STEAM *(Science, Technology, Engineering, Art & Math)* **Lessons**
Based on 'A Whale's Tale'

The 6 minute high interest movie '**A Whale's Tale'** featuring Wyatt the humpback whale and his mother Wendy is designed for elementary students but has enough technological information to make it appropriate for all grade levels. A team of scientists doing research in Antarctica tag both whales to study their behaviors. Wendy explains the process to her young son giving him real insight into the research they are doing and the Antarctic environment. Video and photographs from a recent scientific trip to Antarctica are combined with a compelling narrative to create this interesting resource. A children's book based on this story has also been written and can be used in place or in addition to the film. The movie and book (paperback and kindle versions) as well as additional activities and resources are available at BlueSTEAM.org.

These six lessons integrate science, technology, engineering, visual arts and math (Common Core standards) as well as geography and Common Core language art:

Who Wants to Live Here? *Visual art* focus with students drawing, painting or creating items shown in 'A Whale's Tale' or found when researching Antarctica. *Science* focus is habitat and experimenting with media, especially value in paint. Animals included should live in the Antarctic habitat.
What is Buoyancy? *Science* focus, uses *math* skills in an inquiry lesson with an experiment component allowing students to work in cooperative groups, pose questions, construct responses, observe, measure, investigate, create, use tools, count, discuss, use technology and gather and display data in a safe, fun way.
When Should I Care for the Earth*? Science* focus dealing with habitat protection, environmental issues and careers. *Visual Art* procedures and processes will be used to communicate the importance of caring and protecting the earth's resources and animal life.
Where in the World is Antarctica? *Technology* focus through the manipulation of several computer application programs and online resources to build geography concepts and understanding. *Visual arts* focus with the layout of graphic elements. Activities can be done individually, in pairs or triads depending on technology available and student expertise/objectives.
Why is This Whale Talking? *Mathematical* focus on measuring in a hands-on lesson that provides two different ways to create scaled whales. Encourage students to examine point of view and sequencing of a narrative while developing *language art* skills.
How Can I Build That? *Engineering* and *science* focus, make a simple accelerometer to measure the force of acceleration, whether caused by gravity or by movement of an object.

Lesson plans for these six integrated units, video, additional directions and worksheets are available at BlueSTEAM.org as well as:

- Word search
- Crossword puzzles
- Arts & crafts projects
- Educational quiz

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Based on 'A Whale's Tale'

Common Core and National Standards covering including but not limited to:				
SCIENCE	**T**ECHNOLOGY	**E**NGINEERING	**A**RT	**M**ATHEMATICS
• Careers • Data analysis • Data collection • Discussion • Display • Experiment • Hypothesis • Measurement • Prediction • Research • Technology use	• Display data (graphs/charts) • Input data • Printing • Research via Internet • Overhead or projector for enlargement • Using tools with precision • Word processing	• Building accelerator • Building to understand buoyancy • Comparing and contrasting tools • Discuss technology use by scientists • Experimentation • Prediction • Technology use • Using tools with precision	• Collaboration • Craft projects • Drawing/Painting • Graphics • Layout • Measuring • Mural • Proportion • 2D shapes into 3 D forms • Using Elements of Art • Using tools with precision • Visual display of artwork • Visual display of data in an aesthetic manner	• Balance • Counting • Graphing • Measurement • Prediction • Proportion • Using tools with precision
GEOGRAPHY	LANGUAGE ARTS			
• Environment, habitat • Physical differences	• Comprehension • Main idea • Speaking/listening • Supporting details			

Modify unit lesson pieces to meet content area/grade level requirements. You may find additional standards (including state level) that apply to the activities, feel free to add them to your documentation.

STEAM Lessons (geared to elementary students)

SCIENCE	TECHNOLOGY	ENGINEERING	ART	MATHEMATICS
• Discussion • Display • Experiment • Hypothesis • Research	• Display • Input data • Research via Internet	• Discuss technology use by scientists • Using tools with precision	• Craft projects • Drawing/Painting Antarctic scenes • Mural • Using Elements of Art • Using tools with precision • Visual display of artwork	• Balance • Proportion • Using tools with precision

GEOGRAPHY	LANGUAGE ARTS
• Environment, habitat • Physical differences	• Comprehension • Main idea • Speaking/listening • Supporting details

Modify unit lesson pieces to meet content area/grade level requirements. You may find additional standards (including state level) that apply to the activities, feel free to add them to your documentation.

Who **Wants to Live Here?** *Visual art* focus with students drawing, painting or creating items shown in 'A Whale's Tale' or found when researching Antarctica. *Science* focus is habitat and experimenting with media, especially value in paint. Animals included should live in the Antarctic habitat.

Art Projects (open-ended) /Craft Projects (specific product expected)

Drawing/Painting penguins, seals and/or whales (individual)	**Antarctica Mural (group)**	**Clothespin or Stick Animal Craft**	**Paper Plate Whale/Penguin (craft)**

Materials/Sequence (art)		Materials/Sequence (craft)	
- Brushes - Drawing paper or canvas - Paints (acrylic, tempera or watercolor) - Pencils *Antarctic habitat has a limited color scheme which makes it an ideal topic for creating and using values.*	- Crayons. markers or paint - Drawings of various Antarctic wildlife ('Color Wyatt and His Antarctic Friends' coloring book from http://bluesteam.org/books/ can be used) - Glue - Large paper or appropriate background	- Clothespin - Construction paper or foam - Glue - Markers - Paper - Scissors	- Construction paper (color based on type of whale) - Glue - Google eyes - Markers - Paint - Paper plates - Scissors
1. Plan - sketch whales &/or penguins 2. Create - paint on appropriate surface 3. Revise - step back & determine what else artwork requires 4. Add finishing touches 5. Share artwork& reflect	1. Plan – gather materials, divide jobs for task 2. Create – create and color materials, cut out or sketch 3. Revise – glue materials together or paint on background 4. Add finishing touches 5. Share artwork & reflect	1. Plan – gather materials 2. Create – color pieces as needed 3. Revise – glue materials together 4. Add finishing touches (eyes, etc.) 5. Share artwork & reflect	1. Plan – gather materials 2. Create – color pieces as needed 3. Revise – glue materials together 4. Add finishing touches (eyes, etc.) 5. Share artwork & reflect
High order questions:	- How were photographs and videos incorporated to enhance the story? - What art related skills did you observe the scientists using? - How did colors in the video impact your impression of Antarctica?		- What elements of art are in this photograph? (line, shape, color, value, space, texture, form) - What types of animals did you see during the video? - What type of environment did you see during the video? - If using paint how can you create different values?
Engage	**Set focus for video viewing** (to meet content requirements), Watch *A Whale's Tale: Wyatt's Antarctic Adventure with the Scientists* – available at http://bluesteam.org/video/ - Discussion (small/large group) - Questions: - Plan artwork, discuss process and sequence of selected project		

