Where's the Beach?
Examining Costal Erosion

Williamsport Elementary School for Science, Technology, Engineering, & Math

A Problem-Based Learning Project

Adapted from the Center for Gifted Education, The College of William & Mary

Dear Family,

Your child is about to begin a unique science experience that utilizes an instructional strategy called problem-based learning. In this project, students will take on an active role in identifying and resolving a real-world problem constructed to promote scientific learning. Your child will be gathering information from a variety of sources in order to contribute to the problem resolution. Goals for this project are:

Goal 1: To understand the concept of systems

Goal 2: To understand the principles of erosion

Goal 3: To understand and apply the basic principles of experimental design

Goal 4: To develop reasoning skills with application to science

Successful reasoning and application skills should involve parents as well as teachers. We know from educational research that parental involvement is a strong factor in promoting positive attitudes towards science/STEM, and we encourage you to extend your child's learning through activities as you see fit.

Ways you may wish to help your child during this project include:

- Discussing systems, including family systems, educational systems, and so on, with your child
- Allowing your child to describe the problem about coastal management to you and trying to solve the problem along with your child
- Engaging your child in scientific experimentation exercises based on everyday events (for example, in a grocery store, how would you test whether it is better to go in a long line with people who have a few items or a short line with people who have full carts?)
- Visiting area science museums (or the lake/beach!) and the library to explore how scientists solve problems, particularly the issue of coastal erosion
- Using the problem-based learning model to question students about an issue they might have about the real world (for example, how does hail form? Answer: what do you know about hail? What do you need to know to answer the question? How do you find out?)

Thank you in advance for your interest in your child's education and the gifted/talented curriculum at Williamsport Elementary School for Science, Technology, Engineering, & Mathematics.

Jordyn Himes

Background

When you build a sandcastle on the beach, you don't expect it to last forever. You spread out your towel to sunbathe, but you know you can't stay in the same spot all day without getting wet. Venturing into the ocean to swim, you are cautious-wondering what the currents are doing that day. Subconsciously, you are attuned to the fact that the coastal environment is constantly changing. Coastal erosion is a natural process even in pristine environments. However, in areas where human activity negatively impacts the shoreline, coastal erosion can become a serious problem.

Beach sand originates mainly from rivers and streams that carry it directly to the ocean. Sand also comes from the gradual weathering of exposed rock formations and cliffs along the shore and from the deterioration of shell, coral, and other skeletal fragments. Wave action, wind, and currents move sand up and down the coast. This movement is called *longshore transport*. Sand is also moved onshore and offshore by waves, tides, and currents. During storms, high-energy waves often erode sand from the beach and deposit it offshore as submerged sandbars. This sand is then moved back onshore by low-energy waves in periods of calm weather. Sand that is moved offshore by winter storms, leaving steep narrow beaches, is returned to the shore by the gentle waves of summer, creating wide, gently sloping beaches.

Erosion and accretion of sediment on coasts are natural processes influenced by the beach slope, sediment size and shape, wave energy, tides, storm surge, and near-shore circulation, among other things. Human activities such as dredging, river modification, removal of backshore vegetation, and installation of protective structures such as breakwaters can profoundly alter shorelines, mainly by affecting the sediment supply.

Changes to our shorelines affect our transportation routes, our communities, and our ecosystems; therefore, it is important to monitor them. Researchers can determine shoreline locations with information fathered from topographic maps, aerial photos, Global Positioning System (GPS) surveys, and beach profiles. By analyzing trends over time, future changes can be predicted. Planners and developers can use the prediction for planning future use of the shoreline.

Coastal erosion is a serious problem on many coasts. Some houses on the cliffs in Pacifica, California, were lost to erosion during the 199-7-98 El Nino winter storms. Twelve houses were condemned as unsafe, and seven were knocked down before they were claimed by the sea. A U.S. Geological Survey study was conducted in this area before and after the storms, which showed that the 1997-98 El Nino accounted for about 50 years of cliff erosion at this location in California. On the west-central Florida coast, as in many highly developed coastal regions, millions of dollars are spent on beach nourishment projects every four years. In fact, it is estimated that coastal erosion in the United States costs $700 million annually. In 1999, $10 million was spent moving the historic Cape Hatteras Lighthouse in North Carolina to save it from the sea. This project was widely publicized and hotly debated.

Consider the following: Would you been in favor of moving the lighthouse or against it?

