

BOWFISHING COMMON CARP

6th-8th Grade Discussion Guide

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SCIENCE CATEGORIES

Life Science

TIMEFRAME

Two to Three Class Periods

MATERIALS

Cones, tape, glasses, pencils

KEYWORDS

Common Carp, PFD, Spawn, Invasive, Refraction



LEARNING OBJECTIVES

- Understand what the sport of bowfishing is.
- Understand how bowfishing is connected to the control of invasive species like the common carp.
- Understand how light refraction works.

ACTIVITY SUMMARY

In this lesson students will consider the critical question of what bowfishing is and how it affects the environment and invasive species like common carp.

First, students will work with a partner to organize their new learning by writing an acrostic poem. The instructor will provide the topic; bowfishing and the partners can choose between the words; common carp or invasive. They will summarize their poem and include an image.

Next, students will participate in a short experiment where they examine light refraction using a glass of water and pencil. Groups will use this newfound knowledge to reflect on two questions.

Finally, students will read some background information on invasive species and write a short paragraph on their learning using the connect, extend, challenge protocol. Students will then partake in an activity that illustrates how invasive species affect native species. As a culmination students will respond to reflection questions either whole class, small group or through writing.

BACKGROUND INFORMATION

The sport of bowfishing the common carp is a lot of fun, but with all hunting sports, it is also important to learn the ethics and techniques first. One of the first considerations for bowfishing is having the right equipment. You must have a bow with a retrieval reel, retrieval line, fish arrows with a fish point, safety slide, safety slide stop and finger tabs. Other recommended gear includes non-slip close-toed shoes, polarized sunglasses, sunscreen and clothing that can get wet, dirty, slimy and is weather appropriate. It is also important to wear a PFD, or personal flotation device, while on the boat.

The common carp is a popular choice for bowfishing. They swim in groups of four to five because there is one female with four or five males surrounding them. The reason you see the fish surfacing during spawning season is that the males squeeze the sides of the female so she will release her eggs. This species is popular with bowfishers because it is an invasive species. These non-native species destroy the spawning habitat for native fish.

Another important consideration for bowfishing the common carp is identification. Identification cues for this species include large scales, a golden hue and a weight of ten to forty pounds.

A key tip for shooting at carp is to aim just below their belly. This is due to the refraction of water making objects appear closer to the surface than they actually are.

VOCABULARY

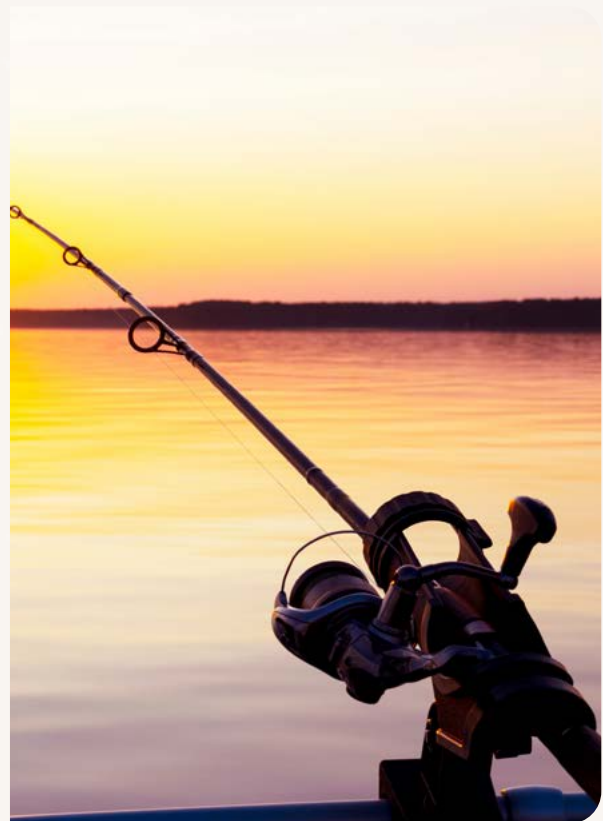
COMMON CARP: a deep-bodied freshwater fish, typically with barbels around the mouth.

PFD: a life preserver, life jacket, or other device for keeping a person afloat in the water.

SPAWN: to produce or deposit (eggs) —an aquatic animal.

INVASIVE: non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

REFRACTION: the bending of a ray when it passes at an angle from one medium into another in which its speed is different (as when light passes from air into water) refraction.



