Sustainability Merit Badge

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- Introductions
- **Goal**—to start the Sustainability Merit Badge today and set yourself up to complete it successfully in the next 5-8 weeks
- Participation
  - Listen and participate, fill out worksheets
  - Ask questions
  - Treat place, instructors and fellow scouts with respect
  - Bring your experiences to the table

- Next Steps
  - Hand in blue cards at the end
  - Do “homework” requirements
  - Email LeighBehrensBSA@gmail.com **by May 15** to get rest of requirements checked off
  - You will get partial or completed blue card back after May 15
- Housekeeping
  - Restrooms
  - Safety: Fire exits, first aid

Requirement 1. Write in your own words the meaning of sustainability

Write in your own words the meaning of sustainability. Think of how conservation and stewardship of our natural resources relate to sustainability.

Intro to Sustainability

EPA definition: Sustainability says that everything we need for our survival and well-being depends on our natural environment (directly or indirectly). Sustainability means humans and nature can coexist productively, and present and future generations have their social, economic and other requirements met.

http://www.epa.gov/sustainability/basicinfo.htm

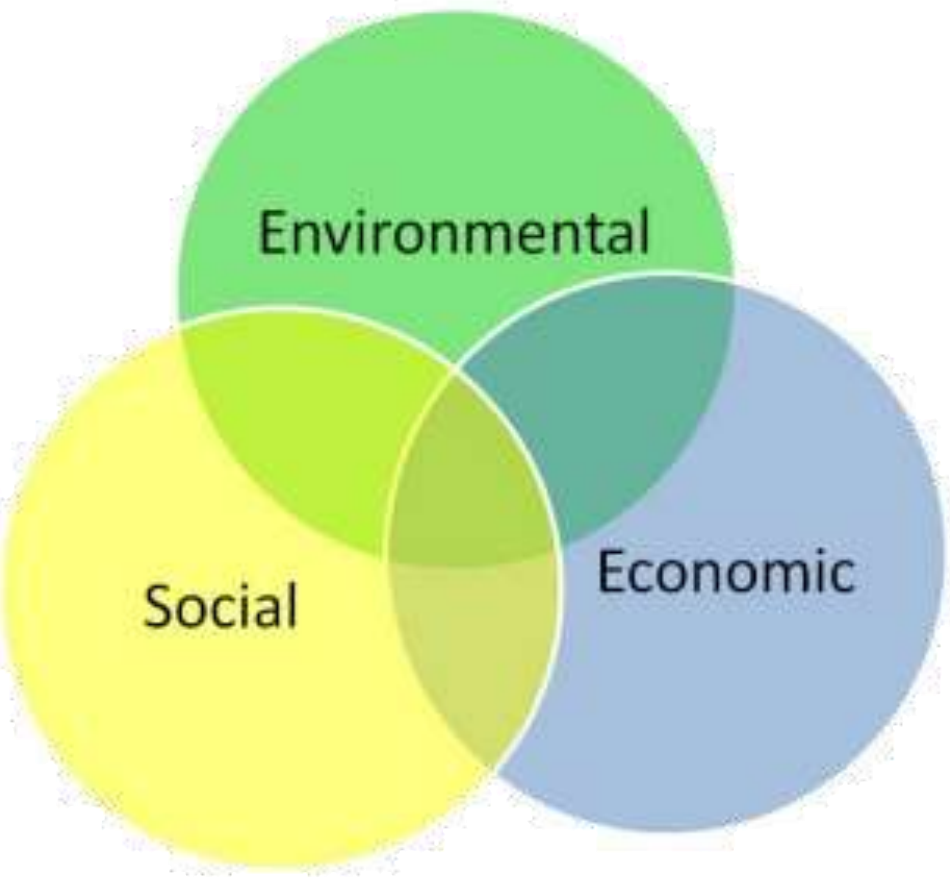
In plain English:

- Sustainability means thinking about people, the environment and systems, and how they're all connected and dependent on each other. It means not shortchanging tomorrow by only thinking about today.

3 Pillars of Sustainability

- **Environment:** Natural systems support the life of all things. Bees pollinating crops, forests filtering pollutants from air, and wetlands purifying water are valuable.
- **Economics:** The flow of money and growth are critical to business, which can benefit quality of life. Green jobs and production efficiency are examples of economic sustainability.
- **People:** Our family and communities are the engine of our economy, and depend on the environment. Long-term health and welfare of people is intertwined with the other two pillars of sustainability.

3 Pillars of Sustainability



Homework: sustainability family meeting

- Have a family meeting, and ask family members to write down what they think sustainability means. Be sure to take notes. You will need this information again for requirement 5.
  - This will complete Requirement 1.

Requirement #2

Sustainability Merit Badge

Requirement 2: Discuss the following sustainability topics

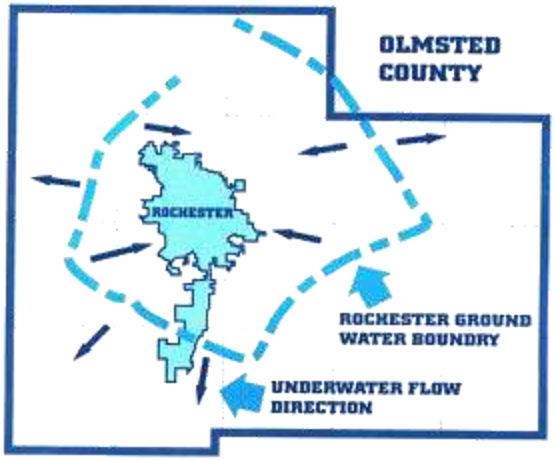
- Water
- Food
- Community
- Energy
- Stuff

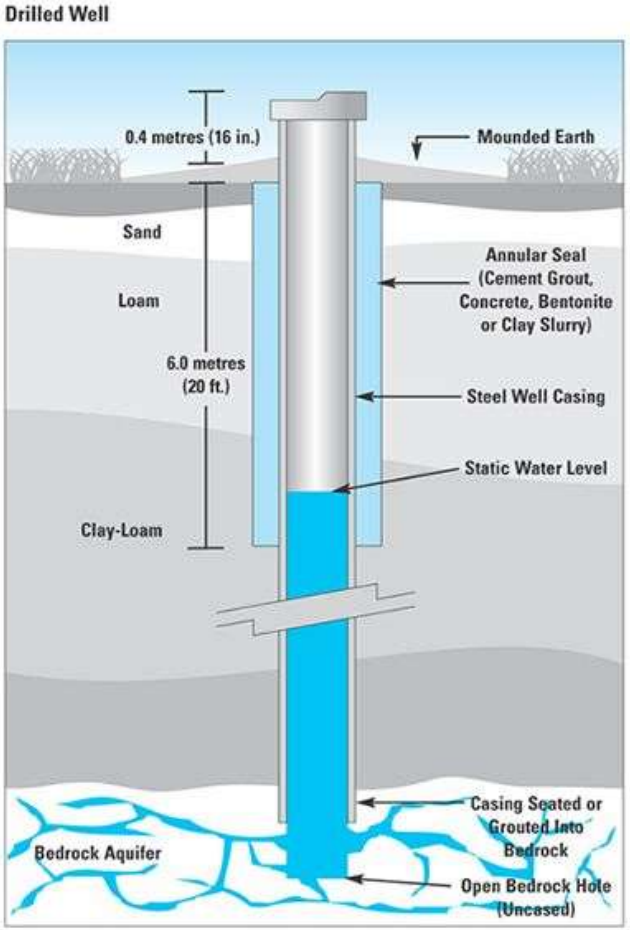
Requirement 2: Water

- Where does your water come from, and where does it go?
- Edmonton, Canada video:
  - http://youtu.be/Msqu4cAQ76U?t=9s

Where does our water come from?

- Ground water (wells)
- Surface water





Source: *Best Management Practices: Water Wells* (Ontario Ministry of Agriculture, Food and Rural Affairs/Agriculture and Agri-Food Canada)

Where does our water come from?

- Ground water (wells)
- Surface water

Where does our water go?

Classwork: Water diagram

Draw a diagram showing how your household gets its clean water from a natural source and what happens with the water after you use it.

