Visionmaker NYC Education
Wildlife Conservation Society 2016

MODULE 4, Lesson 2: Waste Not, Want Not: Reducing Carbon by Reducing Population or Their Needs

Grades: 6-12

Duration: 4-7 class periods (each 45-50 minutes)

Objectives:

- Students will be able to describe the differences in lifestyle that exist globally
- Students will be able to explain the significance of lifestyle and make the connection between lifestyle and population.
- Students will be able to analyze their own lifestyle and select at least one behavior that they could change to make a difference in their environmental impact

Materials: Activity 1 – maps, research materials – computer with internet, books, magazines; photo essay supplies – computers, or poster paper with scissors, glue, tape, and photos to cut out/choose from, pens/pencils/markers; Activity 2 – Computers with internet, Lifestyle Comparison Worksheet/spreadsheet, 100 resource items of your choosing (e.g. candy, popcorn, golf balls, etc.); Activity 3 – computer, optional paper footprint quiz/calculators, art supplies – paper, tape, scissors, pencils, markers

Suggested Standards:

NYS Content Standards:

Grade 6-8 Science Standards:
Standard 1—Analysis, Inquiry, and Design
M2.1
M3.1
S1.1
S1.2
S1.3
S1.4
Standard 2—Information Systems
1.2
1.3
Standard 6—Interconnectedness: Common Themes
2.2
Standard 7—Interdisciplinary Problem Solving
1.1
1.2

Standard 4:
4.1b
6.1c
7.1a
7.1b
7.2c
7.2d

Grade 6-12: Social Studies Practices
A.2.

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Grades 9-12 Science Standards:

Standard 1:
3.1a
M1.1
Information Systems Key Idea 1
Standard 6—Interconnectedness: Common Themes
2.4

Standard 4:
6.1d
6.1f
7.1a
7.1c
7.2c
7.3a
7.3b

Common Core State Standards:

College and Career Readiness Anchor Standards in Reading:
7.
College and Career Readiness Anchor Standards in Writing:
7.
8.
College and Career Readiness Anchor Standards for Speaking and Listening:
1.

Mathematics Standards:
6.RP1
6.NS2
6.NS3
6.SP5
7.RP2
7.RP2
N-Q2
N-Q3

ACTIVITY 1:

Global Lifestyle Photo Essay (2-4 hours)

Students can work individually or in small groups to create a photo essay of a location somewhere in the world and the people who live there. This can take multiple class periods, or be assigned as homework.

Photo essays can be digital or physical depending on preference and available resources.

Begin by explaining what a photo essay is. While there is no universal format for a photo essay, in general it is a way to tell a story mostly through pictures, with the addition of text or captions to supplement, often with an emotional leaning. You may ask the students if they have heard the phrase, “a picture is worth a thousand words”? That’s the idea behind a photo essay, “show don’t tell” – let the images tell the story you are trying to communicate. Additionally, a photo essay is a nice way to engage students in a research project, without a long piece of writing being the final product. It will also allow students to use a variety of sources and types of evidence to compile their photo essay.

For this photo essay students will select a location - a city, region, or even country, to research. Because it will be important to have a diversity of locations in the class (rural, urban, more and less wealthy, etc.), it may be helpful to assign each student or team a continent and then allow

them to choose their location within that continent. If students have trouble, additional guidance can certainly be provided.

Below are photo essays comparing diets of families around the world that you may find interesting to use with the students:

- http://time.com/8515/hungry-planet-what-the-world-eats/
- http://www.demilked.com/what-the-world-eats/
- http://www.huffingtonpost.com/2014/03/28/what-i-eat-around-the-world-in-80-diets_n_5043024.html

Once each student/team has selected a location they should research it and compile images that represent their findings. Students should try to find out what it is like in their location – what is the climate, the ecology, is it urban or rural? They should investigate who lives there – what is the population, family size, economic status? What is life like – what do people eat, where do they live, how do they get around, where do they work? Do they have electricity, how or where do they cook food, where does their water come from, how about heat, etc? They may want to think about showing a day in the life of an average person from their location.

Some information may be easier to find than others, particularly for certain locations. Students should do their best to paint a picture of the lives of the people in their location, but it may not be perfect or complete. Images do not necessarily need to actually be of the place, but could be representations. For example, students may be able to find a source that states that the majority of people living in Amsterdam ride bikes daily, and that there is more bicycle travel in Amsterdam than car or public transit, they could include a photo of a person riding a bicycle, even if it isn't actually someone in Amsterdam.

Students should include captions with their images to help clarify the meaning of each image they include.

Once all the photo essays are complete, students can present to the class or you could have a gallery walk so that students can see one another's work and make comparisons amongst the different locations. Have a class discussion about similarities and differences, patterns and connections.

- Are there differences associated with differences in wealth? With population or density? With climate? With level of urbanization? Are there any other trends the students notice?