LEARNING PROCEDURE

Instructor says, "Our critical question today is: What is the sport of bowfishing and how does it impact the environment and invasive species like common carp?"

Based on what you saw in the video episode, you and a partner will write an Acrostic Poem.

Acrostic Poem Acrostics are powerful memory devices. To write an acrostic, select a key word that is central to the concept you are studying. Write the letters of that word vertically. Then make a list of companion words that describe the concept. Find a way to partner them with the original letters you wrote vertically.

For example: Topic: Sponges Key Word: Porifera

Porous sacs

Osculum acts as exit for current water

Reproduce asexually by budding or sexually with gametes

Internal spongocoel

Four kinds of cells: epidermal, pore cell, collar cell, amoeboid cell

External anatomy strengthened by spicules

Regeneration of damaged tissues by amoeboid cells

Animal kingdom's simplest members

The instructor should write the topic "Bowfishing" on the board and the following Key Words: "Common Carp" and "Invasive" Student pairs should be given the choice of which key word they will turn into an acrostic poem.

Illustrate your acrostic with a picture that summarizes what you've written about. Then write 3 to 5 sentences explaining how the horizontal words and terms AND the illustration fit the vertical term or word

ACTIVITY 1:

For this activity, each group of students will need a clear glass cup filled $\frac{2}{3}$ of the way with water and a pencil.

Instruct students to take the pencil and put it in the glass of water so it is leaning against the edge of the glass's rim. Then instruct students to bend down until they are looking in line with the top of the water. Tell students to discuss their observations, and based on their learning from the video, see if they can explain why the pencil looks broken in two.

Following the short experiment, show the class this short, two minute [video clip](#) which explains how refraction works. Following the video, ask groups of students to discuss the following question. Let them know they should be prepared to share out their ideas with the rest of the class.

Questions:

What effect would water refraction have on bowfishing?

How would water refraction affect predators (like eagles and hawks) who catch some of their food from the water?

ACTIVITY 2:

As a precursor to this activity, have students read this brief [background informational brief](#) on invasive species. While reading, instruct students to engage in note taking using whatever method they are comfortable with. Students should use the [connect, extend, challenge protocol](#) and write a brief paragraph based on their interaction.

Following the background building activity, students would engage in the following activity:

Instructor Set Up:

Find an open area such as a gym, sporting field, tennis court, classroom, or hallway. At both ends, create a starting line and a finish line using an appropriate line marker for that surface (cones, marking tape or paint).

The Activity:

Have students stand behind the starting line.

1. Define the boundaries for the game. The size of the space depends on the number of students.
2. Choose a third of the students to be the “invasive species.” Their job is to tag the other students as they run past. Have the “invasive species” spread out. They can move their bodies but NOT their feet. They must stay in place.
3. Explain to the rest of the class that they are native fish. Each time the instructor says “Go,” they must run from one side to the other, which represents a year, without being tagged by an “invasive species.”
4. If they are tagged, they stop in place and become an invasive species.
5. Play continues until one native fish is left. The last native fish remaining wins the game.

Adaptions:

1. If space is limited, require students to “walk only” during the game.
2. Add obstacles to the course making it more difficult to avoid the invasive species. This can reflect environmental changes to the habitat caused by the invasive species.
3. If outside, invasive species can use wet foam brushes to tag and mark native fish.

Discussion Questions:

1. What happened to the native species with each year (pass)? The population declined.
2. Was there one point in the game where the invasive species overtook the native fish? Yes. Discuss when it happened in your game.
3. Why is it important to limit the number of invasive species? To keep native fish populations healthy.

CONCLUSION

Instructor Says: “We’ve spent some time learning about bowfishing the common carp and how it can be a fun sport but also helps remove invasive species from our waterways. Think about what you have learned about the sport of bowfishing and invasive species. Complete a Draw. Label. Caption.

RELATED LINKS

U.S. Fish and Wildlife Service, Fish and Aquatic Conservation. Visit <https://www.fws.gov/program/fish-and-aquatic-conservation> for more information on invasive species.