- Include water that goes down the kitchen, bathroom, and laundry drains, and any runoff from watering the yard or washing the car.
- Tell two ways to preserve your family's access to clean water in the future.
- This will complete Requirement 2 (Water), option B

Water consumption at home

rpu
we pledge, we deliver
www.rpu.org

Business Partner Name:	JOHN DOE	Statement Date:	09/28/2010
Business Partner Number:	1234567890	Amount Due:	$252.54
Contract Account Number:	123456789000	Due Date:	10/28/2010

ROCHESTER PUBLIC UITILITIES BILLING DETAILS

ACCOUNT ACTIVITY

Balance Forward	$133.05

ROCHESTER PUBLIC UTILITIES CHARGES

RESIDENTIAL ELECTRIC
Meter # 69295 Readings
JUN 01 51302 — Estimated reading
MAY 02 50585 — Actual reading =

(1) Energy Charge	
(2) Energy Charge	
(3) Energy Customer Charge	
(4) Clean Air Rider	
Power Supply Adjustment	
RESIDENTIAL	

RESIDENTIAL WATER
Meter # 21424248 Readings
JUN 01 401.59 — Estimated reading
MAY 02 395.00 — Actual reading

(5) Water Usage Charge	
(6) Water Customer Charge	
(7) Fire Hydrant Facilities Charge	
(8) State Mandated Water Charge	
RESIDENTI	

CITY OF ROCHESTER CHARGES

RESIDENTIAL WASTE WATER

(9) 6.00 Unit(s)	
(10) Waste Water Customer Charge	
RESIDENTIAL WASTE WATER	$18.24

RESIDENTIAL STORM WATER

(11) Storm Water Utility Fee	$3.00
(12) Storm Water Customer Charge	$2.00
RESIDENTIAL STORM WATER	$5.00

TAXES

City Tax	$0.40
State Tax	$5.15
TAXES	$5.55

Total charges billed 10/07/2010 — $119.49

RESIDENTIAL WATER
Meter # 21424248 Readings
JUN 01 401.59 — Estimated reading
MAY 02 395.00 — Actual reading — 6.95 Unit (s)

(5) Water Usage Charge	$4.56
(6) Water Customer Charge	$5.26
(7) Fire Hydrant Facilities Charge	$1.16
(8) State Mandated Water Charge	$0.53
RESIDENTIAL WATER	$11.51

R CHARGES

RESIDENTIAL WASTE WATER

(9) 6.00 Unit(s)	$11.30
(10) Waste Water Customer Charge	$6.94
RESIDENTIAL WASTE WATER	$18.24

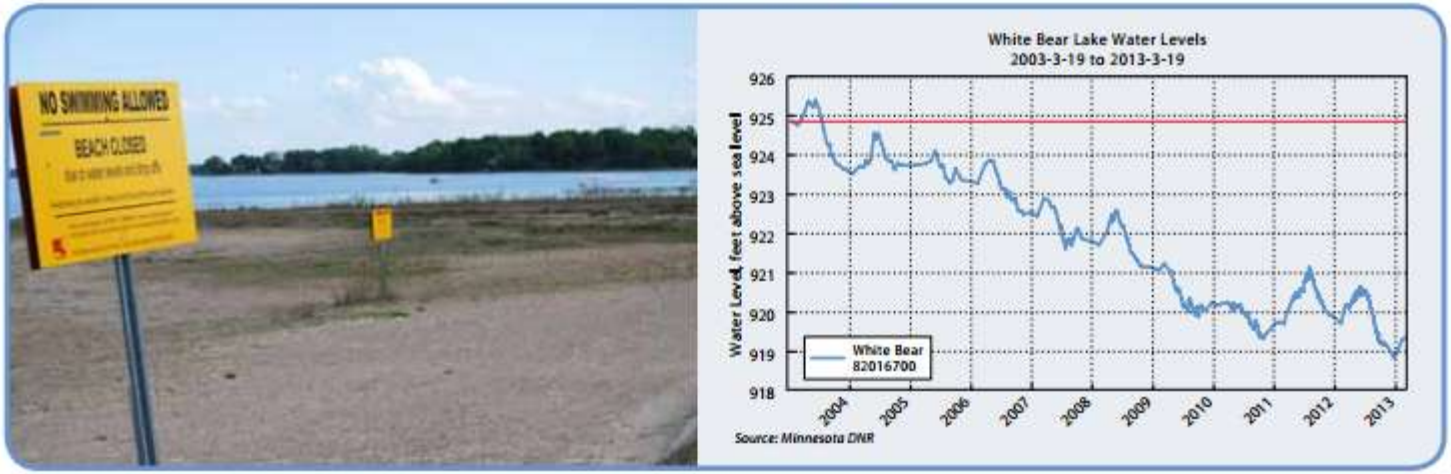
RESIDENTIAL STORM WATER

(11) Storm Water Utility Fee	$3.00
(12) Storm Water Customer Charge	$2.00
RESIDENTIAL STORM WATER	$5.00

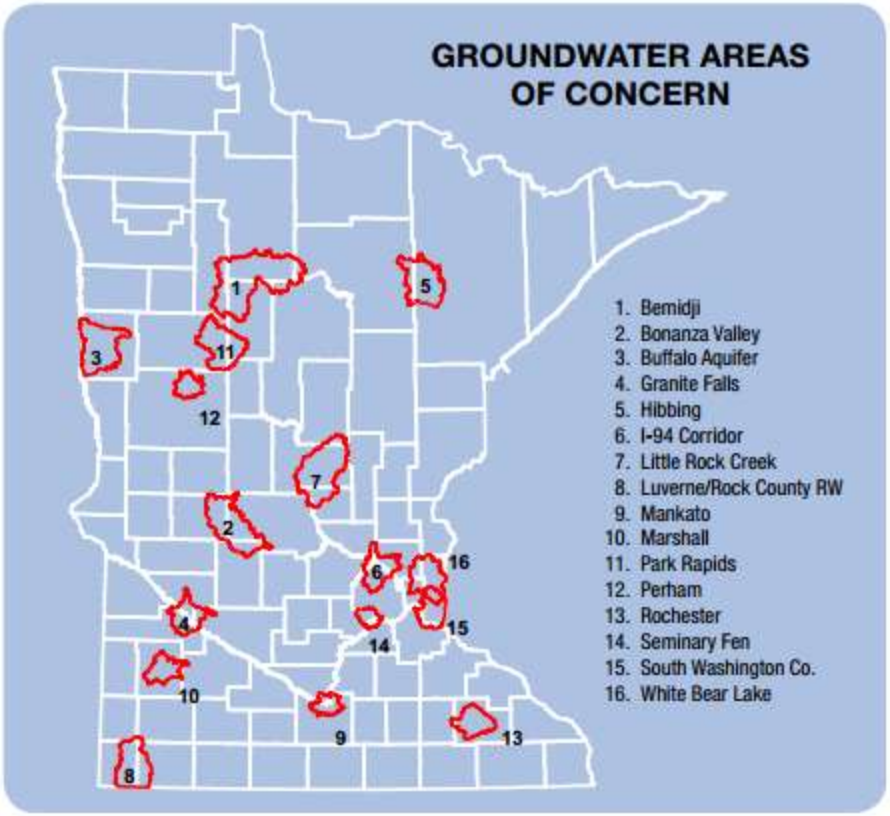
Water Conservation: Why?

- Over-pumping leads to depletion of underground aquifers
- Decreases surface water (lakes)—impacts environment

WHITE BEAR LAKE WATER LEVELS



Water Conservation: Why?



TOP 20 CITIES' GROUNDWATER USE, IN BILLIONS. ABOUT 40% OF MUNICIPAL TOTAL.	
ROCHESTER	4.5
BLOOMINGTON	3.4
MAPLE GROVE	3.3
BROOKLYN PARK	3.3
EAGAN	3.2
PLYMOUTH	3.1
EDEN PRAIRIE	2.9
COON RAPIDS	2.8
WOODBURY	2.6
EDINA	2.5
BLAINE	2.5
MINNETONKA	2.4
APPLE VALLEY	2.3
LAKEVILLE	2.2
ST LOUIS PARK	2.1
BURNSVILLE	2.0
SHAKOPEE	1.8
MANKATO	1.7
WILLMAR	1.5
NEW BRIGHTON	1.3

Ways to save water

Homework: water-saving plan

- Develop and implement a plan that attempts to reduce your family's water usage.
  - As a family, discuss water usage. To aid in your discussion, if past water bills are available, you may choose to examine a few.
  - As a family, choose three ways to help reduce water consumption.
  - Implement those ideas for one month.
- Share what you learn with your counselor, and tell how you think your plan affected your family's water usage.
- This will complete Requirement 2 (Water), part A

Global Perspective: water conservation

- Requirement 2 (Water), option C
  - Research two areas in the world that have been affected by drought over the last three years.
    - For each area, identify a water conservation practice (successful or unsuccessful) that has been used. Tell whether the practice was effective and why.
    - Discuss what water conservation practice you would have tried and why.
    - Discuss your findings with your counselor.

Just for fun… BSA water conservation

- Greywater recycling Shower-houses at 2013 Jamboree
- www.youtube.com/watch?v=xhy73y4RvhA

Requirement 2: Food

- Americans spend about 6% of their household income on food
- In 2012, 36 million tons of food was thrown in the garbage
- There are better ways to deal with food waste then putting it in a landfill or incinerator
  - Reduce methane from landfills
  - Reduce resource use
  - Lower labor/disposal costs
  - Feed people in need

Food Waste Prevention

- **Source Reduction/Prevention:** Preventing food waste before it is created
- **Feeding People:** Donating fresh, wholesome food to those in need
- **Feeding Animals:** Feeding safe, fresh food scraps to animals like pig farms
- **Industrial Uses:** Rendering fats, oils, and grease and turning it into products or biofuel
- **Composting:** Turning food waste into a valuable soil amendment

Ways to Prevent Food Waste

- **Cook/eat what you already have** before…
- **Plan your menu before you go shopping**. Buy…
- **Buy only what you know you will use.** Buying in bulk only…
- **Be creative!** If safe and healthy…
- Nutritious, safe, and untouched **food can be** …
- **Freeze, preserve, or can** surplus…
- At restaurants, **order only what you can**…
- At all-you-can-eat buffets, **take only** …
- **Compost**…

Homework: food log

- Develop and implement a plan that attempts to reduce your household food waste.
- Establish a baseline and then track and record your results for two weeks.
- Share your results to your family
- Report your results to your counselor.
- This will complete Requirement 2 (Food), part A

Conventional Farming

- Why unsustainable?
  - Monoculture
  - No crop-rotation
  - Habitat loss
  - Water use
  - Over-fertilizing
  - Over-pesticide use
  - Destruction of soil
  - Feedlots—environmental hazard

What ways can food be grown/raised locally?

