

## Teacher Lesson Plan



# Chillin' in the Antarctic: Real Cool Research An Internet WebQuest on Researching Changes in Antarctica

Developed by Marianne Kaput, Juanita Constible, and Richard Lee  
Troy Intermediate School, Avon Lake, Ohio and Miami University, Oxford, Ohio

*"...there is no field for the collection of knowledge which at the present time can be compared to the Antarctic."* – Apsley Cherry-Garrard.

**Grade Level:** 4-8

**Overview:** This is a WebQuest in which each student assumes a specific scientific role and researches various aspects of Antarctica using Internet resources. Students then join groups consisting of one of each type of scientist. The groups pool resources in order to prepare a comprehensive presentation. This activity's goal is to provide students with background information on Antarctica so that they might discover the changing environment of Antarctica and its global implications.

This WebQuest is a companion document to a five-part series of distance learning lessons that will be conducted live from Antarctica from 6<sup>th</sup> grade math and science teacher, Marianne Kaput (a.k.a. Antarctica Annie). For further information on receiving dates of these sessions or a recorded copy of the sessions contact Dave Miller at [dmille1@leeca.org](mailto:dmille1@leeca.org).

### National Science Standards Grades 5-8:

[NS.5-8.1 SCIENCE AS INQUIRY](#)

[NS.5-8.3 LIFE SCIENCE](#)

[NS.5-8.6 PERSONAL AND SOCIAL PERSPECTIVES](#)

[NS.5-8.7 HISTORY AND NATURE OF SCIENCE](#)

### National Social Studies Standards:

[NSS-G.K-12.1 THE WORLD IN SPATIAL TERMS](#)

[NSS-G.K-12.2 PLACES AND REGIONS](#)

[NSS-G.K-12.5 ENVIRONMENT AND SOCIETY](#)

### National Language Arts Standards:

NL-ENG.K-12.1 READING FOR PERSPECTIVE

NL-ENG.K-12.3 EVALUATION STRATEGIES

NL-ENG.K-12.4 COMMUNICATION SKILLS

NL-ENG.K-12.5 COMMUNICATION STRATEGIES

NL-ENG.K-12.12 APPLYING LANGUAGE SKILLS

**National Technology Standards:**

NT.K-12.3 TECHNOLOGY PRODUCTIVITY TOOLS:

NT.K-12.5 TECHNOLOGY RESEARCH TOOLS

**Ohio Science Content Benchmarks**

Grades 6-8: Scientific Ways of Knowing

Benchmark A: Use skills of scientific inquiry processes (e.g., hypothesis, record keeping, description and explanation).

**Ohio Social Studies Benchmarks**

Grades 6-8: Geography

- Explain how the environment influences the way people live in different places and the consequences of modifying the environment.

Grades 3-5: Social Studies Skills and Methods

- Use problem-solving skills to make decisions individually and in groups.

**Ohio Reading Benchmarks**

Grades 4-7: Informational, Technological and Persuasive Text Standard

- A. Analyze the importance of setting
- E. Demonstrate comprehension by inferring themes, patterns, and symbols

**Ohio Technology Benchmarks**

Benchmark A: Communicate information technologically and incorporate principals of design into creation of messages and communication products

Benchmark B: Develop, publish and present information in format that is appropriate for content and audience.

Grade 6: Publication

1. Create and publish information in printed form (e.g., use software to produce homework assignments, reports, flyers, newsletters).
2. Develop and publish information in electronic form (e.g., slide presentations, multimedia products, Web materials).

### Grade 7: Productivity Tools

1. Select an appropriate software tool to create and publish print information (e.g., word processor for a report, desktop publishing tool for signs/calendars/newsletters).

