). This research supports the need for differentiated instruction. Two more methods that support the scaffold reading experience are the literacy lesson framework that was developed by Susan Tancock, a Chapter 1 reading specialist and professor at Ball State University, and the literacy scaffolds, using discourse patterns, developed by Owen Boyle, associate professor at San Jose State University, and Suzanne Peregoy, associate professor at San Francisco State University. Both studies agree that in order for struggling reader to achieve success, students need more time for practice. Tancock also stresses that students need a teacher who believes that they can become good readers and writers, and focuses on their students' strengths and plans lessons that build on these strengths. Initial assessments help the teacher to focus at the strategy level and to teach students the process of reading versus isolated skills. Readers construct meaning using prior knowledge and experience, and the interacting semantic, syntactic, and graphophonic language systems (Tancock, 1994; Goodman, 1987, p. 140). Both methods share Goodman's model of reading, which states that readers make predictions, sample text, confirm, and self-correct as they construct meaning (Tancock, 1994; Boyle & Peregoy, 1990). The literacy lesson framework helps students become proficient readers while helping teachers to manage the job of scaffolding for all their students.

Using Goodman's model this whole language approach helps students gain

meaning and progress. Through the researcher's observations of struggling readers' several of the same characteristics became evident: overreliance on the graphophonic cueing system; lack of fluency in reading; a view of reading as accurate word recognition versus meaning construction; few writing strategies; and little self-monitoring and self-correcting behavior (Tancock, 1994). From these characteristics we know that fluency suffers when children focus their attention more on the details of print than the meaning of the text thus comprehension suffers as well. The literacy lesson framework has five components that have been developed to help teachers meet the needs of students in a heterogeneous classroom: 1) familiar reading (fluency), 2) guided reading; before-reading activity, during-reading activity, and post reading-activity, 3) writing, 4) word sorting, and 5) book sharing (Tancock, 1994). This framework will help students become more fluent while attending to the meaning of text. The guided reading portion focuses on teaching students to use both reading strategies and skills.

Marie Clay defines strategies as "mental activities" initiated by the student to get the message from the text. Students learn to use the semantic, syntactic, and graphophonic cueing system through prompting, "Does that make sense?" (semantic), "Does that sound right?" (syntax), "Does that look right?" or "What would you expect to see?" (graphophonic). These strategies are intended to help students become independent readers; the goal is to foster self-monitoring and metacognitive awareness (Tancock, 1994).

Reflecting on Vygotsky's views of learning that are embedded within the natural social interactions aimed at sharing communications and negotiating meaning, and

pairing those with Goodman's views on how children learn to read, commanding a multiple cueing system in a whole language context, Boyle and Peregoy found that literacy scaffolds work when using the whole language approach to reading with students. This framework offered students immediate access to the meanings and pleasures of print. The characteristics of literacy scaffolds that are beneficial to students are aimed at functional, meaningful communication found in whole texts, such as stories, poems, reports, and recipes.

Literacy scaffolds make use of language and discourse patterns that repeat themselves and therefore are predictable. Literacy scaffolds provide a model, offered by the teacher or by peers, for comprehending and producing a written language pattern. They support students comprehending and producing written language at a level slightly higher than their competence in the absence of the scaffold. They are also temporary and can be dispensed of when the student no longer needs them (Boyle, 1990).

Activities that support this method are sentence patterns; which would include repeated phrases, rhymes and reframes, and discourse patterns; which would include DRTA (directed, reading, thinking activities) and story mapping (Boyle, 1990). For the purposes of this project discourse scaffolds were used of language beyond the sentence level, focusing on discourse patterns or structures in whole texts. Researchers have observed that when literacy scaffolds are used with collaborative groups, they find classrooms that have a renewed enthusiasm for students' ability to read and write.

Realistically, if educators are to function in each of their student's zones of proximal development, then the curriculum should be differentiated. The one-size fits all

delivery system will not meet all the needs but by differentiating instruction through content, process, or product, effective learning can occur. Some examples are to provide multiple assignments with each unit, allow students to choose, structure the class assignments so they require high levels of critical thinking and permit a range of responses, have high expectations for all students, implement flexible grouping strategies, create learning centers, differentiate assessment using Bloom's taxonomy, and provide students with opportunities to explore topics that students are interested in (Tomlinson, 1999). "In a differentiated classroom, the teacher proactively plans and carries out varied approaches to content, process, and product in anticipation of and response to student differences in readiness, interest, and learning needs' (Tomlinson, 2001, p. 7).

The principals of differentiating curriculum that support the integration of basic skills with higher level thinking skills will help to eliminate the alienation between students. By focusing on open-ended tasks, with an emphasis on research skills and methods, the students can produce products that challenge existing ideas and stimulate "new" ideas. The ultimate goal is to encourage the development of self-understanding, while recognizing and using one's abilities, becoming self-directed, and appreciating likeness and differences in oneself and in other (Kaplan, 1980).

For the teacher to be successful in running a differentiated classroom requires a paradigm shift. Teachers must move away from seeing themselves as keepers and dispensers of knowledge and move toward seeing themselves as organizers of learning opportunities. While content knowledge remains important, teachers must focus less on knowing all the answers and focus more on knowing how their students learn. This

social constructivist point of view lends itself to differentiation and helps the teacher to create ways to learn that both capture students' attention and lead to understanding. This becomes the teacher's highest priority to organize their classroom for effective activity and exploration. Teachers who differentiate instruction focus on their role as coach or mentor, they give students as much responsibility for learning as they can handle, and teach them to handle a little more (Tomlinson, 2001). There are several general guidelines that make differentiating in the classroom possible.

- Be clear on the key concepts and generalizations or principles that give meaning and structure to the topic, chapter, unit, or lesson you are planning
- Think of assessment as a road map for your thinking and planning.
- Lessons for all students should emphasize critical and creative thinking.
- Lessons for all students should be engaging.
- In a differentiated classroom, there should be a balance between student -selected and teacher-assigned tasks and working arrangements (Tomlinson, 2001, pp.19-20).

Looking back and reflecting on our discussion concerning the constructivist's view of teaching reading through the practice of scaffolding and differentiating within an integrated unit on four ecosystems, the metaphor of the stage, cast, and director was used to represent the classroom, students, and teacher. When the curtain finally opens for the actors' (students') final performance, the director (teacher) watches from afar. The director ponders the question silently to themselves will the actors know their lines, songs, dances, and their places on stage? The director can only watch, wait, and wonder

hoping that this group of strangers, with the director's help, have built a sense of community by focusing on content, process, and have achieved a common end (product). Do they have the tools and experiences that have helped them gain new knowledge so that they can make the show merit a trip to Broadway? These are the questions that the director (teacher) hopes are answered in the spring. The house lights go off, the curtain opens, the stage is brilliantly lit, and the director sits in the dark and whispers their final thoughts to the actors (students), " Break a leg."

References

- Applebee, A. N., & Langer, J. A. (1983). Instructional Scaffolding: Reading and Writing As Natural Language Activities. Language Arts. 60(2), 168-175.
- Beed, P. L., Hawkins, E. M., Roller, C. (1991). Moving Learners Toward Independence: The Power of Scaffolded Instruction. The Reading Teacher. 44(9), 648-655.
- Berk, L. E., & Winsler, A. (1995). Scaffolding Children's Learning: Vygotsky and Early Childhood Education. Washington D.C.: NAEYC.
- Boyle, O. F., & Peregoy, S. F. (1990). Literacy Scaffold: Strategies for First and Second Language Readers and Writers. The Reading Teacher. 44(3), 194-200.
- Brook, J. (1990). Teachers and Students: Constructivists Forging New Connection. Educational Leadership. 49(7), 4-8.
- Brown A.L., & Campione. (1986). Psychological Theory and the Study of Learning Disabilities. American Psychologist. 14(10), 1059-1068.
- Brown K. J. (2000). What Kind of Text- For Whom and When? Textual Scaffolding For Beginning Readers. The Reading Teacher. 53(4), 292-307.
- Bruner, J., & Ratner, N. (1978). Games, Social Exchange and The Acquisition of Language. Journal of Child Language. 5, 391-401.
- Bruner, J. S. (1986). Actual Minds, Possible Worlds. Cambridge, MA: Harvard University Press.
- Case, R. (1982). Addition and Subtraction: A Cognitive Perspective. Hillsdale, NJ: Erlbaum. 156-170.
- Cazden, C. (1979). Peekaboo as an Instructional Model: Discourse Development at

Home and at School. Papers and Reporter on Child Language Development.

(Keynote address to Canadian Council of Teachers of English, Vancouver, B.C., 1981).

Clay, M. M. (1991). Becoming Literate: The Construction of Inner Control. Auckland, New Zealand: Heinemann Education.

Cobb, P. (1986). Making Mathematics: Children's Learning and the Constructivist Tradition. Harvard Educational Review. 56, 301-306.

Davydov, V. V. (1995, April). The Influence of L.S. Vygotsky on Education Theory, Research and Practice. Educational Researcher. 24(3), 12-21.

Englert, C. S., Raphael, T. E., Anderson, L. M., Anthony, H. M., Stevens, D. D. (1991). Making Strategies and Self-Talk Visible: Writing Instruction in Regular and Special Education Classrooms. American Educational Research Journal. 28(2), 337-372.

Fosnot, C. (Ed.). (1996). Constructivism: Theory, Perspectives, and Practices. New York: Teachers College Press.

Good, T. L. & Brophy, J. E. (2000). Looking in Classrooms. New York, New York: Addison, Wesley, Longman.

Goodman, Y.M., Watson, D.J., & Burke, C.L. (1987). Reading Miscue Inventory. Katonah, New York: Richard C. Owen Publishers, INC. 140.

Graves, M. F., Graves, B. B., & Braaten, S. (1996). Scaffolded Experiences for Inclusive Classes. Educational Leadership. 14-16.

Lehr, F., (1985). Instructional Scaffolding: Language Arts. ERIC/RCS Report. 62(5),

667-671.

Memory, D., & Uhlorn K. (1991). Multiple Textbooks at Different Readability Levels In the Science Classroom. School Science and Mathematics. 91, 64-72.

Palincsar, A.S., & Brown, A.L. (1984). Reciprocal Teaching of Comprehension – Fostering and Comprehension Monitoring Activities. Cognition and Instruction. 1(2), 117-175.

Palincsar, A.S., David Y., & Brown, A. (2000). Using Reciprocal Teaching in the Classroom: A Guide for Teachers. 1-55.

Phillips, D. (1995). The Good, the Bad, and the Ugly: The Many Faces of Constructivism. Educational Researcher. 24(7), 5-12.

Pinnell, G.S. (1/25/2002). Matching Books to Readers. www.teacher.scholastic.com

Resnick, L. & Klopfer, L. (Eds.). (1989). Toward the Thinking Curriculum: Current Cognitive Research: 1989 Yearbook of the Association for Supervision and Curriculum Development. Alexandria, VA: Association for Supervision and Curriculum Development.

Rosenshine, B., & Meister, C. (1992, April). The Use of Scaffolds for Teaching Higher-Level Cognitive Strategies. Educational Leadership. 49(7), 26-33.

Scollon, R. (1976). Conversations with a One-Year Old: A Case Study of the Developmental Foundations of Syntax. Honolulu: University Press of Hawaii.

Searle, D. (1984). Scaffolding: Who's Building Whose Building? Language Arts. 61(5), 480-483.

Tancock, S.M. (1994, October). A Literacy Lesson Framework for Children with

Reading Problems. The Reading Teacher. 48(2), 130-140.

Tomlinson, C. (1995). Differentiating Instruction for Advanced Learners in the Mixed Ability Middle School Classroom. ERIC Digest: Gifted Education and Middle School. 35-38.

Tomlinson, C.A. (1999). The Differentiated Classroom: Responding to the Needs of All Learners. Alexandria, VA: Association for Supervision and Curriculum Development.

Tomlinson, C.A. (2001) How to Differentiate Instruction in Mix-Ability Classroom. Alexandria, VA: Association for Supervision and Curriculum Development. 16-20.

Appendix

Scaffold Reading Experience Framework

- **Prereading Activities**
 1. Relating the reading to student's lives
 2. Motivating students
 3. Activating background knowledge KWL
 4. Teaching vocabulary and concepts
 5. Pre-questioning, predicting, and setting direction
 6. **Building text-specific knowledge** (scaffold for low readers)
Example: Use bookmarks with each character's name written on them.

- **During-reading Activities**
 1. Guided reading
 2. Reading to students (the first chapter)
 3. Silent reading
 4. Oral reading by students
 5. **Reading to students** (additional chapters)
 6. **Modifying text** (scaffold for low readers)
Example: By orally summarizing the next several chapters
 7. **Students tape record what they have learned from each chapter; listen before reading next chapter.**

- **Post-reading Activities**
 1. Questions
 2. Discussions
 3. Writing
 4. Drama
 5. Artistic endeavors
 6. Application and outreach activities
 7. Reteaching

Chapter 3

Method

I have presented this six-week unit of study on four Ecosystems to my third grade classroom. This classroom is located in Hartland, Michigan, which is approximately 30 miles south of Flint, Michigan and approximately 60 miles northwest of Detroit, Michigan. Because there is no major industry in Hartland, it is considered a bedroom community with most people seeking employment 30 or more miles away. The ethnicity make-up of the community is white middle class. Most students come from two parent homes and live either in a subdivision or in a rural setting. The school receives very little money from the federal government for free and reduced lunch; because of this the school district must subsidize the Title One program.

The make-up of the classroom that this unit was used for consists of five students of high ability, fifteen average students, five students who are low average and receive Title One reading support, and three special needs students. The three special needs students have resource room support. Keeping the ability of students in mind, assignments are differentiated to meet all the varying learning needs. Students are ability labeled before they come to my classroom from their previous teacher. The purpose of labeling the student is to develop a balanced classroom that benefits students and teacher planning. The purposes of using flexible grouping when planning lessons is so that students are not tracked into those labels but are encourage to shed the label and rise above them.

The specific methods that have been developed into the curriculum and that I have used are the scaffold reading experience framework, reciprocal teaching methods, and contingent scaffold instruction. This last strategy uses five levels of cues, it starts with Level E, which involves teacher modeling giving the student the most support. The cues follow the gradual release of responsibility model and end with Level A, teacher providing general cues (Beed, 1991). These three strategies have been integrated and differentiated throughout the unit.

Materials that were used were a large variety of trade books, textbooks, Internet websites, and teaching curriculum guides.

The final post-test that was developed for some of the units is a differentiated assessment that is based on Bloom's taxonomy, this 2-5-8 plan gives students and teachers flexibility. The codes 2, 5, and 8, refer to codes that the assessment choices are given; the students may choose an average of three choices for each code. They may choose any combinations of assignments so that the total equals ten. For example a student may choose to do one code 2 and one code 8, which equals a total of 10, or they may choose to do two code 5's with the total equaling 10. However a student could also choose to do one code 5 and one code 8 which totals more than 10, and therefore be eligible for extra credit. Codes are based on Bloom's with each code pulling from the two areas of thinking. Code 2 choices center on knowledge and comprehension; they ask students to tell, recite, define, and locate. Code 5 choices fall into the average difficulty range and focus on application and analysis. Students are asked to use and demonstrate

information, classify, and categorize, solve problems, compare and contrast in this category.

The highest code, 8, uses upper level thinking skills. Students are asked to evaluate and synthesize, which may include debates, critiques, informed decisions, stories, advertisements, and inventions. The teacher's job is to act as facilitator and resource person throughout the assessment.

Grading will be in a base 10 percentage. Code 2 assessment = 20%, Code 5 = 50%, and Code 8 = 80%. Students' choices must equal 100% or more. Extra credit is an option for students. A 2-5-8 scoring rubric will be used to help students understand their grade on their assessment and communicate with parents (Winebrenner, 1992).

Budget

I have applied for a \$500 grant from Livingston Council Reading Association to offset costs of curriculum needs to support this project. I plan on using Cromain Public Library, which has a wide variety of children's literature. Dr. Woesteoff has volunteered to provide a list of websites of children's literature.

I have also purchased with funds from our PTO 15 student copies of "National Geographic for Kids". This is a twenty-four page magazine that has many interesting articles that third graders will enjoy reading and that can be used with scaffold teaching methods. It is also one of the choices students can use for their assessment.

Timeline

I wrote this curriculum last fall and taught some of it last winter and spring. The rest will be used this year.

References

- Beed, P. L., Hawkins, E. M., & Roller, C. (1991). Moving learners toward Independence: The power of scaffolded instruction. The Reading Teacher. 44(9), 648-655.
- Winebrenner, S. (1992). Teaching Gifted Kids in the Regular Classroom. Minneapolis, MN: Free Spirit.

Polar Unit

Part 1: Geography and Climate

1:1 The Coldest Places On Earth

Focus question: What are the coldest places on Earth?

*What are the Polar Regions?

Students learn the basics of geography – 7 continents, 4 oceans, latitude, longitude, tropical zones, and polar zones.

Look up weather report for Barrow, Alaska (Arctic), Antarctica, and Hartland, MI for the day the Unit begins. Compare the three different weather temperatures.
www.weather.com

Polar Journals: Pictures, maps, etc. and bind with blank pages in between for students to respond to what they have observed and learned about the Polar Regions.

Activities

1. Act out the globe. Have kids touch their heads and say North Pole, their hands on their waists and say equator, put their hands on their feet and say South Pole. (Jason)
2. Study the shapes of the continents. Complete worksheet "Where are the Continents?" together. Discuss what each continent looks like. Give the students the shapes of each continent and have them write this sentence underneath: This is the continent of _____
But it looks like _____ to me. Example – This is South America but it looks like a pork chop to me. (Jason)
3. Label the Major Landmasses and Bodies of Water worksheet.
4. KWL: Fill out the first two sections of the KWL worksheet: what do you know; what do you want to know; about the Polar Regions?
5. Begin model of the Arctic and Antarctica.

Reading: Scaffold Reading Experience Framework

1. Anticipation Guide: Use *Polar Land*, pp.4-7.
2. DRTA (Directed, Reading, Thinking, Activity)
 - a) Activate prior knowledge for the topic of the text to be read.
 - b) Hypothesize about what might be addressed in the text.
 - c) Establish purposes for reading.
 - Use; Before Reading Strategy, Prediction, and My Reading Guide worksheets.

Read: (Listed in order of difficulty) *Arctic Adventure*, pp. 2-9; "North and South Poles", pp.1-2; *Pole to Pole*, pp.2-5. Life in the Polar Regions

Focus Reading with vocabulary bookmark: Students read for 30 seconds Choose 3 to 4 students to tell one important fact into tape recorder and microphone, continue process. Play back tape at end of reading. Type up facts for and review next day.

Cognitive Strategies (*use polar journals*)

Strategic Summarization

1. Identify the topic.
2. Write two or three words to reflect the topic.
3. Use these words as a prompt to help figure out the main idea of the Paragraph.
4. Select two details that elaborate on the main idea and are important to remember.

Next day: On overhead show facts from previous day's lesson and have students write about main points in polar journal.

