

Into the Outdoors

DESIGN YOUR CRAPPIE FISHING HABITAT

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In This Activity ...

Students will research, debate, and develop quality habitats for the panfish called the black crappie. Their plan will consider the needs of aquatic ecosystems that promote environmental quality, fishing opportunities, and planet stewardship in a select aquatic area.

Educational Partners



Environmental Science,
Habitat Management

GRADE LEVELS

Middle School - Grades 6-8

CONTENT AREAIchthyology, Environmental Science,
Habitat Management, Natural
Resource Science**UNIT THEME**

Habitat Management and Restoration

TOPICCrappie Biology, Habitat Management,
Conservation, Social Responsibility**TIME REQUIRED**

Three, 45-minute sessions

**OVERVIEW**

Aquatic ecosystems are vital to the functioning of the planet and human survival because they provide us with invaluable services. For example, oceans, lakes, and rivers support biological communities and produce food resources for people. Their large water bodies also make for some fun recreational activities for humans. Many people enjoy swimming, scuba diving, boating, fishing, and more. Moreover, aquatic ecosystems can supply humans with fresh drinking water. But aquatic ecosystems are at serious risk from the environmental pressures we humans put on them. Pollution, climate change, habitat degradation, and loss of biodiversity are some of the biggest threats to our aquatic ecosystems. And thus, humans lower our aquatic ecosystems' production and negatively impact human welfare in the process.

Experts say that preventing habitat loss and restoring habitat are vital to protecting our aquatic ecosystems. A habitat is the "home" or place where an organism lives. And every organism on the planet needs a specific set of environmental conditions -food, water, space, oxygen, and cover – in which to live and successfully reproduce. Black crappie usually live in large lakes or sometimes rivers with deep depths. In the spring, they migrate to shallows 1.5 – 6 feet deep with emergent vegetation and canopy cover to build their nests and spawn. Hatched younglings will also school in shallow waters. These water bodies have clear, calm, and cool waters with sandy or muddy bottoms with abundant vegetation. They can tolerate low oxygen levels, but can commonly be found in the thermocline, or the depth with cool water and dissolved oxygen. Although they prefer open water, they need structures for cover. For example, they will hang around stumps, locks, rock piles, rocky ledges, emergent vegetation (not too dense), bridges, walkways, docks, or sunken objects for shade, protection from predators, and food resources. Crappies feed on zooplankton, aquatic insects and larvae like mayflies. Older crappie will also feed on small baitfish like minnows, young bass, sunfish, and perch. Crappies can overpopulate an aquatic area if unchecked. Predators that can keep the populations in check are largemouth bass, catfish, great blue herons, and kingfishers.



But many people do not realize that an easy pathway for anyone to promote habitat management is through fishing. This is a growing recreational activity where people can enjoy the outdoors with their family and harvest natural resources from aquatic areas. The big plus is that this recreation also funds the conservation of habitats and fish populations across the country. When anglers purchase fishing gear, licenses, or permits ... a portion of the money goes to support aquatic fisheries and habitat management programs.

In this lesson, students will assume habitat management roles while researching, debating, and designing a fishing habitat for the popular gamefish, the black crappie. Their habitat presentations will be judged on how well they fulfilled crappie and angler needs as well as their stewardship of ecosystem health.

Enduring Understanding:

Students will understand how quality habitat for crappie and fisheries can benefit human recreation and ecosystem health. Students will also discover how fisheries biology can boost environmental awareness and stewardship.

Content Objectives:

Students will be able to evaluate the key components that determine quality fish habitat and recreational opportunities. They will also be able to research, debate, and design a habitat for crappie that promotes fisheries and long-term ecosystem health.

Learner Outcomes:

Students will use online research to determine crappie and fisheries habitat features and develop a habitat diorama. Students will also debate their habitat management strategies as well as other ways people and anglers can steward aquatic ecosystems.

Process Objectives:

Students will work in small and large groups to process new information and use evidence to come to conclusions.

Materials Needed:

- Access to computers and the internet
- Fishing for Your Planet video and background information at: <http://intotheoutdoors.org/topics/fishing-for-your-planet/>
- Pre-lesson Student Worksheet with questions to fill in while watching the video
- Student Worksheets for each group
- Art supplies for each group: (shoe boxes, construction paper, glue, coloring pencils, crayons, paints).

**PROCEDURES****Session 1:**

Before watching the **Fishing for Your Planet** classroom video or reading the website background information, ask students to brainstorm what humans and animals generally need in their habitat to survive. Then ask students to share what issues they have heard of that could degrade habitat. Lead a short discussion on ways they could steward or manage a habitat.

Have students download, or print and distribute the **Pre-Lesson Student Worksheet** (copy contained in this PDF and on the web link). Instruct students to fill in the worksheet while watching the video. Go over the questions with the students before viewing so they know what to look and listen for.