A complete guide to bowfishing <https://fishingbooker.com/blog/bowfishing-the-complete-guide/>

Wildlife Forever Invasive Species https://www.wildlifeforever.org/home/invasive-species/?gclid=CjwKCAjw6fyXBhBgEiwAhhiZsgCKYZofVKRFOWq50NA5H9X9pEy_cIbPkCfVVgm8LyN7R_iZuGjlihoCYD4QAvD_BwE

History of Common Carp in the United States <https://www.nps.gov/miss/learn/nature/carphist.htm99iu>

The following National Common Core Standards can be met teaching;

BOWFISHING COMMON CARP

6TH GRADE

- CCSS.ELA-LITERACY.RI.6.1** Cite textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- CCSS.ELA-LITERACY.RI.6.2** Determine a central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.
- CCSS.ELA-LITERACY.W.6.2.A** Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
- CCSS.ELA-LITERACY.W.6.3** Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
- CCSS.ELA-LITERACY.W.6.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-LITERACY.SL.6.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 6 topics, texts, and issues, building on others' ideas and expressing their own clearly.

6TH GRADE

- CCSS.ELA-LITERACY.RI.7.1** Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- CCSS.ELA-LITERACY.RI.7.2** Determine two or more central ideas in a text and analyze their development over the course of the text; provide an objective summary of the text.
- CCSS.ELA-LITERACY.W.7.2.A** Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
- CCSS.ELA-LITERACY.W.7.3** Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
- CCSS.ELA-LITERACY.W.7.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

8TH GRADE

- CCSS.ELA-LITERACY.RI.8.1** Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.
- CCSS.ELA-LITERACY.RI.8.2** Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.
- CCSS.ELA-LITERACY.W.8.2.A** Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.
- CCSS.ELA-LITERACY.W.8.3** Write narratives to develop real or imagined experiences or events using effective technique, relevant descriptive details, and well-structured event sequences.
- CCSS.ELA-LITERACY.W.8.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-LITERACY.SL.8.1** Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

9-10 GRADES

- CCSS.ELA-LITERACY.RI.9-10.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- CCSS.ELA-LITERACY.RI.9-10.2** Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.
- CCSS.ELA-LITERACY.W.9-10.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- CCSS.ELA-LITERACY.W.9-10.3** Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.
- CCSS.ELA-LITERACY.W.9-10.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-LITERACY.SL.9-10.1** Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

CCSS.ELA-LITERACY.SL.7.1.C

Pose questions that elicit elaboration and respond to others' questions and comments with relevant observations and ideas that bring the discussion back on topic as needed.

CCSS.ELA-LITERACY.SL.7.1.D

Acknowledge new information expressed by others and, when warranted, modify their own views.

CCSS.ELA-LITERACY.SL.7.5

Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.

7TH GRADE

CCSS.ELA-LITERACY.RI.8.1

Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.

CCSS.ELA-LITERACY.RI.8.2

Determine a central idea of a text and analyze its development over the course of the text, including its relationship to supporting ideas; provide an objective summary of the text.

CCSS.ELA-LITERACY.W.8.2

Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.

CCSS.ELA-LITERACY.W.8.2.A

Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.

CCSS.ELA-LITERACY.W.8.2.B

Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.

CCSS.ELA-LITERACY.W.8.2.C

Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.

CCSS.ELA-LITERACY.W.8.2.D

Use precise language and domain-specific vocabulary to inform about or explain the topic.

CCSS.ELA-LITERACY.W.8.2.E

Establish and maintain a formal style.

CCSS.ELA-LITERACY.W.8.2.F

Provide a concluding statement or section that follows from and supports the information or explanation presented.

CCSS.ELA-LITERACY.W.8.4

Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

CCSS.ELA-LITERACY.SL.8.1

Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 8 topics, texts, and issues, building on others' ideas and expressing their own clearly.

CCSS.ELA-LITERACY.SL.8.1.A

Come to discussions prepared, having read or researched material under study; explicitly draw on that preparation by referring to evidence on the topic, text, or issue to probe and reflect on ideas under discussion.

CCSS.ELA-LITERACY.SL.8.1.B

Follow rules for collegial discussions and decision-making, track progress toward specific goals and deadlines, and define individual roles as needed.

CCSS.ELA-LITERACY.SL.8.1.C

Pose questions that connect the ideas of several speakers and respond to others' questions and comments with relevant evidence, observations, and ideas.

CCSS.ELA-LITERACY.SL.8.1.D

Acknowledge new information expressed by others, and, when warranted, qualify or justify their own views in light of the evidence presented.

CCSS.ELA-LITERACY.SL.8.5

Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.