Explore	1. Observe artwork, discuss-conceptualize artistic ideas and work. 2. Choose 2 pictures from Antarctica, animal photographs or drawings compare and contrast what they observe (cite evidence or facts). (Double Bubble Thinking Map or Venn Diagram work well) 3. Organize and develop artistic ideas and work, set timeline for completion. 4. Begin to create art – Direct Instruction to begin, allow students time to add individual ideas.
Explain	• **Revise** and make corrections as art is being created. • Students reflect on personal art and make revisions as needed. • Questions/explanations: o Why did you do _____?, Did your art turn out as you expected?
Elaborate	• Add **finishing** touches to art.

Evaluate	• **Share** artwork and reflect on final product.
	     o What would you do differently if you were to do the same project again?
	     o What did you learn about value?
	     o How does coloring impact an animal's ability to function and survive in a particular habitat?
	     o What art skills do you think scientists' require?
	     o What do you see you like in your classmates' art?
	 • Plan next step for future learning.

Extend	• Read **A Whale's Tale - Wyatt's Antarctic Adventure: Tagged by Scientists** (narrative available at http://bluesteam.org/books/)
	 • Read **Color Wyatt the Humpback Whale and his Antarctic Friends** (coloring book available at http://bluesteam.org/books/)
	 • Conduct additional research about scientific careers and/or the use of technology.
	 • Word list/crossword puzzles (available at http://bluesteam.org/activities/)
	 • Complete other art/craft projects
	 • Read literature about Antarctica
	 • Research marine life, habitat and/or geography.
	 • Complete other integrated units in the series (available at http://bluesteam.org/resources/):
	     o *What is Buoyancy?*
	     o *When Should I Care for the Earth?*
	     o *Where in the World is Antarctica?*
	     o *Why is This Whale Talking?*
	     o *How Can I Build That?*

National Core Arts Standards Artistic Processes and Anchor Standards	Math - Common Core Standards	Language Arts - Common Core Standards
K-5 **Creating** Conceiving and developing new artistic ideas and work. Students will: 1. Generate and conceptualize artistic ideas and work. 2. Organize and develop artistic ideas and work. 3. Refine and complete artistic work.	**Kindergarten** **Describe and compare measurable attributes.** CCSS.Math.Content.K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	**Kindergarten** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.K.2 Confirm understanding of text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
K-5 **Performing/Presenting/Producing** **Performing:** Realizing artistic ideas and work through interpretation and presentation. **Presenting:** Interpreting and sharing artistic work. **Producing:** Realizing and presenting artistic ideas and work Students will: 4. Select, analyze, and interpret artistic work for presentation. 5. Develop and refine artistic techniques and work for presentation. 6. Convey meaning through the presentation of artistic work.	**1st Grade** • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	**1st Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.1.2 Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
	2nd Grade **Measure and estimate lengths in standard units.** CCSS.Math.Content.2.MD.A.4 Measure to determine how much longer an object is than another, expressing difference as a standard unit. • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	**2nd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.2.1 Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
K-5 **Responding** 9. Understanding and evaluating how the arts convey meaning. Students will: 10. Synthesize and relate knowledge and personal experiences to make art. 11. Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.	**3rd Grade** • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	**3rd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.3.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
Next Generation Science Standards **Grades K-5** **Connections to Engineering, Technology, and Applications of Science Interdependence of Science, Engineering and Technology.**	**4th Grade** • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	**4th Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.4.1 Engage effectively in a range of collaborative discussions (one-on-one, groups, teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
	5th Grade **Convert like measurement units within a given measurement system.** CCSS.Math.Content.5.MD.A.1 Convert among different-sized standard measurement units within a given system (e.g., convert 5 cm to 0.05 m) & use conversions in solving multi-step, real world problems. • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	**5th Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.5.1 Engage effectively in a range of collaborative discussions with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.5.2 Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

STEAM Lessons (geared to elementary students)

SCIENCE	TECHNOLOGY	ENGINEERING	ART	MATHEMATICS
• Data analysis • Data collection • Discussion • Display • Experiment • Hypothesis • Measurement • Prediction • Research • Technology use	• Display data (graphs/charts) • Input data • Printing • Research via Internet • Using tools with precision • Word processing	• Building to understand buoyancy • Repeating process seeking improved buoyancy • Using tools with precision	• 2D shapes into 3 D forms • Using tools with precision • Visual display of data in an aesthetic manner	• Counting • Graphing • Measurement • Prediction • Using tools with precision

GEOGRAPHY	LANGUAGE ARTS	
• Environment, habitat • Physical differences	• Comprehension • Main idea • Speaking/listening • Supporting details	*Modify unit lesson pieces to meet content area/grade level requirements. You may find additional standards (including state level) that apply to the activities, feel free to add them to your documentation.*

What is Buoyancy? *Science* inquiry focus, uses *math* skills in an inquiry lesson with an experiment component allowing students to work in cooperative groups, pose questions, construct responses, observe, measure, investigate, create, use tools, count, discuss, use technology, gather and display data in a safe, fun way.