After watching the video, review and discuss the answers to the worksheet questions as a class.

Next, divide the whole class into small groups of four students. Then assign each student in each group a **conservation role**:

- **Prey Specialist**
- **Cover Architect**
- **Waterbody Expert**
- **Angler Guru**

Have students download and print, or hand out to each student their respective Student Worksheet (copy contained in the web link). Ask them to review the details and assignments of the worksheet in preparation for Session 2.



Session 2: Team Research & Habitat Development

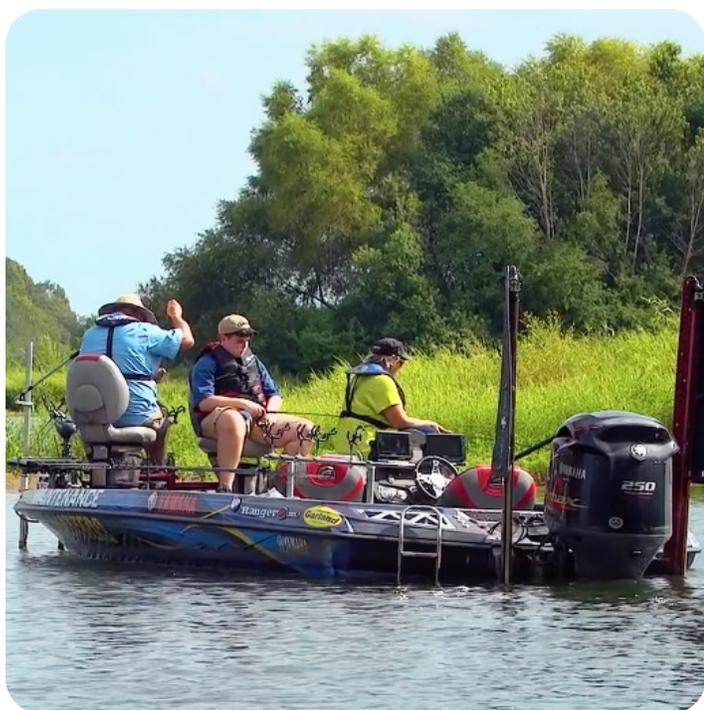
In their assigned conservation groups, have students perform online research from links provided and from other sources they discover. The worksheets give instructions and research options that will guide students in their information gathering. Then, have the small groups discuss and design their own crappie habitat with art supplies. Encourage the students to design their habitats on posters or inside cardboard boxes. Students can use their imaginations and construct habitats with paints, sketches, clay, construction paper, or even with natural resources like sticks for downed debris, pebbles for gravel rock beds, sand, or moss for weedy beds. Inform each group they will present their crappie habitat design to the class and their presentation must be supported by factual research.

Session 3 – Habitat Presentations and Class Debate

Have each group present their Crappie Fishing Habitat Design and supporting research and reasons for key habitat features in their plan. Limit each group to four minutes presentation time followed by two minutes of questions by the other groups.

After all groups present their plans, open the floor to discussion on the key characteristics of crappie habitat they noticed during the presentations. Next, pinpoint what habitat features anglers can easily look for to find crappie in aquatic ecosystems near them. Then, have the class vote on which team designed the best crappie fishing habitat. Each student will be given three crappie cut-outs for the voting, and must give their three fish to the habitats that sustain crappie populations, sustain angler recreation, and were creative. The group with the most “fish” in their habitat wins the challenge!

Conclude the discussion by discussing what environmental pressures your new habitat may still be at risk to. Emphasize how the students can make a difference and steward aquatic ecosystems by fishing. Anglers can investigate fish habitat while on the water and be alerted to the first signs of habitat loss, degradation, pollution, or climate change.

**ASSESSMENT**

- Students will be informally assessed based on their participation within their groups and during class presentations and discussions.
- Teachers could collect the Pre-Lesson Student Worksheets and formally assess the discussion notes students took during the video to check for completion.
- Students can be assessed on meeting the formal learning objectives based on how thoroughly students completed their group worksheets
- Students can be evaluated on their presentations during Session 3.

EXTENSION ACTIVITIES

Students can take the list they brainstormed in the final discussion to create a booklet for anglers that identifies quality habitat features for crappie. Students can also translate their habitat dioramas and research into this crappie habitat booklet. The class can then organize a field trip to an aquatic ecosystem and draw on a map the habitat features they observe that make for great fishing spots and crappie habitat. They can use it on their future fishing trips, or copy and distribute their booklets to fishing guides, local bait and tackle shops, and fishing clubs.

Students can restore crappie habitats by organizing a field trip to a river ecosystem near them and cleaning riverbank shorelines or analyzing downed debris on shorelines. Or take this to the next level by creating a habitat management plan for a landowner on how they can increase crappie abundance.