**Materials:** Computers with Internet access, Rubrics for assessment

#### **Procedure:**

1. Have students go to this web address:  
<http://www.kn.sbc.com/wired/fil/pages/webresearchma1.html> (Alternatively, use the Student Pages attached to this lesson plan.)
2. Read the introductions aloud and check for student understanding by asking for clarification of directions. Read through the entire rubric. Explain that the scenario is a real life situation. Richard Lee, an entomologist from Miami University, conducted research in Antarctica in 1981 and returned back in 2005. In January 2006, he is returning with a new team of researchers including Marianne Kaput, a 6<sup>th</sup> grade math and science teacher from Avon Lake, OH.
3. Divide the students into groups. Each group will consist of one of each of the three roles. Depending on your student's individual learning needs, you may choose to have students work in pairs or as individuals in each of the roles.
4. Provide each student with a rubric for his or her individual role and also for the group project. Make certain each student understands that they will be assessment based on each individual's performance and contributions to the group project. Encourage individuals or groups to come to the teacher immediately if there are any issues with the group that need intervention.
5. Circulate to assist students as needed.

**Please visit this website, which contains journal entries from Marianne Kaput for the 2006 Antarctic expedition along with other valuable information and links. Also on the website are journal entries in both English and Spanish from Giancarlo Lopez-Martinez, one of the 2006 researchers.**

<http://www.units.muohio.edu/cryolab/education/antarctic.htm>



## Chillin' in the Antarctic WebQuest Rubric for:

Student name \_\_\_\_\_

|                                      | Criteria   |   |   |   | Points |
|--------------------------------------|--|---|---|---|--------|
|                                      | 4  | 3   | 2   | 1   |        |
| <b>Introduction</b>                  | All questions were answered completely and rationales for the answers <b>were</b> clearly stated.  | All questions were answered completely, but rationales for the all the answers <b>were not</b> clearly stated.              | Not all questions were answered completely, or greater than 2 rationales for the all answers <b>were not</b> clearly stated.      | All questions <b>were not</b> answered completely.  | _____  |
| <b>Task</b>                          | All areas of the task were addressed and handled with a high degree of sophistication. The plan followed by the team demonstrated a great deal of thought. | At least one area of the task <b>was not</b> addressed. The plan followed by the team demonstrated a great deal of thought. | At least two areas of the task <b>were not</b> addressed. The plan followed by the team demonstrated a moderate level of thought. | The task is incomplete and/or it is apparent that little effort went into the development of the task.        | _____  |
| <b>Process: Teamwork</b>             | It is evident that a mutual effort and cohesive unit created the final product.  | The team worked well together, but could have utilized each other's skills to a better degree.                              | The team had problems working together. Little collaboration occurred.  | The final product is not the result of a collaborative effort. The group showed no evidence of collaboration. | _____  |
| <b>Process: Originality</b>          | The ideas expressed by the body of work demonstrate a high degree of originality.  | The ideas expressed by the body of work are mostly original. The group may have improved upon a previous idea.              | The ideas expressed by the body of work demonstrate a low degree of originality.  | There were no original ideas expressed in this project.   |        |
| <b>Grammar, Format, and Spelling</b> | The final body of work was free of grammar, spelling, and formatting errors.   | The final body of work had 1 error related to grammar, spelling, and formatting errors.                                     | The final body of work had 3-5 grammar, spelling, and formatting errors.  | The final body of work had major grammar, spelling, and formatting errors.                                    |        |
|                                      |  |   |   | <b>Total-----&gt;</b>   | _____  |

**Teacher Comments:**



# Chillin' in the Antarctic: Real Cool Research

## An Internet WebQuest on Researching Changes in Antarctica

Created by Marianne Kaput, Juanita Constible, and Richard Lee  
Troy Intermediate School and Miami University

*\*This document can also be found online at:*

<http://www.kn.sbc.com/wired/fil/pages/webresearchma1.html>

### Introduction

*"...there is no field for the collection of knowledge which at the present time can be compared to the Antarctic." – Apsley Cherry-Garrard.*

Imagine yourself in this pristine environment surrounded by huge mountains of glacial ice millions of years old, icebergs standing proud like frozen monuments of the past and an ocean as deep as it is cold. There's so much to be learned here, which is why scientists from around the world come here to conduct research. The Antarctic polar environment remains predominantly untouched by humans, yet humans have managed to reach far beyond the shores of their industrialized nations and impact this immaculate environment.

