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GRADE 5 LITERACY IN SCIENCE: ECOSYSTEMS

UNIT OVERVIEW

This unit is in alignment with the New York City Science Scope and Sequence, Unit 4 – Exploring Ecosystems—and is the final unit for Grade 5. It can be implemented in the latter part of the year (May/June). The final Performance Task is comprised of three parts: two reading tasks and an informative essay task, explaining how humans have had a negative effect on different ecosystems.

TASK DETAILS

Task Name: Ecosystems

Grade: 5

Subject: Science

Depth of Knowledge: 3

Task Description: Students will study the impact humans have had on ecosystems. Students will then read two informational texts and a graph and write an informative/explanatory essay describing the negative effect humans have had on different ecosystems.

Standards Assessed:

W.5.2 Write informative/explanatory texts to examine and convey ideas and information clearly.

- a. Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
- b. Develop the topic with facts, definitions, concrete details, quotations, or other information and
- c. examples related to the topic.
- d. Link ideas within and across categories of information using words, phrases, and clauses (e.g., in contrast, especially).
- e. Use precise language and domain-specific vocabulary to inform about or explain the topic.
- f. Provide a concluding statement or section related to the information or explanation presented.

RI.5.2 Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

RI.5.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.

Materials Needed:

“Born To Be Wild”

http://www.ifaw.org/sites/default/files/education-publications/us_aaw10_guide_grades3-4.pdf

“Manatee – What is the Problem?”

http://www.theinsite.org/earth/earth_es_manatee.html

“2011 Manatee Mortality – Circle Graph”

http://www.savethemanatee.org/mortality_rescue_2011.pdf

Unit Outline

INTRODUCTION: This unit outline provides an example of how to integrate performance tasks into a unit. *Teachers may (a) use this unit outline as it is described below; (b) integrate parts of it into a currently existing curriculum unit; or (c) use it as a model or checklist for a currently existing unit on a different topic. The length of the unit includes suggested time spent on the classroom instruction of lessons and administration of assessments. Please note that this framework does not include individual lessons.*

Grade 5 Literacy in Science: Ecosystems

UNIT TOPIC AND LENGTH

- This unit will take approximately 3-4 weeks for instruction and 1 week to complete the final task. It can be easily situated late in the school year, as it is aligned with Unit 4 of the NYC Science Scope and Sequence. The unit begins with an in-depth study of how ecosystems change over time, and concludes with the impact humans have had (both positive and negative) on ecosystems.

COMMON CORE CONTENT STANDARDS

- 5.W.2 Write informative/explanatory texts to examine and convey ideas and information clearly.
 - Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
 - Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.
 - Link ideas within and across categories of information using words, phrases, and clauses (e.g., in contrast, especially).
 - Use precise language and domain-specific vocabulary to inform about or explain the topic.
 - Provide a concluding statement or section related to the information or explanation presented.
- 5.RI.9 Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably.
- 5.RI.2 Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.

NEW YORK STATE SCIENCE STANDARDS

Key Idea 7: Human decisions and activities have had a profound impact on the physical and living environment. Humans are dependent upon and have an impact on their environment. Students should recognize how human decisions cause environmental changes to occur.

NEW YORK CITY SCIENCE SCOPE AND SEQUENCE

Grade 5 Unit 4: How are plants and animals in an ecosystem connected?

BIG IDEAS/ENDURING UNDERSTANDINGS

- Populations within an ecosystem are in competition with one another for resources.
- Humans depend on their natural and constructed environments.
- Over time humans have changed their environment by cultivating crops and raising animals, creating shelter, using energy, manufacturing goods, developing means of transportation, changing populations, and carrying out other activities.
- Humans, as individuals or communities, change environments in ways that can be either helpful or harmful for themselves and other organisms.
- Writers use different sources to gather information and write knowledgeably about a topic.

ESSENTIAL QUESTIONS

- How do organisms compete and survive in an ecosystem?
- How do ecosystems change over time?
- How do people affect ecosystems?
- How do readers and writers use informational texts to integrate information, summarize information, and develop a topic clearly?

