Lesson 6: Polar Climate Zones

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Learning Objectives	Assessment Criteria
Students will apply the characteristics of climate regions to the polar climate zone.	Students will explain the characteristics of climate regions to have very low temperatures (below freezing for the vast majority of the year), little precipitation in tundra areas, and they exist at high latitudes.
Students will identify where polar climate regions exist.	Students will describe polar climate regions to exist at the north and south poles of the Earth as well as in Greenland and Northern Europe, as well as the approximate location of the Arctic and Antarctic circles.

Benchmark/Standard/Big Idea:

Weather and climate are influenced by interactions involving sunlight, the ocean, the atmosphere, ice, landforms, and living things. These interactions vary with latitude, altitude and local and regional geography, all which can affect oceanic and atmospheric flow patterns. Because these patterns are so complex, weather can be predicted only probabilistically. A Framework for K-12 Science Education, ESS2.D: Weather and Climate, Grade 8 Endpoint.

Relationship to the driving question:

The lesson focuses on the polar climate zone. Students will answer a question through the creation of their own flipped classroom video, “What are the characteristics of polar climate regions, and what causes of these characteristics?”

Prior Knowledge:

Prior to the lesson, students should have an understanding of the difference between weather and climate. Students should also be familiar with the effect of precipitation, distance from the equator and the proximity to oceans on the characteristics of climate zones. Students should have a familiarity with the internet as well as a decently established ability to critically determine reliable sources in the form of websites.

Instructional Strategies:

In this activity, the students will use technology, and internet resources to create their own flipped classroom video about polar climate regions. Their audience will be students like themselves, with an understanding of climate vs. weather and a background in a few other climate regions.

Instructional resources used:

Bergman, Jennifer. "Life in the Polar Regions: Animals, Plants, and Others in Extreme Environments." *Windows to the Universe*. National Earth Science Teachers Association, 10 Nov. 2010. Web. 29 Apr. 2012.

<http://www.windows2universe.org/earth/polar/polar_life_intro.html>.

"Earth's Polar Regions." *Windows to the Universe*. National Earth Science Teachers Association. Web. 29 Apr. 2012. <http://www.windows2universe.org/earth/polar/polar.html>.

Gardiner, Lisa. "Arctic Tundra." *Windows to the Universe*. National Earth Science Teachers Association, 6 Feb. 2007. Web. 29 Apr. 2012. <http://www.windows2universe.org/earth/polar/arctic_tundra.html>.

Hathaway, Becca. "Geography of Earth's Polar Regions." *Geography of Polar Regions*. National Earth Science Teachers Association, 29 Apr. 2008. Web. 29 Apr. 2012. <http://www.windows2universe.org/earth/polar/polar_geog.html>.

"Polar Regions." *Polar Regions | Climate Change*. Environmental Protection Agency, 14 Apr. 2011. Web. 29 Apr. 2012. <http://www.epa.gov/climatechange/effects/polarregions.html>.

Schaffner, Brynn. "World Climates: Group III." *Blue Planet Biomes*. West Tisbury Elementary School, 2010. Web. 29 Apr. 2012. <http://www.blueplanetbiomes.org/climate.htm>.

Materials and set-up needed:

-Video Cameras

-Computers

-Internet connection

Time required:

150 minutes or three class periods

Cautions:

There were no specific dangerous or hazardous components of this lesson.

Instructional Sequence

1. Introducing the lesson

To introduce the lesson I will remind the students of what we went over the previous day, regarding how to make a flipped classroom video. Then I will introduce the day's assignment by saying that they will be making their OWN flipped classroom video in small groups. As I explain the directions I will hand out the assignment sheet and rubric for the assignment. "The groups will be comprised of 4 students and each student will take on a role, investigator, screenwriter, anchor, or editor. While each person has a specific role, everyone should assist in each step of the assignment. For example, during the research step, everyone should assist the investigator in doing research, the investigator serves as the leader, not the person who does all of the work.

All of the work is to be done in class, the first day is devoted to research and once you've collected all the data, you can begin compiling the data and working on the script. This will carry over into tomorrow. Tomorrow you will finish up the planning and record your video. You MUST get the recording done in class tomorrow because this will be your only time with the video cameras. Once you've gotten all of the footage you need to create your flipped video, you will then begin editing. If any time is left over in class on the second day you may begin editing. The majority of the last day will be devoted to editing your flipped video, adding pictures and power point along with the video." Next I will ask if someone can recap what the task is for the first day, student answers include "We have to pick groups and do research." I will then ask another student what is something they can work on when they've finished

their research? Student answers should include “planning out and writing the ‘script’ for the flipped video.”

