



The Lionfish: Florida's New Marauder

Lesson Topic

Invasive Species and Human Impacts

RIEL Biology Element

Sociopolitical Consciousness

Time Required

One 50-minute lesson

Standards Addressed

- SC.912.L.17.13: Discuss the need for adequate monitoring of environmental parameters when making policy decisions.

Science and Engineering Practice

- Asking questions and defining problems
- Constructing scientific explanations
- Engaging in argument from evidences
- Obtaining, evaluating, and communicating information

Lesson Summary

Students will read an article on the invasive lionfish in Florida and examine key terms. Then, they will respond to a set of questions regarding lionfish threats and management by first highlighting their answers on the original article, and then writing out their answers with reasoning. Finally, students will write a summary of the main points of the article.

Materials

- The lion fish reading activity packet, which includes the article, synonym worksheet, questionnaire, and summary page
- [Supporting PowerPoint](#)
- Highlighters
- Projector
- Pencils

Before the Activity

- Print and staple the appropriate amount of packets for the students, including one for yourself to demonstrate highlighting strategies.

Lesson Activities

Engage

1. Go over the lesson objectives with students (slide 2)
2. Invite students to read the scientific abstract (slide 3) and discuss why it may be difficult to read (3 minutes). While students are reading the slide, hand out the reading activity packet.
3. Show students the picture of the lionfish (slide 4) and probe for background knowledge in students (2 minutes).
4. Invite students to read the article that is on page 1 of the activity or, alternatively, read the article aloud for the students to follow along (10 minutes).

Gauge

1. After reading the article, have the students turn to page 2 of the packet.
2. Have the students read through the article again, on pages 2-3 of the packet. Each time they reach an underline word, students will choose what they think the words mean from the choices next to it using the context of the sentence to determine the meaning of the word (5 minutes).

Demonstrate and push

1. Turn to page 4 of the packet. Pass out a high-lighter to each student.
2. Read the 1st question aloud, then demonstrate how the student can highlight important information that will help them answer the question.
3. Have students work through the remaining questions. Students will highlight the pertinent information in the paragraph in order to answer the question. Students will explain their reasoning. For example, “venomous spines make it a good predator because it make it harder for them to get eaten themselves” (10-20 minutes).

Note: each question has a corresponding paragraph, in such that question 1 goes with paragraph 1; question 2 with paragraph 2; etc.

Content Learning Objectives

- Students will be able to understand the potential impacts of an invasive species on an ecosystem.
- Students will be able to apply their claim, evidence and reasoning (CER) skills to describe problems and solutions to managing an invasive species.

Teacher Notes

- Students will engage in the SEPs by reading the article and identifying the problems that the invasive lionfish poses to the ecosystem.
- Students will also engage through identifying, constructing, and justifying their explanations based on the content from the article. Engagement in these SEPs directly connects to a real-world, local issue that may affect the students.

Teacher Notes (cont'd)

- Furthermore, these SEPS help students better understand the practices enacted by scientists and community members to help mitigate these types of threats.

Check Understanding

1. On page 5, have students summarize the article using the questions they just answered (10 minutes).

Note: some students will finish faster than others. Students should be instructed to move on to *Check Understanding* when they finish *Demonstrate and Push*



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Name: _____

Date: _____

1

The Lionfish: Reading Activity

The Lionfish: Florida's New Marauder

Kenneth Connelly

The Lionfish belongs to the scorpion fish family and is native to tropical coral reefs of the South Pacific and Indian Oceans. While slow-moving, lionfish are quite capable of defending themselves. The lionfish has 18 venomous spines along its dorsal and pectoral fins. When a victim is punctured by a venomous spine, the lionfish delivers a powerful toxin, causing quite a sting! Although lionfish are small in the scheme of marine fish size (a maximum of 18 inches long), they can eat almost any marine creature that fits into their mouths. In fact, a lionfish can eat an organism that is up to two-thirds its own body size because their stomach is able to expand up to thirty times its normal volume! This makes lionfish a voracious predator of other fish!

In the state of Florida, the lionfish is categorized as an invasive species. How did the lionfish make its way from the tropical waters of the South Pacific and Indian Oceans all the way to the Florida Keys? Unfortunately, the accidental release of these fish into the natural environment have contributed to their invasion of the Gulf of Mexico (GOM). The lionfish is a popular aquarium fish due to its prized, unique, shape and coloration. There is speculation that the lionfish was introduced to Florida by the accidental release of six lionfish that escaped from an aquarium during hurricane Andrew in 1992. In addition, scientists propose that a cluster of lionfish eggs was accidentally transported in the ballast of a cargo ship coming from the South Pacific/Indian Oceans and deposited in the GOM, inadvertently.

Since its introduction to coastal Florida, the lionfish population has since increased exponentially. In some areas of the GOM scientists have estimated populations of over 160 fish per acre. Lionfish have few natural predators in these regions, and therefore, have greatly impacted the local ecosystems. A single lionfish can reduce the recruitment (young fish surviving to become adult fish) of a reef by 79%. Because lionfish reduce native fish species populations, there are consequential, negative effects on Florida's overall coral reef habitat and health as well. For example, lionfish prey on herbivorous fish species that eat algae. Herbivorous fish are critical in keeping algal growth in check and preventing overgrowth on coral reefs. Without them, coral reefs are dominated by algal growth, causing a reduction in coral growth and a decrease in symbiotic bacteria that are essential to the health of coral reefs.