CONTENT

- Students will know key vocabulary for understanding ecosystems.
- Students will know how populations interact in an ecosystem. (Predator and Prey relationships/symbiosis.)
- Students will know what organisms compete for in an ecosystem.
- Students will know how adaptations help plants and animals compete.
- Students will know how changes in ecosystems affect the community of organisms within ecosystems.
- Students will know how these changes can cause the extinction of some organisms.
- Students will know how people's actions can change the environment.
- Students will know how the environment can be protected and restored.
- Students will know how reclaiming ecosystems is different from protecting them.

SKILLS

- Integrate information from several texts.
- Write about the subject knowledgeably.
- Write informative/explanatory text to examine a topic and convey ideas.
- Write informative/explanatory text to present information clearly.
- Introduce a topic clearly.
- Provide general observations and a focus.
- Group related information logically.
- Include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.
- Develop the topic with facts, definitions, and concrete details.
- Develop the topic with quotations.
- Link ideas within and across categories of information using words, phrases, and clauses (e.g., in contrast, especially).
- Use precise language and domain-specific vocabulary to inform/explain topic.
- Provide a concluding statement or section related to the information or explanation presented.
- Draw evidence from informational text to support analysis.

VOCABULARY/KEY TERMS

ACID RAIN, ADAPTATION, CARNIVORE, COMMUNITY, COMPETITION, CONSERVATION, CONSUMER, DEFORESTATION, ECOSYSTEMS, EXTINCTION, HABITAT, HABITAT DESTRUCTION, HERBIVORE, POLLUTION, POPULATION, PREDATOR, PREY, PRIMARY SUCCESSION, PRODUCER, RECLAMATION, SECONDARY SUCCESSION, SYMBIOSIS

Additional Support Strategies for Teaching Academic Vocabulary: For students who need support developing their academic vocabulary, consider the following resources: [Building Academic Vocabulary](#), R. Marzano and D. Pickering, and [Bringing Words to Life](#), I. Beck. Further, the Support section of this document contains Instructional Supports designed to scaffold vocabulary development.

ASSESSMENT EVIDENCE AND ACTIVITIES

INITIAL ASSESSMENT :

Students may be assessed using Running Records with non-fiction texts. At this point in the year, readers should be at Level U, and by the end of the year they should be at Level V.

Students will also complete an Anticipatory Guide to gauge understanding of the topic and possible misconceptions to be addressed, to activate prior knowledge and develop schema, and to increase interest in the topic.

FORMATIVE ASSESSMENT:

Lesson One: Summarizing (Main Idea and Supporting Details) – Collaborative poster and summary

Lesson Two: (Cause and Effect) – Relationship between succession and extinction

Lesson Three: (Main Idea and Supporting Details) – Newspaper article and summary

Culminating Activity: Research/Plan to protect an endangered species

Other Assessments – Short teacher made quizzes, science journals, teacher observations, conference notes

FINAL PERFORMANCE TASK:

How has human activity negatively affected organisms?

You have read “Born to be Wild,” “Manatees – What is the Problem?” and the graph “2011 Manatee Mortality.” You have written summaries for both texts which include the main ideas and key supporting details. Integrate information from both texts and the graph to write a well organized, informative essay explaining how human activity has negatively affected organisms within ecosystems.

In your essay, be sure to:

- Introduce the topic clearly.
- Develop the topic with facts, details, quotations, or other information related to the topic.
- Use transition words and phrases to link ideas about the topic.
- Include content specific vocabulary when writing details to support the topic.
- Include a closing statement related to the topic.

UNIT 4: ECOSYSTEMS AND CHANGE – Aligned to Harcourt Science, Grade 5 Chapter 9, but may be used with other NYC Science Programs such as FOSS.

Vocabulary development strategies to be used throughout the unit: Provide students with opportunities to become familiar with the vocabulary introduced in the lesson. Students may maintain a Vocabulary Journal where they record word meanings. They may also complete a graphic organizer based on the Frayer Model (Definition, Characteristics, Example, Non-Example). Teacher should model creating a Journal entry and/or completing a Frayer Model organizer. A sample organizer can be found in the supports section of this document.