*Why are the Polar Regions so cold?

Key Points: *Life in the Polar Regions* (Ranger Rick) pp.6-7

- Relationship earth has with the sun.
- The earth's tilting axis, 23 degrees vertical; 'land of the midnight sun', cause extreme conditions in the polar region.
- Coldest temperature recorded on Earth, Vostok, Antarctica -128

Objectives: To understand that the Earth's warmth comes from the direct rays of the Sun. To understand that the Earth's tilt creates the seasons, and that it also helps create the extreme cold of the Polar Regions.

Demonstration: Globe and Flashlight Experiment

Materials: Use a globe to represent the Earth and a large flashlight to represent the Sun.

1. Have students to identify the North and South Poles. Recall with students how long it takes the Earth to orbit around the Sun. (one year)
2. Have students predict when a Pole will get more light facing toward or away from the sun. (toward)
3. Have a student carry the globe around while teacher holds and shines the flashlight toward its center. Student stops when the North Pole is pointing toward the Sun. Ask which part of the Earth is getting the most direct sunlight. (Region just north of the equator) What about the North Pole and the area around it? This is the position during the Arctic summer. The region is receiving sunlight, but the sun's rays are not as strong and not as direct as the sunlight that is shining on Florida or Mexico.
4. Show why the area around the North Pole experiences summer days during which the sun never sets. Student rotates the globe, remind students that the Earth rotates on its axis every 24 hours. Ask whether any part of the Arctic is ever in shadow. (no) What would this look like in a real life? (The sun would be out all day and all night.) Compare to the rest of the globe, light part of the time and shadow part of the time (day and night).
5. What is happening to the South Pole, as the North Pole is experiencing summer?

6. Finally have a student carry the globe halfway around a circle (representing half of the Earth's year-long orbit around the Sun). The South Pole should now be pointing toward the "Sun". Shine the light again at the equatorial regions, and encourage students to make as many observations as they can.
7. Encourage students to integrate all of their observations to explain why the poles are so much colder and why they have longer days and nights than the rest of the world.

* Cause of the midnight sun is the effect Aurora – Northern Lights

Pole to Pole p. 5 www.athena.ivv.nasa.gov/curric/space/aurora/index.html

Polar Journal: students reflect and answer in their own words, why are the Polar Regions so cold?

1:2 Climate and Polar Regions

Focus questions: What are the general characteristics of the Polar Regions?

What are the North and South Poles?

- Use "*Ranger Rick's*", p.3, and description of the Poles.
- Show *Eyewitness Video "Arctic & Antarctic"*
- After viewing the video, display "Poles Apart" Chart, on large roll paper. Record and compare the many differences between the Arctic and Antarctic regions. See attached example, Polar Regions.
Use facts from Polar Lands, pp.6 & 7.
- Read Pole to Pole, pp. 6 & 7.

Polar Journal: Students write, what are the North and South Pole.

What is Special about the Polar Regions?

Key Points: ("*Ranger Rick*", p.3)

- The Arctic and Antarctic get little precipitation – only about 8 inches per year in most of the Arctic and 2 inches per year in the Antarctic. As in deserts, the air is usually too dry for precipitation to form. Over time, however, the little snow that does fall gets packed down to cover both regions with a thick layer of ice.
- Another special feature is that the Polar Regions have long summer days and long winter nights. These extremes happen because the Poles are at the very ends of the Earth, and because the Earth's axis is tilted. As a result, during its summer, a Pole is pointing towards the Sun, while during its winter, it is pointing away from the Sun. And while it is winter at the North Pole, it's summer at the South Pole, and vice versa. Revisit the Globe and Flashlight experiment.

Extreme Temperature/Sunlight Activity

Have a student serve as the weather person for the day. Look up

forecast for local area as well as the Alaskan locations' (Barrow, Juneau, Nome) at [http:// www.weather.com/](http://www.weather.com/) Students plot the information onto an

on going line graph with the local temperature in red and one or all of the Alaskan locations in other colors. Math: Chill Chart - Converts Celsius temperatures to Fahrenheit and vice versa.

Students look at overhead of Hours-of-Daylight Graph for Barrow, Juneau, and Nome (p.24) and compare with what our local area experiences. Discuss with students the differences.

* What is the Arctic?

The North Pole: Reread with a partner p. 6 in Pole to Pole, p. 4&5 in Kids Discovery, "North and South Poles", and p.6 in Life in the Polar Lands.

Key vocabulary: *Tundra, tree line, permafrost, subarctic, taiga, and ice cap*

Key Points: (*"Ranger Rick", p.3*)

- The Arctic includes the Arctic Ocean, part of which is permanently covered with ice. Land permanently covered with ice and other land known as the *tundra*, which is permanently frozen except for a thin layer on top that thaws in the summer. The deeper soil in the tundra (known as *permafrost*) is permanently frozen; trees cannot grow there, as they cannot send their roots into the frozen depths of the soil. Therefore, the tundra is above the *tree line* – the farthest north that trees will grow.
- The Arctic includes all of the tundra, portions of northern Alaska, Canada, Norway, Sweden, Finland, Russia, all of Greenland, and most of Iceland.
- The *subarctic* is the region just below the Arctic. Its winters are almost as cold, but its summers last longer and are somewhat warmer. The subarctic includes much of central Asia, Siberia, central Alaska and Canada, and parts of northern Europe. This type of land, which is cold but which supports evergreens and birch trees, is known as the *taiga*.

Demonstration: Making the Arctic Tundra

Materials: Clear-glass baking dish, piece of sod the size and shape of the dish, and water.

1. Fill the dish halfway with water and put it in a freezer overnight.
2. Lay the sod on top of the ice and put the dish back in the freezer.
3. The next day, leave the dish out until the sod has defrosted slightly. Let the students touch this "tundra" and make observations in their Polar Journal.
4. Help students to notice that the tundra is actually a thin layer of topsoil with a layer of ice underneath. Explain that because this ice is always frozen, it is called permafrost.

5. Ask students what kinds of plants live in the tundra. (shrubs, grasses, mosses, lichen, herbs) Why can't trees grow there? (They cannot take root.)

*What is Special about the Arctic?

Key Points: (*"Ranger Rick" p,4*)

- The Arctic is much warmer than the Antarctic because it is a sea surrounded by land. Like all large bodies of water, the Arctic Ocean absorbs heat during the day and in the summer; it radiates that heat at night and in the winter. This makes the region much warmer than it would be if it were composed entirely of land.
- Most life in the Arctic is found in the oceans, but people, animals, and plants live on the land as well. Polar bears-found only in the Arctic- live both on land and on the ice cap in the middle of the Arctic Ocean. Some birds and animals live in the Arctic full time, while many other migrate there for the summer.
- Living things survive in the Arctic despite inland temperatures that go as low as -70 degrees Fahrenheit (F) in the winter. The average winter temperature in the arctic is -30 F. Arctic summer temperatures average 50 F.
- The Arctic region is frozen much of the year. Most of the region is ocean covered with a solid layer of ice. It is a permanent ice cap floating on the Arctic Ocean. The Arctic region covers an area of more than five million square miles.

Put more facts onto the "Poles Apart" Chart

*What is Antarctica?

South Pole: Read Alone and Use Think Alone strategy: p.7 Pole to Pole, pp. 6 & 7 Kids Discovery "North and South Poles", and p.7 Life in the Polar Lands.

Key Points: (*Ranger Rick, p.4*)

- Antarctic refers to the entire continent of Antarctica, although some parts of the continent and its peninsula extend beyond the Antarctic Circle.
- The Antarctic region also includes a number of islands, rich in wildlife, that surround the continent.

Polar Journal: Think Alone Strategy- Use 2 or 3 posted notes per page; at each note student is to stop and think about what they are reading and/ or ask themselves a question. They can write their thoughts down and use them to form a retelling, summary or help in answering extended response questions. Example: On what continent is the South Pole located?

*What is Special about Antarctica?

Key Points: (*Ranger Rick, p.4*)

- Antarctica is the fifth largest continent in the world; it is twice as big as Australia. The place has no national status. Although many countries have claimed portions of it, recent treaties have agreed no country may use it for military purposes or for nuclear waste and tried to protect its environment in various ways.
- The land itself is the coldest and most desolate region on Earth, buried beneath a layer of ice and snow about one mile thick. Some of its lofty mountains stick up through the ice. The continent's elevation helps make it even colder than the Arctic. Midwinter temperatures average -40 F on the coast and -100 F inland. The lowest temperature ever recorded on Earth was in Antarctica in 1983; It was -128.6 F.
- Antarctica temperatures seldom rise above freezing. It is too cold for animals, plants, or even most bacteria to survive inland, although scientists have found some fungi, bacteria, and grains of frozen pollen in the ice. Some plants grow on the coast and on the Antarctic Peninsula in the summer: lichens, mosses, and three kinds of flowering plants. The only land animals that live in the Antarctic are some 50 species of tiny insects, spiders, and microscopic creatures. The largest of these is an insect called a midge, which is less than half an inch long.
- Even though Antarctica is a barren land where the ice barely ever melts, the ocean and coastal areas are full of life. Penguins live on and around land year-round. In the summer, seals and seabirds come to join them, along with migrating whales, and the seas are always full of fish and other forms of sea life. Although no people live permanently in the Antarctic, scientists work there for periods of time, studying the weather and other natural phenomena.

Students put facts about the South Pole on the "Poles Apart" Chart.

Read National Geographic for Kids, pp. 18-20, answer questions p.21.

Part 2: History and Culture

2:1 Exploration and Discovery in Frozen Worlds

Focus Questions: How and why did people first settle in frozen worlds?

Who were some of the modern-day explorers and settlers in the Polar Regions, and why did they go there?

Key Points: (*Frozen Worlds, p. 51*)

- Scientists theorize that many millions of years ago, all the land in the world formed a single continent, called Pangaea. Due to the Continental Drift theory this supercontinent broke up between 208 million and 245 million years ago into a northern continent, Laurasia, and southern continent, Gondwanaland.

- 180 million years ago, Gondwanaland and Laurasia started breaking apart. The present-day continents began to form and, through continental drift, started moving toward their present positions.
- Antarctica is remote, inaccessible, and inhospitable. This is the reason there are no native Antarcticans!
- In the Arctic the northern tips of many countries and continents reach up into this region. Toward the end of the last ice age, about 10,000 to 20,000 years ago, people migrated from Siberia across Beringia, a region between the continents of Asia and North America.
- Huge glaciers of the ice age had frozen large amounts of water, lowering the water level of the ocean. The land beneath the Bering Sea, flooded now, was then exposed. Many scientists believe first explorers came to Alaska and North America on this land bridge between the ice sheets.
- The last group to arrive was the descendents of the Inuits.

Activities

1. Teach students the theories of Pangaea and Continental Drift. The Amazing Earth Model Book, by Donald M. Silver and Patricia J. Wynne has a plate puzzle poster that demonstrates how the continents were once joined. There is also a hands-on extension that models how the moving plates spread the continents apart. (pp.118 – 124)
2. Read "The Disaster" (p.56) aloud to the students. Have them work in groups to illustrate the setting of the story before and after "the disaster". Use colored chalk or charcoal.

Explorers

Key Points: (Ranger Rick p.5)

- Robert E. Peary (1856-1920) and Matthew A. Henson (1867-1955) are credited with being the first non-native people to reach the North Pole. Peary had conducted several Arctic expeditions including two attempts to reach the Pole, between 1891 and 1908. He, Henson, and four Inuit men, whose names were Ookeah, Ootah, Eginwah, and Seegloo, finally arrived on April 9, 1909.
- Peary's claim was disputed until recently, when a National Geographic Society study concluded that he did indeed reach his goal. Henson's claim was also disputed and overlooked for years, primarily because of racial discrimination; as the African-American assistant to Peary, he was not taken seriously as an explorer. In 1944, however, Congress awarded Henson one of the medals that jointly honored him with the other explorers, and in 1948, he

- received the Gold Medal of the Geographical Society of Chicago. Presidents Truman and Eisenhower honored him.
- Two explorers reached the South Pole within a few weeks of each other. Roald Amundsen (1867-1928), a Norwegian, reached the Pole on December 14, 1911. Captain Robert F. Scott (1868-1912), an Englishman, staked a claim on January 18, 1912; he and his men died on the way back.

Read: "North and South Poles"
pp.8 & 9.

Activities

1. Read pages together and plot dates and names of explorers on Polar Events Timeline (*The Polar Regions*). Think Along: Predicting and reflections. Discussion questions: Why do you think explorers are willing to risk their lives? What kinds of people make the best explorers? What qualities do they need to have? Write out question and answer in Polar Journal; Would you make a good explorer? Why?
2. Race to the Poles –(8 Polar Explorers)
 - Break into small groups to research an assigned polar explorer. Use 'Kids Discovery' and supplied trade books.
 - Use question sheet found in Polar Journal and complete all research with answers to the questions in journal.
 - Use 'Did You Know' Cards with questions and answers written out on card for presentation board.
 - Put explorers route and flag representing country of origin on class map.
 - Fill out 'Expedition page', 'Travel Guide', and 'Dressing for Survival' found in Polar Journal.
 - Group presents board to the class. Group assesses audience's listening skills by passing out 5 W cards and asking questions about their presentation to the class. Two members of the class and the teacher assess the presentation using an evaluation form provided by teacher. Group also uses a self-evaluation form to assess how they think their presentation went and how well their group worked together.

2:2 Arctic Tradition and Change

*Who Lives in the Arctic?

Focus Questions: What tools and technologies have people used to endure the extreme polar climate? How do tradition, language, and ritual relate to and reinforce Native people's ability to survive in frozen worlds? What are the modern-day challenges and issues facing the inhabitants of Alaska?

Key Points: (Ranger Rick, p.5)

- The Arctic is home to many different peoples. Some 125,000 Inuit live in Greenland, Alaska, Canada, and Siberia. The Inuit were once known to much of the world as "Eskimos." The name "Eskimo" was given to them by others and means "eaters of raw fish," whereas in the Inuit language, *Inuit* means "the people." It is the name by which the Inuit generally refer to themselves. Other names, based on region and language, include *Inupiat* and *Yupik*.
- Also living in the Arctic are the *Nenets* of north central Siberia and Sami – sometimes called *Lapps* – of northern Scandinavia. And there are many more groups whose cultures and ways of life have long been and still are closely tied to the Arctic land. Among them are the *Aleuts*, who live primarily on the Aleutian Island off Alaska, and the Pribilof Islands off Siberia; the *Chukchi*, who live in far eastern Siberia; and the *Yakuts*, who live in north central Siberia.
- Igloos were built as temporary shelters on winter hunting trips. They traditionally lived in sod houses built partially underground. Today, most Alaskans live in modern houses build on platforms above the frozen ground. (Frozen Worlds, p.70)
- Native people used to make their clothes from the hides of animals. Parks and pants were made from caribou, fox, and wolf. Mittens and boots were made from sealskin. Inner layers of clothing were of softer fur and were worn with the fur facing inward. The outer garments were often made of caribou hide and were worn with the fur facing outward. Seams were finely stitched to make the garments waterproof. Some people still wear the traditional clothing, but most buy winter clothes made of synthetic materials. (The Arctic Land, p.11)

Reading: Literacy Lesson Framework

1. Familiar Reading

- Students reread "North and South Poles", p. 4, to activate prior knowledge about the Arctic.

2. Guided Reading

- Read "Crow Steals Some Daylight", Life in Polar Lands, pp. 24- 28 to students as they follow along in their own book. After students listen to the story discuss how the Inuit people interacted with their environment. What were they trying to understand and explain through this legend?
- Partner Reading Assignment; One partner is assigned to read the easier text and other partner is assigned a more difficult text. They are assigned to fill out 'My Reading Guide' worksheet. They are responsible to report to their partner using the worksheet.

(Listed in order of difficulty) Arctic Adventures, pp.12 & 13; "North and South Poles", pp. 14 & 15; Life in Polar Lands, pp.16 & 17; and Pole to Pole, pp.28 & 29.

Activities

- Study the different Inuit words for snow and ice, ("Frozen Worlds, p. 75). Make 'Concentration' game cards, use 3 x 5 cards, put a word on one card and the definition to the word on another card.
Students play concentration by matching the word and the definition.
- Inuit shelter (igloo) – Read "Kids Discover, Shelter", pp.6-7 & 18-19. "Creative Classroom", East or West, Home is Best, pp.45-48. Discuss how the shelters that the Inuit built helped them to adapt to their environment just like the Iroquois and the Hopi.
- Sequence activity, 'Steps to make an Igloo'. Polar Journal: Write and illustrate the steps to building an Igloo.
 1. Mark a circle about ten feet in diameter on the ground.
 2. Using a knife cut blocks of snow.
 3. Place blocks in a wide spiral that leans slightly inward. Lay each block on edge, not flat like a brick.
 4. Continue laying new rows of blocks, with each block tilting inward slightly to narrow the circle.
 5. At the top, block will come together to make a dome. Place the last block from the outside but fit it from inside.
 6. Remove one block to make a window from a piece of fresh-water ice.
 7. Add a long, low entrance tunnel to create an air lock between inner room of the igloo and the cold outdoor air. It also keeps the warm air from leaking out.
- Create model igloos out of sugar cubes. Use 'Build An Igloo' found in "Kids Discover, Shelter" p.19.
- Discuss how they built and used kayaks.
- Students create a bulletin board with 'Did You Know Cards' that relate to the traditions, language, and rituals of the Inuit people's ability to survive in the Polar Region.
- Activity 15 Inuit Mask
- Activity 18 Mukluks

Part 3: Frozen Features

3.1 Frozen Features: Past, Present, and Future

Focus Questions: What unique frozen features can be found in the colder regions of our planet? What are icebergs and glaciers and how do they affect life in the Polar Regions?

Key Points: (Ranger Rick, p.7)

- Ice is an extremely important element in the polar regions. There is so much ice in the Antarctic that it could cover the whole United States with a layer more than two miles thick. Most of the world's fresh water is frozen within the Antarctic ice cap.
- The Arctic Ocean includes two different types of ice: *sea ice*, or frozen seawater, and *glacier ice*, or frozen fresh water. When some of the ice thaws in the spring; the sound is as loud as roaring thunder. Sometimes the breaking ice sounds like a huge explosion. Other times it sounds like a loud snap!

Objective: To help students understand more about the properties of ice and water.

Activities**1. Molecules in Motion**

- Ask students if they know how ice forms. Explain that water is made up of tiny particles called molecules, which are too small to be seen even with a microscope. When water is warm, the molecules vibrate and move, giving water its liquid, flowing quality. When water is cold, they slow down, giving ice its stiff, solid quality.
- Have students form a large circle, this represents a container. Have several students stand inside of the "container", shaking only a little. Tell them they are molecules frozen solid in ice.
- Next, let them pretend to get warm by the sun. The "molecules" should start to sway and move around as the ice melts and becomes a liquid.
- Finally, pretend a freezing wind is blowing in from the Arctic. Can they gradually "freeze" in place, as the water changes back to solid ice?
- Polar Journal: In three to five sentences students discuss in their journal what they learned about water molecules and temperature.

