Profile Sheet
PBL Lesson Plan for Diverse Learners

Original Title: Marine Biologists Design Advanced Dolphinarium for Rescue Dolphin Family

Primary Subject Area: Science

Outside Subject Area: Mathematics

Description of student roles and problem situation:
Students assume the role of key marine biologists for the National Marine Fisheries Services located in Panama City, Florida. The marine biologists’ meet with head Marine Biologist at Gulf World Marine Park, Jane Smith are given a distinct task. She informs the biologists that a new dolphin family has been rescued from the ocean and there is limited time (2 weeks) for this family to safely move into a new advanced dolphinarium. It is up to the biologists to create dolphinarium models to save the dolphins. Marine biologists are to present their final models to Jane Smith of Gulf World, as well as any remaining Marine Biologists working in Gulf World Marine Park.

Teacher: Miss Mary Alice Gollwitzer

Grade level: 5th grade

Adaptations for Student from Non-Western Culture:

General Classroom Accommodations:
Include resources from the student’s culture
Include audience member from the student’s culture
Adapt the text or curriculum to ensure comprehension
Highlight instructions by emphasizing the major points
Work with the library/media center for special bibliographies, collections, displays, and audio-visuals
Supplement textbooks with authentic material from different cultures taken from newspapers, magazines, and other media of the culture.
Adaptations for ESOL Student:

General Classroom Accommodations:

Include resources in student’s first language
Allow students to present in first language
Allow native language dictionaries
Develop a picture dictionary
Use highlight markers to identify key words and phrases

For Science:

Review vocabulary on daily basis and combine with pictures
Teach new vocabulary contextually
Use visual aids, pictures, films, filmstrips, manipulatives and a multisensory approach
Assess students' performance creatively

For Math:

Have students give oral explanations of their thinking
Have students write original word problems
Explain directions clearly and repeat key terms and/or words to look for
Title, Learner Characteristics, and Sunshine State Standards
And
Learning Outcomes, Student Role & Problem Situation, Meet the Problem Method

Teacher: Mary Alice Gollwitzer
PBL Title: Marine Biologists Design Advanced Dolphinarium for Rescue Dolphin Family
Primary Subject Area: Science
Outside Subject Area: Mathematics
Class and Level: Science (Regular)
Grade Level: 5th Grade

Primary Sunshine State Standards from Science:
SC.5.L.17.1: Compare and contrast adaptations displayed by animals and plants that enable them to survive in different environments such as life cycles variations, animal behaviors and physical characteristics.
L.O. # 1: After completing their advanced dolphinarium with the given guidelines, students will share their model with classmates, explaining their decisions based on dolphins physical characteristics, scoring at satisfactory level or above on the rubric.
SC.5.P.8.1: Recognize and explain that science is grounded in empirical observations that are testable; explanation must always be linked with evidence.
L.O. # 2: After receiving instructions their teacher and from a marine biologist on a field trip and conducting research on dolphins, students will create a visual representation of an advanced dolphinarium, basing their models on researched evidence.
SC.5.N.1.5: Recognize and explain that authentic scientific investigation frequently does not parallel the steps of "the scientific method."
L.O. # 3: After creating their dolphinariums, students will accurately distinguish between their scientific investigations and the steps of the scientific method.

Outside Subject Area Sunshine State Standards from Mathematics:
MA.5.A.1.4: Divide multi-digit whole numbers fluently, including solving real-world problems, demonstrating understanding of the standard algorithm and checking the reasonableness of results.
L.O. # 4: After receiving information from their teacher and from marine biologist, students are to accurately determine the appropriate measurements they will need for their dolphinarium designs.

Learner Characteristics:
Physical: Although small in magnitude, gender differences in motor skill performance are apparent.
Justification: Attaining mastery over small and large muscles is beneficial in helping maintain a relatively orderly classroom, as fifth graders are able to sit quietly for an extended period of time. This is encouraging for teachers as they are assigning complex PBL lesson plans for students to partake in.
Social: The peer group becomes powerful and begins to replace adults as the major source of behavior standards and recognition of achievement. Justification: By fifth grade children are more interested in getting along with one another without adult supervision, therefore enabling them to work more independently in groups. However, the teacher needs to strongly monitor the groups and make sure there is no negative influence taking place between students.