RESOURCES FOR TEACHERS & STUDENT RESEARCH

<https://www.takemefishing.org/freshwater-fishing/types-of-freshwater-fishing/lakes-and-ponds/>

<https://www.takemefishing.org/fish-species/black-crappie/>

<https://www.njfishandwildlife.com/pdf/fishfact/bcrappie.pdf>

https://www.fws.gov/ fisheries/freshwater-fish-of-america/black_crappie.html

<https://www.floridamuseum.ufl.edu/discover-fish/species-profiles/pomoxis-nigromaculatus/>

<https://seagrant.sunysb.edu/glsportfish/pdfs/FishFactSheets/FishHabFactSheet-FishHabitat0110.pdf>

STANDARDS

The following **National Common Core Standards** can be met teaching:

DESIGN YOUR CRAPPIE FISHING HABITAT

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.RI.6.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings.
CCSS.ELA-LITERACY.RI.6.7	Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.
CCSS.ELA-LITERACY.W.6.1	Write arguments to support claims with clear reasons and relevant evidence.
CCSS.ELA-LITERACY.W.6.2	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.6.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
CCSS.ELA-LITERACY.W.6.6	Use technology, including the Internet, to produce and publish writing as well as to interact and collaborate with others; demonstrate sufficient command of keyboarding skills to type a minimum of three pages in a single sitting.

- CCSS.ELA-LITERACY.W.6.7 Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.
- CCSS.ELA-LITERACY.W.6.8 Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.
- CCSS.ELA-LITERACY.W.6.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
- 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.
- CCSS.ELA-LITERACY.SL.6.2 Interpret information presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how it contributes to a topic, text, or issue under study.
- CCSS.ELA-LITERACY.SL.6.3 Delineate a speaker's argument and specific claims, distinguishing claims that are supported by reasons and evidence from claims that are not.
- CCSS.ELA-LITERACY.SL.6.4 Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation.
- CCSS.ELA-LITERACY.SL.6.5 Include multimedia components (e.g., graphics, images, music, sound) and visual displays in presentations to clarify information.
- CCSS.ELA-LITERACY.SL.6.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.
- CCSS.ELA-LITERACY.L.6.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- CCSS.ELA-LITERACY.L.6.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
- CCSS.ELA-LITERACY.L.6.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.
- CCSS.ELA-LITERACY.L.6.4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, choosing flexibly from a range of strategies.
- CCSS.ELA-LITERACY.L.6.5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
- CCSS.ELA-LITERACY.L.6.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

7th 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.RI.7.4 Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
- CCSS.ELA-LITERACY.W.7.1 Write arguments to support claims with clear reasons and relevant evidence.
- CCSS.ELA-LITERACY.W.7.2 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.7.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-LITERACY.W.7.6 Use technology, including the Internet, to produce and publish writing and link to and cite sources as well as to interact and collaborate with others, including linking to and citing sources.
- CCSS.ELA-LITERACY.W.7.7 Conduct short research projects to answer a question, drawing on several sources and generating additional related, focused questions for further research and investigation.

- CCSS.ELA-LITERACY.W.7.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
- CCSS.ELA-LITERACY.W.7.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
- CCSS.ELA-LITERACY.SL.7.1 Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on grade 7 topics, texts, and issues, building on others' ideas and expressing their own clearly.
- CCSS.ELA-LITERACY.SL.7.2 Analyze the main ideas and supporting details presented in diverse media and formats (e.g., visually, quantitatively, orally) and explain how the ideas clarify a topic, text, or issue under study.
- CCSS.ELA-LITERACY.SL.7.3 Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and the relevance and sufficiency of the evidence.
- CCSS.ELA-LITERACY.SL.7.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with pertinent descriptions, facts, details, and examples; use appropriate eye contact, adequate volume, and clear pronunciation.
- CCSS.ELA-LITERACY.SL.7.5 Include multimedia components and visual displays in presentations to clarify claims and findings and emphasize salient points.
- CCSS.ELA-LITERACY.SL.7.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.
- CCSS.ELA-LITERACY.L.7.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- CCSS.ELA-LITERACY.L.7.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
- CCSS.ELA-LITERACY.L.7.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.
- CCSS.ELA-LITERACY.L.7.4 Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 7 reading and content, choosing flexibly from a range of strategies.
- CCSS.ELA-LITERACY.L.7.5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
- CCSS.ELA-LITERACY.L.7.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

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.RI.8.4 Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of specific word choices on meaning and tone, including analogies or allusions to other texts.
- CCSS.ELA-LITERACY.W.8.1 Write arguments to support claims with clear reasons and relevant evidence
- 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.8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.
- CCSS.ELA-LITERACY.W.8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas efficiently as well as to interact and collaborate with others.
- CCSS.ELA-LITERACY.W.8.7 Conduct short research projects to answer a question (including a self-generated question), drawing on several sources and generating additional related, focused questions that allow for multiple avenues of exploration.

