

ENVIRONMENTAL LAW

EQ #2- How are Humans Impacting the Environment?



MONDAY DEC 9

- How many people live in the world today?
- Where do most people live?
- How does human population affect the earth in terms of resource use and habitat degradation?

EQ # 2 HOW ARE HUMANS IMPACTING THE ENVIRONMENT?



WHY PROTECT THE NATURAL WORLD?

- So why protect the natural environment?
- Are laws today balanced? Do they go far enough?



WHAT DOES THE EARTH DO FOR US?

- All life and economies depend on:
 - Energy from the sun - Provides heat, wind, & biomass
 - The earth's resources - Such as forests, minerals, soil, air & water.
 - The earth's ecological services- Such as **nutrient cycling, pollution control, water storage, climate control, pest and disease control, waste treatment**

WHAT DOES *SUSTAINABLE* MEAN?

- An environmentally sustainable society meets the needs of its people indefinitely without degrading or depleting natural resources.
- **What are Sustainable Practices?**- Actions that promote the conservation of resources.
What's an everyday example?
- What are some ways we as Americans are NOT living sustainably?

THE GREATEST HUMAN IMPACTS ON THE ENV

- These FIVE major human impacts lead to the greatest environmental problems-
- 1. Population growth
- 2. Over harvesting resources
- 3. Habitat loss
- 4. Loss of Biodiversity / Invasive Species
- 5. Pollution

1. POPULATION

- World population is now about 7.7 billion
- Many believe Earth can support 9-10 billion at the most.
- We are projected to have 10 Billion people by 2050.
- Competition for resources puts stress on the natural world.

WHICH COUNTRIES ARE THE LARGEST?

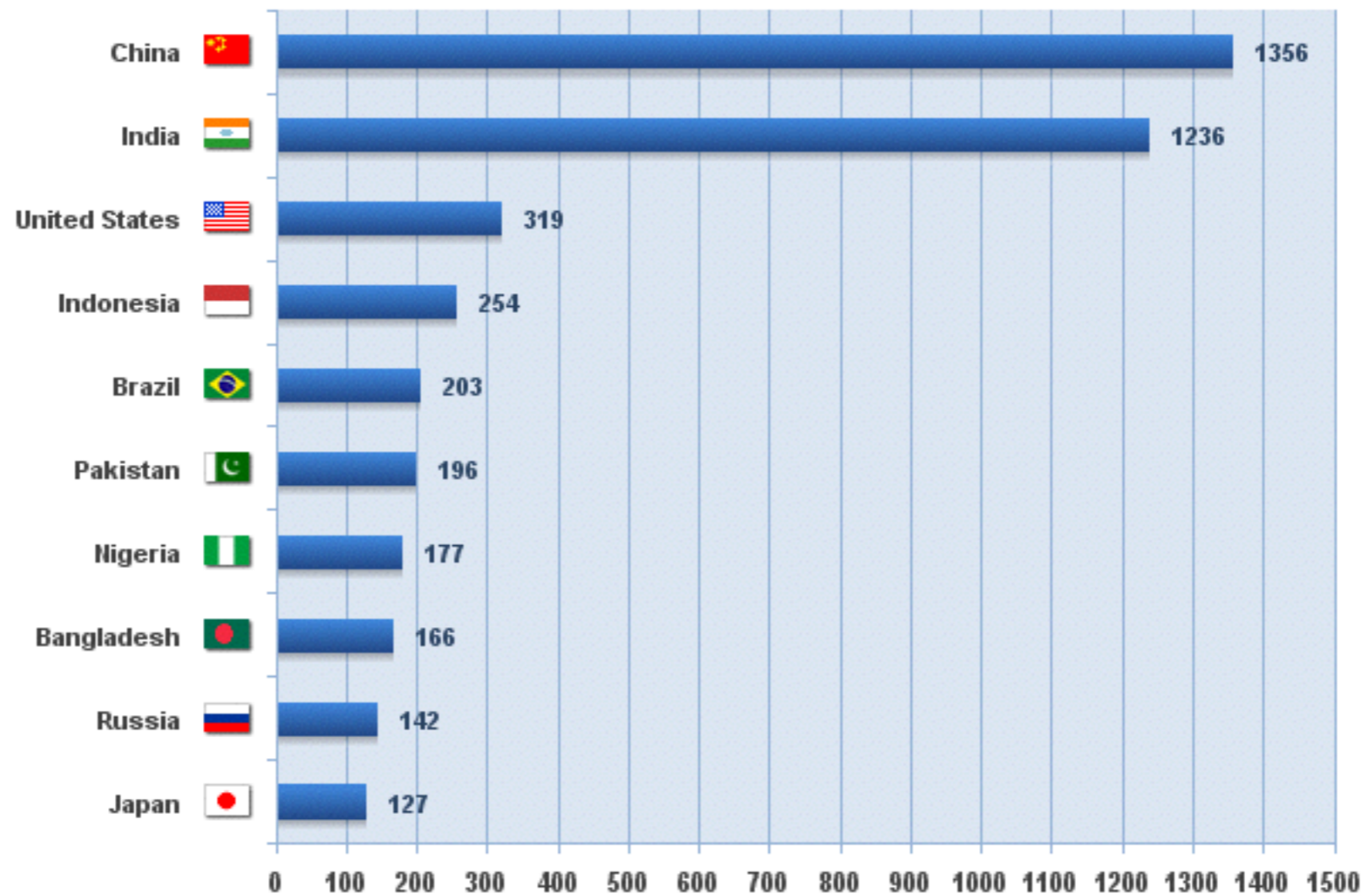
- Brainstorm a list of the TOP FIVE most populated countries...

