

Unit: Regional Climate Change
<http://cimss.ssec.wisc.edu/climatechange/regionalCC/index.html>

Lesson Plan developed for: Grades 7 & 8

Title: Expository Writing: Research and final paragraph

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Applies to Lesson(s): Impacts of Climate Change

Objective: Using the internet and books from the media center, students will research one aspect of climate change and how it is affecting arctic sea life, focusing on polar bears. Instructors will model appropriate search and information techniques.

Total Time Expected: Five to six class periods

Overview: This is the research portion of the expository writing unit and first draft of their research paragraph. The instructor will need to spend time searching the internet for appropriate sites. Once the instructor has identified the topic and several main ideas, then s/he should assign students to a particular idea.

Smartboard technology has improved the ability of the instructor to demonstrate navigating the internet, selecting information and finding sources. Modeling appropriate use and navigation techniques is important for middle school students. Each paragraph must have at least two main ideas that support the topic but three are encouraged.

Sometimes schools have limited access to computers, so it is suggested to the students as they browse and peruse internet sources, they highlight the URL, copy and paste the information into a Word document. They are also encouraged to verify the information by finding the same (or very close; some data is not exactly the same) information so they have some collaborating information. Ideally students should cite three collaborative sources for each detail that supports the main idea. The next step is to cut any information that does not support the specific research the student is responsible for. Terms such as *plagiarism* and *academic integrity* should be clarified and ingrained for proper research.

Once the paragraph is written, students select the text, copy and paste to the bottom on the paper. After each sentence, the student will hit 'return' to isolate each sentence. The first sentence should be the designated topic, the second a main idea, the third should be a detail that supports the main idea. The students will not indent the topic, tab once for the main idea and two tabs before the detail. This creates an outline where overly simple sentences and poorly organized ideas are quite easy to find. Once the indenting is done, student will place a green square in front of the topic, a yellow triangle in front of the main ideas, pink dashes are placed in front of each detail. The conclusion should be preceded by another green square and not tabbed. (a student sample is included with this third lesson)

Conference with each student and have them make corrections. Ideally, all of these paragraphs can be put together making a complete research paper. The 'paragraph conclusions' are transformed into transitional sentences, leading to the next topic. Doing this on a Smartboard can be a powerful tool to demonstrate how to write research papers.

Sequence:

Supplies or references required:

Access to computers and internet

Word processing software

List of websites

Optional: Document projecting device; Smartboard; server drop boxes

National Science Content Standards addressed by the Unit:

National Science Content Standard C

Structure and function in living systems

Populations and ecosystems

Diversity and adaptations of organisms

National Science Content Standard D

Structure of the earth system

Earth in the Solar System

National Science Content Standard F

Populations, Resources and Environments

Natural Hazards

Science and Technology in Society

National Science Content Standard G

Science as a human endeavor

Nature of science

History of science

Related URLs or recommended reading:

A sheet is provided with a list of suggested websites.

Research Sites/ Webquest

Polar Bears

Where they live

Key Words: Arctic; Canada; Newfoundland; Norway; Bearing Strait; Kamchatka; Hudson Bay; James Bay; summer VS winter migration; habitat; polynyas; circumpolar region; sea ice

<http://library.thinkquest.org/3500/polarbear.htm>

<http://gumnesnm.tripod.com/wherepolarbearslive.htm>

Biology

Key Words: Anatomy; size; senses; evolutionary history; taxonomy; breeding biology; lifespan; mortality

<http://www.polarbear-world.com/facts-about-polar-bears.html>

<http://www.bearden.org/Bear%20Facts/Anatomy%20&%20Behavior.htm>

Diet

Key Words: Hunting methods; ringed seal; bearded seal; whales; walrus; eating methods; sea ice

<http://www.seaworld.org/animal-info/info-books/polar-bear/diet.htm>

[http://wwf.panda.org/what we do/where we work/arctic/area/species/polarbear/diet/](http://wwf.panda.org/what_we_do/where_we_work/arctic/area/species/polarbear/diet/)