- CCSS.ELA-LITERACY.W.8.8 Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.
- CCSS.ELA-LITERACY.W.8.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.
- 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.8.3 Delineate a speaker's argument and specific claims, evaluating the soundness of the reasoning and relevance and sufficiency of the evidence and identifying when irrelevant evidence is introduced.
- CCSS.ELA-LITERACY.SL.8.4 Present claims and findings, emphasizing salient points in a focused, coherent manner with relevant evidence, sound valid reasoning, and well-chosen details; use appropriate eye contact, adequate volume, and clear pronunciation.
- CCSS.ELA-LITERACY.SL.8.5 Integrate multimedia and visual displays into presentations to clarify information, strengthen claims and evidence, and add interest.
- CCSS.ELA-LITERACY.SL.8.6 Adapt speech to a variety of contexts and tasks, demonstrating command of formal English when indicated or appropriate.
- CCSS.ELA-LITERACY.L.8.1 Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
- CCSS.ELA-LITERACY.L.8.2 Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
- CCSS.ELA-LITERACY.L.8.3 Use knowledge of language and its conventions when writing, speaking, reading, or listening.
- CCSS.ELA-LITERACY.L.8.4 Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, choosing flexibly from a range of strategies.
- CCSS.ELA-LITERACY.L.8.5 Demonstrate understanding of figurative language, word relationships, and nuances in word meanings.
- CCSS.ELA-LITERACY.L.8.6 Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.

6th - 8th Grade:

- CCSS.ELA-LITERACY.RST.6-8.1 Cite specific textual evidence to support analysis of science and technical texts.
- CCSS.ELA-LITERACY.RST.6-8.2 Determine the central ideas or conclusions of a text; provide an accurate summary of the text distinct from prior knowledge or opinions.
- CCSS.ELA-LITERACY.RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics.
- CCSS.ELA-LITERACY.RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
- CCSS.ELA-LITERACY.RST.6-8.8 Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.
- CCSS.ELA-LITERACY.RST.6-8.9 Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.
- CCSS.ELA-LITERACY.WHST.6-8.1 Write arguments focused on discipline-specific content.
- CCSS.ELA-LITERACY.WHST.6-8.2 Write informative/explanatory texts, including the narration of historical events, scientific procedures/ experiments, or technical processes.
- CCSS.ELA-LITERACY.WHST.6-8.4 Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.

- CCSS.ELA-LITERACY.WHST.6-8.5 With some guidance and support from peers and adults, develop and strengthen writing as needed by planning, revising, editing, rewriting, or trying a new approach, focusing on how well purpose and audience have been addressed.
- CCSS.ELA-LITERACY.WHST.6-8.6 Use technology, including the Internet, to produce and publish writing and present the relationships between information and ideas clearly and efficiently.

Next Generation Science Standards for ...

DESIGN YOUR CRAPPIE FISHING HABITAT

- MS-LS2-1. Analyze and interpret data to provide evidence for the effects of resource availability on organisms and populations of organisms in an ecosystem. [Clarification Statement: Emphasis is on cause and effect relationships between resources and growth of individual organisms and the numbers of organisms in ecosystems during periods of abundant and scarce resources.]
- MS-LS2-2. Construct an explanation that predicts patterns of interactions among organisms across multiple ecosystems. [Clarification Statement: Emphasis is on predicting consistent patterns of interactions in different ecosystems in terms of the relationships among and between organisms and abiotic components of ecosystems. Examples of types of interactions could include competitive, predatory, and mutually beneficial.]
- MS-LS2-5. Evaluate competing design solutions for maintaining biodiversity and ecosystem services.* [Clarification Statement: Examples of ecosystem services could include water purification, nutrient recycling, and prevention of soil erosion. Examples of design solution constraints could include scientific, economic, and social considerations.]
- MS-ESS3-3. Apply scientific principles to design a method for monitoring and minimizing a human impact on the environment.* [Clarification Statement: Examples of the design process include examining human environmental impacts, assessing the kinds of solutions that are feasible, and designing and evaluating solutions that could reduce that impact. Examples of human impacts can include water usage (such as the withdrawal of water from streams and aquifers or the construction of dams and levees), land usage (such as urban development, agriculture, or the removal of wetlands), and pollution (such as of the air, water, or land).]
- MS-ESS3-4. Construct an argument supported by evidence for how increases in human population and per-capita consumption of natural resources impact Earth's systems. [Clarification Statement: Examples of evidence include grade-appropriate databases on human populations and the rates of consumption of food and natural resources (such as freshwater, mineral, and energy). Examples of impacts can include changes to the appearance, composition, and structure of Earth's systems as well as the rates at which they change. The consequences of increases in human populations and consumption of natural resources are described by science, but science does not make the decisions for the actions society takes.]