WORLD POPULATION 2019

- Rank Country Population
- 1. China 1,436,233,261
- 2. India 1,372,415,033
- 3. USA 329,921,215
- 4. Indonesia 271,904,528
- 5. Brazil 211,716,526

WORLD POPULATION

10 Most Populated Countries in the World
Population in Millions - June 30, 2014



WHY HAS POPULATION GROWN SO FAST?

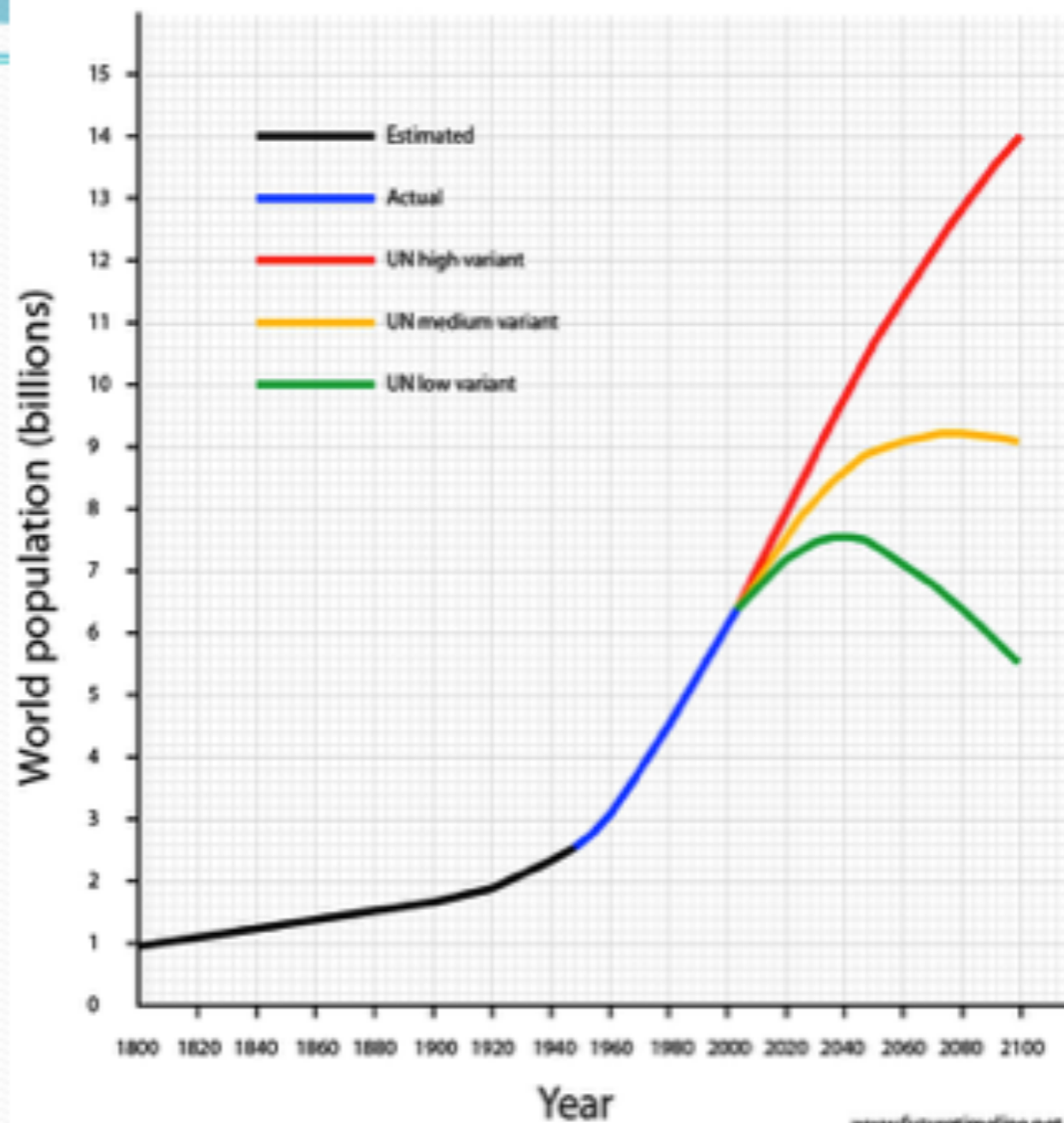
The Human Population Over Time

The time it takes our population to double has decreased sharply.

It only has taken about 12 years to go from 6-7 billion people.

We are projected to hit 9 billion near the year 2050.

Estimates say stabilization around 2100. (10.5 billion)



WHY OUR POPULATION HAS GROWN SO

- Humans have the ability to live in all climate zones and habitats
- Modern agriculture has allowed us to produce food very efficiently and in large quantities
- Death rates decreased due to better health care (most important) and sanitation
- .

HOW FAST ARE WE GROWING?

- The current global population growth rate is about 1.3% (and slowing).
- Most growth is in **developing countries.**
- If growth rate is slowing, why is population increasing so much???

WEBSITES ON POPULATION

- **What's your number (BBC)**-<https://worldpopulationhistory.org/my-population-number/>

Use your phone to check your number from this site...

Population Clock (census)

<http://www.census.gov/popclock/>

Population growth video (dots)

