Coral Bleaching, Why Should I Worry?

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This curriculum unit is recommended for:
5th Grade Technology and Science

Keywords: Coral Bleaching, Coral Reef, Conservation, Coral Polyps, Ecosystem, Run-off, Habitat, Nursery Ground, Species, Global Warming, Sea Surface Temperature, X-Axis, Y-Axis, Origin, Quadrant, Ordered Pair, Technology

Teaching Standards: See Appendix 1 for teaching standards addressed in this unit.

Synopsis: Throughout this unit, students will learn about, interpret data, and form conclusions on coral bleaching. Initially, students will become familiar with coral reefs and will review graphs and graphing. Within a learning team, students will see that such reefs serve as a factor in our world's environment and that they can have either a positive or negative impact it. By looking at and interpreting live and past data, they can see how various ecosystems are being affected by global situations. Also, through participating in scientific discussions and technology based programs, students will be able to become more aware of their impact on these ecosystems and create a way to have a positive effect on their own future.

I plan to teach this unit during the coming year to 120 students in Fifth grade.

Coral Bleaching, Why Should I Worry?

Sandra Spraggins

"Let us be good stewards of the Earth we inherited. All of us have to share the Earth's fragile ecosystems and precious resources, and each of us has a role to play in preserving them. If we are to go on living together on this earth, we must all be responsible for it."
~ Kofi Annan

Introduction:

Most of today's students live in a world of video games and instant information. They tend to look at their immediate environment and don't extend beyond that. Their ability to impact the world around them is rarely realized.

This curriculum unit will not only review the importance of graphs and the ability to decipher information from them, but will introduce students to coral reefs, the existence of coral bleaching, the effect on ecosystems, and the students ability to come up with a solution to this problem and, finally, share this information with others.

"Corals provide a home for fish and other marine creatures. Healthy reefs provide food for millions of people. Reefs help to protect coastal land from cyclones and storm surges. Healthy reefs also support local economies, providing employment from tourism, fishing and many other industries. More than one third of reefs around the world have been lost! This is why it is important to protect the reefs we have left. Overfishing can remove fish that help reefs stay healthy. Sediment and pollution run-off from coastal land and rivers can lead to poor water quality. Storm damage, pests, diseases, and global warming can also damage the health of reefs. Coral bleaching is caused by increased sea temperatures or other stressful conditions. When stressed, corals expel the algae living in their tissue (zooxanthellae). This makes the coral lighter in color, and is called "coral bleaching. Corals can recover from bleaching but if the stressful conditions are severe, loss of algae and the nutrients they provide can lead to coral death." (CoralWatch 2014)

I want my students to first be able to understand how graphs can give us important information, how they can decipher the information, come to conclusions and make predictions from those graphs. Secondly, I want my students to look outside their own

world, beyond Charlotte, NC, to see what is happening globally and how and why they should be concerned. Students will use various technology tools to further research significant information and also share their information with others beyond the four walls of their school.

Background Information:

Irwin Academic Center is located in uptown Charlotte, NC. Our school houses six grade levels which includes kindergarten through fifth grade. Our enrollment is about 550 students. Irwin is the only CMS full magnet program for Learning Immersion (K-2) and Talent Development (Academically Gifted-grades 3-5) students. Both programs are accelerated and offer students rigorous and academically challenging curricula. Students are enrolled by entering a school lottery drawing which is held in early spring. We are also an Individualized Learning school. Teachers use a method of teaching in which content, instructional technology, and pace of learning are based upon the abilities and interest of each learner. The students come from diverse economic backgrounds and tend to come to school with higher academic levels than the grade they are attending. They tend to be self-motivated, ready to learn, with strong parental support.

I teach K-5 technology and see each class once a week. All grades have technology for 45 minutes. I teach keyboarding, internet safety, word processing, and spreadsheets throughout the year. Also this year, I am introducing Coding and 3-D printing into the curriculum. By integrating all academic subjects and creating PBL units, students are able to use real-life technology applications within their grade level's curriculum. This is my second year at CMS. I previously taught 5th grade for 13 years in Hampton, VA where I used technology on a daily basis and I was strongly involved in integrating technology into classrooms in the district and creating district technology policies. I attended Nazareth College of Rochester where I received my BS in Speech Pathology and Masters in Elementary Education. My love of teaching and children has existed as long as I can remember and am considered a "geek" by my friends and family.