Vocabulary

Include a **photograph** for words in blue.

assumption	boundary	bulkhead	chemical	coast
coastal	coastline	constant	constituents	control
dependent variable	dune	dysfunctional	element (of a system)	environment
erosion	fossil	fragment	functional	generalization
hypothesis	implication	independent variable	inference	input (to a system)
interaction	interdependent	jetty	origin	output (from a system)
perspective	physical	productive	reasoning	recommendation
renourishment	rock	sand	seashore	seawall
system	weathering		mechanical weathering	physical weathering

Project Outline

Phase	Task	Product	Checkpoint
1	Pre-assessment	Pre-assessment	June 13 (in school)
2	Vocabulary	Evernote Picture Dictionary	June 13 (in school)
3	Elements of a Beach	Labeled Diagram	June 27
4	Story of Cape Hatteras	Problem Log	July 4
5	Problem Statement	Need to Know Board Problem Log	July 14
6	Causes & Effects Beach Erosion	Weathering Experiment Erosion Experiment	July 28
7	Finding a Solution	Plan of Action	August 8
8	Move That Lighthouse! STEM project	Use of the engineering/design process Rubric	September 1 (in school)
9	Socratic Seminar	Persuasive Letter	September 2 (in school)
10	Where's the Beach Presentation	Presentation	September 5 (in school)
11	Post-Assessment	Post-Assessment	September 12 (in school)

**Please note: these dates are flexible. It is a great idea to set check points for yourself to keep from procrastinating on the tasks.*

Part 1:

To be completed in school

Phase 1

Pre-assessment: students will complete the pre-assessment to see what they already know about coastlines, the beach, changes in the coastal environment, and ways to conduct scientific inquiry. This phase is not graded. The information will be used to guide the project.

Phase 2

Vocabulary: During this phase, students will learn the ins and outs of the online journaling system, Evernote. This is how we will journal during science investigations, along with other writing tasks in other subjects. With Mrs. Himes' assistance, students will develop their scientific vocabulary skills by creating a digital picture dictionary. This phase will be checked for completion and understanding of each word.

Part II:

To be completed at home

Phase 3

Is the Beach a System?

- What is a system?
- Brainstorm different types of systems.
- What are some generalizations about a beach system?
    - Example: most beach systems have life within their system.
- Think about the following generalizations:

    - All systems have boundaries, elements, inputs, outputs, and interactions.
        - *Not sure what these terms mean? Define them!*
    - Systems can be productive or dysfunctional.
        - *Sometimes systems achieve their function or purpose, so that they produce the right output and can be described as productive. Other times they do not function or work properly and so they do not produce the right output and we say they are dysfunctional.*
    - Systems are interdependent.
        - *Many systems rely on other systems for things they need but cannot do or produce on their own. When systems need each other to function, we say they are interdependent. Inputs to a system often come from other systems.*

Additional Resources

http://geology.uprm.edu/Morelock/beachsys.htm

Videos: https://www.youtube.com/results?search_query=coastal+erosion

Your Task

Elements of a beach: For this part of the project, students can use a digital publisher (Microsoft Word or Publisher, Educreations) to create a labeled diagram of a beach system. This should include a drawing or photo of the beach with labeled parts of its system that make it *functional* (sand, waves, jetties, etc). This is to be included in the classroom presentation.

Phase 4

A Problem at the Beach

Read the following articles:

The Story of Cape Hatteras:

http://www.nps.gov/caha/historyculture/cape-hatteras-light-station.htm

Moving the Lighthouse:

http://www.nps.gov/caha/historyculture/movingthelighthouse.htm

Extra Resource: https://www.youtube.com/watch?v=jFFJc0CUOsI

YOU are a member of the Atlantic Coast community of Dunesville. There is a problem in this community that they have been asked to solve. The community needs to approve or disapprove all new building along the beach, and a new group has come to the community council to ask permission for building.

Imagine a children's summer camp in Dunesville… but REMEMBER! The beach environment is a system where different elements interact with each other. As you pursue your problem, keep this in mind!

Problem Log

Sand

1. Why do sands differ?

2. How does weathering affect sand?

3. What happens if…

   a. the sand is water logged?

   b. the sand is dried out?

4. Is sand good for vegetation? Why or why not?

Phase 5

Problem Statement

Problem Statement:

Plans for building a children's camp at the beach town of Dunesville are on hold because the town council is worried about beach erosion. Many towns in coastal areas have been experiencing problems with erosion over the past few years.