2. See It Expand

- Ask your students which they think takes up more room, water or ice? Then let them find out.
- Fill a plastic glass three-quarters full of water, marking the water level with a marker.
- Put the uncovered container into the freezer. When it has frozen, take it out and ask students to describe what they observe. (The ice has bulged above the top of the line.)
- Point out that no water has been added or removed – yet the ice takes up more room.

- Polar Journal: Students answer why this happened reflecting back to the molecule demonstration? (Because water spreads out as it freezes; in addition to slowing down, water molecules also spread out as water goes from cold to freezing.) Challenge question: Think of real-life examples that show that ice takes up more room than water. (Frozen pipes, pop can, boulder)

3. Cold water is denser.

- Show "Jason" video part 2 – Density by temperature experiment.

4. Read Story, "The Three Whales", Icebergs, pp. 24-28.

Reading: Scaffold Reading Experience Framework

Life in Polar Lands, pp.8 & 9; Supportive reading material Icebergs and Glaciers, by Seymour Simon. Danger – Icebergs, by Roma Gans.

1. Building text-specific knowledge
2. Partner reading
3. Discuss with partner one important fact that they learned from each paragraph.

Glaciers

Key Points: New True Book: Glaciers, by D.V. Georges, pp.5 – 16

- Glaciers are formed by thousands of years of packed snow that becomes solid and turns into ice.
- Glaciers creep or slide toward the sea over cold land.
- Glaciers are found on every continent in the world except Australia.
- Glaciers contain over three fourths of all the fresh water in the world.
- All glaciers eventually melt or reach the sea. This may take hundreds or thousands of years to happen.

Polar Journal: Vocabulary Tracker, story map for vocabulary, look up these three words; *glacier*, *ice cap*, *gouging*.

Reading: Glaciers, pp. 5-16 and 24-45.

Focus Reading

Polar Journal:

Reciprocal Teaching: Model

1. Identify the topic.
2. Write five facts to support the topic.
3. Use the facts to write a summary of what they have read.

Activities

1. Glacial Ice Simulation

- Students will make a model simulation of a glacier using gak and an incline plane. They will observe and write their observations in their Polar Journal.
- What factors affect the flow rate of gak on an incline plane?
- How is your model similar to a glacier?

2. Make Alpine Glacier Simulation

- Make an "alpine glacier" by freezing water and rocks (a 1-inch layer on the bottom) in disposable aluminum bread pans or milk cartons.
- Remove the ice from the cartons and slide it down a slope covered in sand.
- Students observe and answer these questions in the Polar Journal. How did the ice block change the sand below it as you pushed it down the slope? How is your model similar to an alpine glacier?
- **3. Reading for Concepts – "A River of Ice"**

Icebergs

Key Points: Wood, Jenny. Icebergs, p. 4 - 7.

- Icebergs are floating masses of frozen fresh water. They are formed from glaciers that break off into the sea.
- Other causes of icebergs are ice sheets in the Arctic and Polar ice cap that produce tabular icebergs.
- Ice volume is lighter than water volume, so icebergs float. But they do not float very well causing between six-sevenths and nine-tenths of the iceberg to float underwater. This is why they are very dangerous for ships.

Polar Journal: Vocabulary Tracker; look up these three words, Iceberg, calving, and ice sheet.

Reading: Polar Lands, pp.8 & 9, and New True Book: Glaciers, pp.17 – 23.

Polar Journal:

Reciprocal Teaching: Model

1. Identify the topic
2. Find five facts that support the topic
3. Use the facts to write a summary of what they have read.

Activities:

1. Why Do Icebergs Float? - Ask students how they think icebergs can be frozen, while the ocean water around them is not. Demonstrate to students with two cups, water, and salt.

- Label one cup "plain" and the other "salty."
- Put the same amount of water in each cup, but stir some salt into the cup marked "salty."
- Place cups in freezer and check them a few hours later. Notice in which cup the water is totally frozen, and which it is only slightly frozen.
- Conclude with students that since ocean water is salty, it does not freeze as quickly as or easily as the freshwater that makes up glaciers and iceberg. That explains why icebergs float. Refer back to the Jason Video and the explanation of the main factors that affect the density of water; temperature and salinity.

Polar Journals: Students record their observations in their journal.

2. Floating Icebergs – Explore the fact that ice floats because it's more spread out, or less dense, than an equal volume of water).

- Fill a glass nearly to the top with water. Drop in an ice cube, representing an iceberg.

- Observe how much of the ice shows above the water. (Only about an 1/8)
- Discuss why partly hidden icebergs are dangerous to ships. (Ship captains cannot tell where they begin or end.) Example: Titanic

3. From the Top Down - Ask students to predict whether water freezes from the bottom up or the top down?

- Fill a plastic container halfway and place in the freezer, check it every few minutes. (After ten minutes or so, a thin sheet of ice should form at the top.)
- Have students think about how and why the fact that water freezes from the top down helps sea animals survive.
- Polar Journal: Students answer; what if water froze from the bottom up how would this affect life in the polar regions?

4. Reading For Concepts: "Fresh Water from the Sea"

Part 4: Who Lives There?

4.1 Arctic and Antarctic Species and Ecosystems

Focus question: What species live in colder regions and how have they adapted to the extreme conditions? What are the basic characteristics of the Arctic and Antarctic ecosystems and how do they differ?

Reading: Pole to Pole pp.8-27, Polar lands pp.10 –15, North and South Poles, pp.12 –13.

Focus reading, Power reading, and Guided reading strategies

Activities

- **Research Reports:** "Polar Animals" – Groups of 2 or 3 students are assigned a Polar animal to interview. The students are given the same basic questions to answer about their animal. They research to find the answers and write them up using a report form that helps them write their answers using a topic sentence with a supporting paragraph and closing sentence.
 1. What kind of animals are you? What special adaptations do you have that help you survive in the cold?
 2. What polar region do you live in? Do you migrate? Are you found anywhere else in the world other than the Polar Regions?
 3. How are your young born? For how long how do you take care of your young?
 4. Can you tell us about your life cycle. What is your average life span?
 5. What are your favorite foods?
 6. Who are natural enemies and why?
 7. What special characteristics do you have that help protect you from your enemies?

8. Is there anything unique about you?
9. Has pollution affected your species? What can we as humans do to help protect you from extinction?

The oral reports are done as interviews. The students make a mask or picture of the animal to show during their report. They also show the food chain that they illustrate using *Kid Pix* and point out on the world map where their animal can be found.

4:2 Monitoring Changes in Marine Ecosystems

Focus questions: What impact do humans and environmental contaminants have on marine ecosystems?

Reading: Pole to Pole pp. 30 –31, North and South Poles, pp.16 –17, "Time For Kids", March 9, 2001, Vol. 2, No. 20.

Key Points:

- The Alaska pipeline and coastal oil traffic at the port of Valdez affect the Arctic Region.
- Scientists on Antarctic have observed the thinning of the ozone layer that protects our planet from the Sun's ultraviolet light. The "hole" is caused by chlorofluorocarbons (CFCs), which are released by some spray cans, by refrigerator and air conditioning fluids, and in the manufacture of plastic foam. The resulting increase of ultraviolet light causes the overgrowth of plankton on which Antarctic animals feed.
- Mining in the Arctic and proposed mining for Antarctica.
- Air traffic over the North Pole
- Garbage from tourism, military bases, and scientific stations in both regions (which is slow to decay in cold climates) and other pollutants.

Activities

- Children should be made aware of the interrelationship among species as well as the effects of pollution on the ecosystem. The Bathtub Bay activity (optional)

4:3 Life in Cold Extremes on Earth – and Beyond

Polar Unit

2-5-8 Assessment

Choose from the variety of assignments listed below to equal 10 possible points. You may choose up to three items per code. The number not only indicates worth but also the higher level thinking skills required to complete the task.

Code 2 (knowledge and comprehension)

- _____ **Fill out the first two pages from the Ecosystem Worksheet.**
- _____ **Fill out a KWL Chart while you read "Penguin Pullovers" found in Scholastic News 58(12) 12/3/2001.**
- _____ **Using a Venn diagram decide where each item is found, Arctic, the Antarctic, neither, or both.**
- _____ **Read about how glaciers are formed, then make a drawing of a glacier and label it.**

Code 5 (application and analysis)

- _____ **Whales, seals, or penguins have many different species. Choose one and make a chart that displays their differences among their various species. Add drawings and pictures to show the differences.**
- _____ **Write a report answering these questions: Why do you think explorers are willing to risk their lives? What kinds of people make the best explorers? What qualities do they need to have? Would you make a good explorer? Why or why not? Use examples from the explorers that we have read about and your report should be at least two pages long.**
- _____ **Recreate a front page from a newspaper featuring the discovery of one of the poles. Use actual facts and names.**
- _____ **Read the article, "Stepping into Tradition: Yup'ik**

families live in the present and the past”, found in National Geographic for Kids, (Spring 2001). Use a Venn to show how Alaina’s life is different and the same as yours. Using the Venn’s information write a paragraph for each part explaining your differences and similarities.

Code 8 (evaluation and synthesis)

- _____ **Complete the 4-page Ecosystem packet. Develop and present a group project with two other students.**
- _____ **Develop Polar Jeopardy for the class to participate in.**
- _____ **Write a play that features animals from the Arctic, or Antarctica, or both. Make masks and perform the play for the class. Example: Legends, Pourquoi (ex: How the polar bear got his white fur?), etc..**
- _____ **Develop a plan on how we can protect the Arctic and Antarctic regions. Write a letter to the EPA (Environmental Protection Agency) or the International Wildlife Federation explaining your ideas. Mail and Share with the class their response to your idea.**

(See Appendix B)

Polar Unit References

Primary Resources

Berger, G. (1994). Life in the Polar Regions. NY: Newbridge Educational Publishing.
3-16.

Brimmer, L. D. (2000). Glaciers. New York, NY: Children's Press. 4-48.

Byles, M. (1990). Life in the Polar Lands. NY: Scholastic Inc. 4-31.

Chinery, M. (1998). Questions and Answers About Polar Animals. NY: Scholastic Inc.

Egan Hopping, L. (2000). Polar Regions. NY: Scholastic.

Haynes, M.J. Alaska (Mini-Unit) at <http://multimedia2.freac.fsu.edu/fga/academy/k1ak.htm>.

Lytle, G. (2001). Primarily Jason: Adapting Jason XIII for Elementary Students.
MA: Jason Foundation for Education.

“Penguin Pullovers”. Scholastic News. 58(12) 12-3-01.

The Polar Region. (1999). Clifton, NJ: Newbridge Educational Publishing.

Sands, Stella. (1991, Aug/Sept.). “North and South Poles”. Kids Discover. 2-19.

Scher, Linda. (1998, March). “Shelter”. Kids Discover. 6-7.

Stelson, C.B. & Farquharson, A. (2000). Arctic Adventure. NY, NY: Addison-Wesley
Educational Publishers Inc. 2-16.

Taylor, Barbara. (1999). Pole to Pole. Hong Kong: Tick Tock Publishers Ltd. 2-31.

Language Art Resources

Atwater R. & F. (1938). Mr. Popper's Penguins. NY: Scholastic.

Gardiner, J. (1980). Stonefox. NY: Harper Trophy.

Hooper, M. (2000). Antarctic Adventure: Exploring the Frozen South. NY: Dorling Kindersley.

Kulling, M. (1999). Sea of Ice. NY: Random House. 4-48.

Osborn, Pope, M. (2001). Polar Bears Past Bedtime. NY: Scholastic.

Potter, K.R. (1999). Seven Weeks on a Iceberg. NY: Scholastic.

Additional Resources

“Antarctica”. Kids Discover. (January, 2001).

Armstrong, J. (1998). Shipwreck at the Bottom of the World. NY: Scholastic.

“At Home in the Arctic”. National Geographic for Kids. (Spring, 2001). 12-16.

Beattie, O. & Geiger, J. (1992). Buried in Ice. NY: Scholastic.

Bernard, R. (1995). Penguins Through the Year. NY: Scholastic.

Burkett, K. (January-February, 2002). “Jumping Into Science”. National Geographic For Kids. 4-13.

Burleigh, R. (1998). Black Whiteness. NY: Atheneum Books.

Cooper Katz, S. (January-February, 2002). “Meet the Parents”. National Geographic For Kids. 14-22.

Dewey, J.O. (2001). Antarctic Journal: Four Months at the Bottom of the World. NY: Scholastic.

Gans, Roma. (1987). Danger Icebergs! NY: Crowell.

George Craighead J. (1999). Snow Bear. NY: Scholastic.

George Craighead J. (1997). Arctic Son. NY: Scholastic.

George Craighead J. (1997). Look to the North: A Wolf Pup Dairy. NY:

Scholastic.

- Georges, D.V. (1986). Glaciers: New True Book. Chicago: Children's Press.
- Goldman, J. (February 5, 2001). "Major Meltdown". Scholastic News. 57(16), 2.
- Grindley, S. (1997). Polar Star. NY: Scholastic.
- Hackwell, W.J. (1991). Desert of Ice. NY: Charles Scribner's Sons.
- Hudson, W. (1995). Five Brave Explorers. NY: Scholastic.
- Johnston, M. (1997). Explorers News. Cambridge, MA: Candlewick Press. 24-27.
- Kalman, B. (1988). The Arctic Land. NY: Crabtree Publishing Co.
- Kimmel, E. C. (1999). Ice Story: Shackleton's Lost Expedition. NY: Clarion Books.
- Kostyal, K.M. (2000). Trail By Ice. NY: Scholastic.
- Krinking, K. (December, 2001). "Bear Necessities". National Geographic World. 24-28.
- Levinson, N.S. (1998). If You Lived In The Alaska Territory. NY: Scholastic.
- Martin, B. & Carle, E. (1991). Polar Bear, Polar Bear What Do You Hear? NY: Henry Holt & Co.
- Miller, C. (January, 2000). "Killer Snow". Ranger Rick. 14-21.
- Miller, D.S. (1994). A Caribou Journey. Hong Kong: Little Brown.
- O'Donnell, P. (1991). Pinkie Leaves Home. NY: Scholastic.
- Ousland, B. (March, 2002). "Solo". National Geographic. 36-47.
- Pringle, L. (1992). Antarctica: The Last Unspoiled Continent. NY: Simon & Schuster.
- Rogasky, B. (1994). Winter Poems. NY: Scholastic.
- Roop, P. & C. (2001). Escape From The Ice. NY: Scholastic. 4-48.

- Simon, S. (1987). Icebergs and Glaciers. NY: William Morrow Co.
- Steger, W. & Bowermaster, J. (1997). Over the Top of the World. NY: Scholastic.
- “Stepping into Tradition: Yup’ik families live in the present and the past”. National Geographic for Kids. (Spring, 2001). 17-19.
- Stone, L. M. (1996). The Antarctic. Vero Beach, Florida: The Rourke Corporation.
- Stone, L. M. (1996). The Arctic. Vero Beach, Florida: The Rourke Corporation.
- Stonehouse, B. (1971). Animals of the Arctic the Ecology of the Far North. NY: Holt, Rinehart, & Winston.
- Thompson, S. (March, 2001). “World News”. National Geographic World. 5.
- Wood, A. (1989). Little Penguin Tale. NY: Scholastic.
- Wood, J. (1991). Icebergs. Milwaukee, Wisconsin: Gareth Stevens Children’s Books.
- Yolen, J. (1987). Owl Moon. NY: Scholastic.

Appendix A
Materials for Polar Unit

Name _____

KWLH

K What I Know

--

W What I Want to Know

--

L What I Learned

--

H How I Learned

--

Name _____

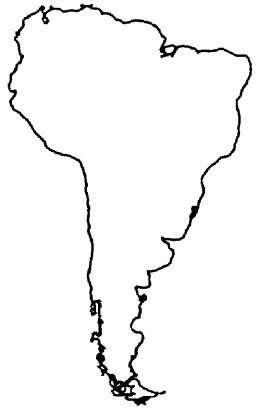
Where are the Continents?

Directions: Label each continent by its shape and color.

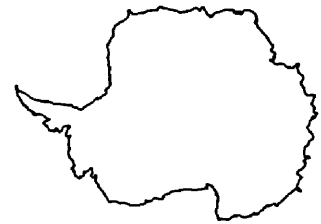
North America
Australia
Africa

Antarctica
South America

Asia
Europe



2. _____



5. _____



1. _____



4. _____



3. _____



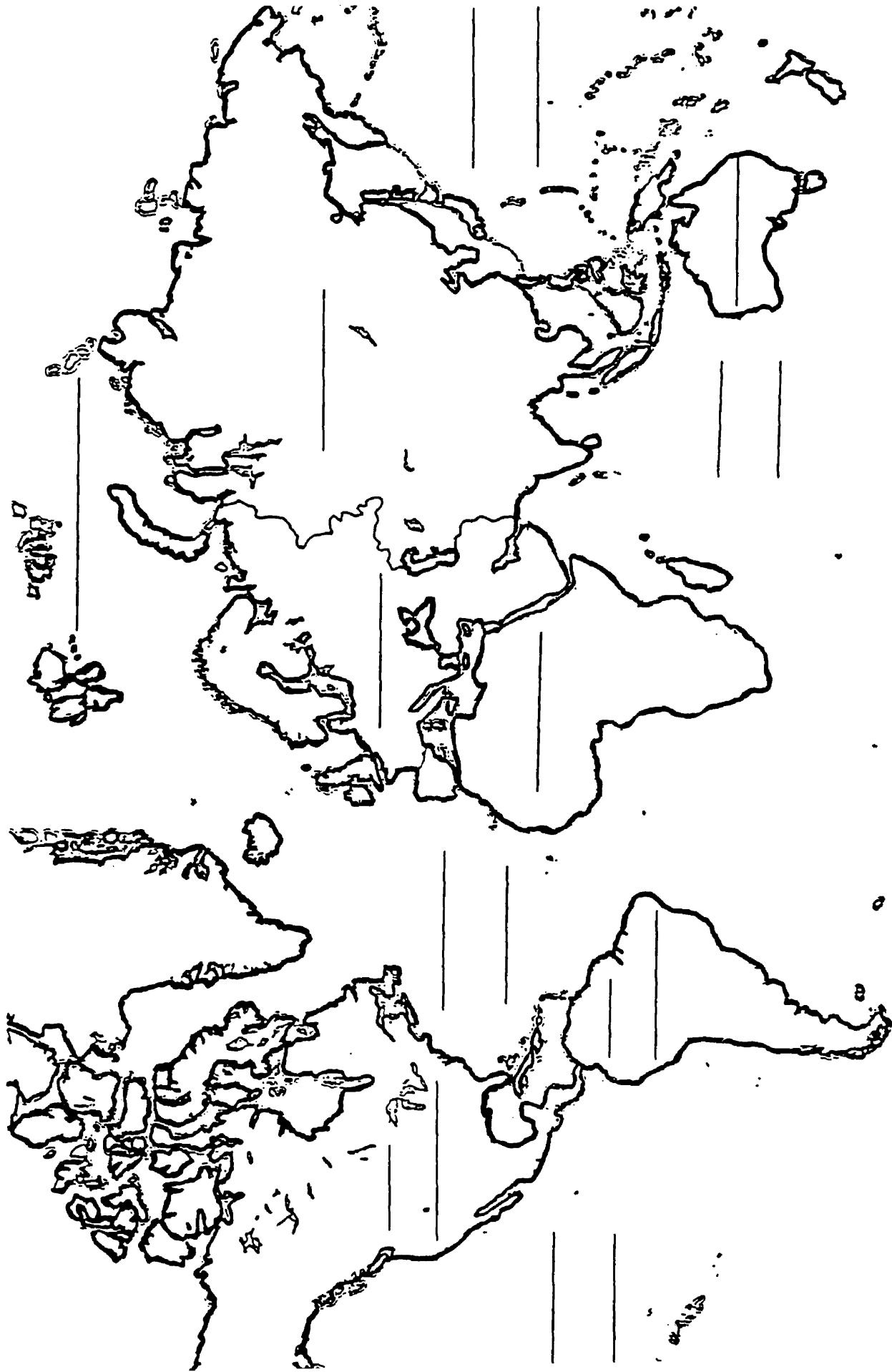
7. _____



6. _____

Major Land Masses and Bodies of Water

Name _____



1. Write the name of each continent inside its outline.
2. Write the names of the five oceans in the correct places.
3. Color all bodies of water blue.