Note Taker: Provide ELL and/or SWD students with a Note Taker to record important information as they grapple with academic texts. A Note Taker structures the information presented and provides a focus for students as they read. A sample note taker can be found in the instructional supports section of this document.

Activate prior knowledge and build curiosity about the topic through the use of the following anticipation guide. The guide can also be used to assess how students reevaluate their opinions at the end of the lessons.

	Agree	Disagree	Reasons
Natural changes in an ecosystem are always positive			
Changes that people make in an ecosystem always have negative consequences			
It's impossible to prevent certain animals from going extinct			
Competition among organisms impacts ecosystems in negative ways			

Vocabulary – Tier III

Population Community Predator Prey
 Competition Adaptation Symbiosis

Vocabulary – Tier II

Fragile Thrive Provide

Lesson One – How do organisms compete to survive in an ecosystem? (2-3 days)

- Explain how populations interact in an ecosystem. (Competition and Adaptation)
- What are the three kinds of symbiosis and their characteristics?
- How do predator and prey relationships change an ecosystem?

Lesson Summary: Students build an understanding of how organisms compete and survive in an ecosystem. They will discuss interactions in nature – symbiosis and predator-prey relationships. Further, the class will learn that a population is all of the organisms that live and interact in a community and that within a community, individual organisms compete for food, water, and space. Adaptations help them to compete and symbiotic relationships among organisms help them meet their needs. Within a community, there are also predator-prey relationships.

Reading Focus – Main Idea/Supporting Details

Pre-teach vocabulary for the lesson. ELL students will benefit from the use of visuals, which may include photographs, or short video clips. The visuals provide comprehensible input, make complex ideas more accessible, and give language concrete meaning.

During the minilesson, model using a Main Idea/Supporting Details/Summary graphic organizer to determine the main idea(s) of an informational text and locate details in the text to support the main idea(s). Teacher should model how to complete the organizer using “Trading Trash for Treasure” or a similar mentor text.

Guide students through the reading of content, explaining that as they read they will be thinking about the main ideas of the text. They will also be looking for details in the text that will support the main ideas. Students read with a partner, stopping after each section to discuss the following questions:

Interactions – What do organisms compete for in an ecosystem?

Symbiosis – Give examples of the three kinds of symbiosis.

Predator/Prey Relationships – What symbiotic relationship is most like predator/prey?

Teachers should check for student understanding through discussion/questioning. Students will complete a Main Idea/Supporting Details/Summary graphic organizer to help identify the main ideas of the text and the relevant details that support the main ideas.

Writing Focus – Summary, Citing Sources

Students will utilize the information from their graphic organizer to write a summary of the text. Teachers should model how to take the main idea and supporting details from their graphic organizer to craft a summary paragraph that includes details cited from the text.

Student Directions –

We have been studying ecosystems in science. Over the next few days you will have the chance to gather information about different ways humans can have a negative impact on different types of ecosystems by reading articles and a graph. You will then write an essay that incorporates information from these sources to inform readers about the topic.

The first text (day 1) you will read “Born to Be Wild” and learn about tigers. As you read, think about ways in which the ecosystems of tigers have been impacted by people. You will use this information when you write your essay. You will then summarize the text, identifying two or more main ideas and providing key details that support the main ideas.

In the second text (day 2) you will read “Manatee – What is the Problem?” and learn about manatees. You will also read a graph that identifies different ways that manatees die. As you read, think about ways in which the ecosystems of manatees have been impacted by people. You will use this information when you write your essay. You will then summarize the text, identifying two or more main ideas and providing key details that support the main ideas.

On the third day, you’ll have time to write your essay. As you write, remember everything you know about writing informative essays. Your essays should include the evidence you found in the articles and the graph. You’ll want to quote the text and reference important facts and details that will explain the topic to readers. As you’re reading the texts, use what you know about taking notes to get all the detailed information and specific references you want to use in your essay.