The camp received a large donation to develop nature-themed experiences, designed to teach children how to protect the environment. The camp manager wants to cooperate with the council so that the environment is protected. The problem is that she must begin construction quickly to be ready for the summer season.

You are members of the town council. You must come up with scientifically based regulations that will satisfy the long-term needs of the town and the plans for the camp.

Consider the following:

- What concerns will community members express?
- What are the benefits of an environmental camp to the community?
- What can the camp do to be sure it protects the coastline?
- What scientific question or concerns might the community environmental engineers have?
- What must be observed or measured in order to find a solution to the scientific questions or concerns?

You will see these brainstorming questions again during the final phases of this project. Become an expert so, if and when you are asked, you can speak effortlessly on these topics.

Your Task

Complete the **Need to Know Board**. Consider the following as you brainstorm ideas:

- What do we know about the problems of building at the beach?
- What do we need to know?
- How can we find out?
- What are the key pieces of information?
- Are there other problems that may be part of the situation that are not specifically mentioned in the problem statement?
- Where can we find answers to these questions?
- What steps will you take next?

Complete the **Problem Log**. Consider the following:

- What are the main purposes of the beach environment?
- When is it functioning properly?
- When is it dysfunctional?
- What elements help or harm the beach environment?

Need to Know Board		
What we know…	What we need to know…	How can we find out…

Problem Log Questions
1. What are some good reasons for having a camp at the beach?
2. What are some possible problems with having a camp at the beach?
3. Who are the stakeholders (who will be affected and why)?

Phase 6

Causes and Effects of Coastal Erosion

Causes of Coastal Erosion:

http://oceanworld.tamu.edu/resources/oceanography-book/coastalerosion.htm

http://www.scientificamerican.com/article/what-causes-beach-erosion/

http://www.dec.ny.gov/lands/28923.html

www.epa.gov/climatechange/impacts-adaptation/coasts.html

Effects of Coastal Erosion:

http://www.coastalwatch.com/environment/4524/impact-of-coastal-erosion-in-australia

http://centerforoceansolutions.org/climate/impacts/cumulative-impacts/coastal-erosion/

http://www.soest.hawaii.edu/GG/ASK/beacherosion.html

Your Task

Below you will find a variety of experiments investigating **weathering** and **erosion**. Your task is to conduct 1-2 investigations from each topic in order to learn more about these two natural processes. As you conduct the investigations, please use the Scientific Method outlined for you on the next page to write your notes (this will be included in the final presentation). Also, you need to take photos or video of your processes/results to include in your final presentation.

Weathering & Erosion Experiments
http://www.pbs.org/wnet/nature/lessons/breaking-it-down/activities/1700/ (contains several experiments) http://www.rsc.org/education/teachers/resources/jesei/weather/teachers.pdf (contains several experiments http://science-class.net/archive/science-class/Geology/weathering_erosion.htm (contains several stations) http://tec.theeducationcenter.com/TextFiles/Email/te_newsletter_int_011912.html Weathering: http://www.fizzicseducation.com.au/experiments/Polar%20Science/freeze%20thaw.html Chemical Weathering: http://www.education.com/science-fair/article/chemical-weathering/ Physical Weathering: http://www.teachercreatedmaterials.com/curriculum_files/free/activities/december2012/Physical%20Weathering.pdf Mechanical Weathering: http://classzone.com/science_book/mls_grade7_FL/231_236.pdf Erosion: http://teacher.scholastic.com/dirt/erosion/lab.htm Erosion: http://www.therez.ms/students/documents/Threetypesoferosionexperiment_000.pdf (contains several experiments)

Resources (extra)
http://studyjams.scholastic.com/studyjams/jams/science/rocks-minerals-landforms/weathering-and-erosion.htm Bill Nye: https://www.youtube.com/watch?v=Xdg1lpQfLbo http://science.nationalgeographic.com/science/earth/the-dynamic-earth/weathering-erosion-article/ http://www.lauracandler.com/filecabinet/science.php#geology Games: http://schoolmediainteractive.com/view/object/interactive/6EF46CAA2D38E0EABB11A57BAFFB1753/099459804A638DAB6873167F7B90E2F4

Investigation	
The experiment tests: _____ Weathering _____ Erosion	Materials:
Question (what are you trying to find out?):	
Hypothesis: I think that….	
Steps in the process:	Data Collection:
Analysis: I think this happened because…	
Was your hypothesis correct? What evidence do you have to support it?	
Conclusion (How does this relate to coastal erosion?):	

Phase 7

Finding a Solution

Recycled Christmas Trees Give Louisiana Coastline a Break

December 22, 2000
Web posted at: 2:53 PM EST (1953 GMT)

From Mary Pflum
CNN Correspondent


(CNN)

A Louisiana family chooses a Christmas tree

(CNN) -- The state of Louisiana loses 30 miles of coastline each year. A system of levies and canals that is designed to keep cities like New Orleans dry also keeps sediment from replenishing shrinking shorelines.