Materials	• Access to A Whale's Tale (http://bluesteam.org/video/) • Data sheets • Large & small paper clips • Small paper clips • Rulers, inches/centimeters	• Pencils • Containers with several inches of water • Foil • Scissors • Computer access

High order questions:	- Who are the main characters? (Literature component) - Who is telling the story? - What information do you think is important in this video? - What are the important characteristics of this habitat? - How is technology being used by the scientists? - How can a heavy object like a ship float?	- Why are they telling the story? (Literature components, point of view) - Where did the story take place? (Literature component) - What is the story about? (Literature component) - How do you think the scientists felt when they tagged Wyatt and Wendy? - Why do you feel that way? (Literature components, summarizing and supporting) - Why do the whales come to the surface and then dive under the water? - What is buoyancy? - Why do whales need to control their buoyancy? - How do whales control their buoyancy?
Engage		**Begin KWL chart to acquire background knowledge** - Complete Knowledge section of chart - For buoyancy focus= KWL: Know – What do you know about whales?, W- What would you like to learn about whales?, L – What did you learn about whales? - For career focus = KWL: Know – What types of technology do scientists use?, W – What would you like to learn about scientist use of technology?, L – What types of technology did you learn scientists use? **Set focus for video viewing** (to meet content requirements), Watch *A Whale's Tale: Wyatt's Antarctic Adventure with the Scientists* – available at http://bluesteam.org/video/ **Continue KWL - What I do I what to know – questions from students** (add more questions if they arise during experiment)
Explore		- Buoyancy is important to animals that live in the ocean. - Discussion - Questions - Divide students into groups of 3 - 4 students **Begin A Whale's Tale Data Sheet (attached at the end of lesson plan)** - Describe, measure and record information for paper clips (centimeters or inches) - High order questions: Do paperclips float? (small/large). Does foil float?, Will a foil whale float?, Will paperclips piled on foil/whale cause it to sink? - Each group (or the class) writes hypothesis about what they think will happen during the experiment. - Hypothesis question examples that can be rewritten: Which size paperclip will cause the whale to sink quicker?, Does the height of my whale's body impact how many paper clips it can hold?, Does piling all of my paperclips at one end of the whale impact how many paperclips it can hold?, Does shape impact buoyancy?

	• Students measure and cut out rectangles in foil. Each student will need 3 rectangles to create 3 whales. Sheets of foil should be cut to the same size. (suggested size = 4"x6",the bigger the rectangles the more paper clips required) Modify as needed.
	• Whales must have tails and curved heads. Eyes and blow holes can be draw on each whale with permanent marker. Caution – the blow hole should be drawn on, not poked out. Student name should be on each whale to eliminate confusion during the experiment.
	    ◦ Students create 1 flat whale cut out of foil – do not bend; a simple pattern can be used.
	    ◦ Students create 1 foil whale by bending the foil (2D shape becomes a 3D form). (wait to make 3rd whale)
	• Predict how many paper clips can be placed onto each whale before it sinks (small clips/large clips). Each student should make their own predictions.
	• Do the experiment. Find out how many small paper clips each whale can hold prior to sinking. Repeat with larger paper clips. Record the data in the appropriate section of the data sheet. *Paperclips should be placed carefully on whales, one at a time, and counted to see how many clips each whale can maintain prior to sinking.*
	• Discuss observations with group.
	• Students create 3rd foil whale choosing shape based on prior experiments.
	• Repeat procedure. Count number of paper clips 3rd whale can hold. Record the data.

Explain	• Discuss observations with small/large groups.
	• Questions:
	    ◦ Why did one whale support more clips than the other?
	    ◦ Did the whales hold more small or large clips?
	    ◦ What could you do to the foil to increase its buoyancy?
	    ◦ What might happen to a ship if freight was only added to the back of the boat?
	• Input data to computer and create a graph(s) with group/class results. If not age appropriate or available create graphs by hand.

Elaborate	• Share graphs, post on wall.
	• Write statement about what they learned about buoyancy.
	• Share acquired information in visual format.
	• Questions
	    ◦ Why did one whale support more clips than the other?
	    ◦ Did the whales hold more small or large clips?
	    ◦ What could you do to the foil to increase its buoyancy?
	    ◦ What might happen to a ship if freight was only added to the back of the boat?
	    ◦ How do you think whales maintain and change their buoyancy? *Research will be needed here.*

Evaluate	- Post graphs and discuss findings. - Students reflect on personal and group learning. - What was observed? - What conclusions can you make? - Were your predictions correction? - Why did one whale support more clips than the other? - Did the whales hold more small or large clips? - What could you do to the foil to increase its buoyancy? - What might happen to a ship if freight was only added to the back of the boat? - How do you think whales maintain and change their buoyancy? Research will be needed here. **Complete KWL - What I learned section** with information they learned from the lesson and activity - Plan next step for future learning.
Extend	- Read **A Whale's Tale - Wyatt's Antarctic Adventure: Tagged by Scientists** (narrative available at http://bluesteam.org/books/) - Read **Color Wyatt the Humpback Whale and his Antarctic Friends** (coloring book available at http://bluesteam.org/books/) - Conduct additional research about scientific careers and/or the use of technology. - Word list/crossword puzzles (available at http://bluesteam.org/activities/) - Complete other art/craft projects - Read literature about Antarctica - Research marine life, habitat and/or geography. - Complete other integrated units in the series (available at http://bluesteam.org/resources/): *Who Lives in Antarctica?* *When Should I Care for the Earth?* *Where in the World is Antarctica?* *Why is This Whale Talking?* *How Can I Build That?*

Next Generation Science Standards Grades K-5 **Science and Engineering Practices** Planning and Carrying Out Investigations, Analyzing and Interpreting Data	Next Generation Science Standards Grades K-5 Connections to Engineering, Technology, and Applications of Science Interdependence of Science, Engineering and Technology
Kindergarten **Describe and compare measurable attributes.** CCSS.Math.Content.K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. Count to tell the number of objects. CCSS.Math.Content.K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality. CCSS.Math.Content.K.CC.B.4.a When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.	**Kindergarten** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.K.2 Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
1st Grade **Represent and interpret data.** CCSS.Math.Content.1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in category than in another.	**1st Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.1.2 Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
2nd Grade **Measure and estimate lengths in standard units.** CCSS.Math.Content.2.MD.A.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit. Represent and interpret data. CCSS.Math.Content.2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems1 using information presented in a bar graph.	**2nd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.2.1 Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
3rd Grade **Represent and interpret data.** CCSS.Math.Content.3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.	**3rd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.3.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
	4th Grade **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.4.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
5th Grade **Convert like measurement units within a given measurement system.** CCSS.Math.Content.5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	**5th Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.5.2 Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

<u>**A Whale's Tale**</u> **Data Sheet for Group # _____**

Size of large paper clip = _____   Describe this object: _____
_____

Size of small paper clip = _____   Describe this object: _____
_____

List each student in your group. Predict how many paper clips you think whale #1 can support without sinking. Write the actual number in the next box. Repeat procedure for whale 2 and whale 3.