Task 1 –

You’re going to read an article about tigers. Remember, the big question to keep in mind is this: What information is important? You may underline or jot in the margins as you read. When you finish reading, write a summary. Remember to mention more than one main idea and to explain how key details in the article support those main ideas. Remember to sometimes quote directly from the article to capture the most powerful parts exactly as they were written.

Task 2 –

You’re going to read an article about manatees. You will also read a graph. Remember, the big question to keep in mind is this: What information is important? You may underline or jot in the margins as you read. When you finish reading, write a summary. Remember to mention more than one main idea and to explain how key details in the article support those main ideas. Remember to sometimes quote directly from the article to capture the most powerful parts exactly as they were written.

Task 3 –

You have read “Born to be Wild,” “Manatee – What is the Problem?” and the graph “2011 Manatee Mortality.” You have written summaries for both texts which include the main ideas and key supporting details. Integrate information from both texts and the graph to write a well organized, informative essay explaining how human activity has negatively affected organisms within ecosystems.

In your essay, be sure to:

- Introduce the topic clearly.
- Develop the topic with facts, details, quotations, or other information related to the topic.
- Use transition words and phrases to link ideas about the topic.
- Include content specific vocabulary when writing details to support the topic.
- Include a closing statement related to the topic.

Born to Be Wild

Imagine that you are a huge, reddish-orange cat covered in bold black stripes. You'd be a tiger, of course—one of Earth's most beautiful and amazing animals.

Every tiger has a different pattern of stripes. These patterns help tigers hide in the forests and grasslands where most of them live.

For thousands of years, these big, striped cats have been symbols of beauty, charm, luck, and power. Tigers are also important to the **ecosystems**—communities of plants, animals, and environments—in the places where they live.

© Emy Smith Photography/Photographers Direct

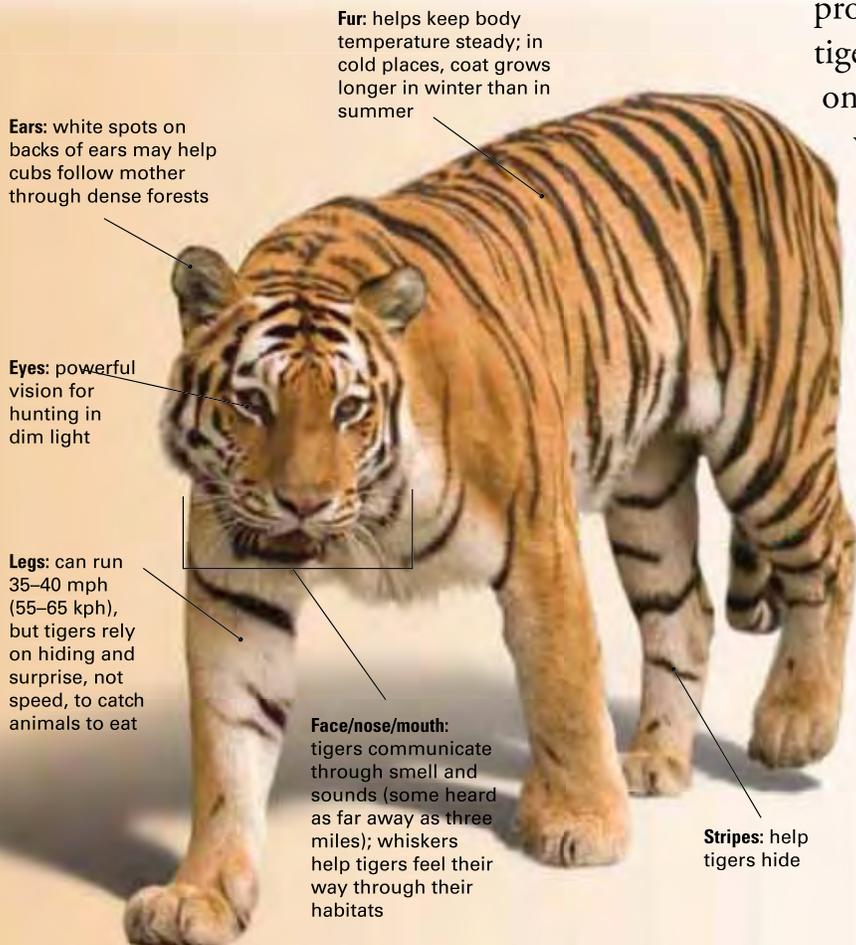


Tiger cubs stay with their mothers for two years or more. Other than mothers with cubs, adult tigers usually live alone. They live for 10 to 15 years in the wild.

