Human Population Growth and Human Impact

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This curriculum unit is recommended for:
Honors Biology-Ecology Unit-9th and 10th Grade

Keywords: Human Population Growth, Human Impact, Population Pyramids,

Teaching Standards: See Appendix 1 for teaching standards addressed in this unit.

Synopsis: This curriculum will offer more activities for teachers for the human impact section of Ecology unit and spark interest and engagement for students. Human impact is a topic that can be very engaging. Based on my experience from teaching this unit in the past, activities seem to be scarce. This curriculum unit will allow students to investigate and analyze human impact related to human population growth. Students will have an opportunity to develop their data analysis, critical thinking, and problem solving skills. Activities include students constructing population pyramids, providing possible solutions for environmental issues, use data and create graphs, analyze data for environmental issues, globally, nationally, and locally. Students will be able to complete assignments catered to their learning styles. This curriculum unit will raise awareness of our impact on our environment and may encourage students to become an advocate for reducing our impact on our environment.

I plan to teach this unit during the coming year in to 30-60 students in Honors Biology: Grades 9-10.

Human Population Growth and Human Impact

Do We Have Room for One More?

Integrating Concepts in Life Science

Rochelle Evette Gray

Introduction

As educators one of our concerns within our school district is large class sizes. I have taught an honor's class of more than 40 in one class. In many schools it seems classrooms are busting at the seams. I felt I did not have room for one more student in my class. Overcrowding is not just in classrooms, but it seems to be everywhere. I reflect on overcrowding as I am stuck in a traffic jam on a daily basis, and venue and entertainment events seem to be more crowded than ever. All of my observations are based on my personal experiences within one city. I am certain that my city is not the only one experiencing human population growth and when I think about human population growth based on cities, states, and countries, I am amazed of how many people can live on this planet. I wonder how will we continue to add more of us to this planet and how will everyone be supported? What will be the tipping point when the planet will not have any more room for us?

The Common Core Standards are designed to ensure students are receiving a high quality education from school to school and state to state and prepare students for the future, which will allow them to be more successful in competing in a global society. Common Core standards encourage real world applications with emphasis on reading and writing, which are universal skills needed by all students in all subjects areas. Human impact (globally and locally) is one of the essential standards for the ecology unit and sustainability of the North Carolina Biology Curriculum.

Student Background

The student population of Mallard Creek High School is 2500 students. The ethnic background of this population includes 63% African Americans, 21% Caucasian, 6% Multiracial, 5% American Indian, and 9% Hispanic. These diverse ethnic backgrounds represent a wide range of socio-economic, religious, and political point of view. During my 18 years of teaching experience, I have taught various academic levels of biology. This year I am teaching Standard Biology, Honors Biology, and Greenhouse Biology. Greenhouse biology is biology concepts taught with an emphasis on plants.

Greenhouse biology is being taught at this school for the first time. Although I have taught it before, it has been some years since I have taught Greenhouse Biology. Students that are enrolled in Greenhouse biology are selected to take this course based on their academic achievement scores on reading and English scores. These students are usually identified as Level II achievement out of level V on state tests. Based on my years of experience with teaching low level achievement students, I found that an effective method of instruction for these students is the "chunking" method and repetition of the material. An example of chunking based on this curriculum unit is teaching one population growth curve (exponential growth curve) only on day one instead of teaching all of the growth curves in one class period. An example of repetition is modeling, reviewing, and providing examples of the same concept over again in a variety of ways.

A standard biology class could have a mixture of all grade levels due to students who may be repeating the biology course and students who are taking biology for the first time. There is not much of a difference between standard and greenhouse biology in terms of instructional strategies for teaching biological concepts. Based on my experience with these academic levels, "hands on" and a "less is more" approach of instruction is a best practice for reaching these students. Most of them want to learn, but have to keep them interested by engaging them in many activities, with constant rotation of changing activities within a class period, and relatable (real-life) applications.

