Comparing CO2 Levels and Earth Temperatures to Animal Populations

Name: Angela Waltner and Lianne Brant

**Summary:**

Summary: Around the world and throughout history, humans have impacted the Earth and its animal populations. Students will read and interpret scientific and math data involving animal populations, habitat temperature change, as it correlates to the Co2 changes from the impact of the Industrial Revolution.

We attempted to include many different standards from different content areas. That way a 5th grade teacher could use the activities and resources for all content taught, where as a math or Science teacher could focus more on the activities involving their standards.

**Activities:**

1. *Social Studies* - The students will create a general timeline of the U.S. Industrial Revolution based upon non-fiction reading. When did different stages of the revolutions begin in the United States?
2. *Math* - Read and Interpret various forms of data. How can you create a bivariable data chart demonstrating the relationship between the two more sets of data?
3. *Science* - How has Co2 level impacted animal populations and their environments?
4. *Language Arts* - Read, Interpret and summarize findings based upon non-fiction reading.

**Key Concepts:**

* Industrial Revolution - Technological advances
* Data plots and graphs
* Reading and writing non-fiction informative text.
* Co2 levels and temperature change
* Animal populations reaction to their environment

**Objectives:**

**Social Studies - U.S. History, the Industrial Revolution’s effects on climate**

**Strand 1: American History**

**Concept 1: Research Skills for History**

**PO 1.** Construct charts, graphs, and narratives using historical data.

**PO 2.** Interpret historical data displayed in graphs, tables, and charts.

**PO 3**. Construct timelines of the historical era being studied (e.g., presidents/ world leaders, key events, people).

**PO 4.** Formulate questions that can be answered by historical study and research.

**Concept 10: Contemporary United States**

**PO 2**. Identify the connection between current and historical events and issues studied at this grade level using information from class discussions and various resources (e.g., newspapers, magazines, television, Internet, books, maps).

**Concept 3: Populations of Organisms in an Ecosystem**

Analyze the relationships among various organisms and their environment.

**PO 1.** Explain that sunlight is the major source of energy for most ecosystems.

**PO 2.**  Describe how the following environmental conditions affect the quality of life:

* water quality
* climate
* population density
* smog

**Language- Reading and Writing a summary a non-fiction reading**

Apply grade 6 Reading standards to literary nonfiction (e.g., "Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not"). **(6.W.9)**

**Math-Scatter plots, interpreting data from graphs**

**6.P.S-IC.B.6-** Evaluate reports based on data.

**7.SP.B.3**

**Draw informal comparative inferences about two populations.**

Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.

**8.SP.A.1**

**Investigate patterns of association in bivariate data.**

Construct and interpret scatter plots for bivariate measurement data to investigate and describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

**Materials**

**Articles on Industrial Revolution** (choose articles best for your students’ level)

<http://www.history.com/topics/industrial-revolution>

<https://www.readworks.org/article/The-Industrial-Revolution---An-Introduction-to-the-Industrial-Revolution/47fe723c-b82e-40b8-8a6c-0f056a917344#!articleTab:content/>

<https://www.loc.gov/teachers/classroommaterials/primarysourcesets/industrial-revolution/pdf/teacher_guide.pdf>

**Science:Statistical Data** (Use the data sources appropriate for your student population):

<http://kanat.jsc.vsc.edu/student/swift/mainpage.htm>

<http://factsanddetails.com/world/cat52/sub328/item2106.html>

<https://climate.nasa.gov/vital-signs/global-temperature/>

**Animal population information:**

<https://www.greenfacts.org/en/arctic-climate-change/l-3/5-arctic-animals.htm>

<http://whitetigerproject2015.blogspot.com/2015_11_01_archive.html>

<http://www.deerfriendly.com/decline-of-deer-populations>

**Procedure:**

**Day 1-2**

Access Industrial Revolution information:

1. Have students read information regarding changes over time during the industrial revolution.
2. Create a timeline of major industrial changes over the last 100 years.

**Days 2-6**

Read and Interpret Statistical data regarding Co2 and temperature changes over the last 100 years.

1. Select two or more graphs to analyze and compare trends of Co2 levels and the impact on temperatures.
2. Create a graph that incorporates both sets of data.

**Days 7-9**

Read and Interpret data sets with regard to animal populations.

1. Have groups of students select a specific animal that they believe has been impacted naturally by increased levels of Co2.
2. Research population changes over the last 100 years.
3. Create single data graph based upon their research.

**Days 10- 14**

1. Have the groups of students compare all sets of data analyzed and summarize the relationship between the Co2 levels and the impact on the their specific animal.
2. The students will create a graph that overlaps the timeline information, temperature, Co2 data and animal populations.
3. Summarize findings and present to the class.

**Assessment**

**Formative assessments**:

* Week 1 - Student access website- Student progress on timeline
* Week 2- Graph Scavenger Hunt- for each graph that they chose.

<http://bit.ly/2FncBHr>

* Week 3- Complete Graphics organize on specific animal <https://docs.google.com/file/d/0B5TyguVC6BFjeC1IUk5YX3hwajg/edit>
* Week 4- Self and partner rubric assessment : <http://fc.dc-grimes.k12.ia.us/~jpoole/Documents/FOV1-00012AAD/Partner%20Rubric.pdf>

**Summative assessments**:

* Week 1- Completed Timeline
* Week 2- Bivariable data graph and summary of findings.

occur at the end of an instructional unit or course and measure the extent to which students have achieved the desired learning outcomes.

* Week 3- Animal population graph
* Week 4- Group Presentation - Group Rubric: <http://www.speaking.pitt.edu/documents/inform-speech.pdf>
* Week 4- Gallery Walk (Peer Feedback) - Give each students a set of post-notes or you can make a form. The students walk around at the end of the presentations and leave feedback on a post-it notes for each group. Have them reflect on what was done well and what could have been improved upon. What questions that might still have.

**Additional Resources:**

* If you need help with going from excel to graphs:

<https://www.wikihow.com/Create-a-Graph-Using-a-Spreadsheet>

* Animal Population information sites:

<http://www.allaboutwildlife.com/endangered-species/endangered-species-population-numbers/3596>

<https://polarbearscience.com/2017/02/23/global-polar-bear-population-larger-than-previous-thought-almost-30000/>

<http://www.savebears.org/news/tahoebbreakin_forcekill6_10.html>

<http://livingplanetindex.org/home/index>