If it hasn't already been discussed, make sure to bring up the idea of lifestyle, and the fact that there are different lifestyles that are possible, and that clearly the people in each of the students'

locations has a different lifestyle. Can they make any observations about these different lifestyles? What are some things they like or dislike about these different lifestyles?

This conversation will lead into thinking about the environmental impact of these differing lifestyles in ACTIVITY 2.

ACTIVITY 2: Two 45-50 minute class periods

Part 1: Visionmaker Lifestyle Comparison (One 45-50 minute class period)

Now that the students have had a chance to explore different lifestyles from around the world, the next step is to investigate the impacts that different lifestyles can have on the environment.

Before introducing this activity to students, create a vision in Visionmaker NYC (see instructions on this). All the students will work with the same vision extent.

Individually, or working in pairs or small groups (one of the advantages of pairs/small groups is that one student can be navigating the Visionmaker software while the other student acts as the scribe, recording all of the data that they find), students should each be assigned a different lifestyle. Do not assign any student Average New Yorker, as all students will compare their assigned lifestyle to Average New Yorker since that is the basis of the 2014 data.

Students should access the teacher's vision (use the search function to find the vision and then load it), and then should select copy and edit at the top of the screen to save a copy of the vision as their own. They should give their vision a unique name that will also allow the teacher to easily find it – a suggestion is to use a common word that all students will include in their title. It is also an option to create a group for the class and have all students share their vision with the group (see instructions for creating groups). Without changing anything else, students should change the lifestyle for their new vision to the one they have been assigned, and then click on "recalculate"

The dashboard will open. They should select the data summary tab from the top of this window to access the complete data for the vision.

There are numerous parameters that could be compared, and the included Lifestyle Comparison Worksheet provides some examples of consumption and waste parameters that students could compare. However, feel free to modify based on student needs, and to go deeper or simplify based on the goals of the curriculum and the skills of the students. More or fewer parameters could be included to go deeper with the data or simplify what students are looking at. For example, students could record "wastes" from the data summary, or go into more detail, opening that out to compare liquid vs. solid waste, or biodegradable vs. non-biodegradable wastes.

Similarly, for fuel consumption, you could choose some fuels that you are interested in and have students compare the consumption rates – there is no composite data point since the different fuel types are in different units of measure. It could also be interesting to have students look at what each fuel is being used for. Whether you use the attached spreadsheet, or modify to create your own, have students fill in their charts, copying the values from the data summary, and calculating the per capita values by dividing each cell by the population of residents in the vision.

Per capita values will account for changes to each value that are correlated with changes in the population. For example, if a lifestyle change causes a 10% increase in population and also a 10% increase in piped water, if you use the total values for piped water you will see this increase without accounting for the fact that there are also now more people in the vision extent using water. The population may not in fact be using more water individually. These two comparisons lead to different conclusions about the impact of the lifestyle.

A column is included in the spreadsheet for students to calculate the percent change for each parameter between lifestyle. Calculating percent change adds an additional math component and also aids students in their comparisons of lifestyles, as percent change will help to illuminate the effects of lifestyle on each parameter. So, as students record their data from Visionmaker they should also make these calculations that can then be compared across all lifestyles, when students combine and compare their work.

For these calculations, students should use the following formula:

Percent Change = (My lifestyle per capita-Average NY per capita)/Average NY per capita *100

However, when calculating percent change for population, students will use the raw numbers rather than a per capita calculation since a per capita calculation for population does not make sense. For this reason, Xs have been placed in the attached spreadsheet for the cells corresponding to per capita population.

Once each lifestyle has been recorded, students should be given a few minutes to analyze their data. They should become “expert” on their lifestyle, noting trends and major changes. Then students should pool the data from all the lifestyles. You can use a more high tech option, where students enter all their data in a common shared spreadsheet, for example a Google spreadsheet, and thus once each group has recorded their data, it will already be pooled and accessible to all students. Or, you could opt for a low tech version, where each student or group is given the printed chart to fill in and then data can be pooled onto one computer and projected, or on chart paper or a white board, whatever makes sense for the classroom.

Each student/group can discuss their findings for the lifestyle they analyzed. What trends do they notice? Were there any surprises? What do they like or dislike? Which lifestyle do they think is best? Why?

Hopefully, the take away should be for students to see the significant impacts that lifestyle can have on consumption and waste.

Another optional conversation could be to get students thinking about why they think some of these changes take place, e.g. what differences might there be between New York City life and the Average American that would result in changes in water usage? If students have engaged in lesson 1 activities, they can draw from their knowledge about density here. Do most New Yorkers have lawns, or wash their cars in the driveway? This will lead into the final activity where they will calculate their own carbon footprint and think about their own lifestyles and efforts they can take to reduce their impact on the environment.

Part 2: Lifestyle and Population (One 45-50 minute class period)

The goal of this activity is to reinforce the significance of lifestyle and make the connection between lifestyle and population.