Why Tigers Matter

Tigers are important meat eaters within their **food webs**. Protecting tigers helps to protect many other living things. Today, tigers need protecting as well. There are only a few thousand tigers alive in the wild worldwide, and they are dangerously close to disappearing forever.

Many types of tigers once lived in different habitats across Asia. Now wild tigers only live in certain small areas. These areas have large, hoofed animals—such as deer and wild pigs—that are tigers' main foods. The places where tigers live need to have water as well as dense plants that help them hide while hunting.



Tigers Under Threat

In the twentieth century, three types of tigers disappeared—or became **extinct**—forever: Caspian tigers, Javan tigers, and Bali tigers. A fourth type, the South China tiger, may no longer live in the wild, either. All of the surviving types of tigers are **endangered**, and as few as 3,000 tigers remain in the wild. Most of these are Bengal tigers.

The other kinds of wild tigers alive today are Amur (or Siberian) tigers, Indochinese tigers, and Sumatran tigers.

Tigers are in danger for several reasons. One reason is that more humans are moving into their habitats. People are replacing wild lands with houses, roads, and farms. This is forcing wild tigers to live in small “islands” of habitat that are not connected—a process called **habitat fragmentation**. As habitat fragmentation increases, tigers have a harder time surviving.

Another problem for wild tigers is food.