“Think Globally, Act Locally”

- Grow vegetables in garden pots
- Backyard vegetable garden
- Plant fruit trees at your home
- Raise chickens for eggs (if allowed)
- Community gardens
  - Milwaukee: Growing Power
  - www.youtube.com/watch?v=ozvrp_uTH98

Homework: local food

- Write down ways individuals, families, and communities can create their own food sources.
- Tell your counselor how this plan might contribute to a more sustainable way of life if practiced globally.
- This will complete Requirement 2 (Food), option B.

Global Food Scarcity

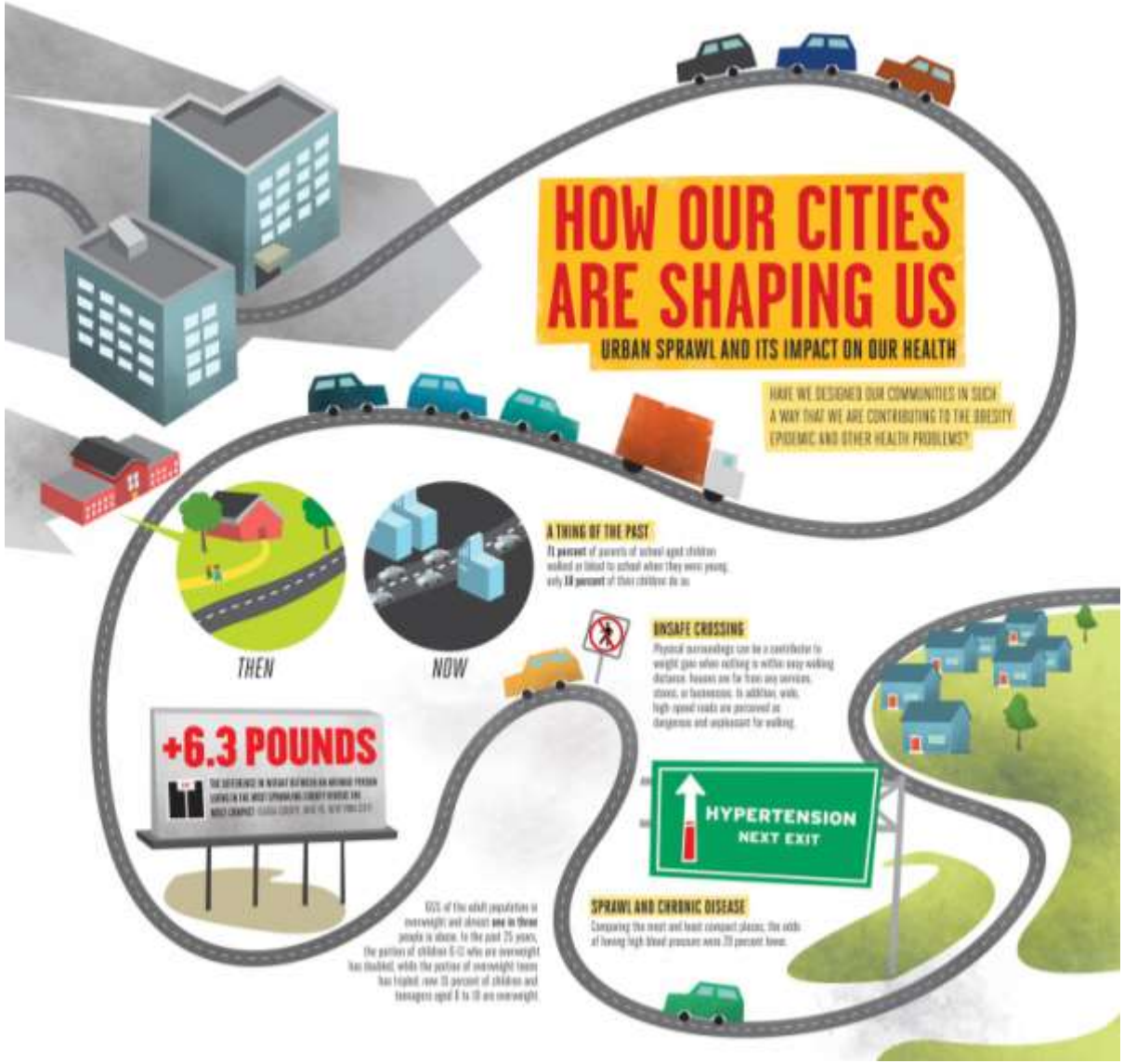
- Requirement 2 (Food) Option C
- Discuss with your counselor factors that limit the availability of food and food production in different regions of the world.
- Tell three ways these factors influence the sustainability of worldwide food supplies.

Requirement 2: Community

- A sustainable community is one that is economically, environmentally, and socially healthy and resilient. It meets challenges through integrated solutions, not fragmented approaches that meet one goal at the expense of the others. And it takes a long-term perspective—one that's focused on both the present and future.

Why is this Unsustainable?

Urban Sprawl



- Must drive everywhere
  - Low "walkability"
- Pollution and run-off
- Loss of or degraded natural habitat
- Increased public works costs
- Lack of community

Classwork: Design a Sustainable Community

- Draw a rough sketch depicting how you would design a sustainable community.
  - Show housing, work locations, shops, schools and transportation systems
- Explain how your design affects
  - energy,
  - pollution,
  - natural resources,
  - and the economy of the community.
- This will complete Requirement 2 (Community), part A

Draw a Sustainable Community

Examples of Sustainable Communities

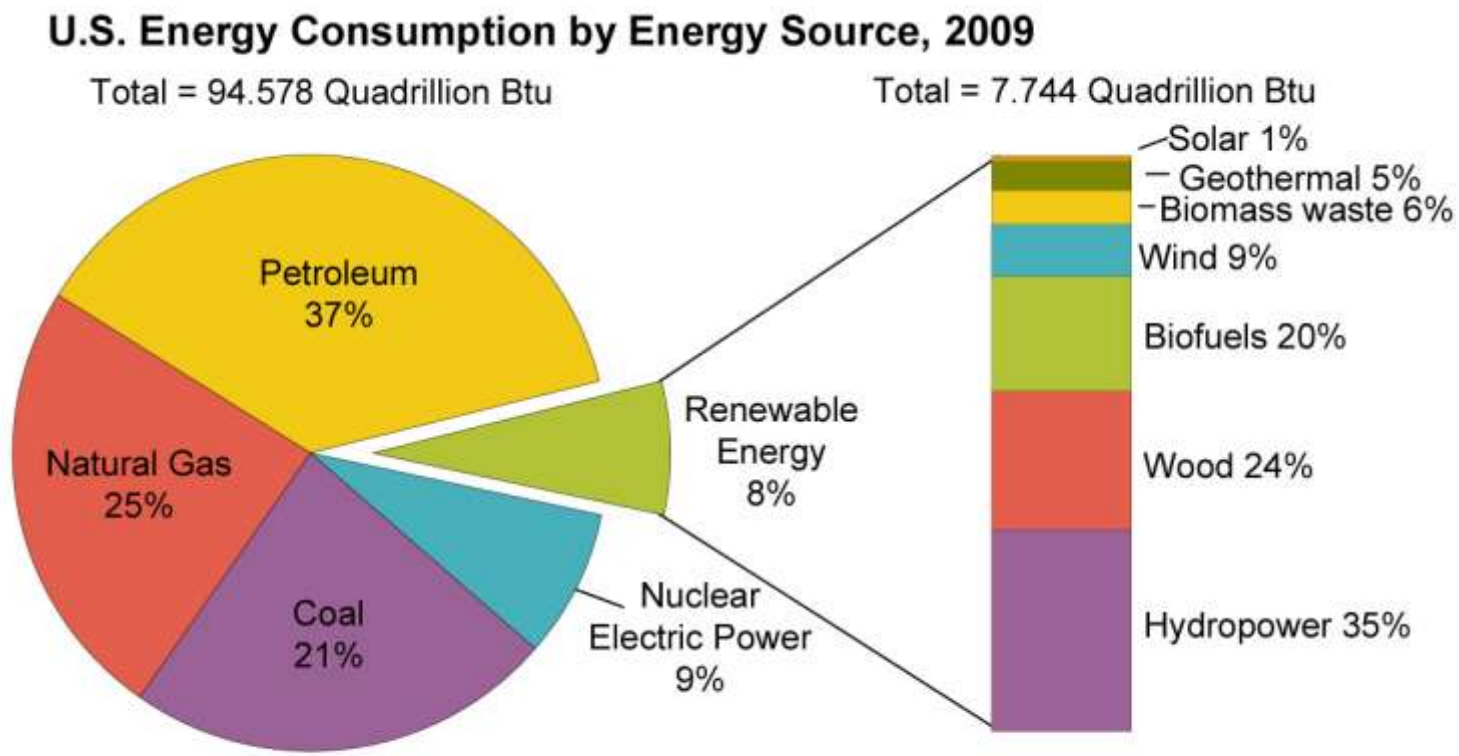
- Can walk to work/school
- Less pollution
- Natural habitat areas
- Fewer miles of roads/pipes
- Community-focused

your.kingcounty.gov/solidwaste/greenbuilding/sustainable-cities.asp

Homework: sustainable building or housing

- Req. 2 (Community), **Option B**: With your parent's permission and your counselor's approval, interview a local architect, engineer, contractor, or building materials supplier. What factors are considered when using sustainable materials in renovating or building a home? Share what you learn with your counselor.
- Req. 2 (Community), **Option C**: Review a current housing needs assessment for your town, city, county, or state. Discuss with your counselor how birth and death rates affect sufficient housing, and how a lack of housing—or too much housing—can influence the sustainability of a local or global area.