Names	Prediction for Flat Whale #1 – large paper clip	Prediction for Flat Whale #1 – small paper clip	Prediction for 3D Whale #2 – large paper clip	Actual for 3D Whale #2 – small paper clip	Prediction for choice Whale #3 – large paper clip	Actual for choice Whale #3 – small paper clip
1.						
2.						
3.						
4.						

Names	Prediction for Flat Whale #1 – large paper clip	Prediction for Flat Whale #1 – small paper clip	Prediction for 3D Whale #2 – large paper clip	Actual for 3D Whale #2 – small paper clip	Prediction for choice Whale #3 – large paper clip	Actual for choice Whale #3 – small paper clip
1.						
2.						
3.						
4.						

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When **Should I Care for the Earth?**

STEAM Lessons (geared to elementary students)

SCIENCE	TECHNOLOGY	ENGINEERING	ART	MATHEMATICS
• Discussion • Display • Measurement • Research • Technology use	• Display data (graphs/charts) • Printing • Research via Internet • Word processing	• Using tools with precision	• Communicating to an audience • Creating a personal message • Using the Elements of art • Using tools with precision • Visual display	• Counting • Graphing • Measurement • Prediction • Using tools with precision

LANGUAGE ARTS	
• Comprehension • Main idea • Speaking/listening • Supporting details	*Modify unit lesson pieces to meet content area/grade level requirements. You may find additional standards (including state level) that apply to the activities, feel free to add them to your documentation.*

When **Should I Care for the Earth?** *Science* focus dealing with habitat protection, environmental issues and careers. *Visual Art* procedures and processes will be used to communicate the importance of caring and protecting the earth's resources and animal life.	
Materials	• Pencils • Paper • Poster board • Markers
High order questions:	• Why should we care about the condition of the water in Antarctica? • What are the important characteristics of this habitat? • Could our trash end up in Antarctica? How or why not? • What do you think the scientists saw in the water besides the animals mentioned in the video? • Why is it important to take care of the environment (ocean)? • What can each one of us do to take care of the earth? • Who are the main characters? (Literature component) • Who is telling the story? • Why are they telling the story? (Literature components, point of view) • Where did the story take place? (Literature component) • How do you think the whales would react if the scientists threw their garbage in the ocean? • How would you feel if people threw their trash into your home? • Why or why shouldn't we recycle?

	• How can we encourage other people to care about the earth? • How is technology being used by the scientists?	• Do you think scientists need to communicate efficiently? Why or why not?

Engage	• **Set focus for video viewing** (to meet content requirements), Watch *A Whale's Tale: Wyatt's Antarctic Adventure with the Scientists* – available at http://bluesteam.org/video/
	• Discussion (small/large group)
	   o Why different environments are needed for diversity and how they are interrelated?
	   o Habitat of Antarctica, what lives there, why important.	

Explore	• Divide students into small groups
	• Use online resources, text and books, videos and a variety of resources
	• Explore purpose of :
	   o Reducing use of materials
	   o Reusing material
	   o Recycling materials	

Explain	• Review Elements of art (line, shape, color, value, space, texture, form). Discuss how they are combined to create art and communicate ideas.
	• In a visual form create a poster encouraging people to take care of the earth through at least one of the 3 Rs.
	• Message should:
	   o Have a 2" border around the outside
	   o Be colorful
	   o Be clear and understandable
	   o Be visually appealing
	   o Be neat
	   o Have logical content to subject matter
	   o Be completed in a timely manner to meet time line.
	   o Reference at least one of the 3 Rs
	   o Have reference to Antarctica
	• Write a short summary explaining the message of their poster.	

Elaborate	• Students will present posters and explain their thoughts and how they communicated their message. • Posters will be displayed. • Discussion on the importance of the 3Rs. • How what happens to us impacts other areas of the world.
Evaluate	• Students reflect on personal and group learning. • Plan mores ways to share importance of caring for the earth.

Extend	• Read **A Whale's Tale - Wyatt's Antarctic Adventure: Tagged by Scientists** (narrative available at http://bluesteam.org/books/)
	• Read **Color Wyatt the Humpback Whale and his Antarctic Friends** (coloring book available at http://bluesteam.org/books/)
	• Conduct additional research about scientific careers and/or the use of technology.
	• Word list/crossword puzzles (available at http://bluesteam.org/activities/)
	• Complete other art/craft projects
	• Read literature about Antarctica
	• Research marine life, habitat and/or geography.
	• Complete other integrated units in the series (available at http://bluesteam.org/resources/):
	   o *Who Lives in Antarctica?*
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National Core Arts Standards Artistic Processes and Anchor Standards	Language Arts - Common Core Standards
K-5 **Creating** Conceiving and developing new artistic ideas and work. Students will: 1. Generate and conceptualize artistic ideas and work. 2. Organize and develop artistic ideas and work. 3. Refine and complete artistic work.	**Kindergarten** **Comprehension and Collaboration**: CCSS.ELA-Literacy.SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.K.2 Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
K-5 **Performing/Presenting/Producing** **Performing:** Realizing artistic ideas and work through interpretation and presentation. **Presenting:** Interpreting and sharing artistic work. **Producing:** Realizing and presenting artistic ideas and work Students will: 4. Select, analyze, and interpret artistic work for presentation. 5. Develop and refine artistic techniques and work for presentation. 6. Convey meaning through the presentation of artistic work.	**1st Grade** **Comprehension and Collaboration:** **CCSS.ELA-Literacy.SL.1.1** Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.1.2 Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
	2nd Grade **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.2.1 Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
K-5 **Responding** Understanding and evaluating how the arts convey meaning. Students will: 10. Synthesize and relate knowledge and personal experiences to make art. 11. Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.	**3rd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.3.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. CCSS.ELA-LITERACY.RL.3.6 Distinguish their own point of view from that of the narrator or those of the characters.
Math - Common Core Standards **Mathematical Practices** • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	**4th Grade** **Comprehension and Collaboration**: CCSS.ELA-Literacy.SL.4.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.4.2 Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
Next Generation Science Standards Grades K-5 Science and Engineering Practices Planning and Carrying Out Investigations Analyzing and Interpreting Data	**5th Grade** **Comprehension and Collaboration**: CCSS.ELA-Literacy.SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

Connections to Engineering, Technology, and Applications of Science Interdependence of Science, Engineering, and Technology.	CCSS.ELA-Literacy.SL.5.2 Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
	CCSS.ELA-LITERACY.RL.5.6 Describe how a narrator's or speaker's point of view influences how events are described.