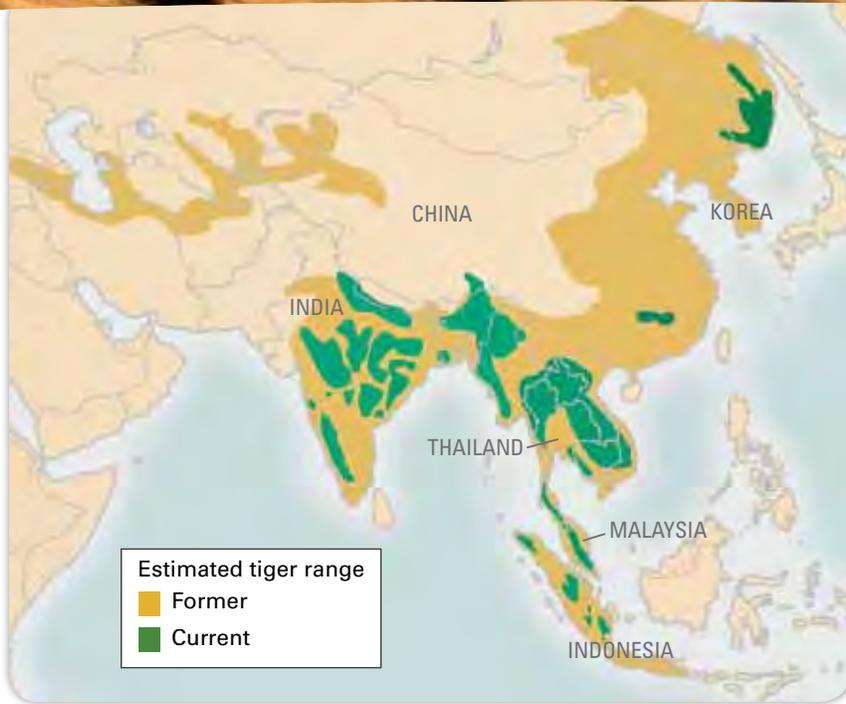


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Tigers in Captivity¹

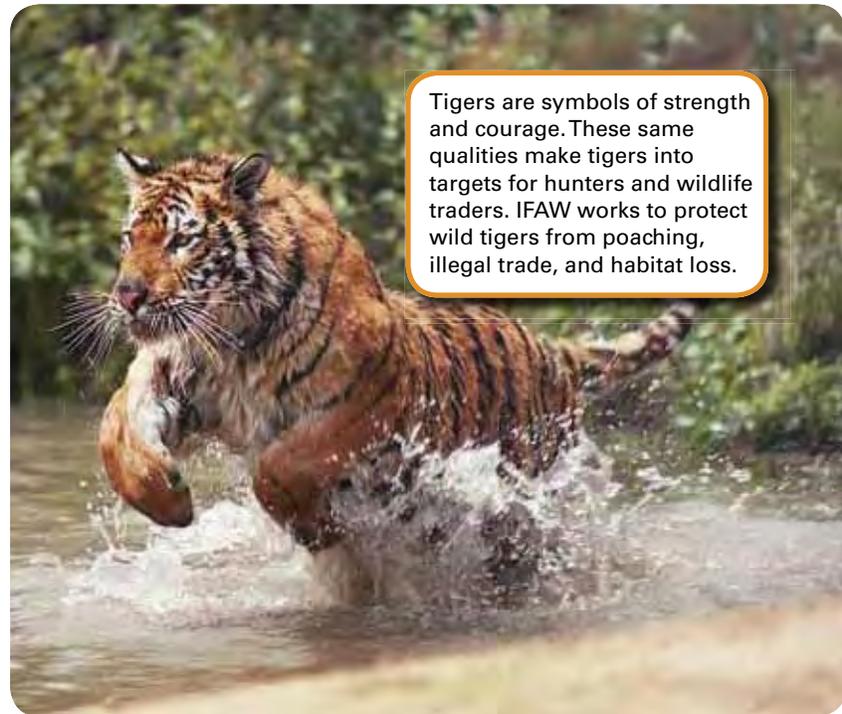
Thousands of tigers are kept in cages and behind bars around the world. In China, tiger farms keep about 6,000 tigers to breed them for parts and products (see page 6). In the U.S., there are between 5,000 and 10,000 captive tigers. Many are kept as pets and live in cramped and miserable conditions. These tigers cannot be released to the wild because they never learned the skills needed to survive.

© Photolibrary



People are hunting the same animals that tigers depend upon. When they cannot find wild animals to hunt, tigers may wander into villages to eat cows and other livestock. More contact with humans often leads to more deaths for both tigers and people.

The most direct danger to wild tigers is the illegal buying and selling of their body parts. Tigers are illegally **poached**—poisoned, trapped, and shot—because some people will pay high prices for tiger parts such as bones, skins, and meat.



Tigers are symbols of strength and courage. These same qualities make tigers into targets for hunters and wildlife traders. IFAW works to protect wild tigers from poaching, illegal trade, and habitat loss.

What's The Problem?

Once thought by sailors to be mythical sirens or mermaids, the Florida manatee, or sea cow, was one of America's most endangered species. Manatees can be found in shallow, slow-moving rivers, estuaries, saltwater bays, canals and coastal areas. They have no natural enemies and live 60 years or more. Sounds cool, right? It is. Except for the fact that they were almost wiped out and are still threatened despite conservation efforts. Why are they still threatened?

Human Impact - People in power boats cause lots of trouble for manatees. **Habitat Loss** - Humans are getting on manatees' turf.

Disease - If the water's too cold, manatees get sick. **Pollution** - Would you like to swim in polluted water?

Slow Reproductivity - It takes a long time to make a baby manatee (calf).

Human Impact: Power boats and manatees share the same waterways in Florida, except that the boats outnumber the manatees 500 to 1! (Not great survival odds.) Almost all manatee deaths are caused by collision with power boats (driven by people, of course) and their blade-like propellers! Manatees also die by being crushed and/or drowned in canal locks and flood control structures. (Built by... people). Manatees also die by getting entangled in nets or other fishing gear or by eating fish hooks. (Tossed in the water by... people!) Because manatees swim in relatively shallow water, close to shore, they are more likely to meet up with... (you guessed it...) people! People can totally stress out these animals by harassing them and often do (even though according to the Marine Mammal Protection Act it's illegal to bother them).