Emotional: During this period, children develop a more global, integrated, and complex self-image. Justification: Developing a positive self-esteem is beneficial in PBL lesson plans for motivating individual participation in groups and for feeling confident in making group presentations.

Cognitive: The elementary grade child can think logically, although such thinking is constrained and inconsistent. Justification: This characteristic is valuable because fifth grade students can understand and solve tasks, provided that the content of the task refers to real, tangible ideas that the child can imagine.

Cognitive: On tasks that call for simple memory skills, elementary grade children often perform about as well as adolescents or adults. But on tasks that require more complex memory skills, their performance is more limited. Justification: This characteristic is important for the teacher to keep in the back of his or her mind, as students may have difficulty organizing research information and applying it to the appropriate areas in designing their dolphinariums.

Description of Student Roles and Problem Situation: Students assume the role of key marine biologists for the National Marine Fisheries Services located in Panama City, Florida. The marine biologists’ meet with head Marine Biologist at Gulf World Marine Park, Jane Smith are given a distinct task. She informs the biologists that a new dolphin family has been rescued from the ocean and there is limited time (2 weeks) for this family to safely move into a new advanced dolphinarium. It is up to the biologists to create dolphinarium models to save the dolphins. Marine biologists are to present their final models to Jane Smith of Gulf World, as well as any remaining Marine Biologists working in Gulf World Marine Park.

Meet the Problem Documents: Head Marine Biologist at Gulf World Marine Park, Dr. Jane Smith, calls an important meeting with Marine Biologists for the National Marine Fisheries Services located in Panama City, Florida. She explains the following to her team of marine biologists the following information:

A dolphin family (Mother, Father, and Baby) were rescued out of the Gulf of Mexico two days ago. They are currently being fostered in our rescue pool, but this is not efficient enough for them to be living comfortably for an extended period of time. Therefore it is
up to my head marine biologists to design a new state of the art dolphinarium. You have two weeks to prepare a model for me. You have $50,000 to use for all the materials you need for your dolphinariums. To help you design your dolphinariums, here are some basic dolphin facts:

Their favorite foods are fish and squid. Play is an important part of dolphin culture. Pesticides, heavy metals, plastics, and other industrial and agricultural pollutants that do not disintegrate rapidly in the environment concentrate in predators such as dolphins. Loud underwater noises may be harmful to dolphins, increasing stress, damaging hearing, and causing decompression sickness by forcing them to surface too quickly to escape the noise. They vary in size from 1.2 m (4 feet) up to 9.5 m (30 feet).

Basic dolphinarium designs are a semi-circular pool, sometimes with glass walls which allow underwater viewing. The water in the pools has to be constantly filtered to keep it clean for the dolphins and the spectators, and the temperature and composition of the water has to be controlled to match the conditions dolphins experience in the wild. A pool for five dolphins should be 2,960 square feet wide, 11 feet deep, and have at least 35,000 cubic feet of water.

Now that you know these basic facts and what is needed of you, I expect you to work hard and have these models ready for me in two weeks so that we can put this dolphin family in a comfortable living environment.
Problem Statement, Know/Need to Know Boards, Possible Resources

Problem Statement:
How can we, as marine biologists, design an advanced dolphinarium to rescue this family of dolphins, in such a way that
~ The dolphin family can maintain a healthy living environment
~ The dolphins have enough room to live comfortably for an extended period of time
~ We stay within our budget
~ We can design the dolphinariums within two weeks

Know Board:
1. A dolphin family consisting of Mother, Father, and Baby, was rescued out of the Gulf of Mexico two days ago.
2. They are currently being fostered in Gulf World Marine Park’s rescue pool, which is inefficient for them to live comfortably and safely.
3. It is our responsibility to create efficient models to present to Jane Smith in two weeks.
4. We have $50,000 as our budget.
5. Foods dolphins eat most are fish and squid.
6. It is important to dolphin culture and health that they play.
7. Pesticides, heavy metals, plastics, and other industrial and agricultural pollutants that do not disintegrate rapidly in the environment concentrate in dolphins.
8. Loud underwater noises may be harmful to dolphins, increasing stress, damaging hearing, and causing decompression sickness.
9. Decompression sickness is caused my dolphins surfacing too quickly to escape noise.
10. Dolphins vary in size from 1.2 m (4 feet) up to 9.5 m (30 feet).
11. Basic dolphinarium designs are a semi-circular pool, sometimes with glass walls which allow underwater viewing.
12. Water in dolphinariums must be consistently filtered to keep in clean for dolphins and the spectators.
13. The temperature and composition of the water in dolphinariums has to be controlled to match the conditions dolphins experience in the wild.
14. A pool for five dolphins should be 2,960 square feet wide, 11 feet deep, and have at least 35,000 cubic feet of water.