Honors biology students are mostly ninth graders. Most students in honors biology are concerned about earning A's and B's in their classes. They are capable of displaying some degree of being self –learners. Students in honors biology are expected to be able to handle rigor, actively participate in inquiry based learning, and develop their critical thinking and analysis skills. This curriculum unit is designed for honors biology, but I plan to modify and use portions of this unit with greenhouse and standard biology classes. All students in biology are expected to grow, develop, and improve in the areas of rigor and problem solving skills.

Rationale

Integrating Concepts in Life Sciences seminar has focused on using data to teach science concepts. Data analysis is a skill that is universal in many areas of science. For example, graphing and data analysis are used in Chemistry, Earth and Environmental, Physical Science, Physics, and Biology. Students are going to be challenged with learning based on data and I will be challenged in teaching this new way of instruction. Students are used to teachers giving them all the facts about a science concept and memorizing the information for the test within a week. It is difficult for teachers to give the power to and allow students to have more control in learning, while giving up the traditional method of teaching. Change is going to be uncomfortable for all parties involved, but with a topic which students seem to have some interest about, such as human impact, should be more engaged in the process will be pleased with the results of trying something new.

The academic rationale for this curriculum unit is based on the North Carolina Essential Standards. According to the essential standards, a well-planned science curriculum provides opportunities for inquiry, experimentation and technological design. Teachers, when teaching science, should provide opportunities for students to engage in "hands-on/minds-on" activities that are exemplars of scientific inquiry, experimentation and technological design. There North Carolina Essential Standards are divided into four categories: 1) Structure and Functions of Living Organisms 2) Ecosystems 3) Evolution and Genetics and 4) Molecular Biology. Biology students are required to take the state biology exam at the end of the course based on these essential standards. The ecosystem category is the basis for this curriculum unit. Each category is broken down into essential standards and clarifying objectives.

The goal for this curriculum unit is for students to make connections between human population growth and human impact on a global and local level. I want students to be able to raise awareness of these issues to others and realize that as the population increases, human impact increases. Although students and our society as a whole may not feel it is time to press the "panic" button about these environmental issues, I feel it is a concern that we should be raising awareness about. We should be aware and making preparations for our impact on our environment, resources, and society now and in the future.

This curriculum unit is designed for a 5 day-90 minute block unit lesson. The biology pacing guide for Charlotte Mecklenburg Schools suggest 4-5 days of instruction for the Human Impact on the Environment topic. The sixth day of this curriculum unit will include a formal assessment (traditional & nontraditional). A lesson path (www.lessonpaths.com) have been created for all documents that is not included in the curriculum unit. If you do not have a lesson path account, create one. Search for the

lesson path named Human Population Growth and Human Impact created by Rochelle Gray. The lesson path assignments are in order based on the assignments in the curriculum unit.

Objectives

Students will have covered Essential Standard 2.1, which is the first standard for the ecosystem unit. Bio.2.1 states that students should be able to analyze the interdependence of living organisms within their environments. During this standard, students will have learned energy flow (food chains and food webs), nutrient cycles, types of population graphs, resources and limiting factors, and how disease can disrupt ecosystem balance.

One of the objectives for this standard (Bio.2.2) is students should understand the impact of human activities on the environment (one generation affects the next). Biology objective 2.2.1 states that students should be able to summarize how humans modify ecosystems through population growth, technology, consumption of resources and production of waste. Students should be able to interpret data regarding the historical and predicted impact on ecosystems and global climate, explain factor that impact North Carolina ecosystems, such as acid rain effects in mountains, beach erosion, urban development in the Piedmont leading to habitat destruction and water runoff, waste lagoons on hog farms, and kudzu as an invasive species. Students should be able to explain the impact of humans on natural resources, which includes but are not limited to resource depletion, deforestation, pesticide use and bioaccumulation. Students should be able to provide examples of methods of stewardship in biology objective 2.2.2.