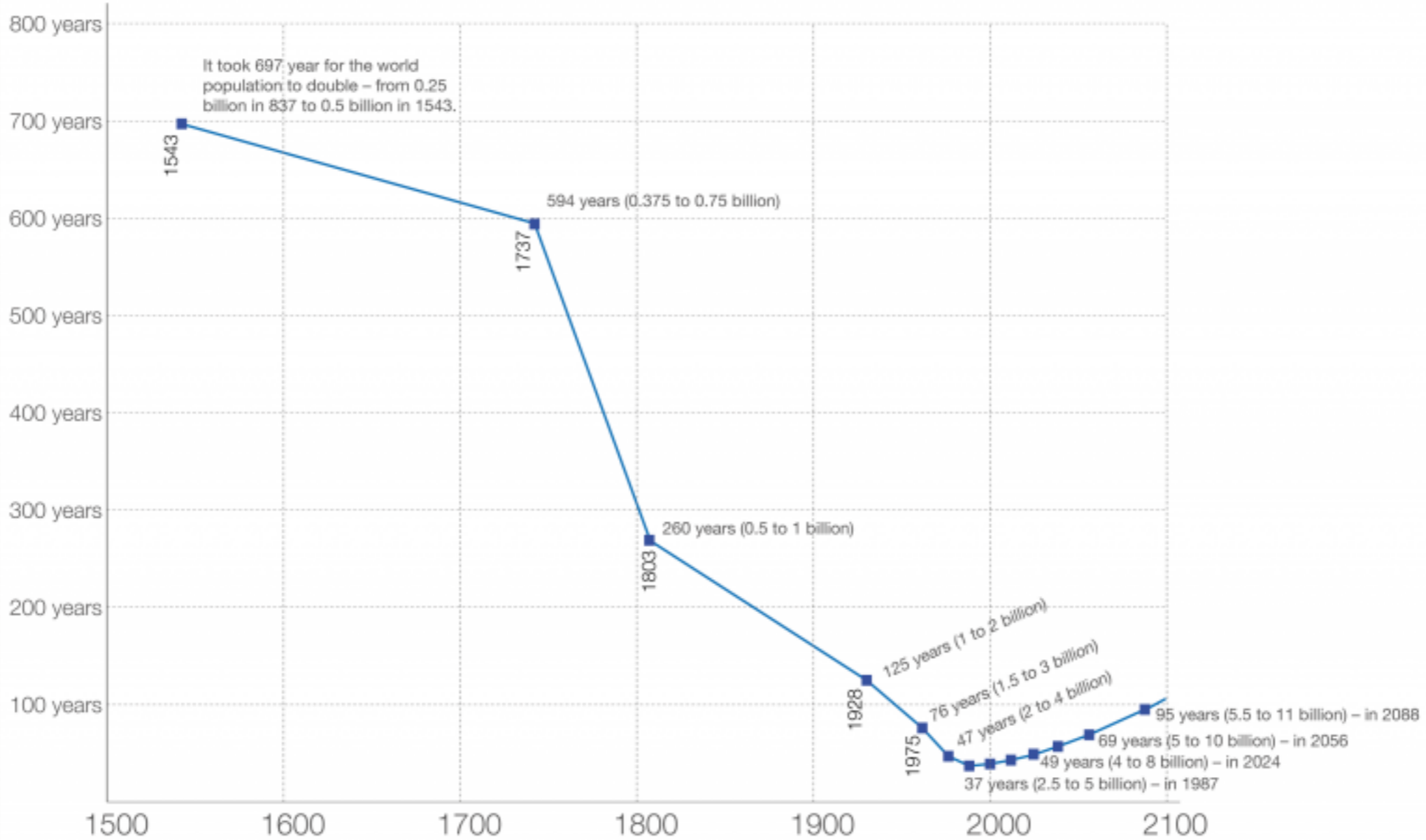
<https://www.youtube.com/watch?v=khFjdmp9sZk>

- Video– <https://www.prb.org/world-population-by-the-billion/>

Time it took for the world population to double

Historical estimates of the world population until 2015 – and UN projections until 2100

Our World
in Data



Data source: OurWorldInData annual world population series (Based on HYDE and UN until 2015. And projections from the UN after 2015 ('Medium Variant' 2015 Revision).

The data visualization is available at [OurWorldInData.org](https://ourworldindata.org). There you find the raw data, more visualizations, and research on this topic.

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ACTIVITY- EXPLORE WORLD POPULATIONS

- Get a Computer
- Use the site- <https://www.worldometers.info/world-population/>
- Explore the site and record FIVE fun facts in your INB on the LEFT side with the title, *World Populations*.
- Find the Population Wizard that shows you how many people lived in the world when you were born and record.

TUESDAY 12/10

- What is the connection between resource consumption and population?
- How are developed and developing countries different in terms of population growth and consumption?
- What are the effects of your resource consumption?

THREE FACTORS THAT EFFECT ENVIRONMENTAL IMPACT

- Not all populations have the same impact
- Impact is a calculation of **Population** size, **rate of resource consumption** and use of **technology** that, in combination, create environmental impact.



- Watch Film Clip- <http://study.com/academy/lesson/economic-inequality-differences-in-developed-and-developing-nations.html>

FILM QUESTIONS

- What is per capita income?
- Describe a **developed** country; describe a **developing** country.

HOW DOES ENVIRONMENTAL IMPACT DIFFER?

- **DEVELOPED countries** -Are MORE industrialized, have HIGHER income per person (\$12,000 and above) and MORE infrastructure (roads, electricity grids, ...).
 - Have LOWER populations (1.3 billion of world pop) but consume far more per person (up to 88% of world's resources).
- The **use of technology** in developed nations adds to resource use and pollution

HOW DOES ENVIRONMENTAL IMPACT DIFFER?