Need to Know:
1. How long do the dolphins have to live in the foster tank they are currently in now?
2. How long is it going to take to build the new dolphinarium?
3. Can we build the dolphinarium in a sufficient enough amount of time to save the dolphin family?
4. What is the temperature of the Gulf of Mexico?
5. How will we design the feeding of the dolphins so that they are eating on a normal schedule?
6. What is a dolphin’s normal feeding schedule?
7. What is the best shape we should use to design our dolphinarium?
8. How do we maintain the temperature of the water in the dolphinarium?
9. What is the safest way to clean the dolphinarium?
10. We have the measurements for 5 dolphins…should we keep this dolphinarium at these dimensions so the dolphin family has plenty of room to live comfortably or find the correct dimensions for 3 dolphins?
11. Where are we going to build this dolphinarium?
12. How can we design the dolphinarium to be safe in hazardous weather conditions?
13. What is the best material to use?
14. Does the dolphin baby have to have special treatment or does the mother take care of all his needs?
15. How do we design a feeding system so that the dolphins do not become dependent on humans to feed them?
16. Do we eventually want to re-release the dolphin family into the Gulf of Mexico?
17. If we do eventually want to re-release the dolphin family into the Gulf of Mexico, how to we ensure that they will be able to survive in the wild after being fostered in a dolphinarium?
18. What if the Mother and Father dolphin have another baby dolphin?
19. If the Mother and Father have another baby dolphin, will it be safe for the Mother to give birth and raise the baby dolphin in the dolphinarium?

**Resources**

**Books**


**Human Resources**

Dr. Jane Smith, Head Marine Biologist, Gulf World Marine Park, 15412 Front Beach Road, Panama City Beach, FL 32413.

**Web Sites**


Capstone Performance Description:

The capstone performance for the problem contains two parts: an individual report and a group presentation. The individual report will be an evaluation and reflection of how the individual feels the group worked together, of how the individual feels he or she participated within the group, and what the individual was most surprised to learn during the duration of this lesson. In the individual report students will also individually provide his or her own choice of the “best” solution, stating at least two reasons why this would be his or her choice. The group presentation will be assessed by a rubric.

In the group presentation, Marine Biologists (the students) for the National Marine Fisheries Services located in Panama City, Florida present their models of their advanced dolphinarium, explaining the determining factors of their designs to head marine biologist of Gulf World Marine Park, Jane Smith, as well as the remaining marine biologists working in Gulf World Marine Park. Each team member is responsible to share at least one aspect of their model. (The faculty of the school, the teacher, and the parents, are also welcome to come to the classroom to see these presentations. The models will be displayed in the school library after the lesson is complete). In the presentation, the team is to provide two feasible solutions and four justifications as to why they are recommending one of these solutions over the other. In the group presentation, students will share their visual model of the dolphinarium with the classroom and panel. Models are to be neat and accurately represent the groups’ dolphinarium designs, including measurements, design, color, and dolphinarium details (e.g. Water level, characteristics of dolphinarium such as feeding chambers, play areas, etc.). The groups are to explain to the remaining class and visitors their two alternatives and their “best solution.” Each solution stated must align with all conditions stated in the problem statement. Group reports must include the group’s problem statement, an explanation and model of the dolphinarium with an explanation of why students chose their model based on dolphin characteristics, an explanation of dolphinarium measurements and justifications for these choosing the measurements, the two different solutions (these don’t have to be exact opposites), and four reasons for choosing one solution over another. Individuals are to make portions of the presentation, distinguishing between their scientific investigations and the steps of the scientific method. Students credit resources for investigation.

Students are also required to distinguish between their scientific investigations and how they differ and relate to the steps of the scientific method.

The panel of marine biologists from Gulf World Marine Park will be asking the marine biologist teams questions to assess their dolphinarium models, making sure the appropriate decisions have been made to ensure safety of the rescue dolphin family. Such questions will be asked concerning the research and investigation that influenced the designs, and which dolphin behaviors and characteristics were taken into consideration and influenced the designs. Marine biologist teams (the students) must also credit and reference verified resources they utilized for the duration of the project. The marine biologist teams (students)
will make their presentations in the front of the classroom, and the panel of expert marine biologist from Gulf World Marine Park will be sitting in a long table in front of them. The rest of the public (parents, teacher, classmates, and faculty) will be sitting behind the panel.