That's where the Christmas trees come in.

For more than a decade the branches of recycled Christmas trees have been providing happiness in more ways than one. In December, they are fragrant fixtures in living rooms, while in January they help save the troubled coastline.

"The Christmas tree project started 11 years ago. They break the wave action so they protect the wetlands. We also use them to fill in abandoned, dead-end oil and gas canals," said Marnie Winter of the Louisiana Department of Environmental Affairs.

Borrowing an idea from the erosion-prone Netherlands, Louisiana environmentalists came up with Project Christmas Tree.

Each January, officials collect the old trees during pickups organized by the county. The trees are then bundled by volunteers and taken to the wetlands via National Guard helicopters and barges donated by the oil industry.

The recycled trees are used to create a natural coastal fence

All told, Louisiana's annual Christmas tree program has utilized more than a million Christmas trees in its 11-year history. Those trees have been used to construct a natural coastal fence that is now about seven miles in length.

"Seeing is believing. We're seeing very dramatic results," said Waters. "You can see in the canals where there was once open water. You can see trees growing. Lots of vegetation. Wildlife loves it. It's good habitat."

The Louisiana program has earned accolades from President Bill Clinton and the Environmental Protection Agency. But many locals say a rebounding coastline is the only reward they seek for their tree donations.

"We get our tree for two reasons. One, it makes the house smell nice. And two, it helps the environment," said one Louisiana resident.

State officials say that 80,000 trees purchased on Louisiana tree lots this holiday season will end up in coastal wetlands.

Your Task

In this phase, students now know more about coastal erosion; this will help them as they learn more about the specific methods communities have used to reduce the effects of erosion brought on by natural and man-made forces. Use the websites on this page to guide the research that will tell you how each solution is used, and the advantages and disadvantages of each. Once you've weighed the pros and cons of each, take a position on one solution for the community of Dunesville. Complete the Plan of Action. This will be included in your presentation.

Brainstorming possible solutions:

http://www.erosionpollution.com/beach-erosion.html

http://www.seafriends.org.nz/oceano/beacheng.htm

Plan of Action

Topic:

My opinion about this method for preventing erosion:

Reasons why it can help or harm attempts to reduce erosion:

My conclusion:

Part III:

To be completed in school

Phase 8

Move That Lighthouse!

STEM Challenge

Focus:

Students will analyze how engineers have to evaluate multiple structural, economic, and environmental factors when moving a building.

Objectives:

I can…

- Learn research how the environment impacts civil engineering
- Evaluate how to move a structure
- Work with an "engineering team" to address problem solving
- Utilize the design process to solve the problem
- Determine how structures are engineered, and the stress that motion can cause.
- Evaluate information and data.
- Analyze how engineers must consider design, environmental, and economic factors when building or moving a structure.

Goal:

Students work in teams to plan the safe and efficient move of a tower of blocks on a desk in a classroom, execute their plan, and evaluate the strategies employed by other student teams.

Materials

- Blocks, weighted milk cartons, stacks of books
- Standard student desk
- Strips of cardboard
- Tape, string, pencils
- optional materials such as rollers, castors, plastic sheets, fan

Procedure

Background: Read *Lighthouses on the Move*

1. Show students the various Student Reference Sheets. These may be read in class, or provided as reading material for the prior night's homework.
2. Divide students into groups of 2-3 students, providing a set of materials per group.
3. Explain that students must construct a two foot tower of materials on their desk (you may chose to have them use books, blocks, weighted milk containers, cans of soup -- but each team must use the same materials).
4. The students are then posed with the problem of having to move their desk ten feet without having the tower fall.
5. Students meet and develop a plan for securing the tower. They agree on materials they will need, write or draw their plan, and then present their plan to the class.
6. Teams may revise their written plan after presentations based on feedback from class.
7. Student groups next execute their plans to secure the tower (which may include tape, cardboard, string, pencils) and move their tower desks.
8. Teachers may consider adding challenges to the lighthouse move by bringing a fan into the classroom to add a "weather" element.
9. Each student group evaluates the results (did the tower fall? why?), completes an evaluation/reflection worksheet, and presents their findings to the class.