- **DEVELOPING Countries -**
 - Are LESS industrialized, have LOWER income per capita(\$0-11,999), have LESS infrastructure.
 - Consume less per person but have higher populations and more harsh living conditions (pollution; poor access to health care...)
- Moderate (Mexico, China, ...) = 4.9 Billion people
- Have **HIGHER** fertility rates



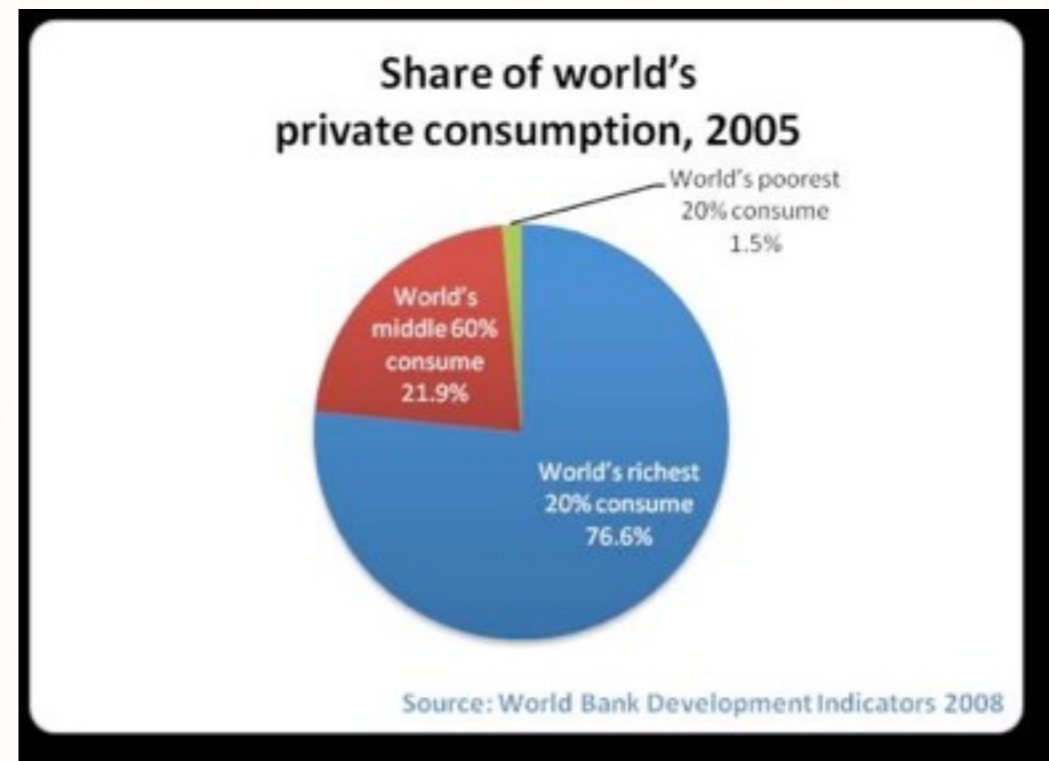
POPULATION AND ITS EFFECTS

If undeveloped countries consumed at the same rate as the US, four complete planets the size of the Earth would be required.

Americans constitute 5% of the world's population but consume 24% of the world's energy.

▪ On average, one American consumes as much energy as

- **2 Japanese**
- **6 Mexicans**
- **13 Chinese**
- **31 Indians**
- **128 Bangladeshis**
- **307 Tanzanians**
- **370 Ethiopians**



POPULATION'S EFFECTS ON THE ENVIRONMENT

- World population is growing fast; faster in developing countries; this strains resources.
- Earth's carrying capacity (the number of humans it can support in terms of their food, shelter and space needs) is estimated at 10 billion; we could reach this # by 2050
- Citizens in developed countries consume far more resources per capita (person) than developing countries

ACTIVITY- ECOLOGICAL FOOTPRINT

- How does your lifestyle impact the earth? Find out!
- How many Earths would it take if everyone lived like you?
- <http://www.footprintcalculator.org/>



ECOLOGICAL FOOTPRINT DEBRIEF Q'S

- 1. How many earth's does it take to support your lifestyle? What were your numbers for **Carbon Footprint**? What % is your carbon footprint? How much cropland do you need? Are you surprised? Write a brief reaction.
- 2. If you wanted to limit your impact, what **THREE** things could you do (realistically) to reduce it?
- 3. What do you think? Write a brief reflection about resource consumption and its effect on the environment. How important is this issue?