Despite the frosty temperatures, Antarctica's frozen landmass and frigid waters are teeming with life. What kinds of organisms survive in this environment? Brave ones for sure! What adaptations are necessary to survive in this land known for its extreme weather conditions? What can we learn from Antarctica that we can use to improve our own environment? What kind of research would be suitable to do Antarctica?

On the eve of the New Year, a five-person team from the United States will embark on a scientific research expedition to Palmer Station, Antarctica. The purpose of this research expedition is to study an insect named *Belgica antarctica*. This extreme survivor is the largest free-living, entirely terrestrial animal in Antarctica. The work of this research team will feature how this amazing insect survives the extreme conditions of this frozen desert.

You have been invited to join this expedition virtually through this WebQuest. The learning activities presented in this lesson are directly related to what the research team in Antarctica will investigate. The topics have been broken into categories so that you will have a specific area to focus your work on.

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## **The Quest**

Each team will present a brief (10 to 15 minute) informational summary of its findings. Included will be visuals, charts or graphs with collected data, and pictures or drawings to illustrate what you learned. Do not limit your presentation to these items alone; use your imagination to make your presentation creatively unique.

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## **The Process and Resources**

Here's the scenario:

*A long time ago, when you were a student, you went on an exciting expedition – to Palmer Station in Antarctica! You and your teacher were studying a wingless fly called Belgica antarctica. The Antarctic Peninsula, where the station is located, is a pretty extreme place: temperatures on the ground range between very cold and rather warm, the growing season is short, winds are high, and for much of the year the Peninsula and local islands are covered by snow and ice! You were interested in how Belgica is adapted to these conditions.*

*Twenty years later, you have a job with a university as an entomologist. You have returned to Antarctica to continue your work with Belgica. It's so good to be back! The whales, skuas, and icebergs seem like old friends.*

*But as you pilot your Zodiac from island to island while on the hunt for Belgica, you notice some strange things. First of all, even though you slather yourself with sunscreen, you get the worst sunburn! Could there be more UV radiation than before? You land your boat on Torgerson Island, not far from the station. At first you can't figure out why it seems so quiet. Then you realize why – the island used to be covered in Adelie penguins, and now there are hardly any!*

*On your way back to Palmer that evening, you see a fur seal and lots of gentoo and chinstrap penguins. You thought they didn't come this far south...were you wrong? You also cruise past Norsel Point – but wait! It's not a peninsula anymore! It's an island!*

*By the time you have your Zodiac docked, you are thoroughly confused. You think to yourself: "I'll just climb up on the glacier behind the station and watch the sunset. The cool air up there will help me think." Walking over bare rocks to the*

*glacier takes much longer than you remember. In fact, you realize that there are a bunch of new buildings where the glacier used to be. The glacier seems to have melted a lot in the last 20 years!*

*After dinner, it's time for you to visit the Amsterdam, a cruise ship from the Netherlands. There are hundreds of people on board. They're really interested in your research, and ask lots of questions. You hear from another scientist that at least 10 more cruise ships will visit Palmer Station this summer. There are more people visiting Antarctica these days than ever before.*

*The next day is Science Sunday, when other researchers at the station give talks about their studies. An oceanographer shows colorful pictures of krill, the keystone species of the Antarctic food web. She is concerned because there aren't as many krill as there used to be.*

*You ARE happy to be back in Antarctica, but it sure is a different place than it was 20 years ago...*

Using the Creative Problem Solving process, scientific inquiry, and your research on the above topics, examine this situation, identify your main problem and select your best solution to the problem.

### **Phase 1 - Background: Something for Everyone**

Use the Internet information linked below to get some background information on Antarctica. Be thorough in exploring the information so that you answer these questions as fully and insightfully as you can.

First, you need some general background information on Palmer Station, Antarctica. You need to know where it is located, what the weather conditions are and what kinds of organisms live there.

