

Instructional Recipe

How Do Changes in the Arctic Environment Affect Wild Animals?

5th Grade
Science



Online research and information resources available through a partnership between the Texas State Library and Archives Commission, the Texas Education Agency and Education Service Center, Region 20
<http://web.esc20.net/k12databases>

Step 1 – Ask

Objectives: Students will become aware of different kinds of animal life in the Arctic as well as the impact of global warming on that continent. Students will recognize cause and effect relationships between changes in the Arctic environment and animal life, and present their predictions for the future of these animals.

Introduction: Global warming is affecting the planet in multiple ways. In recent years there have been reports of disappearance of glaciers and thinning of the Arctic ice cap. In fact, some scientists claim that the region has lost an amount of ice as big as Texas and Alaska combined. How has this affected wildlife in the Arctic?



"global warming: effect on Arctic sea ice and polar bears." Online Photograph. Encyclopædia Britannica Online School Edition. 13 Oct. 2008 <<http://school.eb.com/ebi/art-90106>>.

Ask:

- ★ What is an adaptation?
- ★ Where is the Arctic?
- ★ What animals live in the Arctic?
- ★ What conditions does each Arctic animal need to survive?
- ★ What is happening to the Arctic? Why?
- ★ How is this affecting nature?

Vocabulary:

- ★ habitat
- ★ glacier
- ★ tundra
- ★ global warming

SCIENCE TEKS:

(9) **Science concepts.** (A) compare the adaptive characteristics of species that improve their ability to survive and reproduce in an ecosystem; (B) analyze and describe adaptive characteristics that result in an organism's unique niche in an ecosystem; and (C) predict some adaptive characteristics required for survival and reproduction by an organism in an ecosystem.

ENGLISH/LANGUAGE ARTS

TEKS:(23) Research/Research Plan.

(A) brainstorm, consult with others, decide upon a topic, and formulate open-ended questions to address the major research topic; and (B) generate a research plan for gathering relevant information about the major research question.

(24) Research/Gathering Sources.

Students are expected to: (A) follow the research plan to collect data from a range of print and electronic resources (e.g., reference texts, periodicals, web pages, online sources) and data from experts; (C) record data, utilizing available technology (e.g., word processors) in order to see the relationships between ideas, and convert graphic/visual data (e.g., charts, diagrams, timelines) into written notes;(D) identify the source of notes (e.g., author, title, page number) and record bibliographic information concerning those sources according to a standard format; and (E) differentiate between paraphrasing and plagiarism and identify the importance of citing valid and reliable sources.

(25) Research/Synthesizing Information.

(A) refine the major research question, if necessary, guided by the answers to a secondary set of questions; and (B) evaluate the relevance, validity, and reliability of sources for the research.

(26) Research/Organizing and Presenting Ideas.

Students are expected to synthesize the research into a written or an oral presentation that: (A) compiles important information from multiple sources; (B) develops a topic sentence, summarizes findings, and uses evidence to support conclusions; (C) presents the findings in a consistent format; and (D) uses quotations to support ideas and an appropriate form of documentation to acknowledge sources (e.g., bibliography, works cited).

Step 2 – Investigate

K-12 Databases Resources:

- ★ Locate the Arctic region in the Britannica atlas.
- ★ "global warming." Britannica Elementary Encyclopedia. 2007. Encyclopædia Britannica Online School Edition. 15 Dec. 2007 <<http://school.eb.com/elementary/article?articleId=353185>>.
- ★ Bering Sea." Britannica Elementary Encyclopedia. 2007. Encyclopædia Britannica Online School Edition. 15 Dec. 2007 <<http://school.eb.com/elementary/article?articleId=346095>>.
- ★ Warming Up. (cover story) By: Coco, Paul. Scholastic News -- Edition 4, 2/21/2005, Vol. 67 Issue 15, p4-5
- ★ SURVIVOR. By: Gordon, David George. National Geographic Kids, Dec2002 Issue 326, p20, 4p, 2c; Reading Level (Lexile): 980; (AN 8842125)
- ★ ARCTIC THAW. By: Petit, Charles W.. U.S. News & World Report, 11/8/2004, Vol. 137 Issue 16, p66-69

Additional Websites:

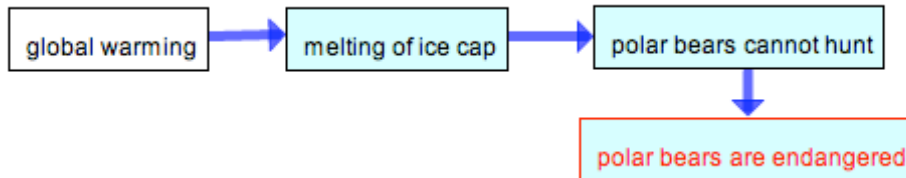
Climate Change Kids Site – Environmental Protection Agency
<http://www.epa.gov/climatechange/kids/index.html>

Technology Application TEKS:

4A Apply appropriate electronic search strategies in the acquisition of information including keyword and Boolean search strategies
5A Acquire information including text, audio, video, and graphics
7A Use software programs with audio, video, and graphics to enhance learning experiences
7B Use appropriate software to express ideas and solve problems including the use of word processing, graphics, databases, spreadsheets, simulations, and multimedia
7C Use a variety of data types including text, graphics, digital audio, and video
10B Use font attributes, color, white space, and graphics to ensure that products are appropriate for the communication media including multimedia screen displays, Internet documents, and printed materials
11A Publish information in a variety of media including, but not limited to, printed copy, monitor display, Internet documents, and video

Step 3 – Create

Students will take notes using note cards. They will identify the main idea and at least 3 supporting details from each source. They will also create bibliography cards. Students will create a graphic organizer that illustrates the causes and consequences of global warming, and their impact in the Arctic environment.



🔗 Technology Link - Students may use graphic organizer software such as Inspiration, a free Web 2.0 tool such as bubbl.us or Cmap Tool, or use the [Seeing Reason](#) tool to map their ideas.

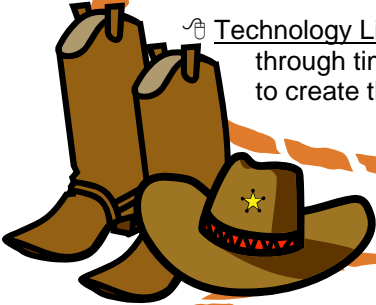
Challenge:

Students will write a summary of an EBSCO article and compare it to the abstract.

Step 4 – Discuss

Students will choose one of the following activities:

1. You have been invited by Congress to discuss the issues of global warming and animal adaptations. You and a partner will choose a different side and defend your position in a debate before Congress.
2. You have just been hired by the National Geographic for Kids magazine to contribute to an article about Arctic animal adaptations. You will have to create a visual display using images from the online databases. Your display will explain how animals have adapted over time to changes in the weather, food supply and environment.
3. Create a game to help your classmates remember some interesting facts about adaptations of animals.
4. Imagine that you are a student on the Magic School Bus. Ms. Frizzle will take you back in time to see how animals lived in prehistoric times. You will then have to compare to how animals live today. Think of what you would wear, what tools you would take with you, and how you will get back to school. Draw a timeline of how animals have adapted through time.
5. Create your own animal that has adapted to global warming. Explain how adaptations happened.

 Technology Link – Students may use Timeliner to explain how animals have adapted through time, and desktop publishing software (i.e., Word, Publisher or Pages) to create the magazine article.

Step 5 – Reflect

Allow students to present their projects to the rest of the class. Use the following suggested rubrics to assess the students' work. Make sure that the students are familiar with the rubric **before** they begin creating their project. They should refer to the rubric repeatedly to monitor their progress in creating their project.

Technology Link: You can also create your own rubric with your students at <http://rubistar.4teachers.org/index.php>.