Requirement 2: Energy

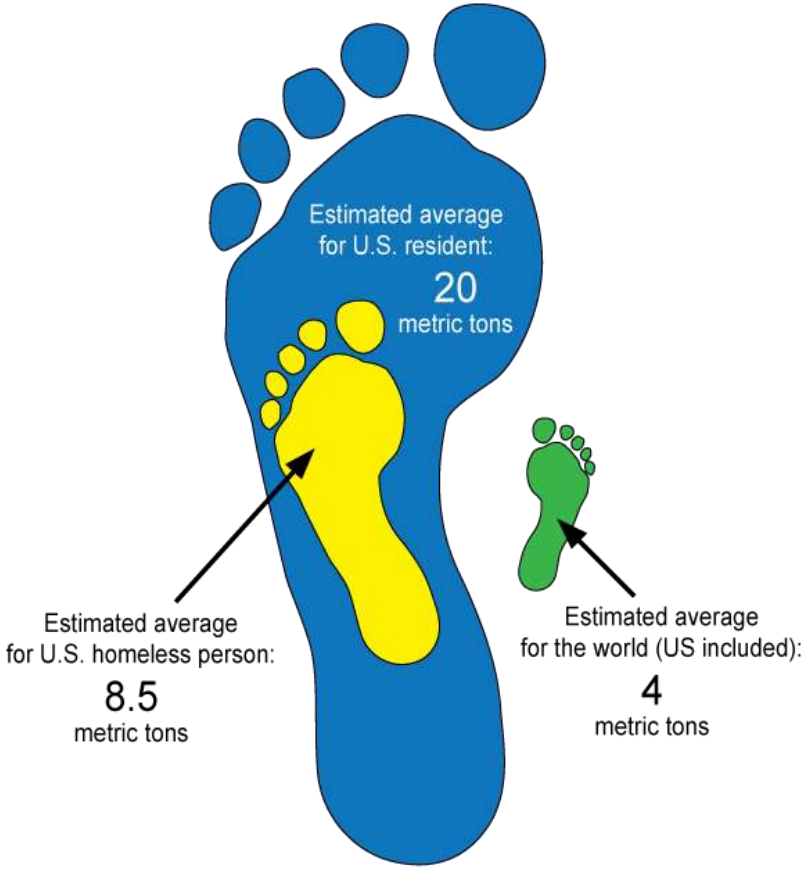


Note: Sum of components may not equal 100% due to independent rounding.
Source: U.S. Energy Information Administration, *Annual Energy Review 2009*, Table 1.3, Primary Energy Consumption by Energy Source, 1949-2009 (August 2010).

Homework: renewable energy perspectives

- Elon Musk on solar energy: www.youtube.com/watch?v=rce5RZHCzLk
- How does wind power work? www.youtube.com/watch?v=SQpbTTGe_gk
- Where does nuclear fit in? www.youtube.com/watch?v=fp7pgMcieXY
- All energy sources have pros and cons: www.youtube.com/watch?v=sWfWPbL0Q-g

Carbon Footprint



- "The total greenhouse gas emissions caused by a person, household or organization"
- Calculate yours: www.nature.org/greenliving/carboncalculator

Homework: Energy Consumption

- Research the sustainability of different energy sources, including:

Fossil fuels	Nuclear
Solar	Hydropower
Wind	Geothermal

- Find out how the production and consumption of each of these energy sources affects the environment and what the term "carbon footprint" means.
- Discuss what you learn with your counselor, and explain how you think your family can reduce its carbon footprint.
- This will complete Requirement 2 (Energy), part A

Global Perspective: Energy

http://india.blogs.nytimes.com/2012/08/06/alternate-energy-practices-at-the-grassroots/