CONSUMPTION OF RESOURCES

BANGLADESH



COSTA RICA



× 1.4

INDIA



NEPAL



× 1.9

UGANDA



FRANCE



× 2.5

UNITED STATES
of AMERICA



× 4.1

POPULATION SCAVENGER HUNT

- **PART 1-** Analyze the Population Infographic online (A Quick Trip to 7.6 Billion e-poster).
- With a table partner, answer **FIVE questions** (you pick) after reviewing the data.
- **PART 2-** Form a team of **FIVE** and get a group question from Helen. Discuss and record an answer; share out with class.

WEDNESDAY 12/11

- Warm-Up from this week's learning
- Finish Population Scavenger Hunt Activity
- Start Overharvesting
- Where to find notes you missed? Website

WARM-UP

- 1. Why are environmental laws necessary? Explain **THREE** reasons.
- 2. How many people live in the world today? Where are most?
- 3. What is *per capita income*?
- 4. What are **THREE** key differences between **developing** and **developed** countries?

FINISH POPULATION SCAVENGER HUNT Q'S

- Answer any FIVE Q's with a partner while viewing the *Quick Trip to 7.6 Billion* Poster

POPULATION INFO CARDS

- Analyze the Population Info cards.
- With a table partner, write THREE questions you have after reviewing the data.
- Write THREE important observations from the data that you noticed / thought relevant.

POPULATION KEY TERMS

- **Total Fertility Rate-** Average # of children born per woman in a country
- **Replacement Fertility Rate-** Rate at which a population exactly replaces itself from generation to generation; is about 2.1 in most developed countries; higher in undeveloped.
- **Life Expectancy-** Average age men and women can expect to live; varies by country; higher for developed countries.

THE WORST HUMAN IMPACTS ON THE ENVIRONMENT

- These FIVE major human impacts lead to the greatest environmental problems-
- 1. Population growth
- 2. **Over harvesting resources**
- 3. Habitat loss
- 4. Loss of Biodiversity / Invasive Species
- 5. Pollution

2. OVER HARVESTING

- Over harvesting plants and animals leads to the depletion of a species to very low numbers or even extinction.
- When one species is over harvested, the food web is unbalanced and other species are affected, too.
- View film clips at <http://www.britannica.com/EBchecked/topic/133385/conservation/272685/Overharvesting>

GO FISH!

- Teams of FOUR
- One Data Sheet per team
- One cup of fish, four paper towels, four straws and one ocean (plate) per team
- Put 30 fish in your team's ocean (on plate)
- Each team member has 1 straw and 1 paper towel

THURSDAY

- Overfishing Research & Guided Questions
- Helen away at training
- Get the assignment from Helen if you were absent
- Due Friday in class

FRIDAY

- Debrief Go Fish Activity
- Discuss Overfishing

GO FISH DEBRIEF

- Discuss the Debrief Questions with your team
- Write up answers in YOUR INB on the LEFT side.
This is for 10 points. Be thorough.

OVER-HARVESTING- TRAGEDY OF THE COMMONS

- What is the idea behind of the “tragedy of the commons?”
- What are some examples of it you are aware of today?
- Are there any problems with the theory? Explain.
- <http://study.com/academy/lesson/tragedy-of-the-commons-theory-definition-examples.html>

WHAT IS THE TRAGEDY OF THE COMMONS?

- It is the depletion or degradation of a renewable resource to which people have unmanaged access
- **Why does it happen?** Because people are self-interested and
 - Many think the earth's resources are unlimited
 - Many believe their use of the resource is justified and has a minimal effect since they are just one person using the resource.

OVERFISHING

- Read the handout on overfishing in the oceans.
- Read the article about shrimp fishing in Canada
- As you read, underline FIVE facts that stand out to you as important.
- Pair share your FIVE facts
- Write a ONE Paragraph reflection about overfishing in your INB.
- <http://www.fishonline.org/information/Pocket+goodfishguide>

OVERFISHING REFLECTION

- Write a one-paragraph response to the prompt-
- What is the main problem with overfishing? How can overfishing one species have a ripple effect? How is overfishing an example of the Tragedy of the Commons?