STEAM Lessons (geared to elementary students)

SCIENCE	TECHNOLOGY	ENGINEERING	ART	MATHEMATICS
• Careers • Measurement • Research • Technology use	• Display/presentation • Input data • Printing • Word processing	• New technologies • Technology use • Use tools with precision	• Graphics • Layout • Technology use • Visual displays	• Distance • Online tools for measurement
GEOGRAPHY	LANGUAGE ARTS			
• Actual location • Environment, habitat • Physical differences	• Comprehension • Main idea • Speaking/listening • Supporting details	*Modify unit lesson pieces to meet content area/grade level requirements. You may find additional standards (including state level) that apply to the activities, feel free to add them to your documentation.*		

***Where* in the World is Antarctica?** T*echnology* focus through the manipulation of several computer application programs and on line resources to build *geography* concepts and understanding. V*isual arts* focus with the layout of graphic elements. Activities can be done individually, in pairs or triads depending on technology available and student expertise/objectives.	
Materials	• Access to A Whale's Tale Film (http://bluesteam.org/video/) • Computers and internet access • Printer
High order questions:	• How is technology being used by the scientists? • Why do you think the scientist who wrote the narrative had the whales explain what was happening to them? • What are graphics? • How do scientists use computers? • Why do you think the scientists share information learned about different places and the animals that live there? • How do you think the scientists felt when they tagged Wyatt and Wendy? • Why do you feel that way? (literature components, summarizing and supporting) • What is a computer application? • How does this group of scientists use photographs and video to support their research?
Engage	**Set focus for video viewing** (to meet content requirements), Watch ***A Whale's Tale: Wyatt's Antarctic Adventure with the Scientists*** – available at http://bluesteam.org/video/ • Discussion, use a circle map or other graphic organizer in discussion after viewing the video • **Technology Focus**: What types of technology do scientists use? Why do them require those tools?, How do they use them?

	• **Geography Focus**: What did you learn about the place featured in this video? How would you describe it? How would you get there from here? • **Visual Art Focus** = Why should you plan the layout of your document?, How can the elements of art and principles of design help you create an aesthetically pleasing document?, How did the scientists use art skills in their research?	

Explore	**Scientists use technology to collect and analyze data. Computer literacy is a required skill.**
	A Whale's Tale Computer Projects (worksheet attached at end of lesson)
	Part 1 Word or word processing application
	• Copy, paste and make corrections to passage
	• Add required elements
	Part 2 Word or word processing application
	• Change margins and orientation
	• Add vocabulary and insert definitions
	• Use spell/grammar check
	• Insert shape
	• Erase directions
	Part 3 Word or word processing application
	• Create or copy table
	• Insert clip art
	• Complete additional elements
	• Print
	Part 4 PowerPoint or presentation application
	• Create a title page, add 4 more pages
	• Change layout to blank on slides 2 & 4
	• Using shapes create either a whale or a penguin on page
	• On page 2 use a numbered (bullet) list type out 5 things you know about your topic (whale/penguin)
	• Add a whale or penguin to page 4
	• Run slide show
	• Change the backgrounds or design of your presentation
	• Create a slide anyway you want but stay on topic
		A Whale's Tale Computer Projects (continued)
		
		Part 5 PowerPoint or presentation application
		• Locate and open Microsoft PowerPoint
		• Create a title page, add 4 more pages
		• Research a career in science
		• Include a description of the job
		• Educational requirements for the job
		• At least 3 types of technology you would be required to use
		• Create a visually appealing document, adding clip art or shapes, changing background etc. – student choice
		• Save as your presentation
		• Share your presentation
		Part 6 Application choice
		• Choose your application and input the following information:
		• Answer the following questions:
		  o What are the names of at least 3 stations in Antarctica? (use a map)
		  o What is the distance between Washington D.C. and Antarctica? (in both kilometers and miles)
		  o What is the distance between your home and the South Pole? (in both kilometers and miles)
		  o If you were going to Antarctica what means of transportation would you take and how long would it take you to get there?
		  o What would you want to research if you were going to Antarctica and why did you choose that topic?
		• Share and discuss group choices

	• Save as and share your presentation
Explain	• Model processes and skills as needed for the group • Encourage further research in areas of student interest • Help with technical issues as needed (individually or group)

Elaborate	• Share PPT presentations with class
	• Discussion based on student presentations
	    o What is the benefit of PowerPoint for research presentations?
	    o What did you think was the most interesting thing you learned about Antarctica?
	    o Do you think it is important to protect the habitat of Antarctica? Why or Why not?

Evaluate	• Students reflect on personal and group learning.
	    o What was observed?
	    o What conclusions can you make?
	    o What did you learn about Antarctica?
	    o What did you learn about scientists?
	    o Plan next steps for future learning.