Student autonomy is incorporated as the group creates their dolphinarium models, decides the most appropriate solution (and justifications for this solution), and decides which members of the group present different elements of the presentation. The students will also complete an individual report, summarizing the groups work. In this report, the students will also individually provide his or her own choice of the “best” solution, stating at least two reasons why this would be his or her choice. Metacognition is incorporated when each student gives his or her individual evaluation and reflection of how the individual feels the group worked together, of how the individual feels he or she participated within the group, and what the individual was most surprised to learn during the duration of this lesson.
# Rubric for Assessing the Capstone Performance

## Rubric for Group Presentation

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Superior</th>
<th>Adequate</th>
<th>Poor</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dolphinarium Model</strong></td>
<td>30 points Model is neat and accurately represents the groups’ dolphinarium design, including measurements, design, color, and dolphinarium details (e.g. Water level, characteristics of dolphinarium such as feeding chambers, play areas, etc.).</td>
<td>30 points Model does not have exact measurements and dolphinarium details.</td>
<td>10 points Model is sloppy and no measurement or dolphinarium details are present.</td>
</tr>
<tr>
<td><strong>Alignment to Problem Statement</strong></td>
<td>20 points Each solution must align with all conditions stated in the problem statement.</td>
<td>15 points One solution aligns with all conditions; the other aligns with two to three conditions.</td>
<td>5 points Neither solution aligns with all conditions.</td>
</tr>
<tr>
<td><strong>Required Components</strong></td>
<td>50 points Report must contain a) The group’s problem statement. b) An explanation and model of the dolphinarium, with an explanation of why students chose their model based on dolphin characteristics.</td>
<td>40 points The report contains a) An explanation and model of the dolphinarium with an explanation of why students chose their model based on dolphin characteristics.</td>
<td>10 points The report contains less information than listed in the “Adequate” category.</td>
</tr>
<tr>
<td>Mechanics</td>
<td>10 points</td>
<td>7 points</td>
<td>3 points</td>
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<tr>
<td>Individual makes portion of presentation, distinguishing between their scientific investigations and the steps of the scientific method. Students credit resources for investigation.</td>
<td>Individual makes portion of the presentation, but does not distinguish between scientific investigations and the steps of the scientific method. Student also fails to credit resources for investigation.</td>
<td>Individual does not make portion of presentation.</td>
<td></td>
</tr>
</tbody>
</table>

b) Explain dolphinarium measurements and justifications for these choosing measurements.

c) Two different solutions (these don’t have to be exact opposites).

d) Four reasons for choosing one solution over another.

c) Explain dolphinarium measurements and justifications for these choosing measurements.

d) Two different solutions (these don’t have to be exact opposites).

e) Four reasons for choosing one solution over another.
Scoring Guide

A  110-120
B  95-109
C  85-94
D  75-84
F  Less than 75
Two Alternative Solutions and “Best” Solution Analysis

Solution One:

The marine biologists will design a dolphinarium to fit the dimensions to hold five dolphins. There will be no set geographic shape; leaving flexibility for the dolphins to swim in the dolphinarium and not feel as if they are “trapped” somewhere. Marine biologists have decided to go with a salt-water-based water system, therefore maintaining an environment closer to the wild for the dolphins’ health and comfort. A feeding system will be installed to release fish into the dolphinarium at different times throughout the day and night. This way, dolphins will not become dependent on humans to feed them. There will be glass walls rather than concrete walls. Concrete walls can distort echolocation signals, causing confusion and distress for dolphins. The dolphinarium will also have areas that resemble the Gulf, such as mock reef barriers and hills that resemble the ocean floor. The goal of the marine biologists is to maintain an environment that closely resembles the Gulf of Mexico that the dolphins are used to. This way the dolphins do not become dependent on humans and will hopefully have an easier time when re-released into the Gulf of Mexico.