Habitat Loss: Manatees spend their lives in the water, and that water has to be warm (nothing below 68 degrees Fahrenheit). They are migratory animals - living in Florida's coastal waters during the winter and migrating as far north as the Carolinas during the summer. Manatees are herbivores (plant-eaters) and can be found in fairly shallow waters where sunlight stimulates plant growth. Development on the waterways has impacted manatees' food sources. So does run-off from fertilizers and herbicides.

Disease: Manatees need warm waters. Occasionally they experience stress due to a prolonged weather front which creates cold waters. This can produce disease in manatees.

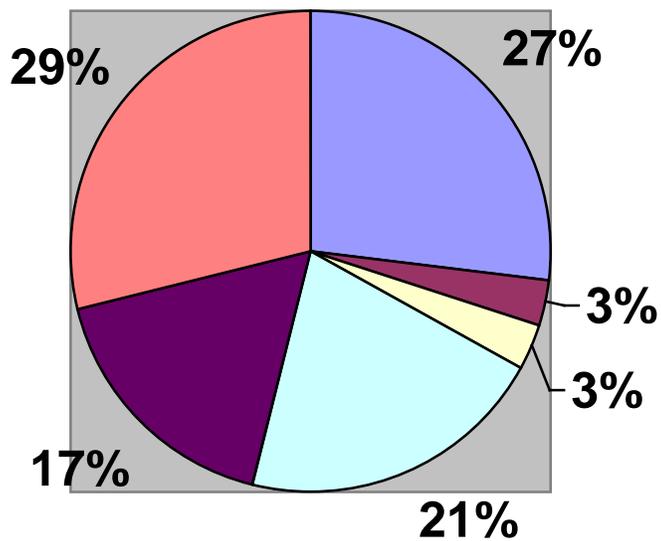
Pollution: Manatees need to be protected from the garbage that people on boats dump into the already polluted bays and streams of southern and central Florida. It is becoming more and more difficult to protect the manatee as more people use their habitat for recreation. Chemical pollution is also a major threat for manatees.

Slow Reproductivity: The reproductive rate for manatees is slow. Female manatees are not sexually mature until five years old, and males are mature at approximately nine years of age. It is believed that one calf is born every two to five years; twins are rare.

Gestation is approximately 13 months. Mothers nurse their young for a long period and a calf may remain dependent on its mother for up to two years.

http://www.theinsite.org/earth/earth_es_manatee.html

2011 Manatee Mortality



Source: http://www.savethemanatee.org/mortality_rescue_2011.pdf

Final Performance Task – Part 3

Name _____

Date _____

How has human activity negatively affected organisms?

How has human activity negatively affected organisms?

You have read “Born to be Wild,” “Manatee – What is the Problem?” and the graph “2011 Manatee Mortality.” You have written summaries for both texts which include the main ideas and key supporting details. Integrate information from both texts and the graph to write a well organized, informative essay explaining how human activity has negatively affected organisms within ecosystems.

In your essay, be sure to:

- Introduce the topic clearly.
- Develop the topic with facts, details, quotations, or other information related to the topic.
- Use transition words and phrases to link ideas about the topic.
- Include content specific vocabulary when writing details to support the topic.
- Include a closing statement related to the topic.