Assess:

- Utilization of STEM rubric
- Utilization of design process
- Write an essay or a paragraph describing the factors engineers had to consider when approaching the move of the Cape Hatteras Lighthouse.

Resource: http://tryengineering.org/lessons/movethatlighthouse.pdf

Phase 9

Socratic Seminar

Background Information:

Socratic seminars are named for their embodiment of Socrates' belief in the power of asking questions, prize inquiry over information and discussion over debate. Socratic seminars acknowledge the highly social nature of learning and align with the work of John Dewey, Lev Vygotsky, Jean Piaget, and Paulo Friere.

Elfie Israel succinctly defines Socratic seminars and implies their rich benefits for students:

> The Socratic seminar is a formal discussion, based on a text, in which the leader asks open-ended questions. Within the context of the discussion, students listen closely to the comments of others, thinking critically for themselves, and articulate their own thoughts and their responses to the thoughts of others. They learn to work cooperatively and to question intelligently and civilly. (89)

Israel, Elfie. "Examining Multiple Perspectives in Literature." In Inquiry and the Literary Text: Constructing Discussions n the English Classroom. James Holden and John S. Schmit, eds. Urbana, IL: NCTE, 2002.

Strategy in Practice:

- Choosing a problem: Socratic seminars work best with authentic problems that invite authentic inquiry
- Preparing the students: While students should read carefully and prepare well for every class session, it is usually best to tell students ahead of time when they will be expected to participate in a Socratic seminar. Because seminars ask students to keep focusing back on the text, you may distribute sticky notes for students to use to annotate the text as they read.
- Preparing the questions: Though students may eventually be given responsibility for running the entire session, the teacher usually fills the role of discussion leader as students learn about seminars and questioning. Generate as many open-ended questions as possible, aiming for questions whose value lies in their exploration, not their answer. Elfie Israel recommends starting and ending with questions that relate more directly to students' lives so the entire conversation is rooted in the context of their real experiences.
- Establishing student expectations: Because student inquiry and thinking are central to the philosophy of Socratic seminars, it is an authentic move to include students integrally in the establishment of norms for the seminar. Begin by asking students to differentiate between behaviors that characterize debate (persuasion, prepared rebuttals, clear sides) and those that characterize discussion (inquiry, responses that grow from the thoughts of others, communal spirit). Ask students to hold themselves accountable for the norms they agree upon.

- Establishing your role: Though you may assume leadership through determining which open-ended questions students will explore (at first), the teacher should not see him or herself as a significant participant in the pursuit of those questions. You may find it useful to limit your intrusions to helpful reminders about procedures (e.g. "Maybe this is a good time to turn our attention back the problem?" "Do we feel ready to explore a different aspect of the problem?"). Rely on other students to respectfully challenge their peers' interpretations or offer alternative views.
- Assessing effectiveness: Socratic seminars require assessment that respects the central nature of student-centered inquiry to their success. The most global measure of success is reflection, both on the part of the teacher and students, on the degree to which text-centered student talk dominated the time and work of the session. Reflective writing asking students to describe their participation and set their own goals for future seminars can be effective as well. Understand that, like the seminars themselves, the process of gaining capacity for inquiring into text is more important than "getting it right" at any particular point.

Your Task

Students have been investigating the natural process of weathering and erosion throughout the summer. They were asked to consider a summer camp on the beaches of Dunesville. Through research of coastal weathering and erosion, you will be asked to come to class prepared to inform and persuade the Dunesville citizens (your classmates) that your plan for the camp is good for campers and good for the community. Students will complete this task in the form of a Socratic Seminar (see rubric on the next page). To prepare in class, students will be given a planning sheet.

