#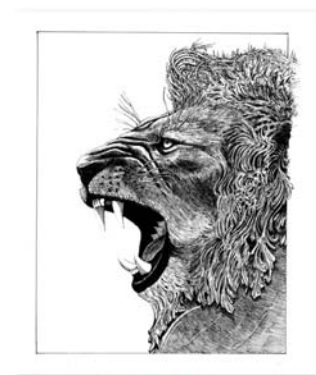 Population vs Consumption: Which is a Bigger Problem for the Environment & Who is Getting the Lion's Share of the World's Resources?

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Objective: Develop critical thinking and awareness about the complexity of natural resource use, wealth distribution, population densities, poverty, and the environment. Students may, for the first time, think about people living in different parts of the world and about the varying effects of population vs. consumption in rich and poor countries. For example, is a family of four in the USA that consumes a lot of resources better or worse for the environment than a family of 10 in Kenya that use only a small amount of resources in daily living? The discussion and follow-up lab bring up themes of equity, war, greed, responsibility, and caring.

Who: I have done this activity with high school students (all grades) in the Ithaca area and from rural Colorado. In one of these classes, there were 3 students with learning disabilities (mostly reading problems) and they did just fine with some help reading their role out loud. I have also used it with freshmen in college. Teachers and students seem to respond positively to this activity. It is very fun to do as well!

Subject Area: Interdisciplinary subject matter from geography, social studies, ecology/biology, and math. Fits well with National Science Content Standards for "Life Science" and "Science in Personal an Social Perspectives" for Grades 5 - 8 and 9 - 12.

What is involved: This can be done in one or two 45-minute class periods – depending on how much time a teacher spends on the introductory lecture and follow-up questions. It involves a **lecture**, **group activity**, and **reflective lab questions**. The group activity, which is the most critical part, takes a minimum of a half hour (because of ongoing discussion during activity). The reflective lab questions can be done in class or as a homework assignment.

Materials Needed:
- Copies of role descriptions included in this packet. There are 20 roles, so this activity is designed for a class of 20 or less students (in smaller classes, students may have more than one role). Students will select their role without being allowed to look at it first – or else everyone would want to be from the United States and no one would choose to be from some of the poorer countries.

- Copies for each student of 1) Country Statistic Spreadsheet and 2) Reflective Lab questions.
- 5 lengths of yarn representing area of 5 world regions
- Candies that can be distributed as "energy units". Need at least 120 individual candies.
- Lecture and Activity Outline (for use by teacher)

Lecture:
You can spend as little as 10 minutes introducing the concepts, or as much as one class period. This will depend on how much time you have and the extent to which you want to illustrate the complex intersection of geography, population densities, poverty, politics, power, current events, etc. For example, this activity prompted a lot of thoughtful conversation during the USA war on Afghanistan. Connecting the activity to current events may not only get the students to participate (maybe a few are up on the news), but also can illustrate the real-life connections of the lecture and might even get a few of them interested in current events (imagine that!). ☺

1. **Put on Chalk-board:**　　**10 people in India use 1 log/month**
　　　　　　　　　　　　　　　1 person in USA uses 10 logs/month
   - To introduce the activity I use this comparison to illustrate the concepts of population versus consumption. Two things are important to also mention: 1) a log represents a unit of energy – it could actually be a log, or it could be the same amount of energy burned as electricity or gas, etc. 2) this comparison is based on the differences but is not true in every case for every person from the USA or from India. It is an estimation used to illustrate the concept.

2. **Go over Concepts** (use chalk-board, class participation to get at answers, etc)
   (This section is more or less necessary depending on what knowledge the students already have from the onset)
   - **Population; Density; Population Density**
     - Parts of the world with high Pop densities (e.g. India, China, Mexico city, NYC)
     - Places with low Pop density (Fact: In Wyoming there are more sheep than people)
   - **Energy units** (use) – burning a log, using electricity for light, running a car on fossil fuel, etc.
   - **Natural Resources** – often the things we convert into energy – forests, water, petroleum, coal, sun, etc.
   - **Energy Consumption** – using energy for daily living. Using electricity every time we watch TV; using gasoline every time we drive to school; etc.
   - **Environment** – the non man-made world around us that we share with all humans and with all life on Earth. Nature. The forests, the rivers, the air we need to breath, the soil that provides nutrients for plants that grow there; etc.
   - **Environmental Problems** – human activities are harming the environment; for example, cutting down forest to raise cows to grow crops can contribute to the loss of species from that forest. On a larger scale, this can be how extinction occurs.