My curriculum is based on the NC State Common Core and each grade level's CMS pacing guide. I meet with teachers on a regular basis to see how I can integrate their curriculum into my technology lessons. I use Weebly to create PBL's for each grade level to make resources available for both students and parents. Links to websites and other forms can also be found on my Weebly. (www.technologyatiac.weebly.com)

My technology lab consists of 30 Chromebooks purchased in December of last year. Irwin Academic also supports the B.Y.O.T. (Bring Your Own Technology) program which allows student to access technology while at school in a safe and protected

environment. This year, fifth grade students throughout CMS have personal classroom Chromebooks which is part of the 1:1 implementation program. They also have access to iPads but I would like to ease the integration of the Chromebooks with the 5th graders by executing a data-based scientific unit using the Chromebooks. My lessons include such technology and web-based resources as: Discovery Ed, Google Classroom, Weebly, and Google Maps. Along with that, I use iPads which include various apps that allow for personalized learning. I also create PBL units to support student's personalized learning.

Rationale:

Whether teaching here or in VA, I have found that students across grade levels have always seemed to have difficulty with graphs and data. The ability to dissect, understand, make conclusions, and make predictions from graphs is lacking. Along with that, being able to associate oneself with real-world problems that they discuss in school rarely happens. Seeing that they serve as a factor in our world's situations and that they can have either a positive or negative impact on those situations, to me, is very important. By looking at and interpreting live and past data, they can see how various ecosystems are being affected by global situations. Also, through participating in scientific discussions through classroom debates, collaborative groups, blogs and other technology based programs, students will be able to become more aware of their impact on these ecosystems and create a way to have a positive effect on their future.

My goal is to integrate the 5th grade Science curriculum on ecosystems and technology. With the increased demands on classroom teachers, I would like to expand the time that students have to explore and learn both Science and Technology. The ability to read and interpret data is not only part of science, but will also expand to the subjects of Math and Social Studies. Through the use of inquiry-based research, students will achieve knowledge and use critical thinking skills to conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools.

Too many times, our students have no concern for what is happening in their world, thinking that they are not affected nor can they personally have an impact.

In Will Richardson's book, Why School: How Education Must Change When Learning and Information Are Everywhere, he says, "So what if we were to say that, starting this year, even with our children in K– 5, at least half of the time they spend on schoolwork must be on stuff that can't end up in a folder we put away? That the reason they're doing their schoolwork isn't just for a grade or for it to be pinned up in the

hallway? It should be because their work is something they create on their own, or with others, that has real value in the real world." (Richardson 2012)

One of the reasons that I choose Coral Bleaching and coral reefs is because our students are not aware of Coral Beaching since it is something that is not part of their immediate environment. They have little to no background knowledge of coral reefs. Through this unit, my underlying desire is to make students aware that things are happening around them that do and will affect them (whether directly or indirectly) and that they CAN do something about it whether it's just sharing awareness or becoming involved.

Objectives

During this unit, my objective is for my students to improve and refine their strategies for finding solutions to questions and interpreting information. By working independently and in collaborative groups, they will make inferences from real-world data in the form of graphs and live information. They will be urged to make careful observations using internet based tools. They will be required to gather, evaluate, and use the information that they find. Through conversations and asking questions, I want students to be able to come up with conclusions, make predictions, and find solutions. Finally, I want students to share these findings with others in various ways using technology. I want them to use digital media and environments to communicate and work collaboratively.

Since Irwin Academic is a Talent Development Magnet school, it is focused on accelerated curriculum for the students. Through the Common Core and the 21st Century Skills curriculum, my students will acquire the abilities necessary to become successful in life. The 5th grade Science Essential Standard 5.L.2.1, 5.L.2.2, 5.L.2.3 addresses the interdependence of plants and animals (in this case, humans). As stated previously, students at Irwin are encouraged and are able to excel in all curriculum areas so 6th grade Common Core standards will also be taught including 6.L.2.1, 6.L.2.2, and 6.l.2.3. These standards will come into play when the discussions about Coral Bleaching begin.

Math standards 3.MD, 4.MD, 5.MD, 5.G all have to do with graphing (line and bar). Unfortunately, students in 5th grade still have a difficult time interpreting and analyzing data. This is why I want to begin this unit with a review of graphing using data that will be relevant as we progress throughout the unit. Discussions will include some 6th grade standards including 6.NS.5, 6.NS.6a-c, 6.NS.7a-d and 6.SP.4, 6.SP5a-c. Technology

standards 5.SI.1, 5.SI.2, 5.SI.1.3 will be used when looking for resources that are useful to their research on coral bleaching. The use of relevant and reliable sources is something that I teach all my grade levels but it is extremely important in 5th grade as the students prepare to go into middle school where they will have to rely much more on independent research strategies. Other technology Common Core Standards that will be used are: 5.TT.1.1, 5.TT.1.2, 5.TT.1.3, 5.RP.1, 5.SE.1.1, 5.SE.1.2, and 5.SE.1.3 all addressing safe and responsible digital practice. Throughout the unit, information that was taught in lower grades will also be reviewed.