Extend	• Read **A Whale's Tale - Wyatt's Antarctic Adventure: Tagged by Scientists** (narrative available at http://bluesteam.org/books/)
	• Read **Color Wyatt the Humpback Whale and his Antarctic Friends** (coloring book available at http://bluesteam.org/books/)
	• Conduct additional research about scientific careers and/or the use of technology.
	• Word list/crossword puzzles (available at http://bluesteam.org/activities/)
	• Complete other art/craft projects
	• Read literature about Antarctica
	• Research marine life, habitat and/or geography.
	• Complete other integrated units in the series (available at http://bluesteam.org/resources/):
	    o *Who Lives in Antarctica?*
	    o *What is Buoyancy?*
	    o *When Should I Care for the Earth?*
	    o *Why is This Whale Talking?*
	    o *How Can I Build That?*

Geography Essential Elements and Standards	Language Arts - Common Core Standards
National Geographic Education Source of Standards **Geography Essential Elements and Standards** • WST – The World in Spatial Terms • PR – Place and Regions • PS – Physical Systems • HS – Human Systems • ES – Environment & Society • UG – The Uses of Geography **Geographic Skills** 1. Asking Geographic Questions 2. Acquiring Geographic Information 3. Organizing Geographic Information 4. Analyzing Geographic Information 5. Answering Geographic Questions	**Kindergarten** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.K.2 Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
	1st Grade **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.1.2 Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
ISTE Standards – Students (*International Society for **Technology** in Education*) 1. **Creativity and innovation** - Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology. 2. **Communication and collaboration** - Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.	**2nd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.2.1 Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
3. **Research and information fluency** - Students apply digital tools to gather, evaluate, and use information. 4. **Critical thinking, problem solving, and decision making -** Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources. 5. **Digital citizenship** - Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior. 6. **Technology operations and concepts** - Students demonstrate a sound understanding of technology concepts, systems, and operations.	**3rd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.3.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
National Core Arts Standards **Artistic Processes** **Creating** - Conceiving and developing new artistic ideas and work. **Presenting -** Interpreting and sharing artistic work.	**4th Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.4.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
Producing - Realizing and presenting artistic ideas and work. **Connecting -** Relating artistic ideas and work with personal meaning and external context.	**5th Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.5.2 Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.

Part 1: Word Processing

*Student directions for **Technology Projects** - Using a word processing application copy the following passage and make the necessary corrections to Part 1.*
(note: there are mistakes in this passage that require corrections)

We are learning about Antarctica using the Internet to find information and facts about where it is located and why it is important to us.

The scientist who wrote this storeie working hard anddoing her best at all times. She studied very hard in school and worked extra hard in math and science so she could follow her dreams.

The movie we watch used photographs and video clips taken by a team of sceintsits   the reasosn the video was created was to chare information about antarcica, whales and about how some sceinstists do research .

Here are thee(or more) things I learned or found very interesting in the video.

- *Change these bullets to numbers & type in at least 3 things*
- *Erase this text*

Part 2:

- *Change the margins of your documents to .75 all the way around.*
- *Change the orientation to landscape.*
- *Type vocabulary word(s)*
  - *Glacier*
  - *Migrate*
  - *Binoculars*
  - *Zodiac*
  - *Scientist*
  - *Oceanographer*
- *Use an online dictionary to find the definition of the word(s)above (use copy and paste tools)*
- *Use Spell & Grammar Check*
- *Insert a shape of your choice*
- *Erase the blue italicized text*
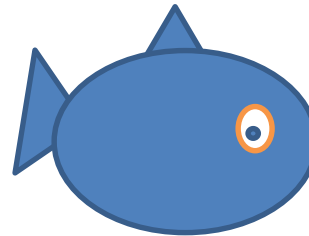
Part 3:

1. Watch *A Whales Tale* for this time focusing on details
2. **Insert** the following table

    3 columns by 6 rows

    Type in the following information

	In the movie	Not in the movie
Two whales		
Penguins		
Polar bears		
Scientists		
Tourists		

3. **Insert** Clip Art whale
4. **Complete as many of the following as you can in the time remaining**
    - Put the date somewhere on your document
    - Add a title to your document using **Word Art**
    - Put page numbers in the footer
    - Using shapes create your own version of a humpback whale
    - Find and include at least 3 facts about Antarctica you did not know previously
    - Present your evidence by citing the source (copyright and ethical standards)
5. ***Print document (when possible)**

Part 4: PowerPoint or another presentation application

1. Locate and open Microsoft PowerPoint
2. Create a title page (whales or penguins as a topic)
3. Add 4 more pages
4. Change layout to blank on slides 2 & 4
5. Using shapes create either a whale or a penguin on page
6. On page 2 use a numbered (bullet) list type out 5 things you know about your topic (whale/penguin)
7. Add a whale or penguin to page 4

8. Run slide show
9. Change the backgrounds or design of your presentation
10. Create a slide anyway you want but stay on topic
11. Save as your presentation
12. Share your presentation

Part 5:

- Locate and open Microsoft PowerPoint
- Create a title page
- Add 4 more pages
- **Copy and insert the following graphic of Antarctica on page**
- **Use the insert tab to add text boxes and label the location of the following**
  - **South America**
  - **Southern Ocean**
  - **Atlantic Ocean**
  - **Pacific Ocean**
  - **Indian Ocean**
  - **South Pole**
- Research a career in science
  - Include a description of the job
  - Educational requirements for the job
  - At least 3 types of technology you would be required to use
- Create a visually appealing document, adding clip art or shapes, changing background etc. – student choice
- Save as your presentation
- Share your presentation
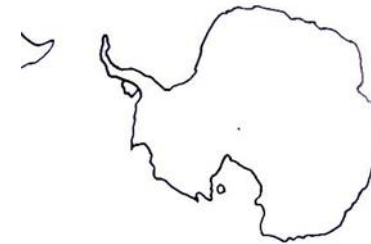
Part 6 (Word, PowerPoint, Publisher or other application of choice):

- Choose your application and input the following information in a visually appealing manner.
- Answer the following questions:

- o   What are the names of at least 3 stations in Antarctica? (use a map)
- o   What is the distance between Washington D.C. and Antarctica? (in both kilometers and miles)
- o   What is the distance between your home and the South Pole? (in both kilometers and miles)
- o   If you were going to Antarctica what means of transportation would you take and how long would it take you to get there?
- o   What would you want to research if you were going to Antarctica and why did you choose that topic?
- Share and discuss group results

STEAM Lessons (geared to elementary students)

SCIENCE	TECHNOLOGY	ENGINEERING	ART	MATHEMATICS
• Discussion • Display • Measurement	• Overhead or projector for enlargement • Using tools with precision	• Using tools with precision	• Collaboration • Measuring • Proportion • Using tools with precision • Visual display	• Counting • Graphing • Measurement • Prediction • Using tools with precision