**Council Meeting Planning Sheet-128*

Socratic Seminar REPI Rubric

	Analysis and Reasoning	Leadership	Recognizes and Understands Multiple Perspectives	Questioning
INDEPENDENT (4)	Always: • References text to support reasoning • Shows thoughtful consideration of topic • Provides relevant and insightful comments • Makes new connections • Demonstrates logical and organized thinking • Moves discussion to a deeper level	Student: • Listens • Participates • Shares ideas • Considers other's ideas • Organizes the discussion	• Student is able to empathize with others' perspectives • Student's own thinking becomes more complex and thorough with added perspectives.	Uses 4-5 questions from divergent questioning model
PROGRESSING (3)	Occasionally: • References text to support reasoning • Demonstrates consideration of topic Provides relevant comments • Thinking is clear and organized	Student: • Shares ideas and considers the ideas of others	Student: • Reflects on others' ideas • Paraphrases others' ideas	Uses 3 questions from divergent questioning model
EMERGENT (2)	Seldom: • References text, or reference text incorrectly • Demonstrates awareness of the topic but little reflection on it • Comments are relevant • Thinking is clear and organized	Student: • Listens • Participates • Contributes an idea	Student: • Recognizes and understands some alternate perspectives through reflection and paraphrasing.	Uses 2 questions from divergent questioning model
READINESS (1)	Does not: • reference text • show consideration of the topic • make relevant comments • show organized thinking	Student: • Listens to the group but does not contribute	Student: • Struggles to reflect and paraphrase alternate perspectives accurately.	Uses 0-1 questions from divergent questioning model:

Persuasive Letter

Whole Group: Use the *Reasoning About the Problem: Reasoning Wheel* to guide students to think about one stakeholder group, beach sport enthusiasts. Complete sections of the model, talking about the meaning of each type of thinking, referring back to the stakeholders.

Small Groups: Provide groups with a community stakeholder assignment representing one citizen group (everyday citizens, builders, environmentalists, etc.). Tell students that groups will complete the reasoning wheel for their assigned constituent group.

Individual: Students will write a Letter to the Editor, persuading their community to consider their proposal.

Phase 10

Where's the Beach?

Presentation

Your Task:

Each student will be asked to produce a presentation (physical or digital). The presentation must contain certain information (see below). The student will be assessed on their level of expertise on the topic, speaking on the topic of coastal erosion and their proposed solution.

Presentation Outline		
Elements of a Beach Labeled Diagram	5 pts	
Weathering Experiment • Investigation report • Photos/Video	5 pts	
Erosion Experiment • Investigation report • Photos/Video	5 pts	
Plan of Action	5 pts	
Problem logs (phase 4 & 5)	5 pts	
Reports on a topic in an organized manner, using appropriate facts and relevant, descriptive details to support main idea; speaks at a clear, understandable pace (see rubric on following page) Discusses: • Beach systems • Problem • Who will be affected • information gathered • Experimental process and how these topics helped them to reach • Resolution	25 pts	

*Presentations may be digital or physical. Be sure to include visuals!

Oral Presentation Rubric

William & Mary

Target Skills	Novice 5 pts	Developing 10-15 pts	Proficient 15 -20pts	Exemplary 20-25 pts
Oral Communication Skills	The speaker's purpose is unclear	The speakers purpose needs additional clarification	The speaker's purpose is clear	The speaker's purpose is clear and fully developed
	Student maintains little to no eye contact with audience	Student sometimes maintains eye contact with audience	Student mostly maintains appropriate eye contact with audience	Student consistently maintains appropriate eye contact with audience
	Student articulation is unclear and difficult to understand	Student articulation is generally clear but may not always be correct	Student articulates clearly and correctly	Student articulates clearly, correctly, and precisely
	Student does not use appropriate volume	The student is sometimes difficult to hear	Student uses appropriate volume most of the time	Student uses appropriate volume and considers audience size and room capacity
	Distracters in language and body movement overwhelm presentation	Minimal distracters in language and body movement are present	Distracters in language and body movement are absent	Student uses language and body movement to enhance, not distract from, the presentation
	Student word choice is inappropriate and imprecise	Student word choice is inappropriate and/or imprecise	Student word choice is appropriate and precise	Student word choice and precise and sophisticated
Organization Skills	Little organization is evident in the presentation	Limited organization is evident in the presentation	Information is presented in an organized sequence	Information is presented in an organized and engaging sequence
	The presentation shows little evidence of planning	The presentation shows some evidence of planning	The presentation shows thoughtful planning	The presentation shows thoughtful planning and careful construction
Visual Display Skills	Visual aids detract from presentation	Visual aids are not appropriately incorporated into the presentation	Visual aids complements presentation information	Visual aids enhance and reinforce presentation information
Problem Resolution Skills	The problem-resolution does not consider stakeholder perspectives	The problem resolution makes some reference to stakeholder perspectives	The problem resolution considers a limited number of stakeholder perspectives	The problem solution considers multiple stakeholder perspectives
	There is no connection made between the problem and resolution and the information discovered through research	Some connection is made between the problem resolution and the information discovered through research	Obvious connections are made between the problem resolution and information discovered through research	Sophisticated connections are made between the problem resolution and information discovered through research