- [Antarctic general information site](#)
- [Facts from the CIA!](#)
- [Antarctic ecosystems created by kids](#)
- [What are some of the issues facing Antarctica?](#)
- [Elementary level information packed website](#)

### **Phase 2 - Looking Deeper from Different Perspectives**

INSTRUCTIONS:

1. You need to choose a specific area that you will research in greater depth. You will do this from the perspective of a specific scientific role. The roles are: Botanist, Ecologist, Zoologist/Wildlife Biologist. You also have the option of

creating your own scientific role, but you need to discuss this with your teacher to receive approval.

2. Go to: [askjeeves.com](http://askjeeves.com) and find out what each of the scientists mentioned above study.
3. Reread the scenario in the section titled 'General Directions' thinking about the different scientific roles and then choose a topic that might relate to one the changes described in Antarctica. Select one of the changes that were observed and research that topic. Find out why those changes have occurred and how these changes have impacted other aspects of Antarctic life and the environment there.
4. Read through the resource files linked to this Web Quest that are related to the topic you have chosen. Remember that you are collecting information for your particular scientific role. You might discover that sometimes scientific roles are interrelated and information might overlap.
5. If you print out the files, underline the information that you feel is the most important. If you look at the files on the computer, copy sections you feel are important by dragging the mouse across the passage and copying/pasting it into a word processor or other writing software.
6. Note: Remember to write down or copy/paste the URL of the file you take the passage from so you can quickly go back to it if you need to prove your point or reference your information sources.
7. Be prepared to focus what each of the group members have learned into one central document.

### **Botanist**

Use the Internet information linked below to answer these questions specifically related to plants of Antarctica and the changing environment:

1. Describe the environment of the peninsula where Palmer Station is located. Describe the factors that affect what kind of plants live there.
2. Describe the characteristics of the plants that live on the Antarctic peninsula where Palmer Station is located. Are there similar plants or a great variety of different kinds of plants? Are there any trees there?
3. Since there is a short growing season, are the plants large or small? How large and/or how small are they?
4. Compare/contrast the plants of Antarctica to those where you live.



5. What kind of adaptations have these plants made that allow them to survive in this environment?

6. Have the plants of Antarctica gone through any changes in the past 50 years? What are those changes and what do you think is causing these changes?

7. Are these plants a food source for any of the animals that live in that area?

8. As a botanist, what do you feel is an important issue facing the plants of Palmer Station, Antarctica? What actions would you like to see taken to address this issue?

- [Plants of Antarctica](#)
- [More plants of Antarctica](#)
- [Yahooligans search results](#)
- [Protecting plants and animals of Antarctica](#)

## **Ecologist**

Use the Internet information linked below to answer these questions specifically related to the ecology of Antarctica and recent changes:

1. What are the biotic factors of the Antarctic environment that affect the animal populations of Palmer Station or the Antarctic peninsula where Palmer is located?

2. What are the abiotic factors of the Antarctic environment that affect the animal populations? What kinds of food webs exist?

3. What are the dominant species of animals that live near Palmer Station?

4. Have there been any changes in the populations of the dominant species in the area?

5. Has there been a change in the food sources of the animals? What are those changes? How do these changes affect the animal populations?

6. What are some of the changes in the climate of the Antarctic Peninsula that could affect the animal populations near Palmer Station?

7. As an ecologist, what do you see as the most important issue facing the ecology of the area around Palmer Station?

8. What do you think should be done to address the ecological issues of Palmer Station?

- [Climate in Antarctica](#)
- [Cold science from USA Today](#)
- [Antarctic climate](#)
- [Ecology of Antarctica](#)
- [Climate changes in Antarctica](#)
- [Changing oceans](#)
- [Ecosystem research](#)
- [Environmental issues of Antarctica](#)
- [What are humans doing in Antarctica?](#)
- [Mining in Antarctica](#)
- [Keeping Antarctica clean](#)
- [The disappearing ozone layer](#)

### **Zoologist and Wildlife Biologist**

Use the Internet information linked below to answer these questions specifically related to animals in Antarctica:

1. What are the different kinds of birds that are found near Palmer Station?
2. What kinds of insects are there?
3. What kinds of animals are found in the oceans?
4. What kinds of animals are found on land?
5. How do these organisms adapt to their environment?
6. How is the environment of these animals changing?
7. Are these animals adapting to their environmental changes? If so, what are the changes? If they are not adapting, what is happening to their population?
8. As a zoologist and wildlife biologist, what do you think the most important issue is regarding the wildlife near Palmer Station? What can be done to preserve this environment?