Tasks 1 and 2 – Reading Rubric

	Level 1	Level 2	Level 3	Level 4
<p>Main idea R.I. Standard 5.2: Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. Should be assessed in the reading response summaries..</p>	When asked to recap the main ideas in a text, the reader may refer to and talk about a very minor point or detail.	When asked to recap the main ideas in a text, the reader may state just one main idea from the text or may cite peripheral ideas rather than main ideas.	When asked to recap the main ideas in a text, the reader states two or more main ideas from the text.	When asked to recap the main ideas in a text, the reader crystallizes one or more overarching ideas that the text communicates, probably referring to ideas that are not explicitly stated.
<p>Support R.I. Standard 5.2: Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. Should be assessed in the reading response summaries.</p>	The reader may restate information from the text without explaining its connection to a main idea or ideas.	The reader explains how one or two key details support main ideas in the text.	The reader explains how the main ideas of the text are supported by key details.	The reader explains subtle as well as obvious connections between the main ideas and some related key details. The reader may also indicate the relative value of these details as support.
<p>Summarizing R.I. Standard 5.2: Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text. Should be assessed in the reading response summaries.</p>	The reader may recount parts of the text, but fails to synthesize them into a summary.	The reader summarizes the text but leaves out key elements or includes inaccuracies in the summary.	The reader summarizes the text. Summary includes multiple relevant details.	The reader provides an accurate summary of the whole text, embellishing this with some well-chosen details.

Final Task 3 – Rubric

	Level 1	Level 2	Level 3	Level 4
Focus- Standard 5.2.a Introduce a topic clearly, provide a general observation and focus, and group related information logically; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.	The writer does not introduce the topic (negative impact of humans on ecosystems). Includes irrelevant ideas, reasons, facts, and/or details that are in no particular order.	The writer does not clearly state the topic (negative impact of humans on ecosystems). May include irrelevant ideas, reasons, facts, and/or details that are in somewhat cohesive paragraphs.	The writer clearly states the topic (negative impact of humans on ecosystems). Ideas, facts, and details are grouped into cohesive paragraphs.	The writer states the topic (negative impact of humans on ecosystems) with a compelling introduction. Ideas, facts, and details are grouped into cohesive paragraphs that are strategically ordered to strengthen the essay.
Standard 5.2.b Develop the topic with facts, definitions, concrete details, quotations, or other examples related to the topic.	Includes facts that do not support the main topic. Most of the facts used are incorrect.	Includes facts and details (from text) that mostly support the topic. Makes inaccurate connections.	Includes facts and details (from text) that all support the topic and gestures towards citation by naming some sources.	Includes facts and details (from text) linking each piece of evidence to the topic as well as citing specific sources.
Standard 5.2.c Link ideas within and across categories of information using words, phrases, and clauses.	Does not use transitional words to link ideas and reasons.	Uses some transitional phrases yet may use the same phrase in every instance. May use some lower level phrases.	Uses a variety of transitional phrases to link ideas and reasons to supporting facts and details.	Uses sophisticated transitional phrases to link ideas and reasons to supporting facts and details.
Standard 5.2.d Use precise language and domain specific vocabulary to inform about or explain the topic.	Does not use appropriate language to inform about the topic.	Attempts to use precise language and domain specific vocabulary to inform about the topic.	Uses precise language and domain specific vocabulary to inform about the topic.	Uses a variety of domain specific vocabulary to inform about the topic.
Standard 5.2.e Provide a concluding statement or section related to the information or explanation presented.	Ends the essay without a sense of closure.	Provides a concluding statement that is not clearly related to the topic.	Provides a concluding statement related to the topic.	Provides a compelling concluding statement that builds on the topic and engages the audiences.

Grade 5 Literacy in Science: Ecosystems

Student Work

People like us are harming animals like manatees and tigers. We need to stop our harmful actions and start conserving to save them. Tigers have been poached and have been hunted because they thought tigers weren't that important. Tigers are important. Tigers are an important part of the food web. They protect other organisms when in need of help.

These tigers are nearly extinct. Now there are only 1,000 tigers in the world since Caspian, Javan, and the Bali tiger have died off. They represent beauty, luck, charm, and power which proves that they are that important. They are illegally poached and hunted which I have said before. They are a big and important part of the food web and protect other organisms which I have said before.

The population of manatees is dropping from the change of habitat, pollution, and powerboat. One, since now all they have is small space. Two, now there trash in the water the manatees live in and they are mistaking the trash for food. Three, the powerboats people drive and they get tangled with they instantly die.

These animals are important because they protect organism and their families. In conclusion they are important.