Objective 2.2.1-Day One

Objective 2.2.1. states that students should be able to infer how human activities (including population growth, pollution, global warming, burning of fossil fuels, habitat destruction and introduction of non-native species) may impact the environment. The essential questions are more student friendly. The essential questions for this objective are: 1) Why is human population growth an environmental problem?

2) What evidence do we have that humans are contributing to climate change?

3) How are North Carolina ecosystems affected by human activity?

The essential questions for the second objective for this unit (Objective 2.2.2) are:

1) How do humans impact other species?
2) What can you do to protect the environment?

I will place both the objective and essential question on the board. The standard can remain on the board for the number of days I am teaching on that unit. I change the essential question daily, focusing on only one during each class period.

The essential question for day one is, "Why is human population growth an environmental problem?"

Background Information

According to the World Population clock, it is estimated that the population of the world is approximately 7.3 billion people. Earth's human population is expected to coast upward to 9.6 billion by 2050 and 10.9 billion by 2100.[1] According to The Population Institute all the major problems that confront the world today relate in some critical way to population growth. [2] Some of the problems caused by human population growth include depletion of natural resources, pollution, climate change, economics, and food supply. The history of the human population can be summarized briefly as prior to the agricultural revolution the world population growth was slow, although steadily increased from 250 million to 400 million.[3] World population actually declined during the 14th century due to the Great Famine of 1315-1317 in Europe and the Black Death.[3] After the 14th century, the world population rebound and since the 1800's, the world's population has been growing at an increasing rate. The population was at 3 billion in the late 1960's, doubled over the past 50 years, and reached an estimated 7 billion in late 2011. The world population is currently increasing at a rate of between 130 and 150 million annually, although the rate of increase has been declining in recent decades.[3]

Demography is the systematic study of human populations.[3] A demographer studies populations, rates of birth, death, and migration, life spans, population pyramids of age structure, and demographic transition models. This information is used to calculate population projections, and is used to advise governments about population policies.[3]

Activities

Activity One: World Population History and Data (30 minutes)

Most of the activities for this day are based on an awesome website/organization (www.population education.org). Before getting into the activities, place the world population clock on the smart board or on the board. The world population clock continues to count the population, based on current estimates of birth and deaths per second. Let it run and count the population until you are ready to have the students fill in the data on their population data sheet (see below). Have students fill in the population for the US, North Carolina, and Charlotte, NC. Although the activities are focused on world population for this day, the other populations included in the data sheet will be used later within the unit. After the students have filled out the population data sheets,

students will watch the world population video. This video can be found and streamed from www.worldpopulationhistory.org. I will play the video on the smart board for the students to view as a class. The video shows changes in the world population from year 1CE in 6 minutes. After the video, students will use the chrome books, go to the website and explore the world population map to answer the questions/discussion sheet that I created using the map. This will allow me to help the students to navigate the map and timeline and entertain any questions they may have. The students will not finish the world population map activity in class. I will give them a couple of days to complete this assignment. There is a lot of information and data on the map and I want the students have time to really peruse, digest, and reflect on the information.

Activity 1

Population Data Sheet

World Population 	US Population 
North Carolina 	Charlotte, NC 

World Population: Explore Map Worksheet

www.worldpopulationhistory.org

Click Explore Map

1. Go to the menu and briefly become familiar with how to use the map and timeline.
2. Complete the following using the map:

Years CE	Population	Food & Agriculture Milestone	Medicine Milestone	Science & Technology Milestone
1000				
1900				
1950				
2000				
2015				
2025				
2050				

Use Overlays tab: Interpret/Analyze the data sets. Write a summary of your interpretation of the data sets. These can be found at http://worldpopulationhistory.org

Human Land Use (1700-2000)	
Fossil Fuels CO_2 Emissions (1751-2010)	
Fertility Rates (1950-2050)	
Urbanization (1960-2050)	
Life Expectancy (1950-2050)	

Activity Two: Power of the Pyramids (60 minutes)

Power of the Pyramids is an activity from www.populationeducation.org. I will use this experiment as is, including the assessment idea. I believe the assessment idea for this activity will give the students an idea of what to do for the formal non-traditional assessment. You can buy the complete download or original lesson for $3.00 through the website. There is a PDF version. Version that can be downloaded for free. I will enlarge the pyramid worksheet that the students will create by copying them on large paper instead of the regular standard size paper. When each group has completed their pyramid, I want them to hang them in the front of the room, so all students can see them. Before I give the students the discussion questions created for this activity, I will initiate a general class discussion about the pyramids and data to get an idea of what the students are thinking and their own analysis of the pyramids and data.