Ways to Save Energy

www.mnenergychallenge.org/Actions/Categories/easy.aspx

- $91/year

- $87/year

- $209/year

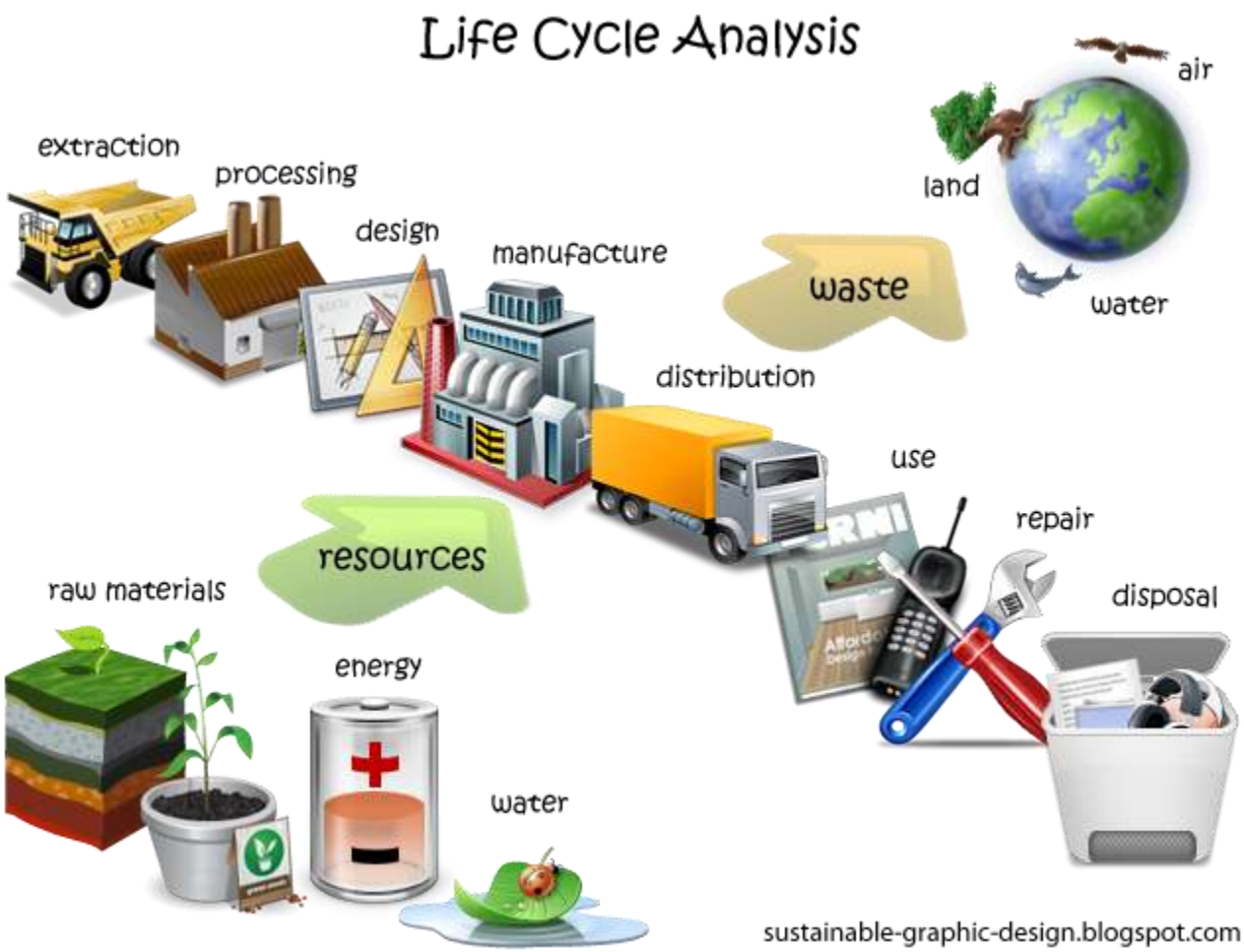
- 52/year

Homework: reduce energy use

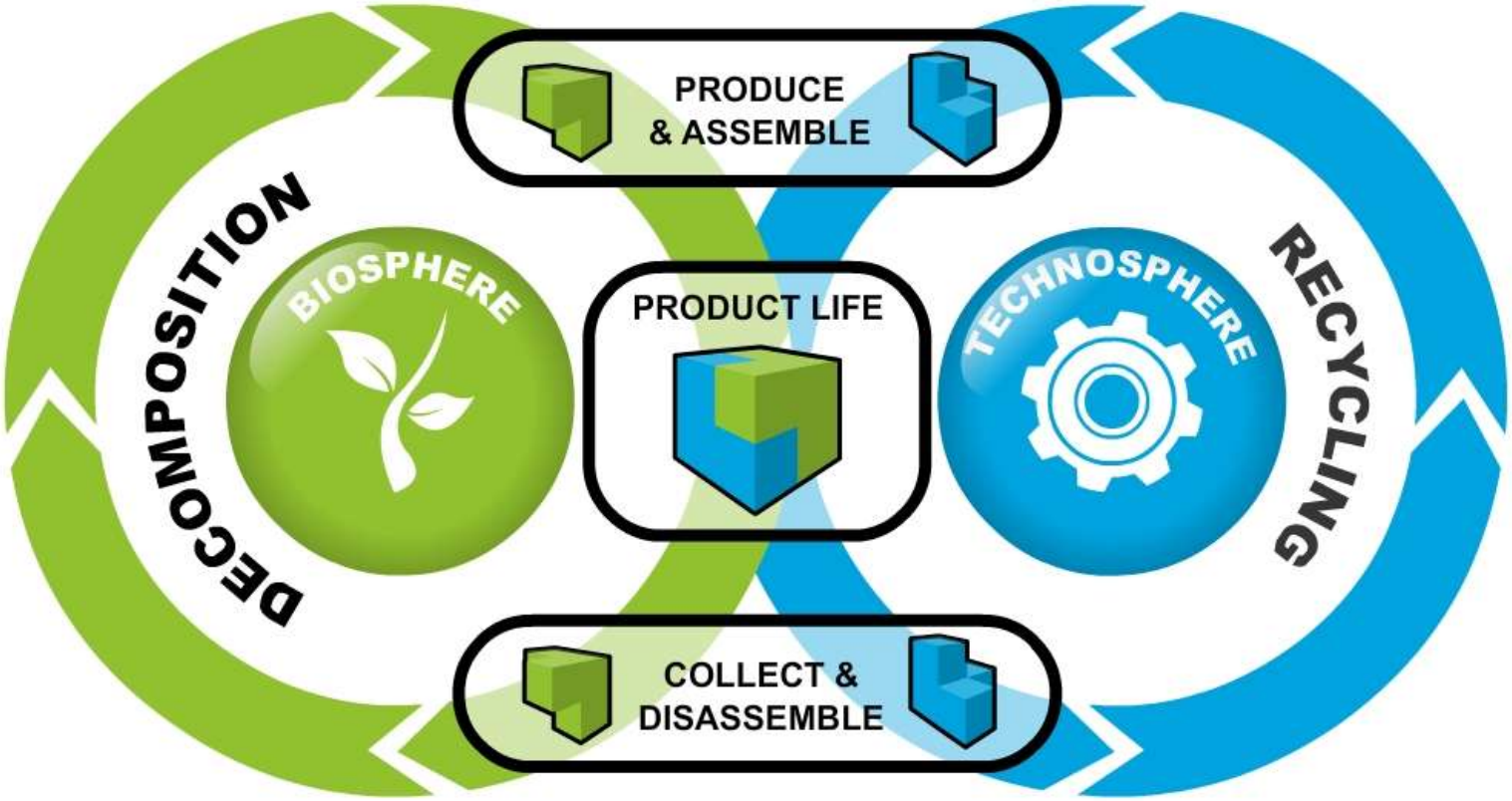
- Req. 2 (Energy) **Option B**: Develop and implement a plan for reducing consumption for one of your family's household utilities.
  - Examine your family's bills for that utility reflecting usage for three months (past or current).
  - As a family, choose three ways to help reduce consumption and be a better steward of this resource. Implement those ideas for one month.
  - Share what you learn with your counselor, and tell how your plan affected your family's usage.
- Req. 2 (Energy) **Option C**: Evaluate your family's fuel and transportation usage.
  - Review your family's transportation-related bills (gasoline, diesel, electric, public transportation, etc.) reflecting usage for three months (past or current).
  - As a family, choose three ways to help reduce consumption and be a better steward of this resource. Implement those ideas for one month.
  - Share what you learn with your counselor, and tell how your plan affected your family's transportation habits.

Requirement 2: Stuff

Unsustainable: Linear Model



“Cradle to Cradle”



Homework: stuff log

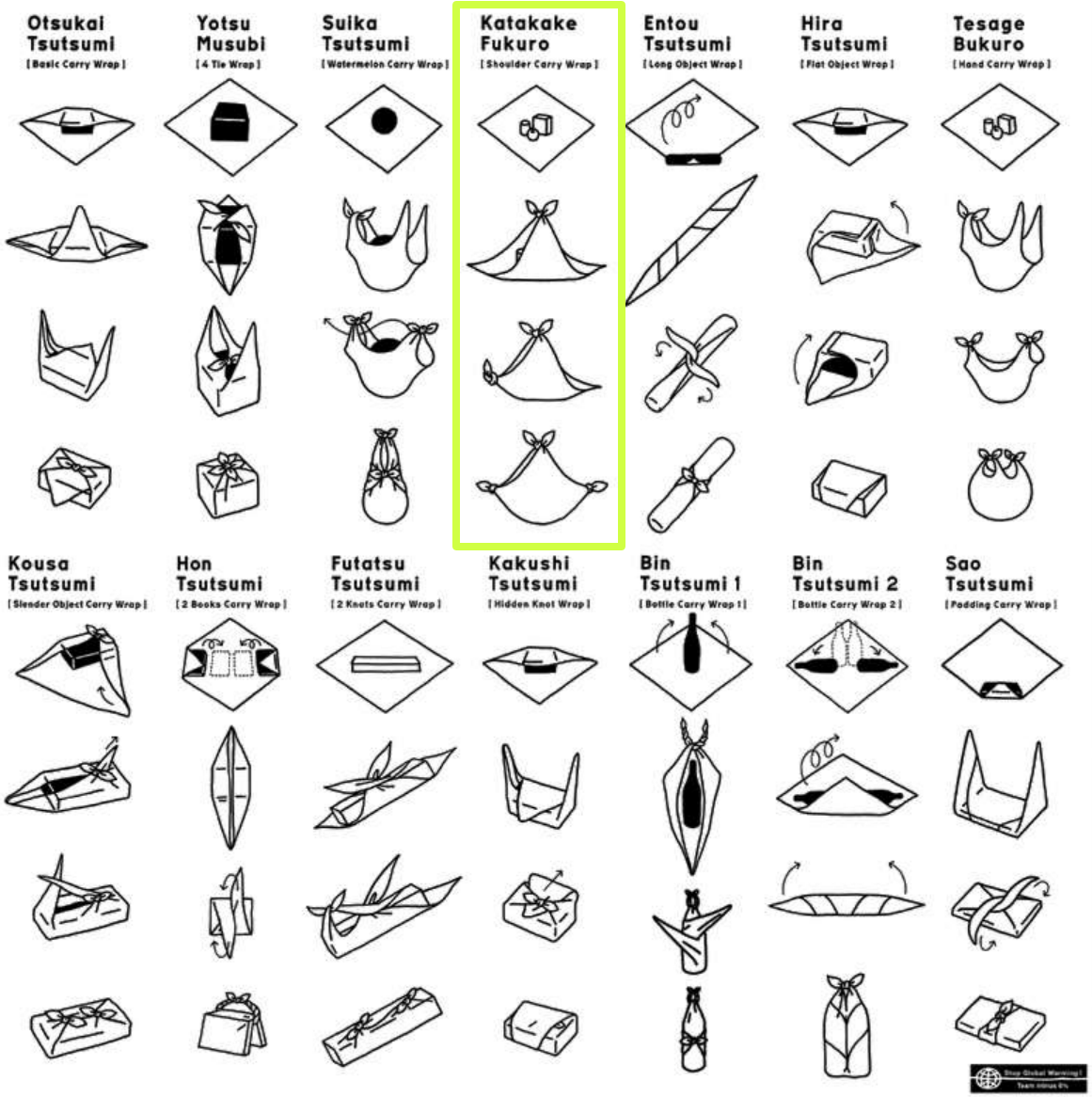
- Keep a log of the "stuff" your family purchases (excluding food items) for two weeks.
- In your log, categorize each purchase as an essential need (such as soap) or a desirable want (such as a DVD).
- Share what you learn with your counselor.
- This will complete Requirement 2 (Stuff), part A

How To Prevent Excess Stuff

- Buy durable, long-lasting things rather than poorly made things (even if they cost less)
- Repair things that break instead of replacing them
- Use reusable (cotton hand towel) instead of disposable (paper towel)
- Don’t take things you don’t need (extra paper napkins at a restaurant)
- Buy in bulk to reduce packaging
- Consider life cycle of products (recyclable vs non-recyclable)

What To Do with Old Stuff

- Donating:
  - thrift store
  - non-profit
  - consignment
  - online
- Repurpose:
- Recycle:
  - Haz waste, appliances, electronics
  - Scrap metal, paper (recycling center)