8TH GRADES

- CCSS.ELA-LITERACY.RI.9-10.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.
- CCSS.ELA-LITERACY.RI.9-10.2** Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text.
- CCSS.ELA-LITERACY.W.9-10.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- CCSS.ELA-LITERACY.W.9-10.2.A** Introduce a topic; organize complex ideas, concepts, and information to make important connections and distinctions; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- CCSS.ELA-LITERACY.W.9-10.2.B** Develop the topic with well-chosen, relevant, and sufficient facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
- CCSS.ELA-LITERACY.W.9-10.2.C** Use appropriate and varied transitions to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
- CCSS.ELA-LITERACY.W.9-10.2.D** Use precise language and domain-specific vocabulary to manage the complexity of the topic.
- CCSS.ELA-LITERACY.W.9-10.2.E** Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- CCSS.ELA-LITERACY.W.9-10.2.F** Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).
- CCSS.ELA-LITERACY.W.9-10.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-LITERACY.SL.9-10.1** Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 9-10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
- CCSS.ELA-LITERACY.SL.9-10.1.A** Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.
- CCSS.ELA-LITERACY.SL.9-10.1.B** Work with peers to set rules for collegial discussions and decision-making (e.g., informal consensus, taking votes on key issues, presentation of alternate views), clear goals and deadlines, and individual roles as needed.
- CCSS.ELA-LITERACY.SL.9-10.1.C** Propel conversations by posing and responding to questions that relate the current discussion to broader themes or larger ideas; actively incorporate others into the discussion; and clarify, verify, or challenge ideas and conclusions.
- CCSS.ELA-LITERACY.SL.9-10.1.D** Respond thoughtfully to diverse perspectives, summarize points of agreement and disagreement, and, when warranted, qualify or justify their own views and understanding and make new connections in light of the evidence and reasoning presented.
- CCSS.ELA-LITERACY.SL.9-10.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.



9TH-10TH GRADES

- CCSS.ELA-LITERACY.RI.11-12.1** Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.
- CCSS.ELA-LITERACY.RI.11-12.2** Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.
- CCSS.ELA-LITERACY.W.11-12.2** Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- CCSS.ELA-LITERACY.W.11-12.2.A** Introduce a topic; organize complex ideas, concepts, and information so that each new element builds on that which precedes it to create a unified whole; include formatting (e.g., headings), graphics (e.g., figures, tables), and multimedia when useful to aiding comprehension.
- CCSS.ELA-LITERACY.W.11-12.2.B** Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.
- CCSS.ELA-LITERACY.W.11-12.2.C** Use appropriate and varied transitions and syntax to link the major sections of the text, create cohesion, and clarify the relationships among complex ideas and concepts.
- CCSS.ELA-LITERACY.W.11-12.2.D** Use precise language, domain-specific vocabulary, and techniques such as metaphor, simile, and analogy to manage the complexity of the topic.
- CCSS.ELA-LITERACY.W.11-12.2.E** Establish and maintain a formal style and objective tone while attending to the norms and conventions of the discipline in which they are writing.
- CCSS.ELA-LITERACY.W.11-12.2.F** Provide a concluding statement or section that follows from and supports the information or explanation presented (e.g., articulating implications or the significance of the topic).
- CCSS.ELA-LITERACY.W.11-12.4** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-LITERACY.SL.11-12.1** Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grades 11-12 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.
- CCSS.ELA-LITERACY.SL.11-12.1.A** Come to discussions prepared, having read and researched material under study; explicitly draw on that preparation by referring to evidence from texts and other research on the topic or issue to stimulate a thoughtful, well-reasoned exchange of ideas.
- CCSS.ELA-LITERACY.SL.11-12.1.B** Work with peers to promote civil, democratic discussions and decision-making, set clear goals and deadlines, and establish individual roles as needed.
- CCSS.ELA-LITERACY.SL.11-12.1.C** Propel conversations by posing and responding to questions that probe reasoning and evidence; ensure a hearing for a full range of positions on a topic or issue; clarify, verify, or challenge ideas and conclusions; and promote divergent and creative perspectives.
- CCSS.ELA-LITERACY.SL.11-12.1.D** Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the task.
- CCSS.ELA-LITERACY.SL.11-12.5** Make strategic use of digital media (e.g., textual, graphical, audio, visual, and interactive elements) in presentations to enhance understanding of findings, reasoning, and evidence and to add interest.