However, Florida biologists and ecologists are fighting back against the lionfish invasion. By creating an 'open season' on lionfish and promoting lionfish fishing tournaments, scientists are encouraging the public to capture as many lionfish from Florida's natural environment as possible. In 2019, these two, simple strategies contributed to the removal of 25,000 lionfish from Florida waters! Recently, a campaign to promote the catch, preparation, and edibility of lionfish has been introduced to the public. To date, this campaign has been successful, with more than 49,000 pounds (about twice the weight of a school bus) of lionfish commercially harvested in 2019. Thus, don't be surprised to see lionfish on the menu of your local seafood restaurant soon! Until then, scientists will continue to research invasive lionfish populations and develop creative strategies to reclaim the native ecosystems from this beautifully distinctive, yet detrimental, South Florida marauder.



Name: _____

Date: _____

2

The Lionfish: Reading Activity

The Lionfish: Florida's New Marauder

Kenneth Connelly

The Lionfish belongs to the scorpion fish family and is native to tropical coral reefs of the South Pacific and Indian Oceans. While slow-moving, lionfish are quite [**very / not very**] capable of defending themselves. The lionfish has 18 venomous [**soft / poisonous**] spines along its dorsal and pectoral fins. When a victim is punctured [**exploded / pierced**] by a venomous spine, the lionfish delivers a powerful toxin [**poison / cure**], causing quite a sting! Although lionfish are small in the scheme [**chaos / organization**] of marine fish size (a maximum of 18 inches long), they can eat almost any marine creature that fits into their mouths. In fact, a lionfish can eat an organism that is up to two-thirds its own body size because their stomach is able to expand up to thirty times its normal volume [**capacity / time**] ! This makes lionfish a voracious predator [**greedy hunter / kind friend**] of other fish!

In the state of Florida, the lionfish is categorized as an invasive [**native / not native**] species. How did the lionfish make its way from the tropical waters of the South Pacific and Indian Oceans all the way to the Florida Keys? Unfortunately, the accidental release of these fish into the natural environment have contributed [**added to / taken away from**] to their invasion of the Gulf of Mexico (GOM). The lionfish is a popular aquarium fish due to its prized [**unwanted / valued**], unique, shape and coloration. There is speculation that the lionfish was introduced to Florida by the accidental release of six lionfish that escaped from an aquarium during hurricane Andrew in 1992. In addition, scientists propose that that a cluster of lionfish eggs was accidentally transported in the ballast of a cargo ship coming from the South Pacific/Indian Oceans and deposited in the GOM, inadvertently [**unknowingly / purposely**] .

Since its introduction to coastal Florida, the lionfish population has since increased exponentially [**minimally / drastically**] . In some areas of the GOM scientists have estimated populations [**communities / individuals**] of over 160 fish per acre. Lionfish have few natural predators in these regions, and therefore, have greatly impacted [**affected / unaffected**] the local ecosystems. A single lionfish can reduce the recruitment (young fish surviving to become adult fish) of a reef by 79%. Because lionfish reduce native fish species populations, there are consequential [**resultant / unrelated**], negative effects on Florida's overall coral reef habitat and health as well. For example, lionfish prey on herbivorous [**meat eating / plant eating**] fish species that eat algae [**plant / animal**] . Herbivorous fish are critical in keeping algal growth in check and preventing overgrowth on coral reefs. Without them, coral reefs are dominated by algal growth, causing a reduction in coral growth and a decrease in symbiotic [**unrelated / interdependent**] bacteria that are essential to the health of coral reefs.



Name: _____

Date: _____

3

The Lionfish: Reading Activity

However, Florida biologists and ecologists are fighting back against the lionfish invasion [**occupation / withdrawal**] . By creating an 'open season' on lionfish and promoting lionfish fishing tournaments, scientists are encouraging the public to capture as many lionfish from Florida's natural environment as possible. In 2019, these two, simple strategies contributed to the removal of 25,000 lionfish from Florida waters! Recently, a campaign to promote the catch, preparation, and edibility [**eatable / not eatable**] of lionfish has been introduced to the public. To date, this campaign has been successful, with more than 49,000 pounds (about twice the weight of a school bus) of lionfish commercially [**for business use / for personal use**] harvested in 2019. Thus, don't be surprised to see lionfish on the menu of your local seafood restaurant soon! Until then, scientists will continue to research invasive lionfish populations and develop creative strategies to reclaim [**give away / take back**] the native ecosystems from this beautifully distinctive, yet detrimental [**harmful / helpful**] , South Florida marauder [**raider / friend**] .



Name: _____

Date: _____

4

The Lionfish: Reading Activity

Reading With Purpose

Answer the questions using the article with your marked notes.

Question	Your Answer	Reasoning
What makes the lionfish a good predator?		
How did lionfish come to live in Florida?		
Why are lionfish harmful to Florida's ecosystem?		
What is being done to rid Florida of the lionfish?		



Name: _____

Date: _____

The Lionfish: Reading Activity

Reading With Purpose

Instructions: In the space below, write a short summary of the main points of the article in 3-5 sentences



Name: _____

Date: _____

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Works Cited

Harrell, Scott. "Lionfish Facts: Frequently Asked Questions about Invasive Lionfish." *Lionfish Hunting Lodge*, LIONFISH.CO, https://lionfish.co/lionfish-faq/#google_vignette.

Gupta, Anika. "Invasion of the Lionfish." *Smithsonian.com*, Smithsonian Institution, 7 May 2009, <https://www.smithsonianmag.com/science-nature/invasion-of-the-lionfish-131647135/>.

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