Discussion Questions for the Power of the Pyramids:

1. Where are you represented on the tables and on the graphs?
2. Can you tell from the data if there are more male or female babies in each country?
3. Are there more elderly women or men? Why might that be the case?
4. Can you tell from the graphs which country has the most people?
5. Which country has the most people? How can you tell?
6. Of the six graphs, which two look most like pyramids? What does that indicate about their population growth rates? What factors would change the shape of the pyramid in the future?
7. Looking at the pyramids, which country appears to have the slowest rate of population growth? How can you tell?
8. Which are the largest age group in the U.S.?
9. In which country do children make up the largest percentage of the population?
10. Some cultures have traditionally favored boy children over girl children (as can be seen in the pyramids for India and China). Why might couples prefer to have boys rather than girls in these countries? What are some consequences that may arise if a generation has a gender imbalance?
11. If you had a business and wanted to capitalize on your information about the population age distribution for the U.S., what would you sell?
12. If you had a business in Nigeria and wanted to capitalize on your information about Nigerian population, what would you sell?
13. How would you expect the Mexican pyramid to look if you graphed it 40 years from now?

Objective 2.2.1-Day Two

Background Information:

A description of human impact involves discussion of human activities that impact the environment. For example, removing trees for urbanization development causes habitat loss and threatens the survival of animal and plant species. Human impact is a broad topic. As I was researching the background information for human impact, research results showed categories such as human impact and natural resources, human impact and biodiversity, human impact and climate change.

Activities

Activity One: World Population Impacts Gallery Wall Activity (90 minutes)

This activity will require some preparation time, but I feel it will be worth the time and the students will get an opportunity to develop critical thinking and problem solving skills. Once a set of posters are made, you may reuse them, especially if you laminate them.

After a brief review of the lesson from the previous day, I will have the students form into groups. There are 6 posters (environmental factors). The 6 environmental factors I selected are: 1) Biodiversity 2) Climate Change 3) Infectious Disease and HIV/AIDS 4) Food Security 5) Migration and Urbanization and 6) Water Resources. I selected these factors because they were the ones listed in our biology standards. I have included the articles for these environmental factors in a lesson path. I will make copies using a color copier. Color copies will be best as the data (graphs and maps) are in color. I feel students will be able to interpret and analyze the data better. Once I have made the copies, I will cut the data from the articles and type up some key points from each of the articles. I will paste the information on a poster board.

Making the posters can be simple or as complex as making them very visual and attractive (colorful with pictures). I will place a 5X7 envelope beside each poster containing a sheet with a few questions about the environmental factor. Each group will take a sheet from the envelope, discuss the data and answer the questions. Each group will have 10 minutes per poster to answer the questions. With the remaining 30 minutes of the class period, I will assign each group one of the original environmental factors article. They will read through the article and compare their answers for the questions to the original information stated in the article. One student from each group will briefly report on the environmental factor including an analysis of the data. I will have the data for each environmental factor projected on the promethean/smart board for the student who may want to use it during their presentation and it also gives the students a better view from where ever their group may be located.

Human Population Growth and Environmental Factor Sheet

Biodiversity

1. What is biodiversity?
2. What is the state of biodiversity?
3. How does human population growth impact biodiversity?
4. Look at Figure 1. What is your analysis of the data? Provide support for your analysis. (Ex. What do you think was the cause of the data? How?)
5. What is a possible solution for reducing human impact and conservation?