Otsukai Tsutsumi
[Basic Carry Wrap]
Yotsu Musubi
[4 Tie Wrap]
Suika Tsutsumi
[Watermelon Carry Wrap]
Katakake Fukuro
[Shoulder Carry Wrap]
Entou Tsutsumi
[Long Object Wrap]
Hira Tsutsumi
[Flat Object Wrap]
Tesage Bukuro
[Hand Carry Wrap]
Kousa Tsutsumi
[Slender Object Carry Wrap]
Hon Tsutsumi
[2 Books Carry Wrap]
Futatsu Tsutsumi
[2 Knots Carry Wrap]
Kakushi Tsutsumi
[Hidden Knot Wrap]
Bin Tsutsumi 1
[Bottle Carry Wrap 1]
Bin Tsutsumi 2
[Bottle Carry Wrap 2]
Sao Tsutsumi
[Padding Carry Wrap]

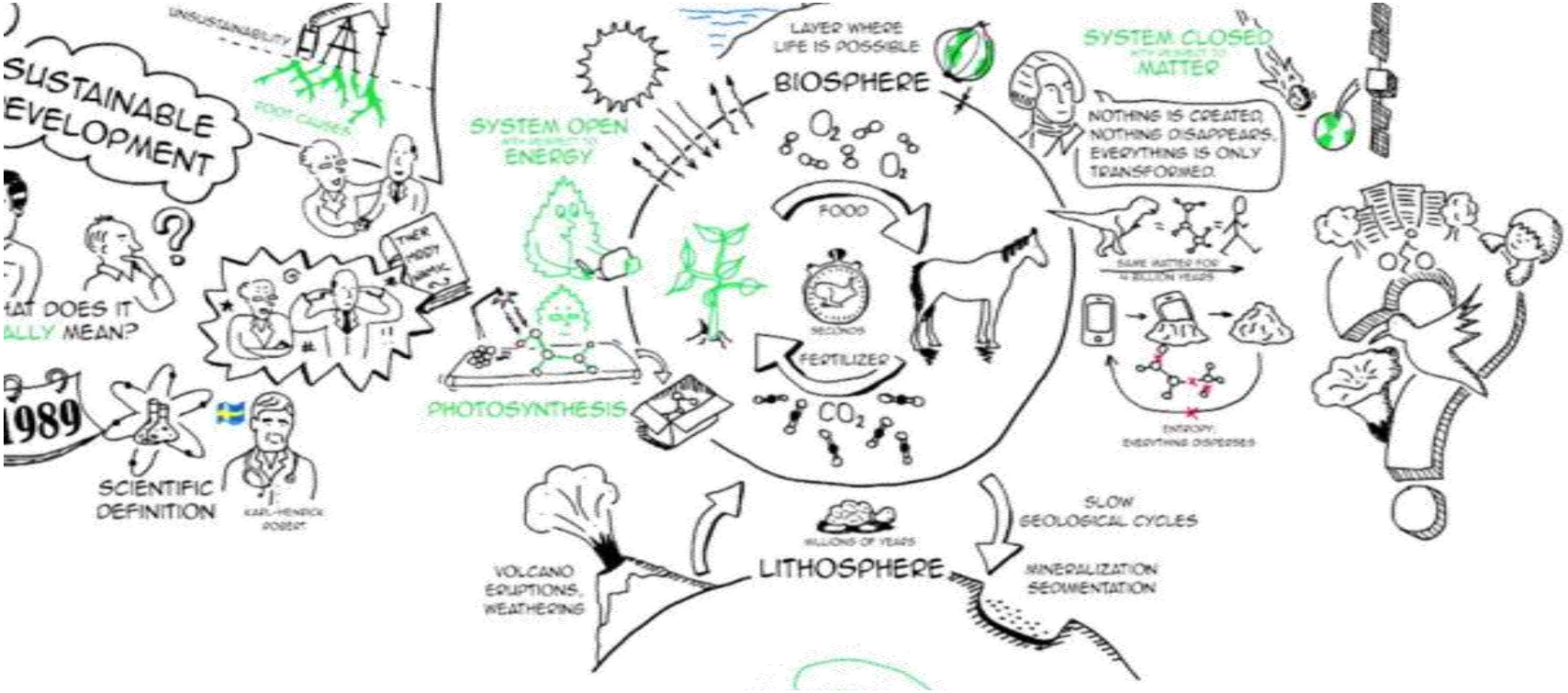
Homework: dealing with stuff

- Req. 2 (Stuff), **Option B**: Plan a project that involves the participation of your family to identify the "stuff" your family no longer needs. Complete your project by donating, repurposing, or recycling these items.
- Req. 2 (stuff), **Option C**: Discuss with your counselor how having too much "stuff" affects you, your family, and your community. Include: financial impact, time spent, maintenance, health, storage, and waste. Include the practices that can be used to avoid accumulating too much "stuff."