Adaptations to Arctic environment

Key Words: Migration; season fidelity; home range; swimming; fat layers; insulation; fur; translucent; Waterproof; webbed toes

<http://adaptations.tripod.com/polarbear.html>

<http://www.saskschools.ca/~gregory/arctic/pbear.html>

<http://www.suite101.com/content/polar-bears-adaptations-to-the-freezing-arctic-a189323>

Polar Bear Cubs

Key Words: Hibernate; teaching cubs to hunt; natural predators; cub mortality; dens; litter size; gestation; boars; sows;

http://endangeredpolarbear.com/polar_bear_cubs.htm

<http://www.athropolis.com/arctic-facts/fact-birth-den.htm>

<http://www.bearplanet.org/polarbear.shtml>

How are Polar Bears faring?

Key words: Plight; mortality; global warming; sea ice

<http://www.spiegel.de/international/world/0,1518,613637,00.html>

<http://www.polarbear-world.com/future-of-polar-bears.html>

<http://abcnews.go.com/Technology/7Wonders/story?id=2399825&page=1>

<http://nsidc.org/arcticseaicenews/>

Climate Change

What is weather?

What is climate change?

Key Words: Weather; climate; climate models; greenhouse gas; energy production; Kyoto Protocol

<http://www.ecy.wa.gov/climatechange/whatis.htm>

http://www.windows2universe.org/earth/climate/cli_sea_level.html

<http://www.greenfacts.org/en/arctic-climate-change/index.htm>

<http://kidsenvirohealth.nlm.nih.gov/TopicSubtopic.php?tid=003&sid=011>
<http://www.newscientist.com/topic/climate-change>

What causes climate change?

Key Words: Pollution; greenhouse gas; natural causes; anthropogenic causes; coal burning power plants; methane; water vapor

<http://climate.nasa.gov/causes/>
<http://www.climatechangechallenge.org/Resource%20Centre/Climate-Change/3-what-causes-climate-change.htm>
<http://www.global-greenhouse-warming.com/anthropogenic-climate-change.html>
<http://library.thinkquest.org/J003411/causes.htm>

Effects of climate change

Key words: Health; environmental health; biodiversity; glaciers; sea ice; tropical storms; agriculture; ocean surface temperature; heat waves; sea acidity; sea level; coastal populations

<http://www.epa.gov/climatechange/effects/polarregions.html>
<http://climate.nasa.gov/effects/>
http://www.windows2universe.org/earth/climate/cli_effects.html
http://www.giss.nasa.gov/research/briefs/gornitz_04/

Arctic Facts and Climate Trends

Key Words: Average winter temperature; average summer temperature; cryosphere; ice core samples; climate modeling; global surface anomalies;

<http://www.seaworld.org/infobooks/PolarBears/pbhabitat.html>
<http://arctic.atmos.uiuc.edu/>
<http://www.arctic.noaa.gov/detect/global-temps.shtml>
<http://maps.grida.no/go/graphic/trends-in-arctic-temperature-1880-2006>

Impact of climate change on polar bears

Key Words: Litter size; eating habits; satellite tracking; drowning; starvation;

<http://www.actionbioscience.org/environment/derocher.html>
<http://www.usnews.com/news/energy/articles/2009/03/23/climate-change-could-harm-penguins-and-polar-bears>
<http://www.newscientist.com/article/dn2285-climate-change-threatens-polar-bears.html>
<http://www.nature.com/ncomms/journal/v2/n2/full/ncomms1183.html>
<http://www.bearplanet.org/global-warming-polar-bears.shtml>

Effects of Climate Change (EXAMPLE ESSAY)