- **BIOMASS-** The number (in weight) of a fish species population
- **Carrying Capacity-** The number of organisms an ecosystem can support (for food, space and other needs)

THE WORST HUMAN IMPACTS ON THE ENVIRONMENT

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3. HABITAT LOSS

- Describes the loss of natural ecosystems due to human activities.
- Is the #1 cause of endangerment and extinction for plants and animals
- **EXAMPLES- Deforestation; development; road-building; plowing farmland, etc.**

ACTIVITIES THAT CAUSE HABITAT LOSS

- Is mostly due to
- 1. Land conversion for development- Filling wetlands, cutting forests, and plowing fields
- 2. Agriculture- Much done long ago when forests were cleared for cropland; chemicals used on crops degrade water and soil today
- 3. Water development- Dams and other diversions siphon off and disconnect waters

TYPES OF HABITAT LOSS

- 1. Habitat Destruction- Clearing forests, filling wetlands, building roads and buildings on sensitive lands
- 2. Habitat Fragmentation- Much of the remaining undeveloped land has been cut up into small pieces NOT large enough for wildlife
- 3. Habitat Degradation-Use of chemicals or disruption of land so it no longer supports species

DEFORESTATION

- Causes of Deforestation - National Geographic
- <https://www.youtube.com/watch?v=Ic-J6hcSKa8>

MONDAY 12/16



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4. LOSS OF BIODIVERSITY

- Biodiversity is the number and variety of organisms living in an ecosystem
- It is being limited by pollution, climate change and invasive species

Biological
+
Diversity
=
Biodiversity



TYPES OF SPECIES

- **Native-** Plants and animals historically evolving in and currently residing in an ecosystem; live in balance with other species in that ecosystem
- **Non-Native-** Species introduced to an ecosystem (intentionally or accidentally) by humans; don't harm native species.

LOSS OF BIODIVERSITY

- **INVASIVE Species-**
Are plants and animals introduced to a new ecosystem (like non-native).
- Outcompete native species for resources and displace them.
- Harm ecology, economy, health and activities of a region.



WHY ARE INVASIVE SPECIES A PROBLEM?

- How do invasive species affect Oregon today?
- **Watch Film Clip-** *Silent Invaders* (PBS)
- <http://watch.opb.org/video/1274375861/>

INVASIVE SPECIES IN OREGON

- Use the sites and handout. For your species, include a picture and the following information:
- **Research and record the following information-**
 - *Common & Scientific Name
 - *Physical Description + Picture
 - *Ecology (habitat, food, space needs)
 - *How did it get here?
 - *Why is it a threat? Ecologically, economically and / or to human health?
 - *What is being done?

WEDNESDAY

- FILM Clip
- Warm-Up in INB
- Wrap up EQ #2 Notes- Pollution
- Work time on your Invasive Species Poster assignment. Due FRIDAY April 12th!
- Use your assigned computer, please

WARM-UP

- 1. What is causing **habitat loss**? Answer by describing the **THREE** specific **human activities** that threaten ecological habitats on earth.
- 2. Describe the **THREE** ways habitat is harmed for species. Give an example of each.
- 3. What is **biodiversity**? Explain its **TWO** qualities.
- 4. How is biodiversity tied to habitat loss?
- 5. What **TWO** qualities do **invasive species** have?