Requirement #3

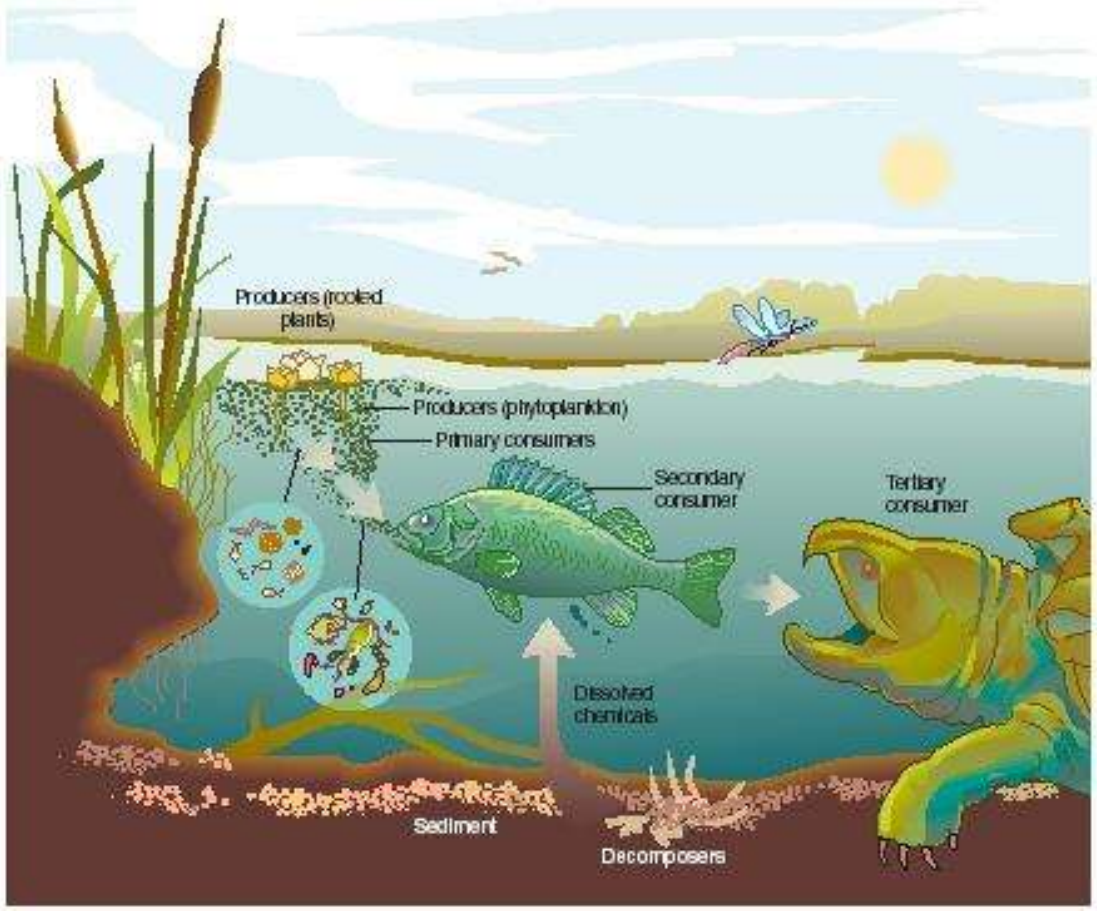
Sustainability Merit Badge

Interconnected Systems

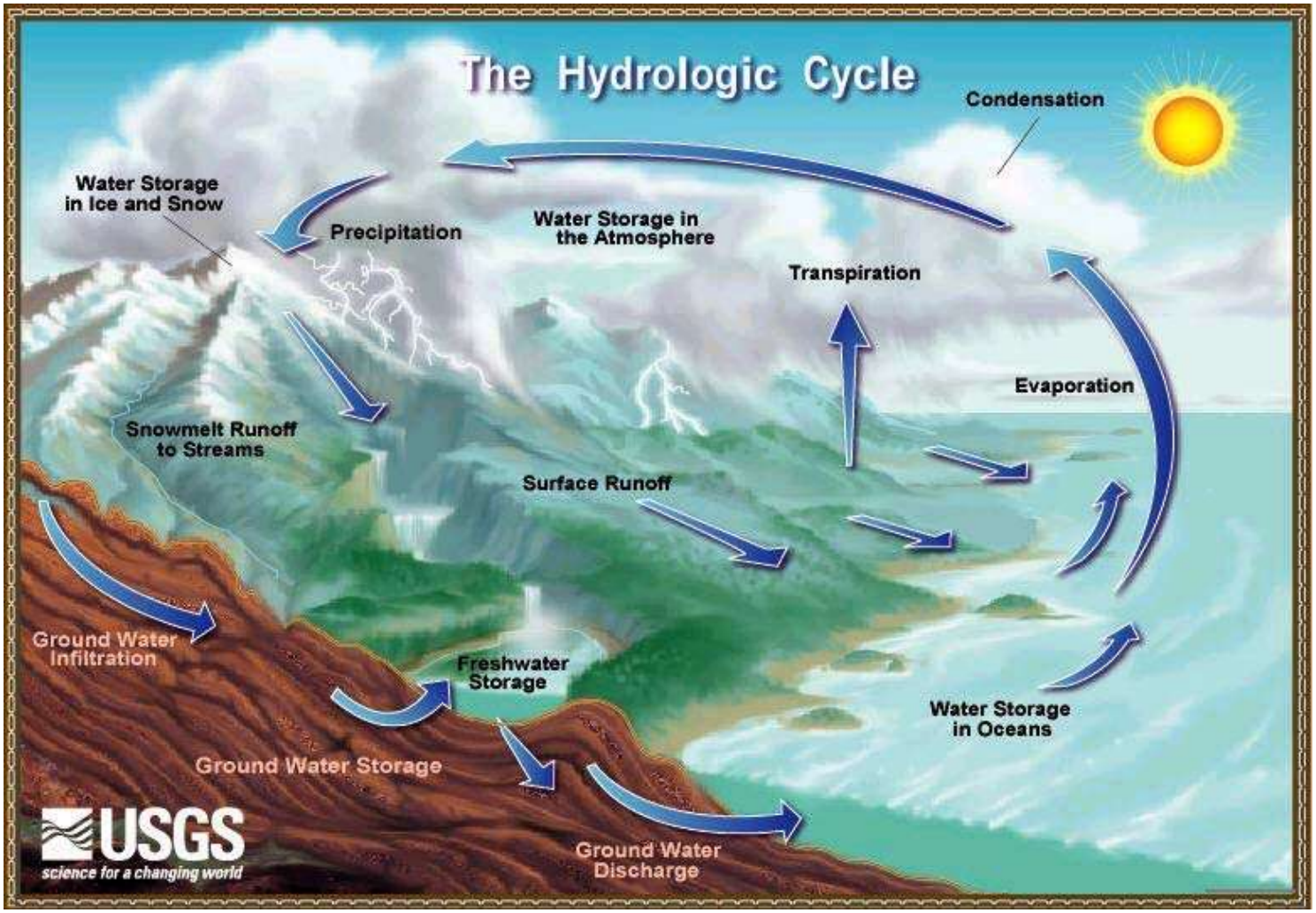


www.youtube.com/watch?v=beidaN3SNdA&t=1m46s (to 5:20)

Systems: Food Webs



Systems: Water Cycle



Homework: Systems

- Explain to your counselor how the planetary life-support systems support life on Earth and interact with one another.
  - soil, climate, freshwater, atmospheric, nutrient, oceanic, ecosystems, and species
- This will complete Requirement 3, part A

Question:

- Identify an item in your possession at this moment
- Name a natural resource that had to be used to create that thing. Did something need to be harvested? Extracted? What material and from where?

Resource extraction

Many countries have financed their development through resource extraction. However, there are risks related to natural resource wealth. These include:

- volatile economic growth;
- Extreme wealth inequity
- limited job creation;
- violent conflicts;
- corruption;
- environmental degradation

Such negative outcomes of resource extraction, however, are not inevitable. They can be tackled through effective strategies, legal frameworks and policies.

Homework: Materials

- Tell how the harvesting or production of raw materials (by extraction or recycling), along with distribution of the resulting products, consumption, and disposal/repurposing, influences current and future sustainability thinking and planning.
- This will complete Requirement 3, part B

Requirement #4

Sustainability Merit Badge

Homework: Requirement #4

- Explore TWO of the following categories.

A. Plastic Waste
B. Electronic Waste
C. Food Waste
D. Species Decline
E. World Population
F. Climate Change

- Have a discussion with your family about the two you select. In your discussion, include your observations, and best and worst practices.
- Share what you learn with your counselor.

A. Plastic Waste

- Discuss the impact plastic waste has on the environment (land, water, air). Learn about the number system for plastic recyclables, and determine which plastics are more commonly recycled. Find out what the trash vortex is and how it was formed.

A. Plastic Waste

Ocean Conservancy

Ocean Conservancy's RECYCLING DECODER

Not all plastics are recycled equally. Before you toss it, check the number on the bottom—it tells you the type of plastic, the key to recyclability.

Recyclable through most curbside programs

PET
- water/soda bottles
- peanut butter jars
- microwavable trays

HDPE
- milk jugs
- detergent containers
- shampoo bottles

PP
- yogurt tubs
- bottle caps
- ketchup bottles

Recyclable through outside programs. Grocery stores will often accept these items.

- plastic bags

LDPE
- dry cleaning bags
- newspaper bags
- shrink wrap

Tip: Keep plastic bags in your reusable shopping bags so you'll remember both on your trip to the store.

Always remember to rinse out your recyclables. Removing food residue will ensure everything you throw in the bin gets another life-and clean bottles keep your bin smelling fresh!

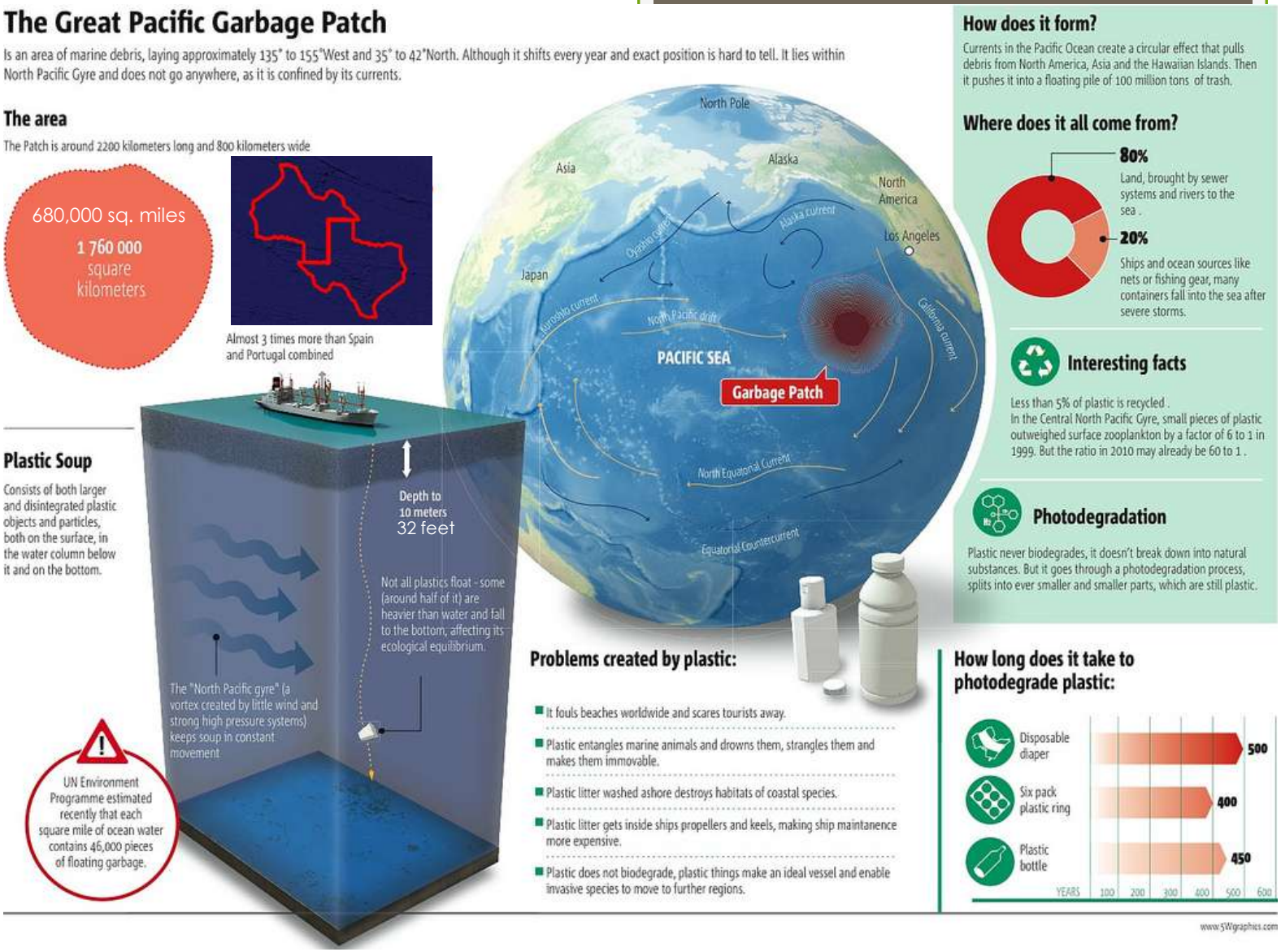
Difficult to recycle

PVC
- berry containers
- deli meat packaging
- PVC pipes

PS
- plastic cutlery
- plastic foam takeout boxes/cups

Other, including bio-plastics. Bioplastics are made from renewable materials, but many recycling systems are unable to process them at this time.

Note: Recycling systems vary by location. This guide is based on research and best practices--for specific recommendations, consult your local curbside program guidelines. Searching "[your city] + recycling" online should get you the information you need. Visit ocean.ly/recycleguide for more.