Anticipation Guide

Directions: Read each statement and decide if agree or disagree with the statement. Write yes if you agree with the statement and no if you disagree.

_____ The North and South Poles are very cold with harsh winds.

_____ The Arctic and Antarctica are continents.

_____ Many animals live in both places.

_____ The North Pole or Arctic has summer the same time we experience it here in Michigan.

_____ Antarctica is really a frozen sea.

_____ Antarctica is called a desert because it receives less than 6 inches of rain or snow per year.

_____ There are many kinds of plants that live in the Polar regions.

_____ The Arctic and Antarctic have glaciers and icebergs.

_____ The polar bear only lives in the Arctic.

_____ Trees can grow on the Tundra.

_____ There are no science labs in the Polar Regions.

_____ Parrots live in the Antarctic.

_____ Both Polar Regions have a magnetic pole.

Model of the Arctic and Antarctica

Objective: The class creates a 2-dimensional model the Arctic and Antarctica Circles. The models will display the ecosystem that is unique to that specific geography as well as the human impact.

Activity: Beginning the first day of the unit 2 groups of 3 students each will create a class model of the North and South Poles. Each day something is added that integrates with the objectives for that day's lesson.

Materials: Round piece of cardboard; salt-dough-dyed blue, green, white, brown, and black; cut-outs or models of animals, plants, people, and ships.

Prep: Paint circle light blue and let dry.

Day#1 – Use Opaque Projector to sketch geography outline onto cardboard, label land, sea, ice.

Day #2 – Begin to put colored salt-dough on board.

Day #3 – Finish putting play salt-dough on board.

Day#4 - Label with pencil trace over with Black marker. Arctic: North Pole, Greenland Asia, Alaska, North America, Iceland, North Pacific Ocean, Arctic Circle, Scandinavia, North Atlantic Ocean. Antarctica: South Pole Ross Sea, Weddell Sea, Antarctic Circle, South Atlantic Ocean, South Pacific Ocean, Indian Ocean.

2

Day #5 – Cut out animals and plants unique to that
Region put on model.

Day #6- Continue from day before.

Day #7 – Add Explorers.

Day #8 – Add Native People

Before You Read

What do you know/predict from looking at the cover?

What do you know after reading the blurb about the book?

What do you know after looking at the table of contents?

What do you know after reading the first page?

My Reading Guide

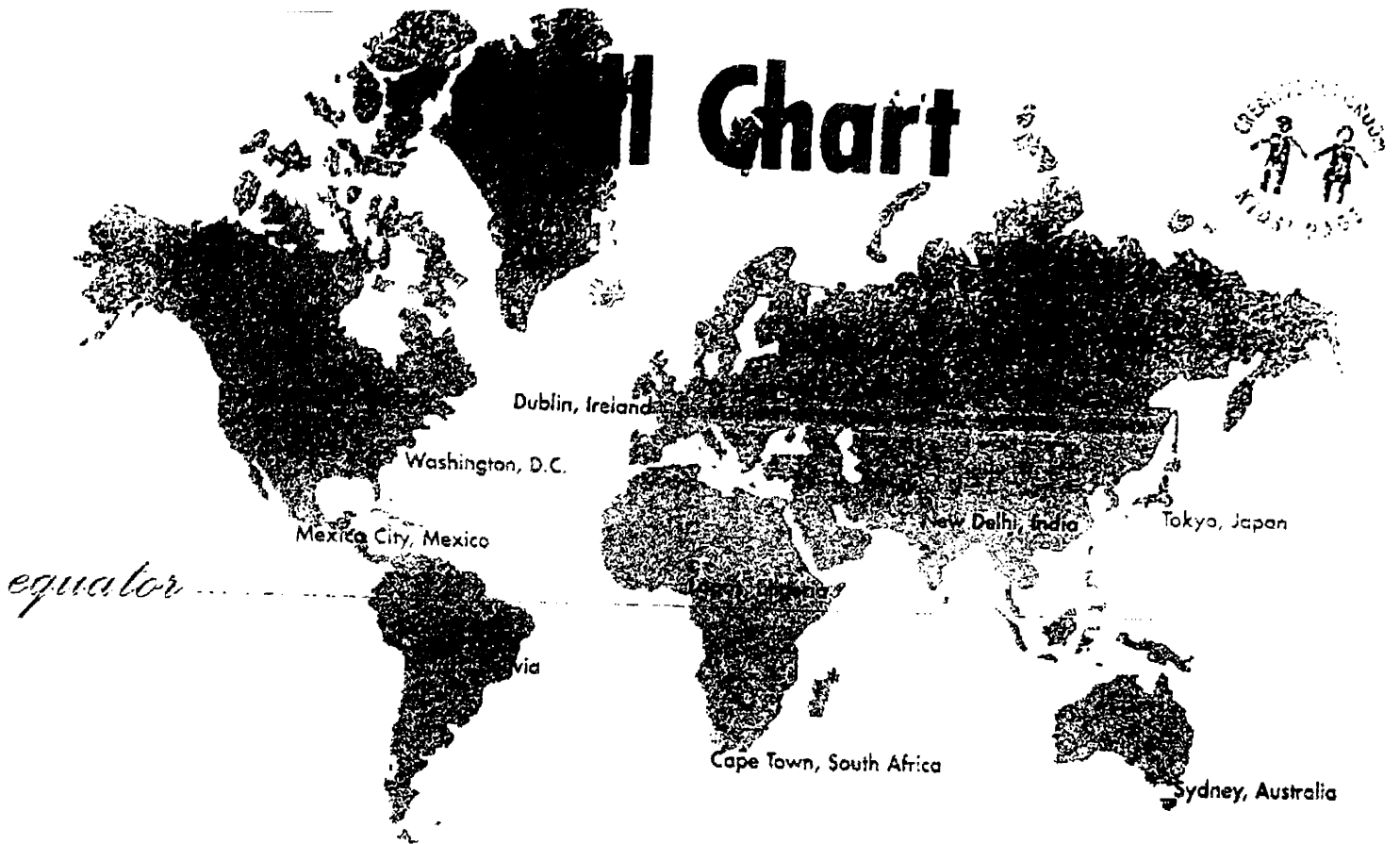
1. What are my predictions?

2. READ pages _____

3. What words are hard to read? What words are hard to understand?

4. Summarize what you read.

5. Write down some good questions that you think your group would want to talk about?



Complete the **CHILL CHART** by converting all Celsius temperatures to Fahrenheit and all Fahrenheit temperatures to Celsius.

CITY	FAHRENHEIT	CELSIUS
Cape Town, South Africa		25° C
Dublin, Ireland	46° F	
Lagos, Nigeria	82° F	
La Paz, Bolivia		13° C
Mexico City, Mexico		21° C
New Delhi, India	68° F	
Sydney, Australia		26° C
Tokyo, Japan		9° C
Washington, D.C.	43° F	

To convert Fahrenheit to Celsius:

1. Subtract 32 from the Fahrenheit temperature.
2. Multiply your answer by the fraction $\frac{5}{9}$.

To convert Celsius to Fahrenheit:

1. Multiply the Celsius temperature by $\frac{9}{5}$.
2. Add 32 to your answer.

GRAPH IT!

Put the cities listed above in order from coldest to warmest average high temperature in January. Be sure that you use the same unit (degrees Celsius or degrees Fahrenheit) for all of the cities. Make a bar graph comparing the temperatures.

Name _____

Name _____
Arctic Vocabulary

Tundra:

Tree line:

Permafrost:

Subarctic:

Taiga:

Ice cap:



Race to the Poles

Break into small groups to research an assigned polar explorer. Use resources provided.

***You will create a Presentation Board for the class.

1. Use question sheet found in Polar journal and complete research with answers to questions in journal.

2. Use "Did You Know" cards with questions and answers written out on card for presentation board.

3. Put explorers route and flag representing country of origin on class map. (You may also include a map on your presentation board.)

4. Fill out Expedition Page, Travel Guide, and Dressing for Survival found in Polar Journal. **Found in Newbridge Educational Program**

5. Add pictures.

6. Group presents board to the class.

Pass out 5w's cards to check audience listening skills.

Teacher and 2 students will assess presentation on an evaluation form.

Fill out group evaluation form to assess how well your group worked together.

Student Evaluation

Name of student being evaluated: _____

Name of evaluator: _____

Please circle.

Organized and Accurate (you understand them): Yes or No

Speaks equally and fluently: Yes or No
(can hear them) (Not too fast)

Visual used: Yes or No
(picture, experiment, poster, overhead)

Overall performance: 1 2 3 4 5
Needs work OK Pretty Good Super The Best, Awesome

Comments:

Group Evaluation
Group Members:

Scale:

1 (never) 2 (sometimes) 3 (okay) 4 (most times) 5 (very well)

Circle the *group's* answer.

1. Our group worked well together. 1 2 3 4 5
2. Our group cooperated with each other. 1 2 3 4 5
3. Our group worked respectfully. 1 2 3 4 5
4. Our group shared materials. 1 2 3 4 5
5. Our group shared the work evenly. 1 2 3 4 5
6. Our group did our best. 1 2 3 4 5
7. Members in our group helped one another. 1 2 3 4 5
8. The part of our project we are most proud of is:

9. The part of our project we could have done better on is:

10. Our favorite part of the project was:

Story Map

Beginning



Middle



Ending

Name _____

"How to Make an Igloo"

--	--	--

1

2

3

--	--	--

4

5

6

Name _____

Glacier Summary

After you have read the book on glaciers use your vocabulary tracker and the book to complete this sheet.

Here is a sentence that tells what the book is about: _____

Here are five facts I learned from this book:

1. _____

2. _____

3. _____

4. _____

Vocabulary Tracker

When you read a book on earth sciences, it's a good idea to keep a list of new words you come across. Write the definition, or meaning, of each new word as you learn it. Then use each new word in a sentence.

New word _____

Definition _____

Sentence _____

New word _____

Definition _____

Sentence _____

New word _____

Definition _____

Sentence _____

Appendix B
Materials for Polar Assessment

Code 2

Ecosystems: An area in which living things interact with one another and with their environment is called an ecosystem. Ecosystems may be large, such as a wetland, the ocean, or a desert. They may also be small, such as a puddle or a piece of rotting log.

Describe your ecosystem:

List some of the plants and animals that interact in your ecosystem:

Give 2 examples of food chains in your ecosystem: (Food energy is passed from one organism to another through a sequence of events called a food chain.)

Example: sun>plant>grasshopper>harvest mouse> marsh hawk

List some of the changes in your ecosystem.

(Seasons/Day/Night/Pollution/Endangered Animals)

Interesting Facts: (Minimum of three)

List some things that may harm ecosystem:

(pollution, predators, endangered species)

Name _____

KWLH

K What I Know

--

W What I Want to Know

--

L What I Learned

--

H How I Learned

--

Code 2

Which is Which?

Using a Venn diagram that is labeled Arctic, Antarctica, or Both place these items in the correct category. Place the terms that do not belong, outside the Venn. Think of two more terms for each category for a total of eight new terms.

Frozen seas

Reindeer herders

Trees

Penguins

Polar Bears

Science Labs

Magnetic poles

Parrots

South Polar skua

Plankton

Tundra

Sources of lumber

Whales

Snakes

Glaciers and icebergs

Hartland Consolidated Schools

Third Grade

Student Assessment

The diagram consists of two large overlapping circles. Each circle is filled with horizontal lines, providing a space for writing. The circles overlap in the center, creating a lens-shaped intersection area also filled with horizontal lines.

Language Arts

17

2002

Code 5

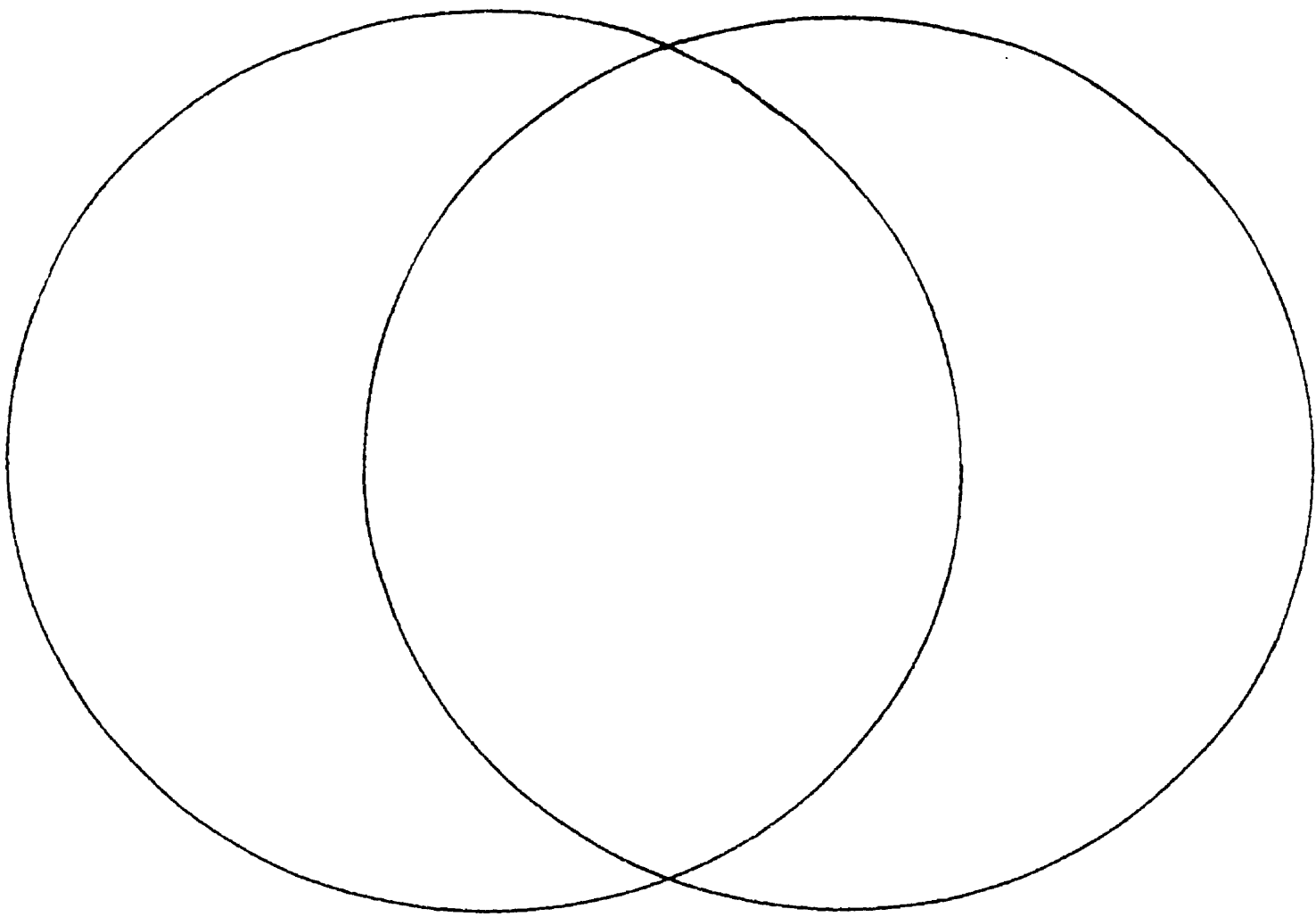
Name: _____

Compare/Contrast Chart

Different

Alike

Different



Code 8

Ecosystems: An area in which living things interact with one another and with their environment is called an ecosystem. Ecosystems may be large, such as a wetland, the ocean, or a desert. They may also be small, such as a puddle or a piece of rotting log.

Describe your ecosystem:

List some of the plants and animals that interact in your ecosystem:

Give 2 examples of food chains in your ecosystem: (Food energy is passed from one organism to another through a sequence of events called a food chain.)

Example: sun>plant>grasshopper>harvest mouse> marsh hawk

List some of the changes in your ecosystem.

(Seasons/Day/Night/Pollution/Endangered Animals)

Interesting Facts: (Minimum of three)

List some things that may harm ecosystem:

(pollution, predators, endangered species)

Group Project: Choose at least one
Diorama/Poster/Mural/Mobile/Take a Walk With Me
Story/Poetry/Technology/ Recording/Slides/Overheads

Oral presentation to the class

Questions for discussion: (Use a variety of W's)

1. _____

2. _____

3. _____

4. _____

5. _____

List career opportunities related to your ecosystem:

Design and Color a food web: (In an ecosystem, there are many different food chains. Different food chains connect to form a network of feeding relationships called a food web.)

Write a math story problem that includes some of the information that you have learned.

You Did it!!!!!!

Polar Jeopardy

Objective:

Students read expository text to gather information to write facts and create questions to cooperatively share with the rest of the class.

Skills:

Research, reading expository text, finding main topic, and writing questions and answers.

Assignment:

Groups of two students are assigned a topic. They read and fill out "Did You Know" cards. Three scaffold levels of cards are available; picture, picture and short summary, or full summary.

On the back the students write a question that pertains to the information on the front. Students are given key words that are leveled by using Blooms Taxonomy to begin their questions. The game uses the Blooms levels to coincide with dollar amounts.

Example: Comprehension/knowledge levels are worth \$100, define and locate; Application/analysis levels are worth \$300, solve and compare; Evaluation/synthesis levels are worth \$500, debate and opinion/fact.

Use Trigger Words found on back.

Topics: Weather, Inuit People, penguins, polar bears, science labs, magnetic pole, South Pole skua, plankton, tundra, ice cap, whales, wolves, glaciers, icebergs, and explorers.