Each group of students represents a community. Each community has a resource demand – group 1 requires 1 unit of resources per person, group 2 requires 2 per person, group 3 requires 3, group 4 requires 4, and group 5 requires 5 units of resource per person. Each group is given 20 resource items (these can be represented by almost anything – popcorn, candy, golf balls, stickers, etc.) and must calculate how many people they can accommodate in their community with the given resources. Will all group members be able to live there? Would they welcome new members? Why?

Example:

Group 1 should be able to determine that they would be able to maintain a population of 20 people with their resources, while group 5 can only support 4 individuals.

Share out these answers among all groups – what can be concluded? Students should notice that with a fixed amount of resources a community can support more low consuming individuals, or fewer higher consuming individuals.

If you have done Lesson 1 with the students ask them how lifestyle and population are connected. Guide a conversation to help students make the connection that depending on the lifestyle of a population, an area can support a larger or smaller population. Basically, the same amount of resources can either support a small population of people who consume a lot or a large population of people who consume less. This is related their exploration of urbanization and

density – if increased density reduces consumption, a larger population can be supported in cities than would be possible at lower densities.

You can also make the connection to carrying capacity in the wild. Humans may often seem separate from nature but in reality the same principles apply to us. The environment has a fixed level of resources and can only support a certain number of individuals. That number varies, however, based on lifestyle and consumption.

Additionally, there is a connection to food chains and energy pyramids. For example, meat eaters tend to have smaller populations because it requires more energy to grow a rabbit than a bush, and energy is lost as you move up the pyramid. The bush requires energy input from the sun, while the rabbit requires multiple bushes to survive and a hawk, e.g., then requires multiple rabbits to survive. There must, therefore, be fewer hawks than there are rabbits and fewer rabbits than there are bushes for the ecosystem to balance. The same holds true for humans – eating meat requires more energy from the environment than eating only plants. So eating meat is a higher consumption pattern, which can thus support fewer people given the same amount of resources or land.

ACTIVITY 3:

Ecological Footprint (One 45-50 minute class period)

Now that students have explored the impacts of differing lifestyles and the relationship between lifestyle and human population, it is important for them to explore the meaning behind these differences.

What does *their* lifestyle look like? What are *their* consumption and waste behaviors?

Have students visit an ecological footprint calculator (two suggestions are listed below)

http://www.earthday.org/take-action/footprint-calculator/ (this is a nice interactive version that also has information about what an ecological footprint is)

http://meetthegreens.pbskids.org/features/carbon-calculator.html (this calculator is specifically for kids)

Alternatively, there are also paper and pencil versions that are available online.

Depending on which calculator you choose, you may need to provide students with some background information or definitions to make some of the pieces make sense to them. For

example, students may need assistance in calculating how far they drive, or figuring out what type of building they live in.

After students have calculated their footprint and seen how many earths it would take if everyone lived like they do, spend a few minutes discussing the implications of this. What does that mean? This means that it is not possible for everyone on earth to live the way we do, we simply do not have enough resources. As we saw in the previous activity, we either need to reduce our consumption or reduce our population.

Now, make sure students spend some time exploring ways to reduce their footprint – what are some choices they could make to decrease their footprint on the planet. The calculators provide this option. They can revisit parts of the quiz, change answers to see the impact it would have and thus learn some ways they could decrease their ecological impact.

Have students share out some of these ideas and create a written brainstorm on the board. Then have every student choose one behavior/action that they want to commit to and create a pledge wall – this could take the shape of an earth or a tree or just a big square where each student (and the teacher) can place a written pledge (in the shape of a leaf, or water droplet, or square, etc.) with one thing they will change to reduce their environmental impact.

If you are able, revisit this wall each month, or as frequently as possible, to check how people are doing – are they still struggling? How can they be successful? Could the class help them? If they have succeeded, can they add something else? Can anyone offer tips to their classmates?

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Student Name: _____

Lifestyle Comparison Worksheet

	Average New Yorker	Per Capita	My Lifestyle	Per Capita	Percent Change
population		X		X	
residents		X		X	
workers		X		X	
piped water					
runoff					
foods eaten					
Greenhouse Gases					
wastes					
fuels consumed					
biodiesel					
ethanol					
municipal solid waste					
wood and other biomass					
coal					
diesel/light fuel oil					
gasoline					
jet fuel					
kerosene					
natural gas					
natural gas compressed (CNG)					
Natural gas liquefied (LNG)					
propane/LPG					
residual fuel oil					
miles					
freight miles by airplane					
freight miles by barge					
freight miles by bicycle					
freight miles by pipeline					
freight miles by train					
freight miles by truck					
personal miles by airplane					
personal miles by bicycle					
personal miles by bus					
personal miles by ferry					
personal miles by personal motor vehicle					
personal miles by streetcar					
personal miles by subway					
personal miles by taxi					
personal miles by train					
personal miles by walking					