This unit is for 5th grade but can easily be adjusted and adapted for 4th or 6th grade. Each of these grade levels can benefit from the review of graphs, the use of technology to learn, attain, and share information, the knowledge of global ecosystem events, and the determination of how they can positively affect the outcome. Finally, the ability to share that information with others in various ways is a 21st century skill that will be necessary to be successful in their future. At the end of this unit, I hope that students will have the ability to look at graphs and other data and interpret it correctly along with asking questions which may lead to their desire for further investigation. My goal is that they will understand that the effects of global damage do affect them and through collaboration and communication with others, they can have a positive influence on their future.

Scientific Content

Vocabulary

Quadrant-the four sections of a coordinate grid that are separated by axis

Ordered pair-a pair of numbers that gives the coordinates of a point on a grid in this order (horizontal coordinate, vertical coordinate)

Origin-the intersection of the X and Y axis in a coordinate plane, described by the ordered pair

X-Axis-in a coordinate plane, the horizontal axis

Y-Axis-in a coordinate plane, the vertical axis

Coral Reef- a reef often of great extent made up chiefly of fragments of corals, coral sands, algal and other organic deposits, and the solid limestone resulting from their consolidation (Webster 2015)

Coral Bleaching-corals that are stressed by changes in light, temperature, and/or nutrients. They expel their symbiotic algae and turn white.

Conservation- a careful preservation and protection of something; especially**:** planned management of a natural resource to prevent exploitation, destruction, or neglect (Webster 2015)

Ecosystem- the interactions between the living and nonliving things in a place

Habitat- The place where each population lives within an ecosystem

Coral Polyps-tiny, fragile animals that compose a coral reef structure (Aware 2005)

Zooxanthelle-algae that live in a symbiotic relationship with coral (Aware 2005)

Global Warming- increase in the average temperature of the Earth's air and oceans.

Websites and lesson plans about Coral Reefs and Coral Bleaching

Coral Reefs, Why Should I Care?

This is the website that I created that goes along with this unit. You will find videos, handouts, links and all resources needed for this unit. This website is made for both teachers and students:

http://cticoralreefs.weebly.com/

Aware Kids

This website was created by NOAA (National Oceanic Atmospheric Administration) but is for students. It includes more topics than Coral Reefs. The information and activities on Coral Reefs are on page #12-16:

http://coralreef.noaa.gov/education/educators/resourcecd/guides/resources/aware_g.pdf

Save a Reef

This website was also created by NOAA. It contains a lesson plan on saving coral reefs. It is made for grades 5-6 but can be adapted for lower or upper grades

http://oceanexplorer.noaa.gov/explorations/08bonaire/background/edu/media/savereef.pdf

Coral Reef Conservation Program

An excellent website put together by NOAA. It includes videos, facts, pictures and other resources:

http://coralreef.noaa.gov/

Coral Reef Live Satellite Watching

Get live updates on Ocean Stress Monitoring for Coral Reefs:

http://coralreefwatch.noaa.gov/satellite/

Coral Watch.org

Tweet live with others about the conditions of Coral Bleaching. This website originates from Australia:

http://www.coralwatch.org/web/guest;jsessionid=569741711B40162D3D56D657A92454F4

Welcome to Coral Watch

Will send you multiple resources for free which you can share with students and use in the classroom including CD's:

http://www.coralwatch.org/web/guest;jsessionid=F226D3B3D59E853CE76C74EB0911D82D

Flower Garden Banks

A National Marine Sanctuary run by NOAA. Has great information on Coral Reefs and what we can do to help save them:

http://flowergarden.noaa.gov/

The Mystery of the Great Barrier Reef-Australia by Carole Marsh (Marsh 2006)

Teaching Strategies

Activity #1

Objective:

To review past lessons (in lower grades) on graphing and data. Initial lessons will include review and discussion on graphs and data. This will be accomplished through reexamination of vocabulary and online graphing using the website: http://www.onlinecharttool.com/graph which allows students to create a variety of graphs along with using the proper labels. Students will be put into pairs and create a simple bar and line graph using the same data and, therefore, be able to compare and contrast both. Data, which will be supplied in a handout, was taken from Australian Institute of Marine Science. http://mclean.ch/climate/GBR_sea_temperature.htm[2] and shows yearly ocean temperature at the Great Barrier Reef in Australia. This data will be used as a resource later in the unit. After graphs have been created, I will show the students the actual data graph from the AIMS which goes into more detail and shows both monthly and yearly data from the years 1982-2011.