Student Evaluation

Name of student being evaluated: _____

Name of evaluator: _____

Please circle.

Organized and Accurate (you understand them): Yes or No

Speaks equally and fluently: Yes or No
(can hear them) (Not too fast)

Visual used: Yes or No
(picture, experiment, poster, overhead)

Overall performance: 1 2 3 4 5
Needs work OK Pretty Good Super The Best, Awesome

Comments:

Group Evaluation
Group Members:

Scale:

1 (never) 2 (sometimes) 3 (okay) 4 (most times) 5 (very well)

Circle the *group's* answer.

1. Our group worked well together. 1 2 3 4 5
2. Our group cooperated with each other. 1 2 3 4 5
3. Our group worked respectfully. 1 2 3 4 5
4. Our group shared materials. 1 2 3 4 5
5. Our group shared the work evenly. 1 2 3 4 5
6. Our group did our best. 1 2 3 4 5
7. Members in our group helped one another. 1 2 3 4 5
8. The part of our project we are most proud of is:

9. The part of our project we could have done better on is:

10. Our favorite part of the project was:

ECOSYSTEM REPORT EVALUATION

Name _____ Date _____

Ecosystem _____

The point scale is base on performance expectations.

1. Describe your ecosystem. earn 5: 10 descriptive words

4: 8 descriptive words

POINTS _____

3: 6 descriptive words

2: 4 descriptive words

1: 2 descriptive words

2. List plants and animals in your ecosystem: earn 5: 10 plants and animals

4: 8 plants and animals

POINTS _____

3: 6 plants and animals

2: 4 plants and animals

1: 2 plants and animals

3. Give 2 examples of food chains. earn 10: 2 chains; 5 organisms in each

8: 2 chains; 4 organisms in each

POINTS _____

6: 2 chains; 3 organisms in each

4: 1 chain; 4/5 organisms

2: 1 chain; 3 or less organisms

4. Group project: communicate information in varied forms. (5 attributes)

earn 10: Visual used; project is neat, complete, creative, accurate

POINTS _____

8: 4 of 5 attributes are present.

6: 3 of 5 attributes are present.

4: 2 of 5 attributes are present.

2: 1 attribute is present.

5. Oral Presentation: group members present data collected. (5 attributes)

earn 20: technology used; data complete, organized; speak equally and fluently.

POINTS _____

16: 4 of 5 attributes are present

12: 3 of 5 attributes are present.

8: 2 of 5 attributes are present.

4: 1 attribute is present.

6. Discussion questions: express and compare data using a variety of "W's."

earn 10: 5 different questions (W's) with complete answers.

POINTS _____

8: 4 different questions (W's) with complete answers.

6: 3 different questions (W's) with complete answers.

4: 2 different questions (W's) with complete answers.

2: 1 different question (W's) with complete answer.

7. Identify career opportunities.

POINTS _____

- earn 5: 5 specific careers listed.
- 4: 4 specific careers listed.
- 3: 3 specific careers listed.
- 2: 2 specific careers listed.
- 1: 1 specific career listed.

8. Describe positive changes.

POINTS _____

- earn 5: 5 positive changes listed.
- 4: 4 positive changes listed.
- 3: 3 positive changes listed.
- 2: 2 positive changes listed.
- 1: 1 positive change listed.

9. Interesting facts from variety of texts.

POINTS _____

- earn 5: 5 complete facts stated.
- 4: 4 complete facts stated.
- 3: 3 complete facts stated.
- 2: 2 complete facts stated.
- 1: 1 complete fact stated.

10. Describe negative changes.

POINTS _____

- earn 5: 5 negative changes listed.
- 4: 4 negative changes listed.
- 3: 3 negative changes listed.
- 2: 2 negative changes listed.
- 1: 1 negative change listed.

11. Food Web; interdependence shown

POINTS _____

- earn 5: 10 organisms shown.
- 4: 8 organisms shown.
- 3: 6 organisms shown.
- 2: 4 organisms shown.
- 1: 2 organisms shown.

12. Math Problem: (5 attributes)

POINTS _____

- earn 5: Data has character(s), 2 events, problem, and answer.
- 4: 4 of 5 attributes are present.
- 3: 3 of 5 attributes are present.
- 2: 2 of 5 attributes are present.
- 1: 1 attribute is present.

13. Written summary: (5 attributes)

POINTS _____

- earn 10: 4 paragraphs, complete sentences with capitals, punctuation, spelling.
- 8: 4 of 5 attributes are present.
- 6: 3 of 5 attributes are present.
- 4: 2 of 5 attributes are present.
- 2: 1 attribute is present.

Name _____
2-5-8 Scoring Rubric

Code 2 (if chosen) Assessment Description _____

Skill is incomplete.	Some skill is shown.	All skills are complete.
1	5	10

Work is disorganized Unsatisfactory	Work is satisfactory	Work is outstanding
1	5	10

Code 2 Total _____ 20 points

Code 5 (if chosen) Assessment Description _____

Skills are incomplete	Some skill is shown	All skills are complete.
1	10	20

Work shows little thought.	Work is original.	Work is original and creative.
1	10	20

Work is disorganized Unsatisfactory	Work is satisfactory	Work is outstanding
1	5	10

Code 5 Total _____ 50 points

Code 8 (if chosen) Assessment Description _____

Skills are incomplete	Some skill is shown	All skills are complete.
1	15	30

Work shows little thought.	Work is original	Work is original and creative.
1	15	30

Work is disorganized	Work is satisfactory	Work is outstanding
1	5	10

Class presentation is Disorganized, hard to hear.	Presentation was organized, mostly audible.	Project was well presented and easily heard.
1	5	10

Code 8 Total _____ 80 point
 Assessment Total _____ /100 points

Comments:

Name _____
2-5-8 Scoring Rubric

Code 2 (if chosen) Assessment Description _____

Skill is incomplete.	Some skill is shown.	All skills are complete.
1	5	10
Work is disorganized Unsatisfactory	Work is satisfactory	Work is outstanding
1	5	10

Code 2 Total _____/20 points

Code 5 (if chosen) Assessment Description _____

Skills are incomplete	Some skill is shown	All skills are complete.
1	10	20
Work shows little thought.	Work is original.	Work is original and creative.
1	10	20
Work is disorganized Unsatisfactory	Work is satisfactory *	Work is outstanding
1	5	10

Code 5 Total _____/50 points

Code 8 (if chosen) Assessment Description _____

Skills are incomplete	Some skill is shown	All skills are complete.
1	15	30
Work shows little thought.	Work is original	Work is original and creative.
1	15	30
Work is disorganized	Work is satisfactory	Work is outstanding
1	5	10
Class presentation is Disorganized, hard to hear.	Presentation was organized, mostly audible.	Project was well presented and easily heard.
1	5	10

Code 8 Total _____/80 point
 Assessment Total _____/100 points

Comments:

Ocean Unit

Coral Reef Study

Part 1: Physical Description

Science Standard I: 1.1: Generate reasonable questions about the world based on observation.

Language Arts Standard 9.2: Identify and categorize key ideas, concepts, and perspectives found in texts.

Social Studies Standard II: 2.2.4: Explain basic ecosystem concepts and processes.

Social Studies Standard II: 2.4: Students will describe, compare, and explain the locations and characteristics of ecosystems, resources, human adaptation, environmental impact, and the interrelationships among them.

Focus questions: **What and where are the oceans of the world?**

Ecosystem Packet (E.C.P.): (*Appendix A*)

Read: "Ocean Life", Newbridge, p. 1.

Key points:

- Earth is called the 'Blue Planet' because $\frac{3}{4}$ of the earth's surface is covered by water, and mostly by oceans.
- Oceans cover 360 million square miles of the earth's surface.
- Oceans are about 3.5 billion years old.
- The deepest point in the ocean is more than 7 miles down.
- More than 200,000 different species live in the ocean.

Activities

1. Label map of oceans of the world (teacher resources) on overhead. Stress where student lives compared to location of oceans. Ask the question; What large bodies of water do we live by? Compare and contrast using a class VENN.
2. Students complete 'The Ocean Plant Worksheet'.
3. Students watch "Eyewitness Ocean Video"; see video facts (*Appendix B*) Students tell one fact that they learned from the video into tape recorder. Type up facts to view on overhead and listen to tape the next day to review what they learned from video.
4. Fill out E.C.P.; Describe Ecosystem and Reading for Concepts; 'The River in the Oceans'.
5. Students perform 'A Salt Solution Experiment' to observe the evaporation of salt water.

Part 2: Plants and Animals

Science Standard II: 1.4: Develop an awareness of and sensitivity to the natural world.

Science Standard III: 2.1: Compare and classify familiar organisms.

Focus question: What lives in the ocean?

Reading: Scaffold Reading Experience Framework

1. DRTA (Directed, Reading, Thinking, Activity)
 - a) Activate prior knowledge for the topic of the text to be read.
 - b) Hypothesize about what might be addressed in the text.
 - c) Establish purposes for reading.
 - Use Before Reading Strategy and Predictions.

Read: Kids Discover, "Ocean" pp.2-7

Activity: List some of the plants and animals that interact in the ecosystem, E.C.P.

Read: Animals of the Sea and Shore

Activity: Students are divided into six smaller groups and are assigned an animal category to research for a mini oral presentation to be given at the end of the class period or first thing the next day. Mini reports should include: a brief description of their type of animal, names of animals in their category, and any interesting facts. (*See Appendix C*)

Enrichment (*for highly capable students*): Classy Sea Creature Worksheet Classification exercise (*See Appendix D*)

- Watch "Sea and Shore" Video

Part 3: Food Chains and Webs

Science Standard III: 5.1: Identify familiar organisms as part of a food chain or food web and describe their feeding relationships within the web.

Science Standard III: 5.2: Explain common patterns of interdependence and interrelationships of living things.

Focus question: What are examples of ocean food chains and webs?

Read: "Ocean Life", p. 2

Key points:

- The ocean food pyramid begins with a strong base of primary producers, the Phytoplankton. This is the source of all energy in the ocean.
- Phytoplanktons are microscopic plants that produce energy through photosynthesis.
- Next, is the first order of consumers, the tiny animals called zooplankton, followed by the second order of consumers the small sea animals, such as crabs, squids, shrimp, and small fish. They feed the larger sea animals.
- The third order of consumers on the food pyramid is larger sea animals such as sea turtles and seals.
- Finally we have the fourth order of consumers, the large carnivores, sharks and Orcas.
- As energy moves up the food pyramid the animals get larger and fewer in number.

Activities:

1. Put examples of food pyramid on overhead. Discuss where and why each animal is on the food pyramid.
 2. Put cut out animals with magnets on back on the board, have students make a food chain with the cut outs, explaining as they go the transfers of energy in their food chain.
 3. Give two examples of food chains with four transfers of energy for E.C.P.
1. Design and color a food web found in E.C.P. Use examples from Student literature.
 2. *Enrichment: '1,000 Pound Tuna Fish Sandwich'*, this challenge engages students to understand the concept of energy transfers and their efficiency in two-ocean food chains. (*Appendix D*)

Part 4: Human Impact

Social Studies Standard II: 2.2: Students will describe, compare, and explain the locations and characteristics of ecosystems, resources, human adaptation, environmental impact, and the interrelationships among them.

Science I: 1.2: Develop solutions to unfamiliar problems through reasoning, observation, and/or experiment.

Science III: 5.5: Describe positive and negative effects of humans on the environment.

Focus questions: Describe how humans impact the ocean ecosystem in negative and positive ways? What can we do to help solve some of these problems?

Reading: Literacy Lesson Framework

Guided Reading

- Make predictions about what may harm the oceans and how we can protect this ecosystem.
- Partner read *Kids Discover*, "Oceans", p. 8-17
- Checks to see if predictions were accurate.

Activities:

1. List some things that may harm your ecosystem in E.C.P. as well as career opportunities.
2. Read *Sea Star Poem*; draw a picture of the setting.
3. Read *Oil Spill* by Melvin Berger to students.
4. "Oil Spill Experiment" (*Appendix A*) – Students mix cooking oil and water in a large clear bowl, noticing that the two don't mix. Provide some feathers from water birds, ducks or gulls, explain how feathers create a watertight seal that insulates the bird from cold water. Students dip feathers in the oil and water mixture, they should notice how they lose their shape, and their insulating ability. If this happened to a bird, it might die from the cold. Students then try to rinse the oil off under a faucet to restore a feather's shape. (They will find they can't.)

5. Put "Dangerous Waters" article on overhead and read to students.
(*Teacher Resources*) Students write letters to their Senator to encourage them to make new laws to help prevent oil spills.

Senator _____

U.S. Senate

Washington, DC 20510

Coral Reef Study

Focus Questions: What is a Coral Reef? Where are the world's coral reefs? Why are they important to our planet and to us?

Key points: Ranger Rick: Life in a Coral Reef, pp.3 &4.

- Coral reefs are limestone structures formed in warm, shallow seas by the external skeletons of millions and millions of tiny sea animals called coral polyps. Coral polyps belong to the phylum *Cnidaria* that includes jellyfish and sea anemones. All these soft-bodied animals have a mouth surrounded by tentacles that take in food.
- Many individual polyps of the same species live joined together in a single colony, and many different species and colonies can be found in a single coral reef. The species of coral and the characteristic shapes their colonies take determine the shape of the reef. The colors come from the individual polyps (which get their color from microscopic algae that live in their cells) and from other sea animals and plants that attach themselves to the reef.
- Coral reefs can form only where the water temperature is above 68 degrees and below 96 degrees Fahrenheit. The reefs require moving water, which brings inhabitants a continuous supply of oxygen to breathe and tiny animals called plankton to eat. Reefs also need clear, clean water so that the algae that live in a symbiotic relationship with the coral polyps can use sunlight to produce food and oxygen through photosynthesis. Pollution or silt in the water can kill or bury coral reef.
- Most of the world's coral reefs are located in the South Pacific, the Indian Ocean, the Red Sea, and the Atlantic Ocean, from the coast of Brazil up through the Caribbean to the coast of Florida. In general, reefs more commonly form on the eastern seaboard of islands and continents due to the circulating currents there that favor coral growth.
- Ecologists say that coral reefs, because of their biodiversity, are the marine equivalent of tropical rain forests. A coral reef is a complex biological system in which various organisms form a community, each dependent on the delicate balance of nature in the reef. Destroying coral reefs, one of the oldest ecosystems on earth, endangers that balance and all who depend on it, ultimately effecting quality of life on our planet.

Coral Reef Packet (CRP) (*see Appendix E*)

Reading Strategies used in the Coral Reef Study

Reciprocal Teaching Model:

1. Identify the topic.
2. Write five facts to support the topic.
3. Use the facts to write a summary of what they have read or heard.

Scaffold Reading Experience Framework:

1. Build text-specific knowledge (activate prior knowledge, Predicting) and establish purpose for reading.
2. Partner reading
3. Discuss with partner one important fact that they learned from each paragraph.

Cognitive Strategies

1. Use the 5 W cards (who, what, when, why, where/how) identify the topic and main points.
2. Write two or three words to reflect the topic and each point.
3. Use these words as a prompt to help figure out the main idea of the paragraph.
4. Select two details that elaborate on the main idea and are important to remember.

Activities

1. Students perform the experiment 'The Differences Between Fresh and Salt Water' record observations.
2. Students listen to the National Geographic tape "Wonders of Learning" and read along using the provided pamphlet. Record five interesting facts in the E.C.P.

Read: Life on the Coral Reef, pp.4-21, read this Big Book out loud.

Coral Reefs, pp.4-9, power read and partner read

3. Students use their CRP to perform the activities and answer the questions.

Read: Read together Coral Reefs, pp. 18-21.

With a partner read the article "Can We Rescue The Reefs", Time For Kids, November 10, 2000 6(9).

4. Use the 5 W cards for class discussion. Fill out 'Analyzing a News Story' overhead from class discussion. (*Teacher resource*)
5. Students answer question and complete 'What's Missing Here?' assessment worksheet found in CRP.
6. Perform two experiments to demonstrate water pressure. (*teacher resource*)

- a. 'Push Water Away' – Will blowing bubbles in deep water be harder, easier, or the same as blowing bubbles in shallow water?
- b. 'Feel the Squeeze' – Have you felt the squeezing force of water pressure?

Read: Coral Reef, pp. 14-17, partner read.

7. Imagine a dive to a Coral Reef. Draw what you would see close Up, and label any threats you may see. Color the Coral Reef drawing or create your own. Label some of the plants and animals.

Read: Power Read, Coral Reef, p.22

8. List three examples and answer 'What can we do to help?' CRP

Read: Reread 'Shipwreck', Coral Reef, pp. 24-28 with a partner.

9. Discuss the Reader's Response questions with your partner.
10. Define Symbiosis, Algae, and Coral Polyps.

Read: "Adventures of Ranger Rick", Ranger Rick, June 1997, pp.28-31.

11. Complete the story map.
12. Prepare 1-minute presentation to share aloud with the class on what you have learned and how this Coral Reef Study affected. CRP
13. Create a math story problem that includes some of the information that you have learned, E.C.P.

Assessments (*Appendix F*)

1. Reading for Concepts, "Life from the Sea"
2. The World's Awesome Oceans
3. Four paragraph written summary using E.C.P.
4. Oceans Final Group Project
5. Ecosystem Report Evaluation
6. Self-Reflection
7. Cooperative Group Evaluation

References

- Berger, G. (1994). Ranger Rick: Life In A Coral Reef. New York: Newbridge Educational Publishing. pp. 3 & 4.
- Berger, M. (1994). Oil Spill! New York: Harper Collins Publishers. pp. 4-32.
- Coral Reefs. (1999). Clifton, NJ: Newbridge Educational Publishing.
- King, J. (1993). The Pools and Coral Reefs. Huntington Beach, CA: Teacher Created Material, Inc.
- Life on a Coral Reef. (1982). National Geographic. pp. 1-8.
- Martinez, A. (2001, February 23). Helping Hawaii's Reefs. Weekly Reader. p.2.
- Mearns, A. (1997, June). Adventures of Ranger Rick. Ranger Rick. pp. 28 -31.
- Ocean Life. (1999). Clifton, NJ: Newbridge Educational Publishing.
- Su, A. (1996). Oceans. Kids Discover. pp. 2-17.
- Upadhyay, Ritu. (2000, November 10). Can We Rescue The Reefs? Time For Kids. pp. 1-4.
- Wood, J. (1991). Coral Reefs. NY: Scholastic, Inc. pp. 4-28.

Websites

- <http://www.coralreefnetwork.com>
<http://geosun1.sjsu.edu/~dreed/105/coral.html>
<http://library.advanced.org/11922/fish/fish/htm>
<http://nationalgeographic.com>
<http://www.divediscover.whoi.edu>

Appendix A
Ecosystem Packet

Ecosystems: An area in which living things interact with one another and with their environment is called an ecosystem. Ecosystems may be large, such as a wetland, the ocean, coral reef, or a desert. They may also be small, such as a puddle or a piece of rotting log.