Climate Change

1. What is climate change? What is the state of climate change?
2. How does human population growth impact climate change?
3. Look at Figure 1. What is your analysis of the data? Provide support for your analysis. (Ex. What do you think was the cause of the data? How?)
4. Look at Figure 2. What is your analysis of the data? Provide support for your analysis. (Ex. What do you think was the cause of the data? How?)
5. What is a possible solution for reducing human impact and conservation?

Infectious Diseases and HIV/AIDS

1. What are infectious diseases? What is the state of infectious diseases?
2. How does human population growth impact infectious diseases?
3. Look at Figure 1. What is your analysis of the data? Provide support for your analysis. (Ex. What do you think was the cause of the data? How?)
4. What is a possible solution for reducing human impact and conservation?

Food Security

1. What is the state of food security?
2. How does human population growth impact food security?
3. Look at Figure 1. What is your analysis of the data? Provide support for your analysis. (Ex. What do you think was the cause of the data? How?)
4. What is a possible solution for reducing human impact and conservation?

Migration and Urbanization

1. What is the state of migration and urbanization?
2. How does human population growth impact migration and urbanization?
3. Look at Figure 1. What is your analysis of the data? Provide support for your analysis. (Ex. What do you think was the cause of the data? How?)
4. Look at Figure 2. What is your analysis of the data? Provide support for your analysis. (Ex. What do you think was the cause of the data? How?)
5. What is a possible solution for reducing human impact and conservation?

Water Resources

1. What is the state of water resources?
2. How does human population growth impact water resources?
3. Look at Table 1. What is your analysis of the data? Provide support for your analysis. (Ex. What do you think was the cause of the data? How?)

4. Look at Figure 1. What is your analysis of the data? Provide support for your analysis. (Ex. What do you think was the cause of the data? How?)
5. What is a possible solution for reducing human impact and conservation?

Objective 2.2.1: Day Three

Activity One: Human Impact Notes Chart (20 minutes)

This is information the students need to know to be able to complete activities. Objectives 2.2.1 and 2.2.2 overlap and if students understand these types of human impact they can relate them to the remainder of the unit globally and locally. Completing the chart now allow students to review and also learn new ways of human impact. Students will fill in the chart using a power point that includes the types of impact. This is a quick way for students to take general notes and have more time for activities. There are several power points that are already created on the internet. I will be using the power point that is created for our biology classes at my school. You may decide to create your own based on the science department of your school.

Human Impact Fill-In Notes Chart

Issue	Definition/Description	Cause & Effect	Interesting Characteristic(s)
Acid Rain			
Ozone Depletion			
Global Warming			
Beach Erosion			
Biomagnification			
Decrease in Biodiversity			
Habitat Destruction			
Deforestation			
Water Pollution			
Hog Waste Lagoons			

Activity Two: Human Impact on Natural Resources Video (10 minutes)

Students will watch the You Tube video (9-minute): Human Impact on Natural Resources & Ecosystems. The students are expected to answer questions while the video plays. There is no verbal commentary on the video. The students must read as it plays. It has a lot of good information and it raises their awareness of how important it is to take these issues related to human impact seriously.

Human Impact on Natural Resources Video Questions:

1. _____ and _____ have been wreaking havoc on our _____ and ecosystems.
2. Over consumption of natural resources is a big problem in the US. The US makes up _____ % of the world's population, it consumes _____ % of the world's resources.
3. How many earths would be needed if all countries used the same amount of resources as the United States? _____

Water

4. How much of the Earth's Water is drinkable?
5. List a result of our impact on the water supply.
   1) (US) _____
   2) (Globally) _____

Land

6. How is the demand/supply of food affected by our impact?
7. The world has lost ____% of its original forest. Less than _____ % of the original forest remains in the US.
8. List 2 things deforestation causes:
   1) _____
   2) _____

Pollution

9. What is the cause of air pollution?
10. Each one of us in the US produces _____ lbs. of garbage each day.

What Can WE do?