Climate change has many consequences for many life forms, including polar bears. To begin with, climate change has caused changes in the formation of sea ice. More of the Arctic sea ice is melting every year. The extent of the sea ice has decreased by 2.7% per decade. That may not sound like a lot but if you put it to scale, it's massive. According to the National Snow and Ice Data Center (NSIDC), the sea ice extent in March 2011 was the second lowest in the satellite record. The sea ice in March 2011 contained much less multi-year ice- or ice that stays in the same area for more than one year- that the polar bears use for resting platforms while hunting. We know that the climate change affects the sea ice, melting it more and more every year. The altering of sea ice extent and thickness is seriously effecting the polar bears habitat, hunting tactics, and reproduction.. Polar bears use the sea ice in many ways that make it very important for their life and survival. They use the sea ice as a platform for hunting, a habitat for mating, for travel, migration, and connections to other habitats, as a summer refuge, and a place to den and produce young. The polar bears follow the temporal shifts in the sea ice to hunt for their prey. Their main meal is usually ringed seals and sometimes they resort to clawing through solid ice to get to sea pups because they are near starvation. With the altered sea ice conditions, the seals have changed their breeding patterns. Seals usually give birth under snow drifts, which is easily accessible for polar bears. Other things have changed for polar bears because of sea ice decrease. With more distance between ice flows, polar bears have to swim more which means chilled cubs with less of a chance to survive.

Now you know some of the problems climate change, some of which is human induced, is causing for polar bears and other arctic sea life.

All the websites cited:


<http://kidsenvirohealth.nlm.nih.gov/TopicSubtopic.php?tid=003&sid=011>


<http://climate.nasa.gov/effects/>


<http://www.climatewatch.noaa.gov/2011/articles/march-2011-ice-extent-second-lowest-on-record>

<http://www.actionbioscience.org/environment/derocher.html>


http://www.neaq.org/conservation_and_research/climate_change/effects_on_ocean_animals.php

 Climate change has many consequences for many life forms in arctic regions, including polar bears.

 To begin with, climate change has caused changes in the formation of sea ice.

 More of the Arctic sea ice is melting every year.

 The extent of the sea ice has decreased by 2.7% per decade.

 That may not sound like a lot but if you put it to scale, it's massive.

- According to the National Snow and Ice Data Center (NSIDC), the sea ice extent in March 2011 was the second lowest in the satellite record.
- The sea ice in March 2011 contained much less multi-year ice- or ice that stays in the same area for more than one year- that the polar bears use for resting platforms while hunting.
- We know that the climate change affects the sea ice, melting it more and more every year.



The altering of sea ice extent and thickness is seriously effecting the polar bears habitat, hunting tactics, and reproduction.

- Polar bears use the sea ice in many ways that make it very important for their life and survival.
 - They use the sea ice as a platform for hunting, a habitat for mating, for travel, migration, and connections to other habitats, as a summer refuge, and a place to den and produce young.
- The polar bears follow the temporal shifts in the sea ice to hunt for their prey.
 - Their main meal is usually ringed seals and sometimes they resort to clawing through solid ice to get to sea pups because they are near starvation.
- With the altered sea ice conditions, the seals have changed their breeding patterns.
 - Seals usually give birth under snow drifts, which is easily accessible for polar bears.

(TEACHER'S NOTE: **How has this changed? Is this method of raising seal pups different? They use lice flows, don't they? How has climate change affected this?**)

- Other things have changed for polar bears because of sea ice decrease.
 - Reduced access to dens (**Develop this idea**)
 - With more distance between ice flows, polar bears have to swim more which means chilled cubs with less of a chance to survive.
 - Changed subpopulation boundaries, more use of unneeded energy, and increased time without access to prey.

Now you know some of the problems climate change, some of which is human induced, is causing for polar bears and other arctic sea life.

Other things that have changed for polar bears because of sea ice decrease are: reduced access to dens, changed subpopulation boundaries, more use of unneeded energy, increased time

without access to prey, and more swimming which means chilled cubs with less of a chance to survive