Describe your ecosystem:

List some of the plants and animals that interact in your ecosystem:

List some things that may harm your ecosystem:(pollution, predators, Human impact)

Design and Color a food web: (In an ecosystem, there are many different food chains. Different food chains connect to form a network of feeding relationships called a food web.)

Write and illustrate a math story problem that includes some of the information that you have learned.

Group Project: see attached

Group Presentation

Coral Reef Facts:

1. _____

2. _____

3. _____

4. _____

5. _____

List career opportunities related to your ecosystem:

Give 2 examples of food chains in your ecosystem: (Food energy is passed from one organism to another through a sequence of events called a food chain.) Use back if necessary.
Example: sun>plant>grasshopper>harvest mouse> marsh hawk

Appendix B

Video Facts

Eyewitness-Oceans Video facts

Barrier Reef is the largest structure on earth made by living things.

Whale shark is the largest ocean animal, yet it eats mostly tiny plankton.

The sail was invented over 8,000 years ago.

Magellan proved that all oceans were joined. Some positive effects of this were that ships could carry more than land transportation vehicles. This discovery opened up a world of exporting goods and world trade. 95% of world trade today still travels by sea.

If all the salt were extracted from the ocean “we would be up to our necks in salt.” (about 5ft.)

Salt water density experiment

Early scientists in the 1800’s charted currents by sending messages in bottles.

If you drain water in a sink and you live north of the equator the water will drain clockwise. If you south of the equator the water will drain counter clockwise.

In 1943 Jacques Cousteau invented the scuba equipment to go to depths of 160 ft.

Humans have to adjust to the pressure under the water unlike seals. The pressure near the bottom is equivalent to 50 jumbo jets supported on top of you.

Some ocean animals need that pressure to survive. They would disintegrate if brought to the surface.

Humans knew the distance of the moon before the depth of the ocean was discovered.

Some animals may have survived with chemosynthesis rather than photosynthesis.

Appendix C
Animals of the Sea and Shore

Name _____

Animals of Sea and Shore

Please read the highlighted pages, research the animal category, and prepare a mini oral presentation. Presentations should include a brief description of the animal's characteristics, names of the animals in your category, and interesting facts. Everyone should read the final chapter found on pages 43-45.

Animals with Fur pp. 5-9

Names of Animals

Animals with Fins pp. 10-12

Animals with Many Legs pp. 13-19

Animals with Shells pp. 20- 28

Animals with Spiny Skins pp. 29-34

Animals with Soft Bodies pp.35-42

Read your assigned pages by yourself and write five key words that describe your type of animals.

1.

2.

3.

4.

5.

Pair up; take turns telling each other a research narrative – using all your key words. Listener will tell some of the keywords you had on your paper without looking. Now trade places and you become the listener and your partner the speaker.

Read the pages again and list three or more interesting facts with a partner.

1.

2.

3.

Now write your paragraph(s) using your keywords. Include a brief description of the animal's characteristics, names of the animals in your category and interesting facts.

Read Aloud in your group and choose one to share with the class.

Appendix D
Coral Reef Packet

Coral Reef Ecosystem Study
The Oldest Ecosystem on Earth

1. Listen to the National Geographic tape and record five interesting facts.
2. Using the book, Life on the Coral Reef, and other resources available answer the following questions:

(Use sticky notes as you read to predict, clarify, summarize, and question the ideas presented.)

What is a Coral Reef?(pgs.4-7) Briefly describe. _____

Where are Coral Reefs Found? (pg. 8) Describe the conditions that they prefer, and plot them on your map.

Coral Reefs are in danger. (page 18-21) Read the Time for Kids article and answer the worksheet. What causes the death of Coral Reefs?

Imagine a dive to a Coral Reef. (pgs. 14-17) Draw what you would see close up, and label any threats you may see. Color the Coral Reef drawing or create your own. Label some of the plants and animals.

Why are Coral Reefs worth protecting? (pg. 22) List 3 examples.
What can we do to help? (2 ideas)

3. Reread Shipwreck with a partner after your teacher reads aloud. Briefly discuss the Reader's Response questions with your partner from the yellow sheet.

4. Define:

Symbiosis-

Algae-

Coral Polyps-

5. Read Adventures of Ranger Rick story and complete the story map. Be sure to pay attention to the problem and how the problem was solved.

6. Now that you are an expert marine biologist what are you thinking about concerning the Coral Reef? What will you do differently? What are you wondering? Does this remind you of anything? What facts stick in your brain? What surprised you? Prepare a 1-minute presentation to share aloud with the class. Time yourself. Make some notes below and on back of this sheet about what you'd like to say. Get teacher approval.

* Bonus visit any of the web sites listed. Try Animal Advance Internet at home.

Name _____

Date _____



WHAT'S MISSING HERE?

How well did you read this week's cover story? Fill in the missing words in the sentences below. Circle your answers.

1. Busy communities of ocean creatures live together in brightly colored structures called _____.
 - A. houses
 - B. coral polyps
 - C. coral reefs

2. Creatures have lived in coral reefs for _____ of years.
 - A. hundreds
 - B. thousands
 - C. millions

3. More than _____ of coral reefs have been destroyed by pollution and careless human behavior.
 - A. 75%
 - B. 25%
 - C. 100%

4. All of the following are threats to coral reefs except _____.
 - A. algae
 - B. pollution
 - C. warm waters

5. Fishermen have contributed to the coral reef crisis by _____.
 - A. catching the reefs' fish
 - B. using dynamite to shatter the reefs
 - C. both A and B

BONUS: Your turn! Create a fill-in-the-blank sentence for a friend based on something you read in this week's cover story.

Name _____ # _____

Link: Experiment: "Push Water Away"

Will blowing bubbles in deep water be harder, easier or the same as blowing bubbles in shallow water?

My Comments : _____

Name _____ # _____

Link: Experiment: "Push Water Away"

Will blowing bubbles in deep water be harder, easier or the same as blowing bubbles in shallow water?

My Comments : _____

Story Map

Title: _____

Setting:

Characters: _____

Problem:

Event 1 _____

Event 2 _____

Event 3 _____

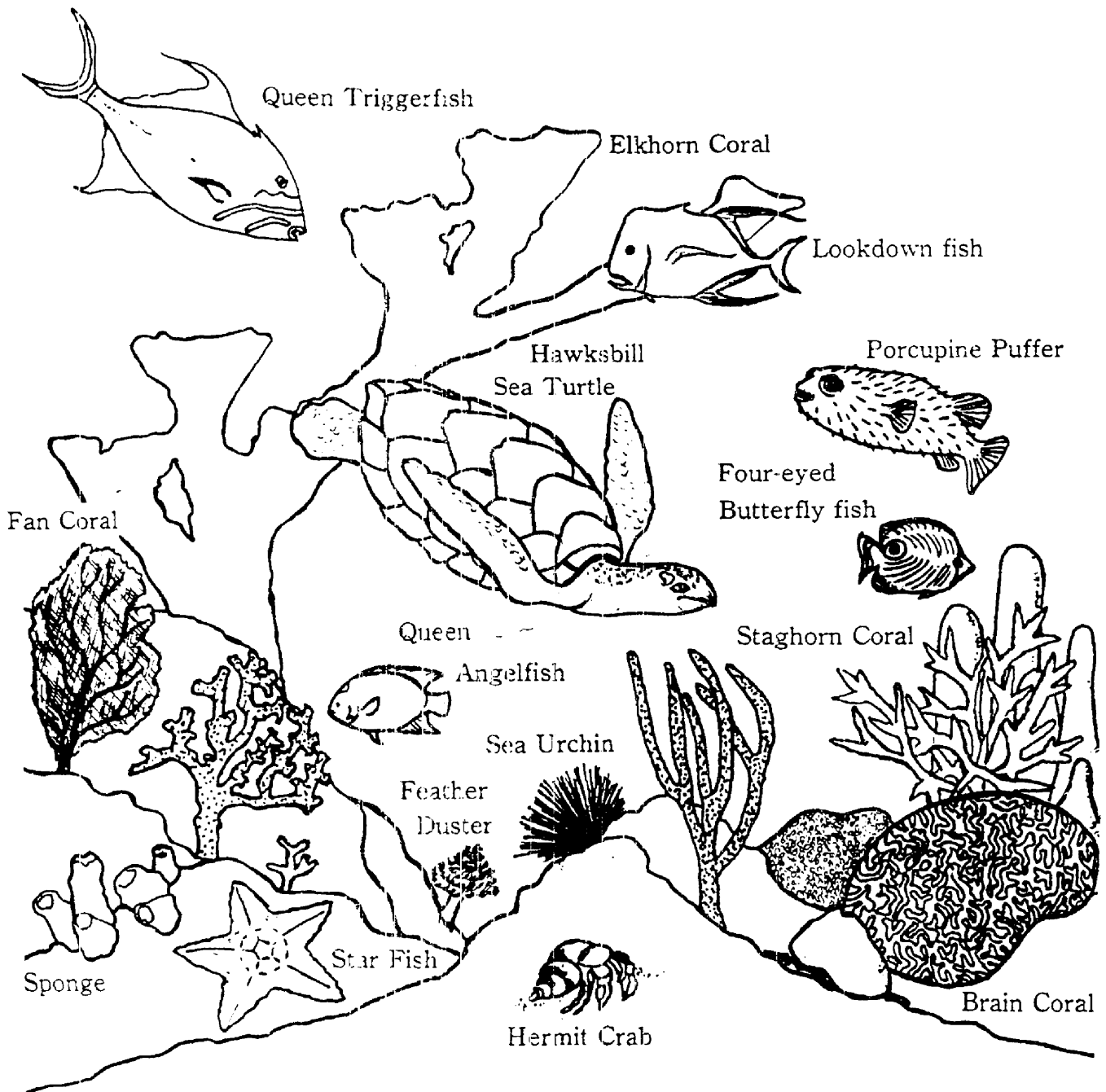
Event 4 _____

Event 5 _____

Resolution:
(Ending)



Coral Reef



The colorful coral reef looks like a beautiful underwater garden. It provides a good home for many kinds of animals.

Color This Coral Reef

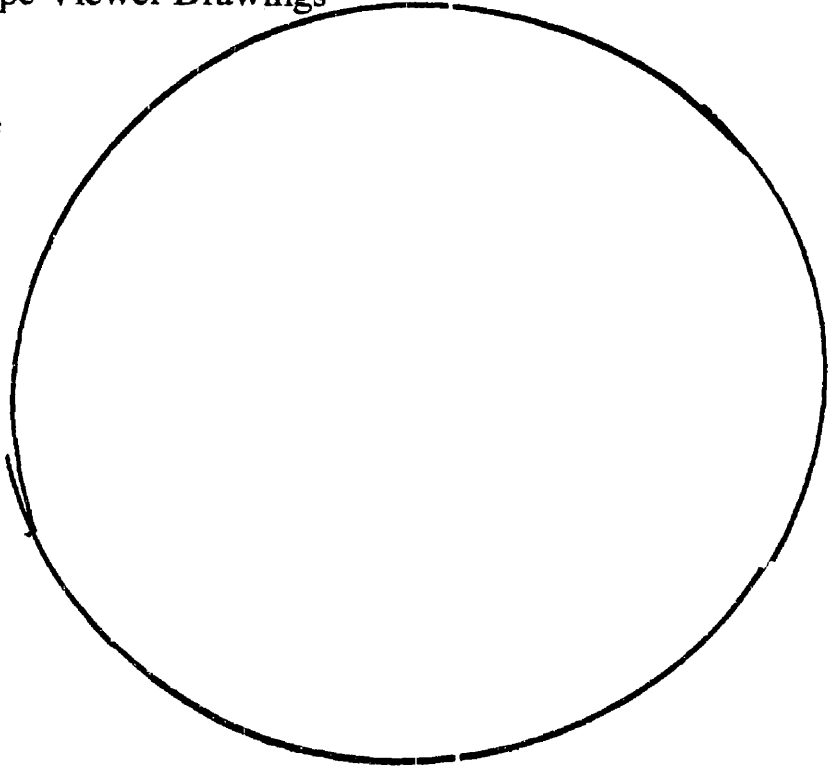
Courtesy of Sea World Ohio

Name:

Microscope Viewer Drawings

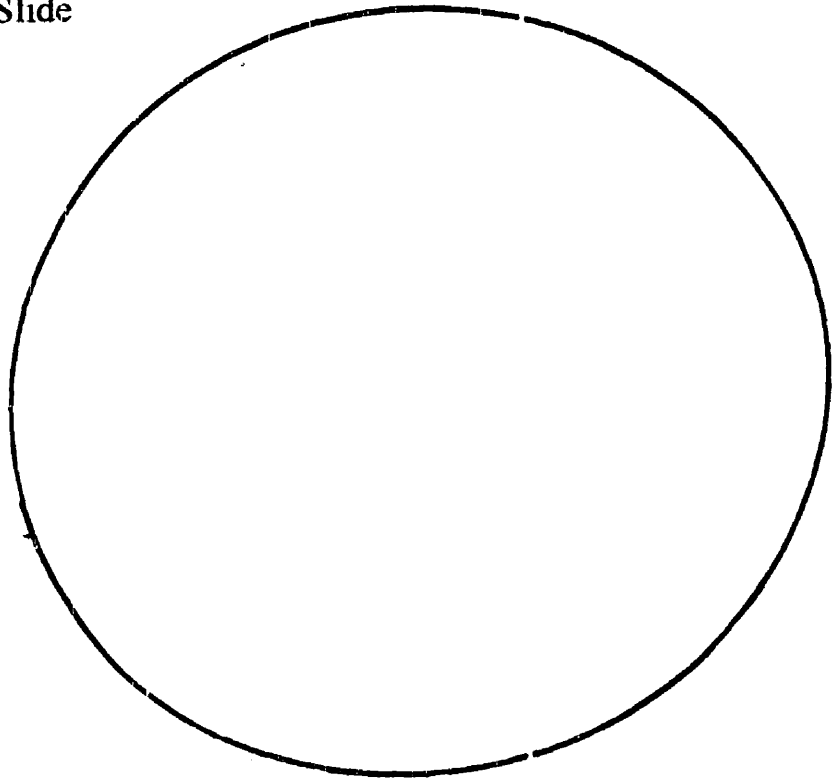
1. _____ Slide

Describe what you see
(Use at least 3 adjectives)



2. _____ Slide

Describe what you see
(Use at least 3 adjectives)



Appendix E
Assessment

The World's Awesome Oceans

Write your opinions on the lines.



The oceans of the world are very important because _____



The oceans are becoming more and more polluted because _____



Pollution of the world's oceans is harmful because _____

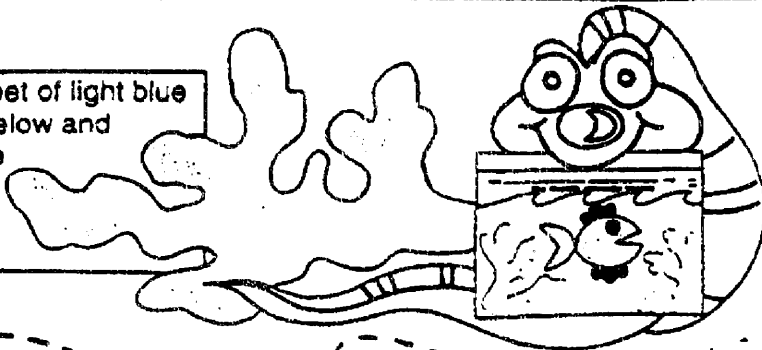
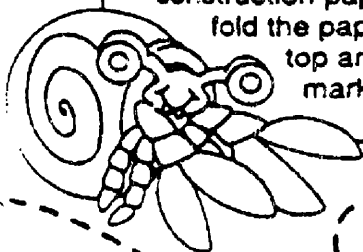


Humans can prevent the oceans from becoming more polluted by _____



If I could spend a day exploring the ocean, this is what I would like to do:

Bonus Box: Glue this paper atop a 9" x 12" sheet of light blue construction paper. Cut on the dotted lines below and fold the paper to match the waves on the top and bottom. Use crayons or markers to draw a scene "beneath the waves."



Oceans

Final Project

Materials: Ecosystem research page, map of world, bag of shapes: (1) 3-dimensional shape; for the body and various 2-dimensional shapes, glue, paint, tape, and science research pages.

Objective: Groups of 4/5 students will create a factitious aquatic creature that is based on factual research.

- Creature has to adapt to chosen environment.
- Environment has to support creature.
- Representation of food chain with creature included.
- Location of creatures home, where young are raised.
- Migration of creature.
- What is the human impact on the creature.
- Is this creature endangered?

Fill out "Did you ever see a.....?" worksheet and use for oral presentation of creature.

Each group completes the "Cooperative Group Evaluation" to be discussed with teacher.

ASSESSMENT

Project Self-Reflection: _____

Topic

Name _____ Date _____

As I think about the research project I have just completed, I am especially pleased about _____

I think this turned out so well because _____

The most important thing I learned while working on this project was _____

If I were to improve one thing about my project, I would _____

My next goal is _____

Name _____ Date _____

Ecosystem _____

The point scale is based on performance expectations.

1. Describe your ecosystem. earn 5: 10 descriptive words

4: 8 descriptive words

3: 6 descriptive words

2: 4 descriptive words

1: 2 descriptive words

POINTS _____

2. List plants and animals in your ecosystem: earn 5: 10 plants and animals

4: 8 plants and animals

3: 6 plants and animals

2: 4 plants and animals

1: 2 plants and animals

POINTS _____

3. Give 2 examples of food chains. earn 10: 2 chains; 5 organisms in each

8: 2 chains; 4 organisms in each

6: 2 chains; 3 organisms in each

4: 1 chain; 4/5 organisms

2: 1 chain; 3 or less organisms

POINTS _____

4. Group project: communicate information in varied forms. (5 attributes)

earn 10: Visual used; project is neat, complete, creative, accurate

8: 4 of 5 attributes are present.

6: 3 of 5 attributes are present.

4: 2 of 5 attributes are present.

2: 1 attribute is present.

POINTS _____

5. Oral Presentation: group members present data collected. (5 attributes)

earn 20: technology used; data complete, organized; speak equally and fluently.

16: 4 of 5 attributes are present

12: 3 of 5 attributes are present.

8: 2 of 5 attributes are present.

4: 1 attribute is present.

POINTS _____

6. Discussion questions: express and compare data using a variety of "W's."

earn 10: 5 different questions (W's) with complete answers.

8: 4 different questions (W's) with complete answers.

6: 3 different questions (W's) with complete answers.

4: 2 different questions (W's) with complete answers.

2: 1 different question (W's) with complete answer.

POINTS _____

7. Identify career opportunities.

POINTS _____

- earn 5: 5 specific careers listed.
- 4: 4 specific careers listed.
- 3: 3 specific careers listed.
- 2: 2 specific careers listed.
- 1: 1 specific career listed.

8. Describe positive changes.

POINTS _____

- earn 5: 5 positive changes listed.
- 4: 4 positive changes listed.
- 3: 3 positive changes listed.
- 2: 2 positive changes listed.
- 1: 1 positive change listed.