List 5 ways we can reduce our impact and explain how it will help.

1) _____
2) _____
3) _____
4) _____
5) _____

Activity Three: Human Impact & North Carolina (60 minutes)

Essential Question: How are North Carolina ecosystems affected by human activity?

Background Information:

According to the Unites States Census Bureau the estimated population of North Carolina is 9,934,964 in 2014.[4] According to state projections, North Carolina will finally pass the 10 million mark in 2020, reaching a population of 10.6 million, and then hitting 11.7 million by 2030.[5] As stated earlier in this curriculum unit, human population growth results in more impact on the environment. Some environmental issues of North Carolina include beach erosion, invasive species, such as kudzu, acid rain in the mountains, urban development, and hog waste lagoons.

City population projections produced by the United Nations show Charlotte and Raleigh is growing the fastest among large U.S. cities from 2010 to 2030.[6] With such rapid growth in cities such as Raleigh and Charlotte, urban development may become an issue for these cities if development is unmanaged.

The human impact power point used for the fill in the blank notes chart covered several of the human impact issues within North Carolina so I selected to focus on 3 environmental factors for North Carolina. I will set up 3 stations: Station 1: Coal Ash, Station 2: Beach Erosion, and Station 3: Urbanization in Charlotte, NC. The documents with data for this activity is included in the lesson path that I created for this curriculum unit. Each student will have 30 minutes to complete the activities at each station. Students will interpret data and complete activities for each station. Stations should be decorated to engage students by what they see and then the information that is at each station. For example, the impact on beach erosion station should be decorated as a beach. Items such as a small bucket of sand, sunglasses, a beach ball, sea shells, etc. should be displayed at the station. In my experience, I do not think the students would be as interested if they went to a station and only saw a lot of data tables, charts, and graphs. If you have access to chrome books or I-pads, you may want to set out a few per station. If you don't have access to portable technological devices, make the areas you have computers the stations for coal ash. Coal ash is the station they really need computers for. In the lesson path, you will find all the handouts for each station with instructions.

Objective 2.2.2: Day Four

Objective 2.2.2: Students should be able to explain the impact of humans on natural resources (e.g., resource depletion, deforestation, pesticide use, and bioaccumulation). Students should be able to exemplify conservation methods and stewardship.

Essential Question: What can you do to protect the environment?

Activity One: NC Rotation Stations Part 2 (45 minutes)

Students will complete the last station from the previous day. When students finish the last station they will staple all activities in order according to the rubric and turn it in.

Activity Two: Earth-The Apple of Our Eye (Demonstration)

This is another activity from www.populationeducation.org. This activity uses an apple to show a visual demonstration of the limited resource of food available from Earth's Land, followed by discussion of how to feed a growing population. I will set up stations with the apples already cut and an index card explaining what each piece of apple represent. Students can take a look at when they need a "brain break" from the main activity for the day. I will have a strip of paper and a little basket for the students to answer two questions.

> Question 1: What conclusions can be drawn about the relationship between a growing population and a shrinking amount of land capable of growing food for those people?
>
> Question 2: How can we preserve farmland? These two questions are from the original activity. I will collect the student's answers from the basket and we will have a class discussion at the end of the period.

Activity Three: Human Impact Issue Comic Strip or Newspaper Article (30 minutes)

Students will randomly select one of the human impact issues and choose to create a comic strip or newspaper article about their issue. I decided to give 2 options for this assignment. Students who like to draw may enjoy the comic strip assignment. Students who like using the computer and technology/media may enjoy the newspaper assignment. There are many free printable template downloads for creating a newspapers and comic strips. The students will not finish this activity in class. Students will complete this activity for homework. The newspaper or comic strip must include the following:

1) Title
2) Description of the human impact issue
3) Cause & Effect
4) At least 1 Data source related to the issue with an explanation of data
5) At least 1 possible solution
6) Ethical implication

The last 15 minutes of the class period, I will use for a class discussion about the demonstration. I will also answer any questions from the students about the comic strip or newspaper article assignment.