*Purpose*s:

To review vocabulary and necessary parts of a graph. Also to have students practice creating a graph and interpreting the data presented.

Essential Questions:

What are the essential parts of a graph? What types of conclusions can we make from the information presented in a graph? Can we make predictions from graphs?

Teaching Strategies:

Cooperative learning, re-looping of previously learned material, internet based technology, teacher read-aloud

Teacher Input:

The teacher will review types of graphs, specifically line and bar graphs and what they can display. Review will also include parts of a graph and important vocabulary. Teacher will introduce students to the premade website (www.cticoralreefs.weebly.com) and direct them to the graphing page. The teacher will then allow students to work in pairs on the graphing project.

Vocabulary:

Line graph, bar graph, scale, interval, trend, X-Axis, Y-Axis

Guided Practice:

The teacher will display vocabulary words on the board and have students respond to what the words mean. He/she will also show 2 different types of graphs (bar and line) and discuss what types of data represent. The teacher will facilitate the classroom discussions to make sure the students are understanding the correct meaning and use of the vocabulary. Students can also be sent to the board to draw a representation of each word.

Independent Practice:

Students will pair up and create a bar or line graph from the data that is on the Weebly Website.

Assessment:

Make sure student's responses are appropriate. Assess graphs when completed to make sure they are representing the correct data.

Suggested Materials:

www.cticoralreefs.weebly.com

http://www.onlinecharttool.com/graph (Zygomatic 2003)

http://mclean.ch/climate/GBR_sea_temperature.htm (McLean 2011)

Summary:

Students will have reviewed graphs and data so that they will be able to interpret data and make predictions from information that will be presented to them throughout this unit.

Activity #2

Objective:

Students will be directed to the Weebly Site and will go under the heading, "What Are Coral Reefs? They will complete the activities on that page at a self-paced rate having 1 week (until we meet next time) to complete the activities on that page. Activities include: watching an introduction video on coral reefs (School 2015), reading from a student Activity book created by N.O.A.A. for students on coral reefs, "Crazy about Coral Reefs," (Aware 2005) and answer questions from both the video and the activity book. Standards that will be covered in this section will be: 5.L.1.1, 5.L.2.1, 5.L.2.2, 5.L.2.3, 6.L.2.3. Students will also be practicing creating both a folder and a document in Google Docs. It will also be a review of saving a document in the correct location. 5.TT.1.1, 5.TT.1.2, 5.SE.1.3.

During the next class, students will get into teacher-created groups and share the answers that they found with each other. At this time, they can add to or replace the information they had on the document. The newer answers will be used in future research.

Next, the teacher will read from the book: The Mystery of the Great Barrier Reef by Carole Marsh. (Marsh 2006) The book includes facts and information about the Great Barrier Reef along with a "mystery" which will entice and inform the students at the same time. The teacher will read aloud from the book to the class and will continue throughout the unit. By doing this, additional information will be given to the students through the story and it will also to keep their interest up during the unit. One to two chapters can be read per class since they are very short chapters.

Purposes:

The purpose of this lesson is to introduce the students to coral reefs thorough various media and to improve technology skills by creating and maintaining documentation in Google Docs.

Essential Questions:

What are Coral Reefs and why are they important?

Teaching Strategies:

Self-paced, independent learning, teacher read-aloud, peer tutoring, internet based technology.

Teacher Input:

Introduce coral reefs and their ecosystem to students by a short discussion of questions such as:

1-Do you know what the oldest ecosystem is on the Earth?

2-Do you know where 25% of all known marine life live?

3-What part of the ocean is a valuable tourist attraction, protects coastal communities from storms and erosion, and is also a very important resource for medical cures for things like heart disease, cancer, and asthma?

Vocabulary:

Polyps, calcium carbonate, reef, conservation, ecosystem, habitat, species

Guided Practices:

Demonstrate and explain what is on the Weebly Site under “What are Coral Reefs.” Then show students how to complete the page.

Assessments:

Answers to questions and ability to create a folder with correctly named document in it.