RUBRIC Debate

CATEGORY	4	3	2	1
Respect for Other Debater	All statements, body language, and responses were respectful and were in appropriate language.	Statements and responses were respectful and used appropriate language, but once or twice body language was not.	Most statements and responses were respectful and in appropriate language, but there was one sarcastic remark.	Statements, responses and/or body language were consistently not respectful.
Quality of Information	All information presented in the debate was clear, accurate and thorough.	Most information presented in the debate was clear, accurate and thorough.	Most information presented in the debate was clear and accurate, but was not usually thorough.	Information had several inaccuracies OR was usually not clear.
Understanding of Topic	The student clearly understood the topic in-depth and presented their information forcefully and convincingly.	The student clearly understood the topic in-depth and presented their information with ease.	The student seemed to understand the main points of the topic and presented those with ease.	The student did not show an adequate understanding of the topic.
Attractiveness	Diagrams and illustrations are neat, accurate and add to the reader's understanding of the topic. Article is enhanced by appropriate use of fonts, colors, images, and format.	Diagrams and illustrations are accurate and add to the reader's understanding of the topic. Article is somewhat enhanced by appropriate use of fonts, colors, images, and format.	Diagrams and illustrations are neat and accurate and sometimes add to the reader's understanding of the topic. Article has very little use of fonts, colors, images, and format.	Diagrams and illustrations are not accurate OR do not add to the reader's understanding of the topic. Article lacks appropriate use of fonts, colors, images, and format.
Presentation Style	Student consistently used gestures, eye contact, tone of voice and a level of enthusiasm in a way that kept the attention of the audience.	Student usually used gestures, eye contact, tone of voice and a level of enthusiasm in a way that kept the attention of the audience.	Student sometimes used gestures, eye contact, tone of voice and a level of enthusiasm in a way that kept the attention of the audience.	Student had a presentation style that did not keep the attention of the audience.

RUBRIC Magazine Article

CATEGORY	4	3	2	1
Note Taking and Organization	Notes cards are organized in a neat and orderly fashion.	Notes cards are somewhat organized.	Notes cards are somewhat disorganized.	Notes cards are organized only with assistance and reminders.
Quality of Information	Information clearly relates to the main topic. It includes several supporting details and/or examples.	Information clearly relates to the main topic. It provides 1-2 supporting details and/or examples.	Information clearly relates to the main topic. No details and/or examples are given.	Information has little or nothing to do with the main topic.
Use of Language	No grammatical, spelling or punctuation errors.	Almost no grammatical, spelling or punctuation errors	A few grammatical spelling and/or punctuation errors.	Many grammatical, spelling and/or punctuation errors.
Sources	All sources are accurately cited.	All sources are accurately cited, but a few are not in the desired format.	Not all sources are accurately cited.	Few sources are accurately cited.
Attractiveness	Diagrams and illustrations are neat, accurate and add to the reader's understanding of the topic. Article is enhanced by appropriate use of fonts, colors, images, and format.	Diagrams and illustrations are accurate and add to the reader's understanding of the topic. Article is somewhat enhanced by appropriate use of fonts, colors, images, and format.	Diagrams and illustrations are neat and accurate and sometimes add to the reader's understanding of the topic. Article has very little use of fonts, colors, images, and format.	Diagrams and illustrations are not accurate OR do not add to the reader's understanding of the topic. Article lacks appropriate use of fonts, colors, images, and format.

RUBRIC Game

CATEGORY	4	3	2	1
Knowledge Gained	All students in the team could easily and correctly state facts about global warming included in the game without looking at the game.	All students in the team could easily and correctly state most facts about global warming included in the game without looking at the game.	Most students in the team could easily and correctly state some facts about global warming included in the game without looking at the game.	Several students in the team could NOT correctly state facts about global warming included in the game without looking at the game.
Accuracy of Content	All information in the game is correct.	Most of the information in the game is correct.	Some information in the game is incorrect.	Most information in the game is not accurate.
Attractiveness	Contrasting colors and numerous appropriate visuals were used to give the game visual appeal.	Contrasting colors and many appropriate visuals were used to give the game visual appeal.	Contrasting colors and some appropriate graphics were used to give the game visual appeal.	Little or no color or 3 or less graphics were included.
Creativity	The group put a lot of thought into making the game interesting and fun to play as shown by creative questions, game pieces and/or game board.	The group put some thought into making the game interesting and fun to play by using textures, fancy writing, and/or interesting characters.	The group tried to make the game interesting and fun, but sometimes it was hard to understand and enjoy the game.	Little thought was put into making the game interesting and fun.
Rules	Rules were written clearly enough that all could easily participate.	Rules were written, but one part of the game needed slightly more explanation.	Rules were written, but players had some difficulty figuring out the game.	The rules were not written.