GEOGRAPHY	LANGUAGE ARTS	
• Environment, habitat • Physical differences	• Comprehension • Main idea • Speaking/listening • Supporting details	*Modify unit lesson pieces to meet content area/grade level requirements. You may find additional standards (including state level) that apply to the activities, feel free to add them to your documentation.*

Why **is This Whale Talking?** *Mathematical* focus on measuring in a hands on lesson that provides two different ways to create scaled whales, *visual arts* focus. Encourage students to examine point of view and sequencing of a narrative while developing **language art** skills.
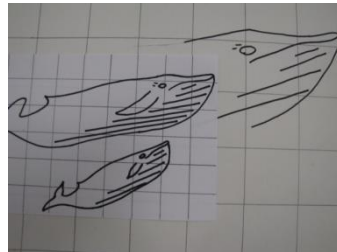
Materials	• Access to A Whale's Tale Film (http://bluesteam.org/video/) • Crayons • Glue • Paper • Rulers	• Scissors • Whale pictures • If you have access to an overhead or digital projector then can be used to enlarge the whales (additional technology component)

Project	**Scaled whale - Individual** 1. Plan – gather materials, discuss and model part of project. Create – 1" x 1" squares on top of a photograph or drawing. Create a 2nd grid with bigger squares (2'x2", same number of squares). 2. Number squares on each grid in the same order. Draw what is visible in each section box by box to create a larger whale. 3. Revise, correcting sections that need refining. 4. Add Finishing Touches and color if part of the project. 5. Share artwork & reflect.	**Scaled whale -Group** 1. Plan – gather materials, discuss and model part of project 2. Measure photograph or drawing and figure out the conversion to a large scale whale (ex. 1 inch = 1 foot). Draw larger sections of the whale and color or cut out. Different types of whales or calves can be completed by different groups.* 3. Revise, correcting sections that need refining. 4. Add Finishing Touches and color if part of the project. 5. Share artwork & reflect. *If you did different whales to scale compare and contrast including sizes.
Engage	**Set focus for video viewing** (to meet content requirements), Watch *A Whale's Tale: Wyatt's Antarctic Adventure with the Scientists* – available at http://bluesteam.org/video/ • Questions: • If you have using the book, compare and contrast the book to the video. (Venn diagram or Double Bubble thinking map) • Gather materials and introduce the project.	
High order questions:	• How big is a humpback whale? • How does the size of Wyatt compare to the size of Wendy? • Why do you think the author chose to tell the story of tagging through Wyatt? • What is different from this habitat from the one you live in? • How do you think scientists use math in their daily work tasks? • What type education do you think these scientists have? (encourage research of careers) • What do the scientists do with the data they gather? • What other type of whales do you know and how big are they? • How can rulers be used effectively? • What is important to remember when you are using a ruler? • How can you draw a grid? • What did you learn about proportion and measurement during this activity? • Why is it important to measure correctly?	

Explore	**Measurement is an important skill for scientists. Using either centimeters or inches review measurement modeling the correct use of ruler and proper etiquette for the tool.** • Work through the project.

Explain	• Writing prompt to describe the process. Please write this from the whale's point of view:
	    ○ What do you think your whale would say if it could talk?
	    ○ What just happened to your whale?
	    ○ What did the mathematician/artist do?
	    ○ How would your whale describe the process you just took them through?
	• Discuss process
	• Difficulties, Conclusions

Elaborate	• Share both whale stories and scaled whales • Share writing prompts • Discussion - questions :
Evaluate	• Share and reflect on project. • Display. • Plan next step for future learning.

Extend	• Read **A Whale's Tale - Wyatt's Antarctic Adventure: Tagged by Scientists** (narrative available at http://bluesteam.org/books/)
	• Read **Color Wyatt the Humpback Whale and his Antarctic Friends** (coloring book available at http://bluesteam.org/books/)
	• Conduct additional research about scientific careers and/or the use of technology.
	• Word list/crossword puzzles (available at http://bluesteam.org/activities/)
	• Complete other art/craft projects
	• Read literature about Antarctica
	• Research marine life, habitat and/or geography.
	• Complete other integrated units in the series (available at http://bluesteam.org/resources/):
	    ○ *Who Lives in Antarctica?*
	    ○ *What is Buoyancy?*
	    ○ *When Should I Care for the Earth?*
	    ○ *Where in the World is Antarctica?*
	    ○ *How Can I Build That?*

National Core Arts Standards Artistic Processes and Anchor Standards	Math - Common Core Standards	Language Arts - Common Core Standards
K-5 **Creating** Conceiving and developing new artistic ideas and work. Students will: 1. Generate and conceptualize artistic ideas and work. 2. Organize and develop artistic ideas and work. 3. Refine and complete artistic work.	**Kindergarten** **Describe and compare measurable attributes**. CCSS.Math.Content.K.MD.A.1 Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object. Count to tell the number of objects. CCSS.Math.Content.K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality. CCSS.Math.Content.K.CC.B.4.a When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.	**Kindergarten** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.K.2 Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
K-5 **Performing/Presenting/Producing** **Performing:** Realizing artistic ideas and work through interpretation and presentation. **Presenting:** Interpreting and sharing artistic work. **Producing:** Realizing and presenting artistic ideas and work Students will: 4. Select, analyze, and interpret artistic work for presentation. 5. Develop and refine artistic techniques and work for presentation. 6. Convey meaning through the presentation of artistic work.	**1st Grade** **Represent and interpret data.** CCSS.Math.Content.1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in category than in another.	**1st Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.1.2 Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
	2nd Grade **Measure and estimate lengths in standard units.** CCSS.Math.Content.2.MD.A.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.	**2nd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.2.1 Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
K-5 **Responding** Understanding and evaluating how the arts convey meaning. Students will: 10. Synthesize and relate knowledge and personal experiences to make art. 11. Relate artistic ideas and works with societal, cultural and historical context to deepen understanding.	**3rd Grade** **Represent and interpret data.** CCSS.Math.Content.3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.	**3rd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.3.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. CCSS.ELA-LITERACY.RL.3.6 Distinguish their own point of view from that of the narrator or those of the characters.
Next Generation Science Standards **Grades K-5** **Connections to Engineering, Technology, and Applications of Science Interdependence of Science, Engineering, and Technology.**	**4th Grade** **Represent and interpret data.** CCSS.Math.Content.4.MD.B.4 Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line	**4th Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.4.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.

	plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.	CCSS.ELA-Literacy.SL.4.2 Paraphrase portions of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
Mathematical Practices • Use appropriate tools strategically. • Attend to precision. • Look for and make use of structure.	**5th Grade** **Convert like measurement units within a given measurement system.** CCSS.Math.Content.5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	**5th Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.5.2 Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally. CCSS.ELA-LITERACY.RL.5.6 Describe how a narrator's or speaker's point of view influences how events are described.