9. Interesting facts from variety of texts.

POINTS _____

- earn 5: 5 complete facts stated.
- 4: 4 complete facts stated.
- 3: 3 complete facts stated.
- 2: 2 complete facts stated.
- 1: 1 complete fact stated.

10. Describe negative changes.

POINTS _____

- earn 5: 5 negative changes listed.
- 4: 4 negative changes listed.
- 3: 3 negative changes listed.
- 2: 2 negative changes listed.
- 1: 1 negative change listed.

11. Food Web; interdependence shown

POINTS _____

- earn 5: 10 organisms shown.
- 4: 8 organisms shown.
- 3: 6 organisms shown.
- 2: 4 organisms shown.
- 1: 2 organisms shown.

12. Math Problem: (5 attributes)

POINTS _____

- earn 5: Data has character(s), 2 events, problem, and answer.
- 4: 4 of 5 attributes are present.
- 3: 3 of 5 attributes are present.
- 2: 2 of 5 attributes are present.
- 1: 1 attribute is present.

13. Written summary: (5 attributes)

POINTS _____

- earn 10: 4 paragraphs, complete sentences with capitals, punctuation, spelling.
- 8: 4 of 5 attributes are present.
- 6: 3 of 5 attributes are present.
- 4: 2 of 5 attributes are present.
- 2: 1 attribute is present.

Assessment Forms

The evaluation form below provides student groups with the opportunity to evaluate the group's overall success.

Cooperative Group Evaluation

Assignment: _____

Date: _____

Scientists

Jobs

_____	_____
_____	_____
_____	_____
_____	_____

As a group, decide which face you should fill in and complete the remaining sentences.



1. We finished our assignment on time, and we did a good job.



2. We encouraged each other, and we cooperated with each other.

3. We did best at _____

4. Next time we could improve at _____

Wetland Unit

Part 1: Physical Description

Science Standard I: 1.1 Generate reasonable questions about the world based on observation.

Language Arts Standard 9.2: Identify and categorize key ideas, concepts, and perspectives found in texts.

Focus questions: What is a Wetland? What are examples of Wetlands?

Students learn what a Wetland is and types of Wetlands.

Wonderful Wetland Packet (W.W. P.): Graphic organizer, curriculum page, pictures for model, Wetland Model directions, Group project Rubric, Reader's Theater script, Opinion and Support, Word Search, and Settle Down Experiment directions.

(Appendix A)

Day #1

Activities

1. Class KWL: Fill out the first two sections of the KWL Chart: what do you know; what do you want to know about Wetlands?
2. Read Main Ideas from Curriculum page in (W.W.P.). Students will respond to these ideas as we go through the unit.
3. Use the Graphic Organizer to take notes. Write definition of what a Wetland is and students put on the Graphic Organizer. Wetland: an area of land that is underwater for all or part of the year, and supports plant and animal life adapted to a wet environment.

Reading: Scaffold Reading Experience Framework

1. DRTA (Directed, Reading, Thinking, Activity)
 - a) Activate prior knowledge for the topic of the text to be read.
 - b) Hypothesize about what might be addressed in the text.
 - c) Establish purposes for reading.
 - Use Before Reading Strategy and Predictions.
 2. Picture walk through the book on Wetlands. Write questions about What you want to know about the pictures.
- Cognitive Strategies
Strategic Summarization
1. Identify the topic.
 2. Write two or three words to reflect the topic.
 3. Use these words as a prompt to help figure out the main idea of the paragraph.
 4. Select two details that elaborate on the main idea and are important to remember.

Read: New True Book: Wetlands, pp.5-21

Focus Reading: Students read for 30 seconds, choose 3 to 4 students to tell one important fact into tape recorder and microphone, continue process. Play back tape at end of reading, type up facts for review the next day.

*What is a Wetland?

Day #2

Read: (Listed in order of difficulty) New True Book: Wetlands, "Understanding Wetlands", p.2, and "Michigan United Conservation Club" newsletter, p.3.

Key Points: (*"MUCC newsletter, p.1, "MUCC flier, p. 1, Wetlands, p. 5, "Copycat, p.4"*)

- A Wetland is land that is underwater at least part of the year and supports plant and animal life.
- Wetlands can be made of freshwater, saltwater, or both depending on what feeds the wetland; oceans, rivers, lakes, or runoff of rain and snow; and others contain brackish water-a mix of fresh or saltwater.
- Types of wetlands; bogs, swamps marshes, prairie potholes, sloughs, shallow ponds and lakes.

Activities

1. Answer the questions: What is a Wetland? What are types of Wetlands?
2. Use Graphic Organizer and Curriculum page
3. Visit the National Wildlife Federation website to view Types & Cool Tours.
www.nationalwildlifefederation.com

Part 2: Plants and Animals

Science Standard II:1.4: Develop an awareness of and sensitivity to the natural world.

Focus question: What lives in a Wetland?

Key Points: (*Wetlands, pp.22-31, "Tracks", p.2, 3, "Copycat, p.7*)

- Some examples of plants from Wetlands are the Pitcher plant, Sundew plant, Cattails, Peat moss, Spanish moss, Mangrove tree, Saw grass, Cypress Trees, Shrubs, Cranberries, Purple Loose Strife, Bulrushes, Spruce, Maple, and Redwood Trees.
- Some examples of animals and insects from the Wetlands; turtles, muskrats, beavers, frogs, songbirds, egrets, bobcats, wild turkeys, deer, toads, snakes, cranes, bears, mink, rabbits, dragonflies, monarchs, snails, ducks, mussels, clams, raccoons, mosquitoes, fiddler crabs, geese, and swans.

Day #3

Read: Wetlands, pp.22-31, "Tracks", pp.2-3.

Groups of 2 or 3 students read and use Cognitive Strategies to summarize and pick out the main ideas, and supporting ideas of what they have read.

Activities

1. Students read with partners and groups are assigned specific pages to retell the important information and main idea found in the articles.
2. Students are also assigned a wetland poster to introduce the types of wetland animals and plants found in the poster.
3. Put animals and plants in graphic organizer.
4. View the pictures of wetland sites on www.yahooligans.com.
5. Begin to color worksheet of wetland animals and plants for final project.

Enrichment

1. Make a What Am I? Class book; picture and riddle with three clues including, what am I? on front. On the back include the answer to your riddle.
2. Word search – Swamp Thing
3. Name that animal and plant game, use pictures of wetland animals and plants.

Part 3: Food Chain

Science Standard III.5.1: Identify familiar organisms as part of a food chain or food web and describe their feeding relationships within the web.

Standard III.5.2: Explain common patterns of interdependence and interrelationships of living things.

Focus question: How do animals and plants in a wetland survive?

Day #4

Key Points: (*"Wading into Wetlands", p.4, 5, & 19.*)

- Animals and plants depend on one another to survive.
- Introducing a foreign animal or plant to a wetland can harm the interdependence and interrelationships of living things. Example: The Purple Loose Strife.
- Students will demonstrate knowledge of what a food chain is by giving an example of a food chain with at least four transfers of energy.

Read: Wetland, p.21. Power Read; read aloud to students, students follow along using a bookmark, teacher pauses every fifth or sixth word, students fill in missing word.

Activities

1. What are food chains? Discuss what a food chain is and work on worksheet p.15 and p.17.
2. With a partner color 'copycat page' p.5, cut out and glue on to construction paper to make a food chain. Present to class you food chain with four transfers of energy.
3. Watch Magic School Bus: Food chains Video, take notes.
4. After watching video create a food chain using class white boards.

Part 4: Human Impact

Science Standard I.1.2: Develop solutions to unfamiliar problems through reasoning, observation, and/or experiment.

Science Standard III.5.5: Describe positive and negative effects of humans on the environment.

Focus questions: Why are wetlands important to humans? What do wetlands do for us and provide us? What is 'The Sponge Effect'? How are Wetlands being destroyed? How can we help save Wetlands?

Day#5 "Wetlands/Water/Benefits"

Key Points: (*MUCC newsletter, p.1 & 3, MUCC flier, Wetlands, pp.15- 19*)

- Wetlands Provide
 1. Areas for waterfowl breeding, feeding and resting during migration. They provide winter quarters.
 2. Spawning and nursery areas for fish that live in larger bodies of water.
 3. A filter for silt-laden run-off water. Solids are removed from run-off resulting in cleaner water entering streams and lakes.
 4. Temporary storage basins for flood waters and as a result control extremes of stream flow.
 5. The recharge of ground water and flowing springs.
 6. A trap for phosphates, nitrates, pesticides, and toxic metals before polluted waters enter lakes and streams.
 7. The sounds of spring!
- Sponge Effect prevents flooding.
- Provides food, water, and habitats for many species.

Read: (Listed in order of difficulty) Wetlands, pp. 32-37 Wetlands, pp.15-19, "Tracks", "MUCC flier", pp.2 & 3, &"MUCC newsletter" p.1.

Reciprocal teaching strategies: Use in cooperative learning groups, students take turns assuming the role of dialogue leader with the goal to help students understand a text passage and acquire new knowledge from the text.

Activities

1. Assign 3-4 students to a guided reading group and assign article that is appropriate to that groups reading level. Groups will present a summary of their finding from the article and answer 'Why Wetlands are important to us?'
2. Fill out Graphic Organizer and curriculum page found in W.W.P.
3. "Dirt Drop" and "Settle Down" Experiments (Appendix B)

Day # 6 Threats to Wetlands

Key points: (*"Wading into Wetlands"*, p.3, *"MUCC" newsletter*, p. 3, *"MUCC" flier*, p. 3, *"Tracks"*)

- Threats to the Wetlands are building, draining, filling, pollution, Purple Loose Strife, and agriculture.
- Humans can prevent the wetlands from becoming more polluted by not dumping wastes into wetlands, picking up litter, buy duck stamps and learning more about wetlands.
- Half of our nation's 215 million acres of wetlands have been lost. Each year over 700,000 acres of wetlands are lost. Primary reasons are agriculture, development, and pollution.
- Agriculture is responsible for about 80% of all wetland losses. Wetlands are being drained to make way for cropland, cropland is less productive than the surrounding farm land.
- When wetlands disappear so do the plants and animals they support.

- Golf courses are a major threat to Wetland loss. Michigan has more public gold courses than any other state.
- Biggest threat the public's perception of wetlands. Many feel that they are just a smelly swamp, not knowing the overall impact on the environment that wetlands provide.

Read: Wetlands, pp. 38-48, Wetlands, pp.36-45 "MUCC flier" p.3, & "MUCC newsletter" p.3. Focus reading strategy

Activities

1. Continue experiment discussion, relate benefits to our world.
2. KWL; what students think threatens Wetlands.
3. Complete Graphic Organizer in W.W.P.
4. Complete Curriculum Page in W.W.P., did we learn what we set out to learn.
5. Students participate in a mock trial using Reader's Theater script found in W.W.P. The audience will act as the jury and decide the verdict.
6. Students will then decide on their own should they save or drain the Wetlands. They need to two facts to support their opinion, fill out opinion and support worksheet in W.W.P.
7. Send home study guide for test.

Part 5: Models and Field Trip

Science Standard II.1.2: Show how science concepts can be interpreted through creative expression such as language arts and fine arts.

Day #7 Exploring a Wetland

Activities

1. Set purpose of walking fieldtrip by going over 'Wetland Field Study Scavenger Hunt'.
2. Take class to local Wetland and explore.
3. Fill out scavenger hunt worksheet when we arrive back at school.
4. Finish coloring wetland animals and plants worksheet after viewing real life models.
5. Explain Wetland Models and group assignments for the next day. You will begin after taking the test.

Days # 8 &9 Test and Begin Models

Activities

1. Take test – Day #8 (Appendix C)
2. Begin working on Models, instructions are in W.W.P.
3. Go over rubric for final presentation.

Day #10 Presentation

Activities

1. Group presentation / teacher filled out rubric (Appendix D)
2. Group member evaluation

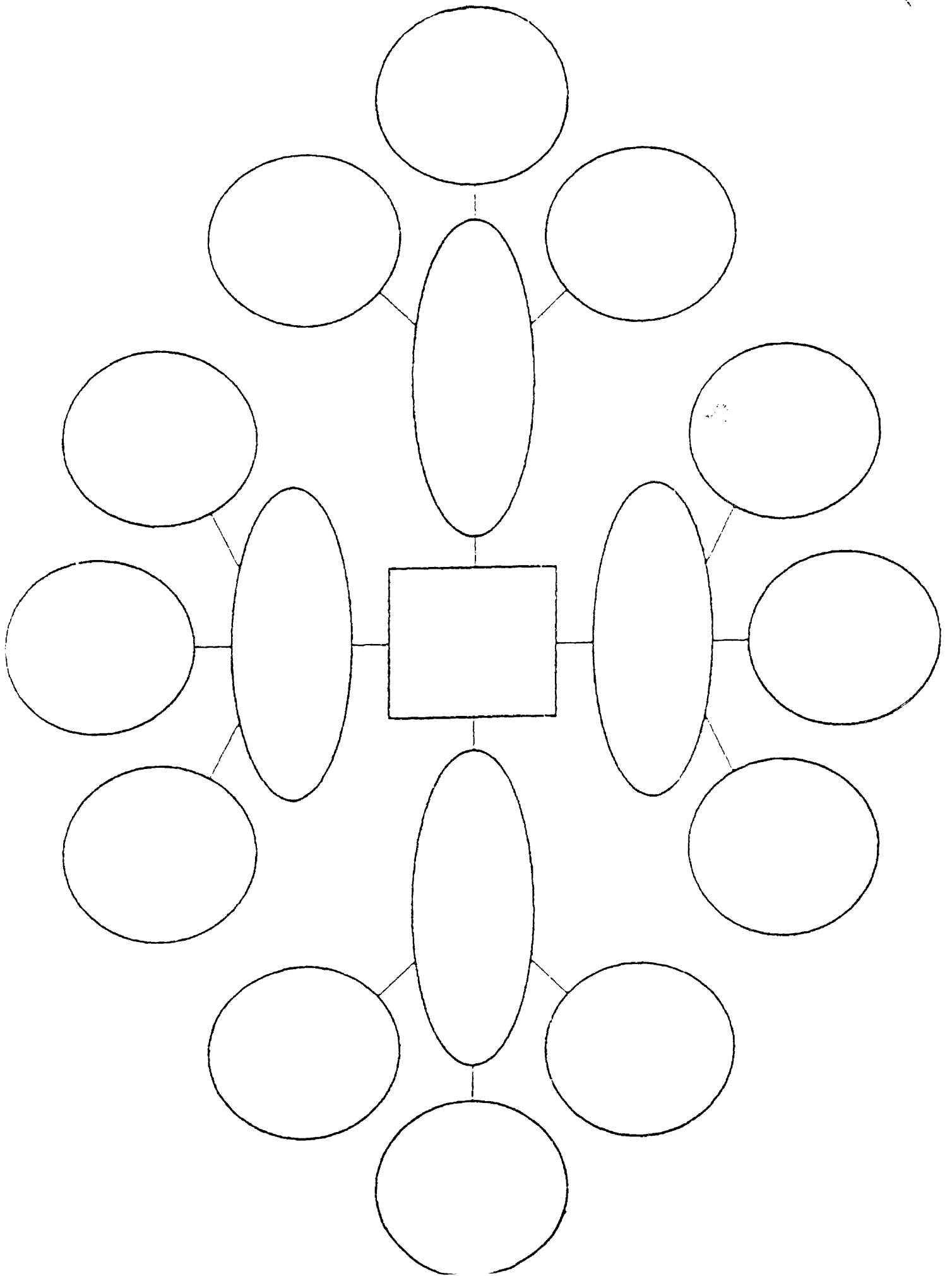
References

- Bleck, Christie. (1999). Wetlands. Tracks, Lansing, Michigan;
Michigan United Conservation Club.
- Kalbacken, J. & Lepthien, E. (1993), Wetlands. NY: Children's Press.
pp. 4-45.
- Kendrick, K. (1997). The Magic School Bus: Season Four, Activity Guide.
NY, NY: Scholastic Inc. pp. 14-15.
- Stille, D. R. (1999). Wetlands. NY: Children's Press. Pp. 5-44.
- "Squish, Wading Through Wetlands", Copycat. (May/June 98). pp. 4-8.
- Wading Into Wetlands. (1995). Virginia: National Wildlife Federation.
- Wetlands. (1999). Clifton, NJ: Newbridge Educational Publishing.
- "What Is A Wetland?" Michigan Conservation Club Newsletter. Lansing,
Michigan.
- Wonderful Wetlands. (1999). Clifton, NJ: Newbridge Educational
Publishing.
- Understanding Wetlands. Michigan United Conservation Club.

Appendix A
Wonderful Wetland Packet

Name: _____

Wonderful Wetlands



Wonderful Wetlands

3rd Grade Curriculum Page

Learn about wetlands from the coast to the mountain top, from freshwater to saltwater. What are some other names for wetlands? Do we live near any?

When you drink a glass of water, a wetland has helped you. When you eat a plate of fish, a wetland has helped you. Find out ways wetlands help us everyday.

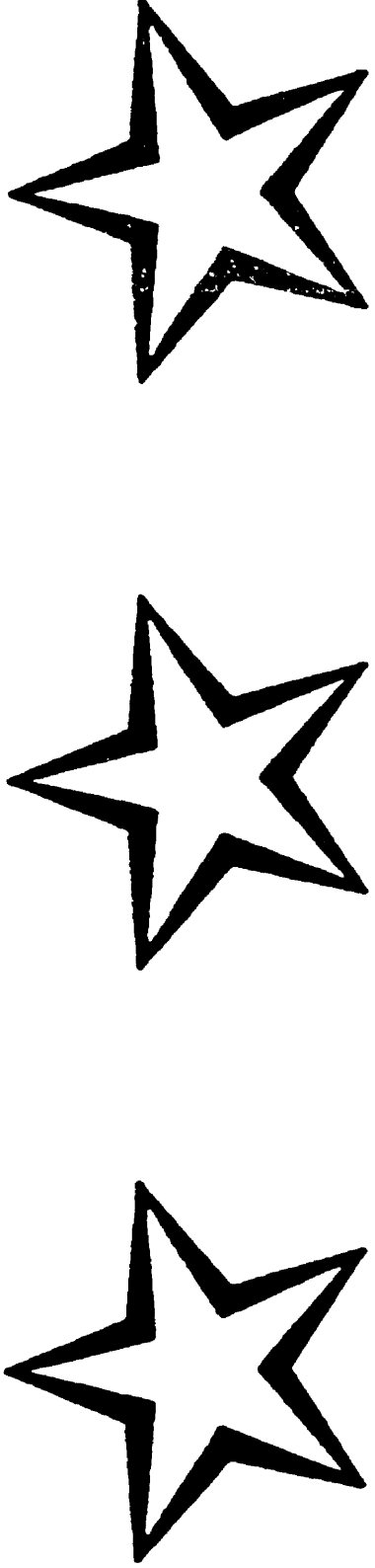
Learn what the two greatest threats to wetlands are. Learn about the right and wrong ways to live with wetlands. How can you help?