Use the Internet information linked below to answer these questions specifically related to animals in Antarctica:

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2. What kinds of insects are there?
3. What kinds of animals are found in the oceans?
4. What kinds of animals are found on land?

5. How do these organisms adapt to their environment?
6. How is the environment of these animals changing?
7. Are these animals adapting to their environmental changes? If so, what are the changes? If they are not adapting, what is happening to their population?
8. As a zoologist and wildlife biologist, what do you think the most important issue is regarding the wildlife near Palmer Station?

- [Animal adaptations](#)
- [Plant and animal adaptations in a desert biome](#)
- [Arctic animal and plant adaptations](#)
- [Animals in Antarctica](#)
- [Antarctic animals](#)
- [General information on Antarctica: a resource page created for kids by kids](#)
- [Birds of Antarctica](#)
- [How penguin chicks adapt to their environment](#)
- [Winter survival for animals](#)

## **Other**

After reviewing the three previous roles, use the Internet to conduct your own independent research study. You must be willing to work diligently on your own. You will choose your own scientific role and create at least 8 questions that need to be answered in your research. The 8th question will address a specific issue of the peninsula where Palmer Station, Antarctica is located. The topic options are endless so be sure to receive prior approval from your teacher before taking this option. You may choose to work with a group or on your own. Work out a presentation plan with your teacher. You will conduct your own research using your own resources.

For example, you may be interested in glaciers and how they are changing and why. You would then assume the role of glaciologist and pursue a study of glaciers in Antarctica. Other possible roles: geographer, marine biologist, meteorologist, microbiologist.

## **Phase 3 - Debating, Discussing, and Reaching Consensus**

You have all learned about Antarctica from the perspective of a specific scientific role. Your group members come back to the larger team with expertise gained by searching from one perspective.

Discuss with your group what you have each found to be an important scientific

issue in Antarctica. As group, you will choose one specific topic to present, each presenting from his or her unique scientific role. Remember that each of you will bring a certain viewpoint: some of you will agree and others disagree. Use information, pictures, movies, facts, opinions, etc. from the WebPages you explored to present your view of the issue you have all chosen to explore.

#### **Phase 4 - Real World Feedback**

You have learned a lot by dividing up into different scientific roles and focusing on a topic. Now's the time to put your learning into a comprehensive presentation.

Together (or alone if appropriate) you will create a presentation on a scientific Antarctic issue presenting what you have learned from each of these different perspectives.

Here's the process:

1. Begin your presentation with a statement of what you have studied and what roles you have assumed. Include what your roles are and necessary background information.
2. Present a specific issue that all members of your group have a different perspective on. For example, your group has chosen a topic such as increasing temperatures on the Antarctic Peninsula. The botanist would discuss how increasing temperature has affected plants, the ecologist would discuss how temperature increases have affected the population of a specific species of penguins and the zoologist will discuss how this change has affected the food supply of penguins.
3. Each person in your group should have equal time in the presentation and include information specific to their scientific role. Make sure to be specific in both the information (like where you got it from on the Web) and the reasoning (why the information was chosen for your presentation).

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#### **Conclusion**

It is important for us to recognize how our actions can affect others and impact the world around us. We can improve the world around us in many important ways. Together we can make a difference and improve this amazing place we live. It is through understanding that we give ourselves power.

*"Knowledge is power."* – Sir Francis Bacon

Travel to Antarctica with me virtually by visiting this website:  
<http://www.units.muohio.edu/cryolab/education/antarctic.htm>

Marianne Kaput  
aka Kaput-on-Ice



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