Independent Practices:

Students will watch video, read information from N.O.A.A. activity book, and answer questions.

Activity #3

Objectives:

5.L.2.1, 5.L.2.2, 5.L.2.3 The objective of this activity is to narrow down the locations and research of Coral Reefs to the Great Barrier Reef. The lesson will begin as a whole class review of how to use Google Maps (Google, Google Maps 2015) and what it can be used for (students used Google Maps last year in an in-depth unit on Google Maps.) Students will then go into their group and will use Google Maps to observe and make conclusions about the Coral Reef, “The Great Barrier Reef.” 5.SI.1.1, 5.SI.1.2, 5.SI.1.3, 5.TT.1.1, 5.TT.1.2, 5.SE.1.3 They will create notes on what they observe on a new Google Document labeled, “Google Maps.”

We will also continue our reading of the story, The Mystery of the Great Barrier Reef.

It should be noted that since students are using Chromebooks in my lab, Google Earth is not available to them, therefore, Google Maps is being used instead.

Purposes:

The purpose of this lesson is to give students a more detailed perspective of Coral Reefs by looking at the Great Barrier Reef using Google Maps. Through their observations,

they should be able to come up with specific conclusions about that ecosystem. It is also a review on using an app on their Chromebook and Google Maps.

Essential Questions:

What does a specific Coral Reef (The Great Barrier Reef) ecosystem look like? What conclusions can you make about this ecosystem?

Teaching Strategies:

Sharing, whole group instruction and review, small group collaboration, self-paced, independent learning, technology based instruction, teacher read-aloud.

Teacher Input:

As students get into groups to share results from independent work during the week, teacher will walk around and monitor conversations. Following discussions, teacher will conduct a whole group review of Google Maps including launching the app, tools that can be used, and how to navigate around the site. Finally, a few more chapters will be read from the book, The Great Mystery on the Great Barrier Reef.

Vocabulary:

Great Barrier Reef

Guided Practices:

Guide students through group sharing of answers to questions from last week. As a class, review Google Maps.

Assessments:

Observation of student groups as they research and explore Google Maps and the Great Barrier Reef. Teacher will have discussions and ask open-ended questions when walking around the classroom with specific groups based on what they are currently looking at and exploring.

Independent Practices:

Students will continue their use and observations on Google Maps outside of the lesson. They will add to their Google Doc which will be shared with their group next week.

Suggested Web Sites:

Using Google Maps in the Classroom

http://maps.google.com/help/maps/education/ (Google, Google Maps Education 2015)

The Great Barrier Reef, Australia

https://www.google.com/maps/about/behind-the-scenes/streetview/treks/oceans/ (Google, Great Barrier Reef, Australia 2015)

Activity #4

Objectives:

Students will be introduced to Coral Bleaching by watching a video as a class. In their small groups, they will use specific websites and articles which are located on the Weebly. Students will click on particular links to find the needed information. When outside of the classroom, students will be allowed to do further research using books, other websites and videos. Through the ability to collaborate using Google Docs, students will add to and contribute information on one combined document. It will be at this time that they will use the previously created graph in Activity #1 to add to their information on ocean temperatures by the Great Barrier Reef. Students will name their document, "Coral Bleaching" and put it in their folder, "Coral Reefs." 5.L.2.1, 5.L.2.2, 5.L.2.3, 6.L.2.3, 5.SI.1, 5.IN.1, 5.TT.1, 5.RP.1, 5.SE.1. We will also continue our reading of the story, The Mystery of the Great Barrier Reef.

Purpose:

The purpose of this lesson is for students to use appropriate research and digital citizenship skills both as a group and independently to acquire needed information on Coral Bleaching.

Essential Question:

What is Coral Bleaching and what are its effects?

Teaching Strategies:

Whole group instruction, modeling, small group collaboration, independent and self-paced learning, internet based technology, teacher read-aloud.

Teacher Input:

Through the use of a video, students will be introduced to one of the problems facing Coral Reefs, Coral Bleaching. The teacher will introduce the page on the Weebly that has the needed links to specific websites and information. There will also be a review of being a responsible digital citizen when going on the internet looking for information. The teacher will then monitor and facilitate the students as they work in their small groups extracting relevant information on Coral Bleaching.

Vocabulary:

search engine, coral bleaching, salinity, Zooanthelle

Guided Practices:

Students will be led in a discussion after watching the video on Coral Bleaching. Teacher will model how to determine if a website is credible or not.

Assessments:

Observation, group's documentation of information

Independent Practice:

Students will collaborate through the use of one shared document to record information acquired through independent research.