STEAM *(Science, Technology, Engineering, Art & Math)* **Lessons**
Based on 'A Whale's Tale'

How **Can I Build That?**

STEAM Lessons (geared to elementary students)

SCIENCE	TECHNOLOGY	ENGINEERING	ART	MATHEMATICS
• Data analysis • Data collection • Discussion • Display • Experiment • Hypothesis • Measurement • Prediction • Research • Technology use	• Display data (graphs/charts) • Input data • Printing • Research • Using tools with precision • Word processing	• Building accelerometer • Comparing and contrasting tools • Experimentation • Prediction • Using tools with precision	• Visual display of data in an aesthetic manner • Using tools with precision	• Counting • Graphing • Measurement • Prediction • Using tools with precision

LANGUAGE ARTS	
• Comprehension • Main idea • Speaking/listening • Supporting details	*Modify unit lesson pieces to meet content area/grade level requirements. You may find additional standards (including state level) that apply to the activities, feel free to add them to your documentation.*

How **Can I Build That?** *Engineering* and *science* focus, make a simple accelerometer to measure the force of acceleration, whether caused by gravity or by movement of an object.	
Materials	• Pencil • Paper • Ruler • Protractor • Hole punch • String
High order questions:	• What is an accelerometer? • What devices do you know that have accelerometers? • What could you use an accelerometer to measure? • What did the tags placed on the whales measure? • Did the tags do anything else? • Why did the scientists have to retrieve the tags? • What is the difference between a marine biologist and an oceanographer? • How would a scientist use an accelerometer? • Who else might want to use an accelerometer and for what purpose? • How do you think an accelerometer might help an athlete?

Engage	**Set focus for video viewing** (to meet content requirements), Watch *A Whale's Tale: Wyatt's Antarctic Adventure with the Scientists* – available at http://bluesteam.org/video/ **Begin KWL (what you *K*now, what you *W*ant to know, what you *L*earned) chart to acquire background knowledge.** • Complete Knowledge section of chart, Know – What is an accelerometer? • Discussion/Questions **Continue KWL - What I do I what to know – questions from students** (add more questions if they arise during experiment)
Explore	**Explore accelerometers** • Use the Internet to search resources • Sample site: https://www.youtube.com/watch?v=gIud8W8Hw0E by John Baglio – How to Make a Simple Accelerometer • IPhone, other hand held accelerometers • Each group (or the class) creates a hypothesis about what they think will happen when they use the accelerometer. What do they think they will learn and discover with this tool? Create accelerometers, find out what they record, write down data. Complete the exploration/experiment. • Record data.
Explain	• Discuss observations with small/large groups. • Questions from KWL chart • Input data to computer and create a graph(s) with group/class results. If not age appropriate or available create graphs by hand.
Elaborate	• Share graphs, post on wall. • Write statement about what they learned about accelerometers. • Share acquired information in visual format. • Questions

Evaluate	• Post graphs and discuss findings.
	 • Students reflect on personal and group learning.
	     ○ What was observed?
	     ○ What conclusions can you make?
	     ○ Were your predictions correction?
	 • **Complete KWL - What I learned** section with information they learned from the lesson and activity
	 • Plan next step for future learning.

Extend	- Read **A Whale's Tale - Wyatt's Antarctic Adventure: Tagged by Scientists** (narrative available at http://bluesteam.org/books/) - Read **Color Wyatt the Humpback Whale and his Antarctic Friends** (coloring book available at http://bluesteam.org/books/) - Conduct additional research about scientific careers and/or the use of technology. - Word list/crossword puzzles (available at http://bluesteam.org/activities/) - Complete other art/craft projects - Read literature about Antarctica - Research marine life, habitat and/or geography. - Complete other integrated units in the series (available at http://bluesteam.org/resources/): *Who Lives in Antarctica?* *What is Buoyancy?* *When Should I Care for the Earth?* *Where in the World is Antarctica?* *Why is This Whale Talking?*

Next Generation Science Standards Grades K-5 Science and Engineering Practices, Planning and Carrying Out Investigations, Analyzing and Interpreting Data	Next Generation Science Standards Grades K-5 Connections to Engineering, Technology, and Applications of Science Interdependence of Science, Engineering, and Technology
Math - Common Core Standards	**Language Arts - Common Core Standards**
Kindergarten **Describe and compare measurable attributes.** **Count to tell the number of objects.** CCSS.Math.Content.K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality.	**Kindergarten** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.K.1 Participate in collaborative conversations with diverse partners about kindergarten topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.K.2 Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.
1st Grade **Represent and interpret data.** CCSS.Math.Content.1.MD.C.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in category than in another.	**1st Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.1.1 Participate in collaborative conversations with diverse partners about grade 1 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.1.2 Ask and answer questions about key details in a text read aloud or information presented orally or through other media.
2nd Grade **Measure and estimate lengths in standard units.** **Represent and interpret data.** CCSS.Math.Content.2.MD.D.10 Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.	**2nd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.2.1 Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups. CCSS.ELA-Literacy.SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.
3rd Grade **Represent and interpret data.** CCSS.Math.Content.3.MD.B.3 Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.	**3rd Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.3.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 3 topics and texts, building on others' ideas and expressing their own clearly. CCSS.ELA-Literacy.SL.3.2 Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.
	4th Grade **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.4.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 4 topics and texts, building on others' ideas and expressing their own clearly.
5th Grade **Convert like measurement units within a given measurement system.** CCSS.Math.Content.5.MD.A.1 Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	**5th Grade** **Comprehension and Collaboration:** CCSS.ELA-Literacy.SL.5.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 5 topics and texts, building on others' ideas and expressing their own clearly.

	CCSS.ELA-Literacy.SL.5.2 Summarize a written text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.