<table>
<thead>
<tr>
<th>Pro</th>
<th>Con</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building a dolphinarium for the dolphin family will enable them to recover until they are ready to be re-released into the Gulf of Mexico</td>
<td>Animal rights and welfare groups still consider keeping dolphins “captive” a form of animal abuse.</td>
</tr>
</tbody>
</table>
**wild/gulf.**

<table>
<thead>
<tr>
<th>Water in the pool will match the temperature of the Gulf of Mexico and new research has enabled marine biologists to use a new salt-water based water system.</th>
<th>Water in pools must constantly be filtered to keep clean for the dolphins.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salt-water based water system and glass walls will enable dolphins to feel as if they are in the wild, enabling them to better adapt to the dolphinarium and to being re-released into the Gulf of Mexico.</td>
<td>Salt-water based pools are more costly and available from fewer distributors. Glass is also more maintenance.</td>
</tr>
<tr>
<td>Having no specific geometric dolphinarium shape enables marine biologists to be more flexible with where they will put feeding chambers and mock-reefs.</td>
<td>Although dolphinarium will have no specific geometric shape, marine biologists need to make sure to have specific models and measurements so engineers do not make mistakes in the initial construction of the dolphinarium.</td>
</tr>
</tbody>
</table>

**Consequences:**

With this dolphinarium design, the cost of having a salt-water-based water system and glass walls will be higher.

However, dolphins do not become dependent on humans and will have an easier time to adapt when re-released into the Gulf of Mexico.
Solution Two:

Marine biologists have designed the dolphinarium to be a huge semi-circular pool with glass walls, making it easy for engineers to construct the dolphinarium and to do so in a timely manner. The characteristics of the dolphinarium will reflect those of the natural Gulf of Mexico. We will have mock reef barriers and hill-like floors that resemble the sandy ocean floor. A feeding chamber will be installed so that the dolphins do not become dependent on humans for feeding purposes. The water will be of chlorine, to save on time, cost, and availability of the water system (as it is easier to find chlorine pool systems rather than finding a salt-water-based water based system for such a large area). The size of the dolphinarium will be large enough to hold five dolphins.

<table>
<thead>
<tr>
<th>Pro</th>
<th>Con</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building a dolphinarium for the dolphin family will enable them to recover until they are ready to be re-released into the wild/gulf.</td>
<td>Animal rights and welfare groups still consider keeping dolphins “captive” a form of animal abuse.</td>
</tr>
<tr>
<td>Water in the pool will match the temperature of the Gulf of Mexico. The chlorine-filled dolphinarium will be more affordable and easier to maintain than a salt-based dolphinarium.</td>
<td>Water in pools must constantly be filtered to keep clean for the dolphins. The chlorine based pool may be easier to maintain, but brings upon questions of dolphin adaptation. Marine biologists need to ensure that the dolphins will be able to adapt to the chlorine after living in the Gulf and will they be able to adapt back into the salty water of the Gulf of Mexico after living in chlorine water for a period of time.</td>
</tr>
</tbody>
</table>
Glass walls will enable dolphins to feel as if they are in the wild, as concrete walls can distort echolocation signals, causing confusion and distress to dolphins.

The semi-circular design will make it easier for engineers to construct the pool, therefore also gaining time for the dolphinarium to be complete and ready to foster the dolphin family.

Consequences:

Questions arise with the chlorine pool about how dolphins will adapt to the change in water. After coming from a salt-water living environment, we wonder how the dolphins will adapt to the chlorine-filled pool. After they adapt to the chlorine, we hope that the dolphins will be able to re-adjust to the salt water once re-released into the Gulf of Mexico.

Most dolphinariums to have chlorine-filled waters, and there has not been evidence of this being harmful to the animals. Going with the semi-circular pool shape and the chlorine-filled water, we will save a lot of money and gain a lot of time in building this dolphinarium.

Justification:

Best solution: Solution One. It is going to be more beneficial for the dolphins if marine biologists design the dolphinarium to maintain an atmosphere that closely resembles that of the Gulf
of Mexico. Although construction may take a little longer and the cost of having the salt-water system will be more expensive, it is necessary to do to ensure the comfort and health of the dolphins. After being fostered in an atmosphere that closely resembles their normal lifestyle in the Gulf of Mexico, it will also be easier for the dolphins to re-adapt once re-released into the Gulf of Mexico.