3. Introduce thinking about the world as being divided into **5 Population Regions:**
   - Write these on the board as the students help you come up with them. As they shout out ideas, countries, places, stimulate them by asking what countries are in the regions, etc…
   - (Basically these correspond to the 7 continents except that Antarctica is not included (no population) and Australia is included with Asia)

- The relative size of each of the population regions can be represented by forming a circle with each of the lengths of string below. To illustrate the relative population density in each region, the students in the class who have roles from those regions can step inside the string circle of their country. Some regions will only have 1 or 2 people, whereas other regions will be very crowded with several students.
  - **North America** (string length = 14 feet)
  - **Latin America** (string length = 16 feet)
  - **Europe** (string length = 17 feet)
  - **Asia** (string length = 24 feet)
  - **Africa** (string length = 23 feet)

Activity:
1. **World Representative Forum** – Role Play from Countries Around the World
   - Explain that a meeting among representatives from countries all over the world is being held in [insert your school name here] and that they have each been selected by their governments to come as examples of upstanding citizens who work hard and do their best to raise happy, healthy families.
   - The 20 country roles correspond to the relative distribution of people around the world. Hence, there is only 1 person from a North American country, whereas there are 12 people from Asian countries. Useful to point this out to students as they are choosing their role.
   - Have students pick roles from a hat/envelope—each person will be from a different country with a different set of socio-economic circumstances—particularly family size, monthly income and consumption. Country statistics also note environmental considerations such as original forests lost (which in some cases corresponds to the amount of agriculture in the country), and number of threatened mammals and bird species.
2. **Students share their Country Roles**
   - Works best if students are in a large circle facing each other.
   - Go around in circle, each student reads his/her role. Everyone should be listening.
3. **Group Discussion**
   - Pass out Spreadsheet with Country Statistics (summarizes info in country roles)
   - After everyone has gone around, it is a good time to discuss what they may have noticed as trends in the statistics (this requires a lot of prompting)
     - Correlation between amount of agriculture (i.e. deforestation) and number of species threatened with extinction.
     - Why would a country like Switzerland, which has almost 99% agriculture, have low numbers of threatened species? (Mountainous, cold climate. Diversity hot-spots are in the tropics; or is it possible that Switzerland has lower numbers of threatened species because it has been settled for so long and species went extinct years ago? These are good questions for launching into another critical thinking exercise!)
     - Correlation between poverty and amount of children. Why? Why does China have so few children per family (there is an actual law limiting children because of over-population concerns)?
     - Comparisons of average age at death?
     - What is a refugee?
     - What is the relative wealth of oil producing countries (Venezuela, Kuwait, Iran) relative to other developing countries?

- You make the most money living where? You use the most energy living where? Does being the richest mean using the most?
- Etc., etc., etc., etc. – students will also have many questions

4. **Distribute Energy Units** (based on energy consumption per person per year by country)
   - Ask students not to eat the energy units (candy) so that they can all see how much everyone is getting as you go around
   - Countries that use less than one energy unit per year can either share with another country (ies) until their total use equals 1 energy unit (e.g. Pakistan, Cambodia, and Nepal together get 1 candy). Or you can buy some kind of candy that you can physically divide so that, for example, the person from Nepal would only get 1/10 of a candy. This is useful because it illustrates that even among the poverty-stricken, there can be vast differences between the poor (e.g. Philippines) and the destitute (e.g. Nepal).
   - Once they all have their candies, ask them what they are going to do about it – (e.g. nothing; USA feels generous and shares; a bunch of poor countries get together and "war" on rich countries to share their candies; alliances form… these are all examples of scenarios that I saw occur with students who have done this exercise). Useful for them to think about the root causes of some wars and revolutions – poverty and desperation.

5. **Populations Densities and size of World Regions**
   - Finally, illustrate the relative size of the different areas of the world and their population densities
   - Each world region should have a length of string/yarn cut. When this string is joined at the ends to form a circle, it represents the area of that region. (Asia is the longest, North America is the shortest)
   - Take string one-at-a-time, and have students help make a circle out of it while the students from that region get inside of it. Ask them how cozy or spacious it feels. They will see and experience population densities.
   - More things could be done with this aspect of the activity…. But that is all that is planned here.[1]

Now it's time for the Reflective Lab Questions
- See handout
- Can be done in-class or at home
- Compiling student answers to this handout -- sharing and discussing it with them later-- is a really nice wrap-up to this lesson. (I included examples of compiled student answers from high school classes that have done this activity)

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[1] These string lengths are based on a handout included with this packet titled "Food for Thought Distribution Chart." The other information on this chart could be used to expand on this activity or develop new ones. Information includes land area, population and density, arable land, per capita GNP, and per capita energy consumption.