Day Five

The students will complete the activity from day four this first half of the 90-minute block and review the second half for their traditional assessment (Unit Test). Our school requires all biology teachers to give a common traditional assessment so we are able to use their test scores as data for mastery and/or remediation strategies. I am not allowed to share the unit test, they are private and for the use of our biology teachers only. Students will also have a non-traditional informal assessment.

Non-Traditional Assessment Preparation (Population Scrapbook)

I will assign the non-traditional formal assessment (Population Scrapbook). Students will randomly choose a country. Students will use data from worldometers.info/world-populations/populations-by-country and predict future population growth trends. There are 200 hundred countries listed on this website. There are other resources that can be used as well. I will select enough countries so no student will have the same country. Students will use the class set of chrome books to research and brain storm ideas for their project. Students will turn in their plan for their scrapbook and I will briefly read through them. I will add comments, suggestions, etc. to their plan and return them the next day. When students arrive to class, I will allow students a little more time to work on the project in class. For example, students will review for the Traditional Assessment (Unit Test) the first half of the period and work on their project the second half. Allowing some class time to work on their project, will give me an opportunity to check the progress of students, assist students who may be struggling with getting started, and entertain any questions students may have about the project.

The scrapbook will include the following:

1. Attractive Cover
2. Organized Sections/Tabs and Neat
3. Facts/Characteristics about the country
4. Create Data Tables and Graphs (Population Information)
5. 3 detail examples of human impact on the country and solutions for conservation and sustainable environmental practices.
6. Visuals (pictures from the internet/magazines, etc.)
7. References & Works cited page
8. A reflection summary/log of what they have learned during the entire unit-this will be how I will assess and show student growth.

Appendix 1: Implementing Common Core and Essential Standards

Essential Standard: Biology 2.2

Students will understand the impact of human activities on the environment (one generation affects the next)

Objectives

Biology 2.2.1: *Students will infer how human activities (including population growth, pollution, global warming, burning of the fossil fuels, habitat destruction, and non-native species) may impact the environment.*

Biology 2.2.2: *Explain how the use, protection, and conservation of natural resources by humans impact the environment from one generation to the next.*

Annotated List of Resources

www.scientificamerican.com Human Population Growth Creeps Back Up (January 14, 2013)

This website contains articles from Scientific American. It is user friendly and you can search for many articles for many topics.

www.populationgrowth.org

This is an organization called the population institute. They contain many articles about population issues globally.

"The World's Population"

This book contains all topics related to population. It is divided into topics with subtopics in alphabetical order. It is organized in an encyclopedia format. It is an easy resource to peruse.

www.census.gov

A website with population data for countries, states, and cities.

www.worldpopulationreview.com

A website with population data globally and nationally.

www.ui.uncc.edu

This is the website of UNC Charlotte Urban Institute. This website contains many articles, data, programs, resources, information about this organization and their work in urban development of Charlotte, NC and surrounding areas.

www.worldpopulationhistory.org

This website shows how the world population changes from year 1CE in 6 minutes. It also includes the changes and activities that result in the increase of the world population. This website also have lesson plans and teacher resources related to this website.

www.populationeducation.org

This website is more of a teacher resource with many units related to population studies. Some of the lesson plans can be downloaded for free. Some of them require payment to download entire unit. The prices are reasonable ($3.00/unit)

www.lessonpaths.com

This website allows teachers to make a lists of assignments for students. Students can complete assignments through lesson paths. Teachers can include supplementary materials for students, such as articles, videos, etc. for students to use. I created a lesson path with all the additional resources for this unit that was not included in the curriculum.

Notes

[1]www.scientificamerican.com

[2]www.populationgrowth.org

[3]The World's Population (An encyclopedia of Critical Issues, Crises, and Ever-Growing Countries), Fred M. Shelley, 2015

[4]www.census.gov

[5]www.worldpopulationreview.com

[6]www.uncc.edu