Although Solution Two seems more timely and cost efficient (which are two very important variables in our equation to design the dolphinarium) the safety of the dolphins must come first and the dolphins will be more comfortable and feel “more at home” being fostered in the dolphinarium of Solution One.
Debriefing Plan and Coaching Questions

All teams of Marine Biologists for the National Marine Fisheries Services located in Panama City, Florida (the students) will make their advanced dolphinarium design presentations (explaining the determining factors of their designs) to head marine biologist of Gulf World Marine Park, Jane Smith, as well as the remaining marine biologists working in Gulf World Marine Park. Other members present in the classroom will include the remaining classmates, faculty of the school, and any parents who want to see their children’s presentations. The teacher will act as the “scribe” and record the characteristics of each proposed “best solution.” These characteristics are provided on a handout to all students on the day of class following all group presentations. Other marine biologist teams (other teams of students) are to rate each “best solution” providing a list in priority order (#1 is best of the “best”). Points are assigned for each “place” on the list as designated below. The teacher is to tally the points for each solution.

The two solutions receiving the most points will then be examined in a whole class sessions. The teacher will ask the class if there is a way to combine the two solutions to make one “even better” solution. Through the class discussion, students will reach consensus on portions of the solutions to use. Then, the teacher is to write a bulleted list of these portions on the board for all to see.

<table>
<thead>
<tr>
<th>Place</th>
<th>Points Awarded</th>
</tr>
</thead>
<tbody>
<tr>
<td>1st</td>
<td>10</td>
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<tr>
<td>2nd</td>
<td>7</td>
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<tr>
<td>3rd</td>
<td>5</td>
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<tr>
<td>4th</td>
<td>3</td>
</tr>
<tr>
<td>5th</td>
<td>2</td>
</tr>
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</table>

Five Essential Concepts:

The “best” solutions must demonstrate understanding of accurate scientific and mathematic concepts including:

- Ability to compare and contrast adaptations displayed by animals that enable them to survive in different environments such as life cycles, variations, animal behaviors, and physical characteristics.

- Recognition and explanation that science is grounded in empirical observations that are testable; explanations must be linked with evidence.
- Recognition and explanation that authentic scientific investigation frequently does not parallel the steps of “the scientific method.”

- Dividing multi-digit whole numbers fluently, including solving real-world problem.

- Analysis of research in order to take a position about which dolphinarium design is more important for the dolphin family: the more natural setting without a symmetric geometrical shape and with a salt-water-based water system, or a more typical dolphinarium setting with a semi-circular shape and chlorine-based water system.

In order to coach students to grasp the essential concepts of the PBL lesson, the teacher will ask coaching questions (please see below) in group discussions with the class. She will also address these concepts by addressing the coaching questions when giving students initial instructions regarding the assignment. She will also address the coaching questions with each group while monitoring group progress and work.

Coaching Questions:

C- Cognitive
M- Meta-Cognitive
E- Epistemic

<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Question</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Meet the Problem</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>What is the student role in this problem?</td>
</tr>
<tr>
<td>M</td>
<td>What do you already know about dolphins?</td>
</tr>
<tr>
<td>E</td>
<td>Do you think this is a realistic problem? Could it happen in the real world?</td>
</tr>
<tr>
<td><strong>Know/Need to Know Board</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>Where could you go to find that out?</td>
</tr>
<tr>
<td>M</td>
<td>How do you “know” this?</td>
</tr>
<tr>
<td>E</td>
<td>What obstacles do you see?</td>
</tr>
<tr>
<td><strong>Problem Statement</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>What is your role in the problem?</td>
</tr>
<tr>
<td>M</td>
<td>What, if anything, could you change or add to the problem statement?</td>
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<tr>
<td></td>
<td>What factors do you need to consider in order to reach a “good” solution?</td>
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<td>-------------------------------------------------------------------------</td>
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<tr>
<td><strong>Research</strong></td>
<td></td>
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<tr>
<td>C</td>
<td>What types of resources can you use to find more information on the dolphin?</td>
</tr>
<tr>
<td>M</td>
<td>How have you divided the work among group members and how did you decide to divide the work this way?</td>
</tr>
<tr>
<td>E</td>
<td>What resource is the most reliable? How do you know?</td>
</tr>
<tr>
<td><strong>Generating Possible Solutions</strong></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>What scientific evidence do you have to back up this solution?</td>
</tr>
<tr>
<td>M</td>
<td>Why do you feel that Solution 1 is better than Solution 2? Explain your reasoning.</td>
</tr>
<tr>
<td>E</td>
<td>Do you think this solution would work in the real world?</td>
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</tbody>
</table>