Wetlands help our health, wealth, and wildlife. How?

Build a model wetland.

Act out a play about wetlands. You be the verdict.

Discover interesting facts about wetlands to share with your classmates.



Opinion and Support

Wetland Models



Make a clay model of a wetland and discover how a wetland works.

Objectives:

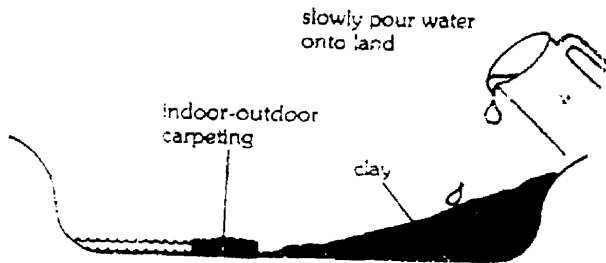
In small groups students will discuss what a wetland is. Describe several functions of a wetland. Show how a wetland works and how it looks.. Include one threat to your wetland and show how it affects the plants, animals, and humans that live within the habitat.

Materials:

- Modeling clay
- Florist foam
- Roasting pans
- Small pieces of indoor outdoor carpet
- Sponges
- Pine needles, twigs, grass
- Weeds, soil, muddy water
- Toothpicks, cotton swabs
- Pictures of wetland plants and animals
- Reference materials
- Art supplies

Procedure:

1. Spread a layer of modeling clay in half of the roasting pan to represent land. Leave the other half of the pan empty to represent the water.
 2. Shape the clay on a slope toward the water.
 3. Cut a piece of carpet to fit along the edge of the clay. The carpeting represents the wetland between dry land and water.
 4. After teacher demonstration show how a wetland controls flooding and soil erosion.
 5. Show how a wetland filters water, traps pollutants, and collects silt.
 6. Attach plants and animals to your model.
 7. Show one threat to your model and explain it's impact on the rest of your wetland.
- ***Bonus Include at least one food chain in your model.



Observations and Results:

Complete Group Project Evaluation Form

Model Wetlands Group Project

Group Members:

- ___ 8 interesting facts on note cards
- ___ 1 food chain with at least 4 transfers of energy
- ___ 4 different wetland plants
- ___ 4 different wetland animals
- ___ 1 threat to wetlands shown
- ___ 4 questions to ask the audience about wetlands. (Use overhead)
(Be sure you know the right answers)
- ___ Wetland model showing the "sponge effect," erosion, and flood control (3)
- ___ Share aloud with the class (5)
- ___ Complete group evaluation form (2)
- ___ What's the Verdict (Reader's Theater) Opinion and Support (5)

Total Points /40

Comments:

Name _____



The World's Wonderful Wetlands



Write your opinions on the lines.



The wetlands of the world are very important because



The wetlands are becoming more and more endangered because



Pollution of the world's wetlands is harmful because



Humans can prevent the wetlands from becoming more polluted by



If I could spend a day exploring a wetland, this is what I would like to do:

Group Evaluation
Group Members:

Scale:

1 (never) 2 (sometimes) 3 (okay) 4 (most times) 5 (very well)

Circle the *group's* answer.

1. Our group worked well together. 1 2 3 4 5
2. Our group cooperated with each other. 1 2 3 4 5
3. Our group worked respectfully. 1 2 3 4 5
4. Our group shared materials. 1 2 3 4 5
5. Our group shared the work evenly. 1 2 3 4 5
6. Our group did our best. 1 2 3 4 5
7. Members in our group helped one another. 1 2 3 4 5
8. The part of our project we are most proud of is:

9. The part of our project we could have done better on is:

10. Our favorite part of the project was:

Appendix B
Wetland Final Assessment

Name _____

The World's Wonderful Wetlands Test

1) Describe a wetland:

2) Name three types of wetlands:

3) Name six kinds of plants **or** animals:

4) The wetlands of the world are very important because

5) The wetlands are becoming more and more endangered because

6) Humans can prevent wetlands from becoming more polluted by

7) If I could spend a day exploring a wetland, this is what I would like to do:

8) Draw your favorite plant or animal that lives in a wetland.

Appendix C

Wetland Presentation Rubric

Model Wetlands Group Project

Group Members:

- ___ 8 interesting facts on note cards
- ___ 1 food chain with at least 4 transfers of energy
- ___ 4 different wetland plants
- ___ 4 different wetland animals
- ___ 1 threat to wetlands shown
- ___ 4 questions to ask the audience about wetlands. (Use overhead)
(Be sure you know the right answers)
- ___ Wetland model showing the "sponge effect," erosion, and flood control (3)
- ___ Share aloud with the class (5)
- ___ Complete group evaluation form (2)
- ___ What's the Verdict (Reader's Theater) Opinion and Support (5)

Total Points /40

Comments:

Bibliography

- Anderson, R.C., Hiebert, E.H., Scott, J.A., & Wilkinson, I.A.G. (1986). Becoming a Nation of reader: The Report of the Commission of Reading. National Institute Of Education, U.S. Department of Education: Washington, D.C.
- Applebee, A. N. & Langer, J. A. (1983). Instructional Scaffolding: Reading and Writing As Natural Language Activities. Language Arts. 60(2), 168-175.
- “Antarctica”. Kids Discover. (January, 2001).
- Armstrong. (1998). Shipwreck at the Bottom of the World. NY: Scholastic.
- “At Home in the Arctic”. National Geographic for Kids. (Spring, 2001). 12-16.
- Atwater R. & F. (1938). Mr. Popper’s Penguins. NY: Scholastic.
- Beattie, O. & Geiger, J. (1992). Buried in Ice. NY: Scholastic.
- Beed, P. L., Hawkins, E. M., Roller, C. (1991). Moving Learners Toward Independence: The Power of Scaffolded Instruction. The Reading Teacher. 44(9), 648-655.
- Berger, G. (1994). Life in the Polar Regions. NY: Newbridge Educational Publishing. 3-16.
- Berger, G. (1994). Ranger Rick: Life In A Coral Reef. NY: Newbridge Educational Publishing. 3-4.
- Berger, M. (1994). Oil Spill! NY: Harper Collins Publisher. 4-32.
- Berk, L. E., & Winsler, A. (1995). Scaffolding Children’s Learning Vygotsky and Early Childhood Education. Washington D.C.: NAEYC.
- Bernard, R. (1995). Penguins Through the Year. NY: Scholastic.
- Bleck, Christie. (1999). “Wetlands”. Tracks. Lansing Michigan: Michigan United

Conservation Club.

Boyle, O.F., & Peregoy, S. F. (1990). Literacy Scaffold: Strategies for First and Second Language Readers and Writers. The Reading Teacher. 44(3), 194-200.

Brimmer, L. D. (2000). Glaciers. NY, NY: Children's Press. 4-48.

Brook, J. (1990). Teachers and Students: Constructivists Forging New Connection. Educational Leadership. 49(7), 4-8.

Brown A. L., & Campione. (1986). Psychological Theory and the Study of Learning Disabilities. American Psychologist. 14(10), 1059-1068.

Brown K.J. (2000). What Kind of Text – For Whom and When? Textual Scaffolding For Beginning Readers. The Reading Teacher. 53(4), 292,307.

Bruner, J., & Ratner, N. (1978). Games, Social Exchange and The Acquisition of Language. Journal of Child Language. 5, 391-401.

Bruner, J. S. (1986). Actual Minds, Possible World. Cambridge, MA: Harvard University Press.

Burkett, K. (January/February, 2002). "Jumping Into Science". National Geographic For Kids. 14-22.

Burleigh, R. (1998). Black Whiteness. NY: Atheneum Books.

Byles, M. (1990). Life in the Polar Lands. NY: Scholastic Inc. 4-31.

Case, R. (1982). Addition and Subtraction: A Cognitive Perspective. Hillsdale, NJ: Erlbaum. 156-170.

Cazden, C. (1979). Peek-a-boo as an Instructional Model: Discourse Development at Home and at School. Papers and Reporter on Child Language Development.

(Keynote address to Canadian Council of Teachers of English, Vancouver, B.C., 1981).

Chinery, M. (1998). Questions and Answers About Polar Animals. NY: Scholastic Inc.

Clay, M. M. (1991). Becoming Literate: The Construction of Inner Control. Auckland, New Zealand: Heinemann Education.

Cobb, P. (1986). Making Mathematics: Children's Learning and the Constructivist Tradition. Harvard Educational Review. 56, 301-306.

Cooper Katz, S. (January/February, 2002). "Jumping Into Science". National Geographic For Kids. 4-13.

Coral Reefs. (1999). Clifton, NJ: Newbridge Educational Publishing.

Davydov, V. V. (1995, April). The Influence of L. S. Vygotsky on Education Theory, Research and Practice. Educational Researcher. 24(3), 12-21.

Dewey, J.O. (2001). Antarctic Journal: Four Months at the Bottom of the World. NY: Scholastic.

Egan Hopping, L. (2000). Polar Regions. NY: Scholastic.

Englert, C. S., Raphael, T. E., Anderson, L. M., Anthony, H. M., Steven, D. D. (1991). Making Strategies and Self-Talk Visible: Writing Instruction in Regular and Special Education Classrooms. American Educational Research Journal. 28(2), 337-372.

Fosnot, C. (Ed.). (1996). Constructivism: Theory, Perspectives, and Practices. NY: Teachers College Press.

Gans, Roma. (1987). Danger Icebergs! NY: Crowell.

Gardiner, J. (1980). Stonefox. NY: Harper Trophy.

George Craighead, J. (1999). Snow Bear. NY: Scholastic.

George Craighead, J. (1997). Arctic Son. NY: Scholastic.

George Craighead, J. (1997). Look to the North: A Wolf Pup Dairy. NY:
Scholastic.

Georges, D. V. (1986). Glaciers: New True Book. Chicago: Children's Press.

Goldman, J. (February 5, 2001). "Major Meltdown". Scholastic News. 57(16),2.

Good, T. L. & Brophy, J. E. (2000). Looking in Classrooms. NY, NY: Addison,
Wesley, Longman.

Goodman, Y. M., Watson, D. J., & Burke, C. L. (1987). Reading Miscue Inventory.
Katonah, New York: Richard C. Owen Publishers, Inc. 140.

Grindley, S. (1997). Polar Star. NY: Scholastic.

Graves, M. F., Graves, B. B., & Braaten, S. (1996). Scaffolding Experiences for
Inclusive Classes. Educational Leadership. 14-16.

Hackwell, W. J. (1991). Desert of Ice. NY: Charles Scribner's Sons.

Haynes, M. J., Alaska (Mini-Unit) at <http://multimedia2.freac.fsu.edu/fga/academy/>

klak.htm.

Hooper, M. (2000). Antarctica Adventure: Exploring the Frozen South. NY: Dorling

Kindersley.

Hudson, W. (1995). Five Brave Explorers. NY: Scholastic.

Johnston, M. (1997). Explorers New. Cambridge, MA: Candlewick Press. 24-27.

Kalbacken, J. & Lepthien, E. (1993). Wetlands. NY: Children's Press. 4-45.

Kalman, B. (1988). The Arctic Land. NY: Crabtree Publishing Co.

Kaplan, S., Kaplan, J., Maden, S., & Gould, B. (1980). Change for Children: Ideas and

Activities for Individualizing Learning. 14-16.

Kendrick, K. (1997). The Magic School Bus: Season Four, Activity Guide.

NY, NY: Scholastic Inc. 14-15.

Kimmel, E. C. (1999). Ice Story: Shackleton's Lost Expedition. NY: Clarion Books.

King, J. (1993). The Pools and Coral Reefs. Huntington Beach, CA:

Teacher Created Material, Inc.

Kulling, M. (1999). Sea of Ice. NY: Random House. 4-48.

Kostyal, K. M. (2000). Trail By Ice. NY, NY: Scholastic, Inc.

Krinking, K. (December, 2001). "Bear Necessities". National Geographic World.

24-28.

Lehr, F. (1985). Instructional Scaffolding: Language Arts. ERIC/RCS Report. 62(5),

667-671.

Levinson, N. S. (1998). If You Lived In The Alaska Territory. NY, NY:Scholastic, Inc.

"Life on a Coral Reef." (1982). National Geographic. 108.

Martin, B. & Carle, E. (1991). Polar Bear, Polar Bear What Do You Hear? NY: Henry

Holt & Co.

Lytle, G. (2001). Primarily Jason: Adapting Jason XIII for Elementary Students. MA:

Jason Foundation for Education.

Martinez, A. (February 23, 2001). 'Helping Hawaii's Reefs'. Weekly Reader. 2.

Mearns, A. (June 1997). 'Adventures of Ranger Rick'. Ranger Rick. 28-31.

Memory, D., & Uhlorn K. (1991). Multiple Textbooks at Different Readability Levels

In the Science Classroom. School Science and Mathematics. 91, 64-72.

Miller, C. (January 2000). 'Killer Snow'. Ranger Rick. 14-21.

Miller, D. S. (1994). A Caribou Journey. Hong Kong: Little Brown.

O'Donnell, P. (1991). Pinkie Leaves Home. NY, NY: Scholastic, Inc.

Ocean Life. (1999). Clifton, NJ: Newbridge Educational Publishing.

Osborn, Pope, M. (2001). Polar Bears Past Bedtime. NY, NY: Scholastic, Inc.

Ousland, B. (March 2002). 'Solo'. National Geographic. 36-47.

Palincsar, A.S., & Brown, A.L. (1984). Reciprocal Teaching of Comprehension-
Fostering and Comprehension Monitoring Activities. Cognition and Instruction.
1(2), 117-175.

Palincsar, A., & Brown, A. (1985). Reading, Thinking, and Concept Development.
NY: College Entrance Examination Board.

Palincsar, A.S., David Y., & Brown, A. (2000). Using Reciprocal Teaching in the
Classroom: A Guide for Teachers. 1-55.

'Penguin Pullovers'. Scholastic News. 58(12) 12-3-01.

Phillips, D. (1995). The Good, the Bad, and the Ugly: The Many Faces of
Constructivism. Educational Researcher. 24(7), 5-12.

Pinnell, G.S. (1/25/2002). Matching Books to Readers. www.teacher.scholastic.com

The Polar Region. (1999). Clifton, NJ: Newbridge Educational Publishing.

- Potter, K.R. (1999). Seven Weeks on a Iceberg. NY, NY: Scholastic, Inc.
- Pringle, L. (1992). Antarctica: The Last Unspoiled Continent. NY: Simon & Schuster.
- Resnick, L. & Klopfer, L. (Eds.). (1989). Towards the Thinking Curriculum: Current Cognitive Research: 1989 Yearbook of the Association for Supervision and Curriculum Development. Alexandria, VA: Association for Supervision and Curriculum Development.
- Rogasky, B. (1994). Winter Poems. NY, NY: Scholastic.
- Roop, P. & C. (2001). Escape From The Ice. NY, NY: Scholastic. 4-48.
- Rosenshine, B., & Meister, C. (April 1992). The Use of Scaffolds for Teaching Higher-Level Cognitive Strategies. Educational Leadership. 49(7), 26-33.
- Sands, Stella. (August/September 1991). "North and South Poles". Kids Discover. 2-19.
- Scher, Linda. (March, 1998). "Shelter". Kids Discover. 6-7.
- Scollon, R. (1976). Conversations with a One-Year Old: A Case Study of the Developmental Foundations of Syntax. Honolulu: University Press of Hawaii.
- Searle, D. (1984). Scaffolding: Who's Building Whose Building? Language Arts. 61(5), 480-483.

- Simon, S. (1987). Icebergs and Glaciers. NY: William Morrow Co.
- Steger W. & Bowermaster, J. (1997). Over the Top of the World. NY, NY: Scholastic.
- “Stepping into Tradition: Yup’ik families live in the present and the past”. National Geographic for Kids. (Spring, 2001). 17-19.
- Stelson, C.B. & Farquharson, A. (2000). Artic Adventure. NY, NY: Addison-Wesley Educational Publishers Inc. 2-16.
- Stille, D. R. (1999). Wetlands. NY: Children’s Press. 5-44.
- “Squish, Wading Through Wetlands”. Copycat. (May/June 1998). 4-8.
- Stone, L. M. (1996). The Antarctic. Vero Beach, Florida: The Rourke Corporation.
- Stone, L. M. (1996). The Arctic. Vero Beach, Florida: The Rourke Corporation.
- Stonehouse, B. (1971). Animals of the Arctic the Ecology of the Far North. NY: Holt, Rinehart, & Winston.
- Su, A. (1996). “Oceans”. Kids Discover. 12-17.
- Tancock, S. M. (October, 1994). A Literacy Lesson Framework for Children with Reading Problems. The Reading Teacher. 48(2), 130-140.
- Taylor, Barbara. (1999). Pole to Pole. Hong Kong: Tick Tock Publishers Ltd. 2-31.

- Thompson, S. (March, 2001). "World News". National Geographic World. 5.
- Tomlinson, C. (1995). Differentiating Instruction for Advanced Learners in the Mixed Ability Middle School Classroom. ERIC Digest: Gifted Education and Middle School. 35-38.
- Tomlinson, C. A. (1999). The Differentiated Classroom: Responding to the Needs of All Learners. Alexandria, VA: Association for Supervision and Curriculum Development.
- Tomlinson, C. A. (2001). How to Differentiate Instruction in Mix-Ability Classroom. Alexandria, VA: Association for Supervision and Curriculum Development. 16-20.
- Understanding Wetlands. Michigan United Conservation Club.
- Upadhyay, Ritu. (November 10, 2000). 'Can We Rescue The Reefs?' Time For Kids. 1-4.
- Wading Into Wetlands. (1995). Virginia: National Wildlife Federation.
- Wetlands. (1999). Clifton, NJ: Newbridge Educational Publishing.
- "What Is A Wetland?" Michigan Conservation Club Newsletter. Lansing, MI.

Winebrenner, S. (1992). Teaching Gifted Kids in the Regular Classroom. Minneapolis,

MN: Free Spirit.

Wonderful Wetlands. (1999). Clifton, NJ: Newbridge Educational Publishing.

Wood, A. (1989). Little Penguin Tale. NY, NY: Scholastic, Inc.

Wood, D.J., J.S. Bruner, & G. Ross. (1976). "The Role of Tutoring in Problem-Solving."

Journal of Child Psychology and Psychiatry. 17, 2: 89-100.

Wood, J. (1991). Coral Reefs. NY, NY: Scholastic, Inc. 4-28.

Wood, J. (1991). Icebergs. Milwaukee, Wisconsin: Gareth Stevens Children's Books.

Yolen, J. (1987). Owl Moon. NY, NY: Scholastic, Inc.

Websites

<http://www.coralreefnetwork.com>

<http://geosun1.sjsu.edu/~dreed/105/coral.html>

<http://library.advanced.org/11922/fish/fish/htm>.

<http://nationalgeographic.com>

<http://www.divediscover.who.edu>