I will then instruct the students to use the sources I have provided for them. They should use these sources because they are reliable sources that I found to save the students time so that they can gather as much information as possible without wasting time. I might then ask the students, “What makes a reliable source? Or what clues do you know of that can tell you if a website is reliable or not?” This question would bring in students knowledge of technology which was taught earlier in the unit regarding finding reliable sources and what reliable sources look like. Possible student answers include “If it is a .org or a .gov website” “It might be biased if the website is trying to sell a product” or “If the website is really out of date it might not be credible.”

For this project I will allow students to choose their own groups. This is because since the roles of each student in the group are so specific, they should be able to work in groups with their friends fairly efficiently. I will give students 45 seconds to get into groups of four students. If there are one or two students left over I will allow those two students to join other groups to create one or two groups of 5. The fifth student will take on the role of the director. If there are three students left over, they will be a group of their own; one student will take on the role of anchor/editor. Once all of the groups are settled and everyone has a role I will let students go work at computer stations together.

2. Body of the Lesson

This lesson is very student based; students will work together on the computers researching the polar climate regions. Students will fill out a research worksheet to direct their search and so that they know what information they need to include in their flipped videos. Much of class time will be work time where students will do research, write scripts, create power points to go along with their flipped classroom videos, film their videos and finally edit their videos. I will circulate around the room, troubleshooting technology issues as well as keeping students on task via proximity management.

3. Wrap up lesson

Students will save their progress in folders on the computer desktops. I will instruct the students to save their files as their last names so that I can find them if I need to and so that they will be able to find their materials the next day in class. At the end of the lesson each day, an exit slip will be required from students. On the first day, the exit slip prompt will be “I used to think, but now I know” statement about Polar Regions. Possible student answers to this prompt might be “I used to think that it never got warmer than freezing in polar regions, but now I know that there is usually a month of above freezing temperatures in the tundra.” Students will write what they have learned about Polar Regions based on research. On the second day, the exit slip prompt will be technology related, “What was one thing about the technology we used in class today that was troublesome, or difficult to work with?” The goal of this exit slip is to help me as a teacher determine what about this lesson was difficult for students and what part of the technology was troublesome. Possible student answers include issues with the editing program, issues with video camera use etc. This information will help me to reflect upon whether students need more time to get acclimated to technology as well as what programs they may need more instruction with. On the final day, if there is extra time, student work will be exhibited so that students can see what the other groups came up with.

4. Evaluating Learning

Assessment will occur throughout the lesson in a few different ways. Formative assessment will occur during my circulation around the room. I will identify which groups are having trouble with the associated research guide. I will also conduct formative assessment in the way of exit slips. The questions asked by the exit slip at the end of day one will help me to recognize which students still do not understand concepts about the major characteristics of polar climate zones. The question asked by the exit slip at the end of day two will help me to determine how effective the technology portion of the lesson is for the students. The exit slip at the end of day two will help me to reflect upon how I can change the lesson to aid student's use of the technology. The final informal summative assessment of this lesson will be the final product that the students will have produced. Student learning will be assessed and evaluated based on the associated rubric for the project.

Design Rationale

I chose to have my students create their own flipped classroom videos, as if they were to be teaching their classmates about polar regions, because the research, screenwriting, videotaping and explanation and editing will give students a chance to learn meaningfully about the polar region. The more the students work with the information the more they will know about the information. The students will be required to recall facts about the Polar Regions as well as information about plants and animals in Polar Regions. In analyzing why plants and animals from this region n have the characteristics they do, they will enhance their understanding of Polar Regions as well as plant and animal adaptations to their environment.

In addition to the meaningful learning that the students will take part in, students will begin to understand what credible sources look like as well as working through guided models of what good research looks like. Students will have the opportunity to work with technology in the form of computer programs. The ability to work through these computer programs are important skills to have in the work force in the digital age.

Differentiation in this lesson will come in the form of the use of technology and visual aids. Students who are low readers will be able to rely on students in their group to help with reading heavy research. ELL/ESL students will have meaningful learning experiences as they are able to associate pictures, such as maps and animals with the polar region. This will help to scaffold their already present knowledge of Polar Regions.