Lesson #5

*Objectives**:***

Students will conjoin all they have learned throughout this unit and create a technology-based project. The goal of the project is to share with others: what Coral Reefs are, why they are important, what Coral Bleaching is, why we should care, and finally, what we can do about it. Through the collaboration with their group, they will determine roles and complete the project in two weeks. Their project will be presented to the class and will be shared within the school community (parents, teachers, students) via Mrs. Spraggins' Weebly (www.technologyatiac.weebly.com). 5.L.2.1, 5.L.2.2, 5.L.2.3, 6.L.2.3, 5.SI.1, 5.IN.1, 5.TT.1, 5.RP.1, 5.SE.1.We will also continue our reading of the story, The Mystery of the Great Barrier Reef.

Purposes:

The purpose of this lesson is for student to take what they have learned, analyze their data, make conclusions, share it, and bring it together in order to present it to others. It is also a way for students to determine how they will use technology to share this information.

Teaching Strategies:

Small group collaboration, technology based sharing, teacher read-aloud.

Teacher Input:

Teacher will briefly review what students have learned and accomplished throughout the previous lessons. An overview of various ways to share information via technology will be discussed. A sample of the rubric that will be used to assess the final project will be posted on the Weebly and discussed. Teacher will also post how many days students have remaining till final project is due.

Guided practice:

Teacher will lead students and answer questions in discussion about final project.

Assessment:

Final project

Independent practice:

Students will work in groups and outside of class to create final project.

Suggested Materials:

Google Docs, Google Slides, Weebly, Kidblog, Screencastify, iMovie, Audio Recorder, Vocaroo

Bibliography

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School, Free. 2015. *YouTube.* January 26. Accessed October 31, 2015. https://youtu.be/J2BKd5e15Jc?list=PL3WhiU6Jui0rLuAqTyTGpfOcAWMsERabW. A short video that introduces students to coral reefs. On an elementary level.

Webster, Merriam. 2015. *Merriam-Webster.com.*

Zygomatic. 2003. *Online Charts.* Accessed October 24, 2015. http://www.onlinecharttool.com/graph. An online graphing tool which allows students to imput data and then choose which type of graph they would like to create. Easy to use even for elementary students.

Appendix 1: Implementing Teaching Standards

This curriculum unit will include science, math, and technology standards (North Carolina Department of Public Instruction):

Science standards that are addressed are:

4.L.1.1, 4.L.1.2, 4.L.1.34.L.1.4, 5.L.2.1, 5.L.2.2, 5.L.2.3, 6.L.2.1, 6.L.2.2, 6.L.2.3.

The background knowledge along with the information given to students about coral reefs and bleaching has to do with the understanding of the structures and systems of these organisms and what they need to do to perform those functions that are necessary for life. They will learn about, discuss, and research the coral reef ecosystems and how they are affected by the varying temperatures of the ocean and other factors. They will also learn about the interdependence of the plants and animals in this environment.

The review of 4^{th} grade standards along with the movement up to 6^{th} grade standards goes along with Irwin's accelerated and rigorous curriculum.

Math standards that are addressed are:

5.MD.2, 6.MD.2

In the beginning of the unit, students will review parts of a graph and basic vocabulary. As the unit goes on, students will learn to further this knowledge by learning how to interpret, organize, display, and analyze data. The data will be given directly to the students (pre-made by the teacher) and will also be live as students go online to research more on coral bleaching.

Technology standards that are addressed are:

5.SI.1, 5.SI.2, 5.SI.3, 5.L.21, 5.TT.1.1, 5.TT.1.2, 5.TT.1.3, 5.RP.1, 5.SE.1.1, 5.SE.1.2, 5.SE.1.3

Throughout the unit, technology will be integrated in various ways. Students will be creating documents which will be shared with those in their groups. They will apply research criteria as they collect and interpret both data and other information. Using the internet in a safe and responsible way along with properly giving credit to that information will be expected. Students will also determine how they will present their information using a technology based program.

Appendix #2-Data sheet for Activity #1

Water Temperature by Year

Appendix #3- Website to use along with this unit

(The following information was taken from the Australian Institute of Marine Science)

Year	Temperature (°C)
1982	25.5
1984	25.5
1986	25.9
1988	26.0
1990	25.9
1992	25.7
1994	25.8
1996	26.0
1998	25.9
2000	27.0
2002	25.8
2004	26.2
2006	26.1
2008	25.9
2010	26.2
2012	26.5

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