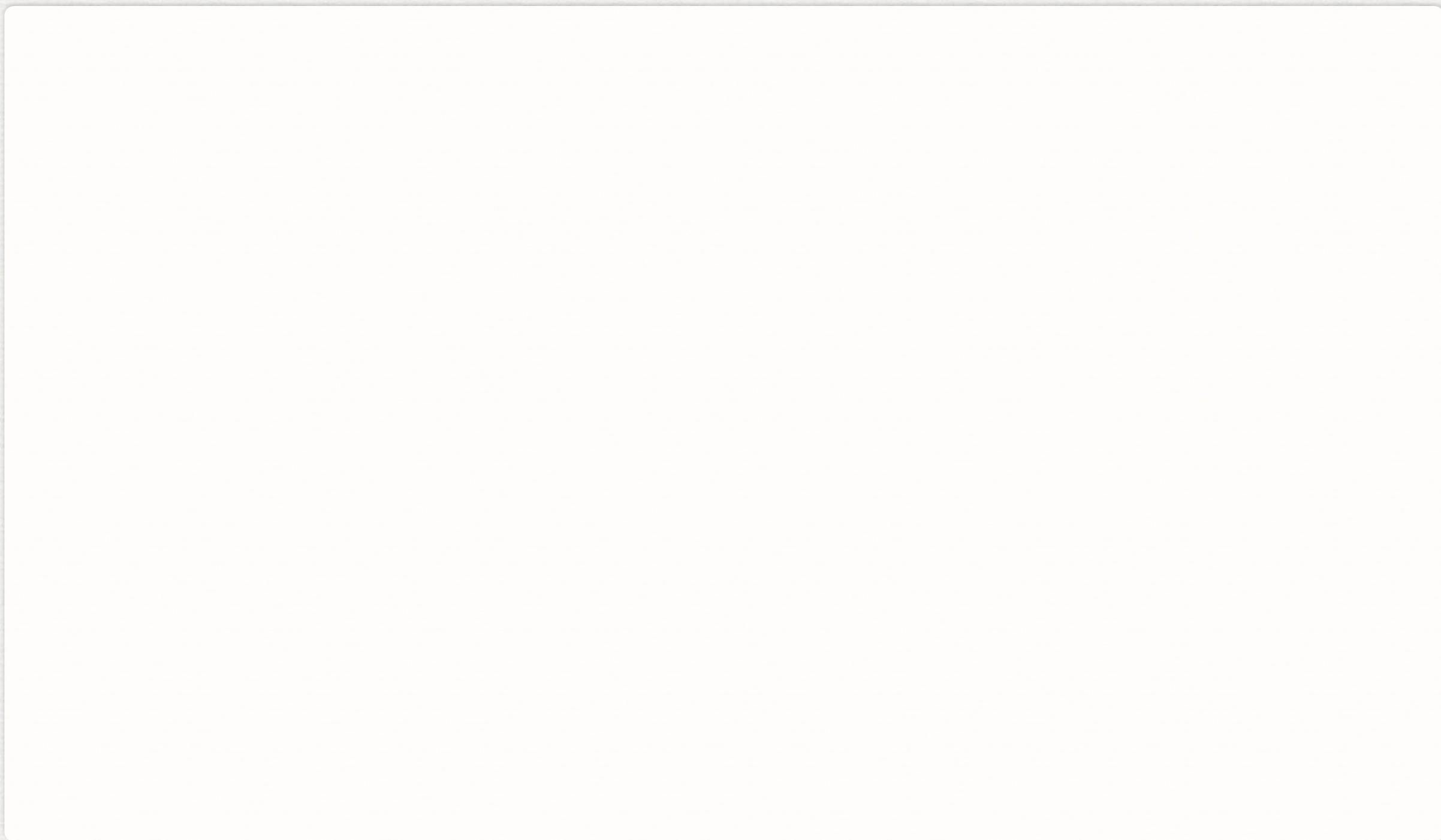
5. POLLUTION

- Is the disruption of the natural components of earth's resources (air, water, soil...) from industry & transportation.
- Damages the natural environment and human health.
- Sewage, trash, exhaust, agricultural and household chemicals, car and industrial emissions,



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THURSDAY

- Invasive Species Gallery Walk Activity
- Wrap up Unit 1 Notes- Pollution

GALLERY WALK DIRECTIONS

- **Rounds 1-3-** Learn about **THREE** other invasive species or give information about your species to **THREE** other groups. I will rotate you every **FOUR** minutes. Please don't move on until I tell you to.
- **Rounds 4-6-** Switch roles and give (if you were getting) or get (if you were presenting) information on **THREE** species.
- You should have **THREE** new species recorded today!

DO ONE LAST ROUND

- Find a pair or person you haven't heard from yet and exchange information with them for a FOURTH invasive species for your grid.
- Return to your seats when you're done. Answer these Debrief Questions on the bottom of your sheet-
 1. What pattern(s) do you see in the invasive species you learned about? Cite 2-3.
 2. Which was the worst, in your opinion? Why?

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- 5. **Pollution**