More info: http://awesome.good.is/transparency/web/0905/trans0509throughthegyre.jpg

B. Electronic Waste

- Choose three electronic devices in your household. Find out the average lifespan of each, what happens to these devices once they pass their useful life, and whether they can be recycled in whole or part. Discuss the impact of electronic waste on the environment.

How sustainable is my laptop?

http://vimeo.com/67574609

Link to EPEAT website

C. Food Waste

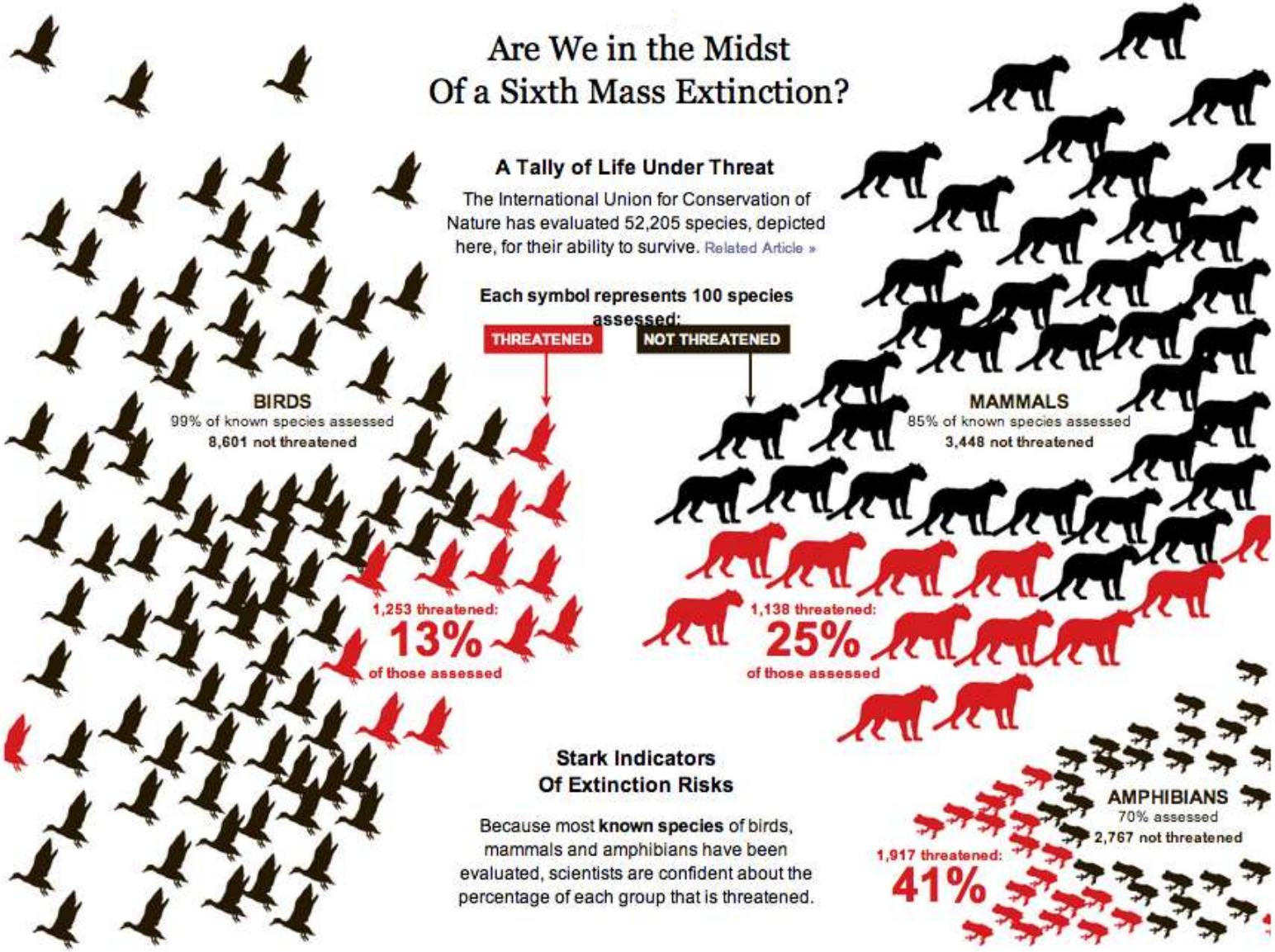
- Learn about the value of composting and how to start a compost pile. Start a compost pile appropriate for your living situation. Tell what can be done with the compost when it is ready for use.

- Backyard Composting
  - http://www.epa.gov/waste/conserve/tools/greenscapes/pubs/compost-guide.pdf
- Vermicomposting
  - http://makezine.com/projects/make-your-own-worm-bin/
- Commercial Composting
  - The next big thing?

D. Species Decline

- Explain the term species (plant or animal) decline. Discuss the human activities that contribute to species decline, what can be done to help reverse the decline, and its impact on a sustainable environment.

- Class question: name an extinct, endangered, threatened or formerly endangered/threatened species



http://www.nytimes.com/interactive/2012/06/01/opinion/sunday/are-we-in-the-midst-of-a-sixth-mass-extinction.html?ref=sunday

E. World Population

- Learn how the world's population affects the sustainability of Earth. Discuss three human activities that may contribute to putting Earth at risk, now and in the future.

8 billion in 2024

Crossed 7 billion on 10/31/2011

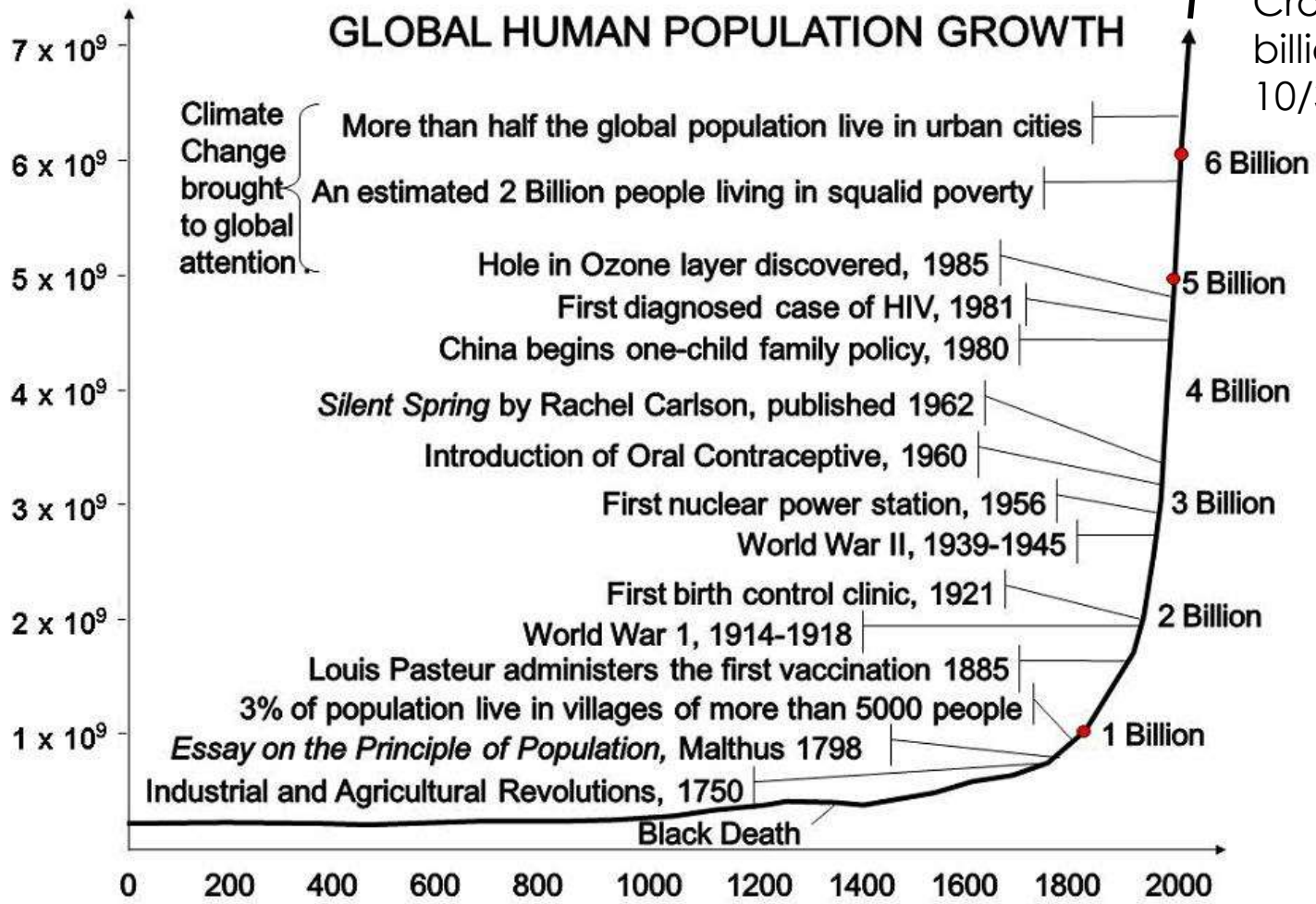
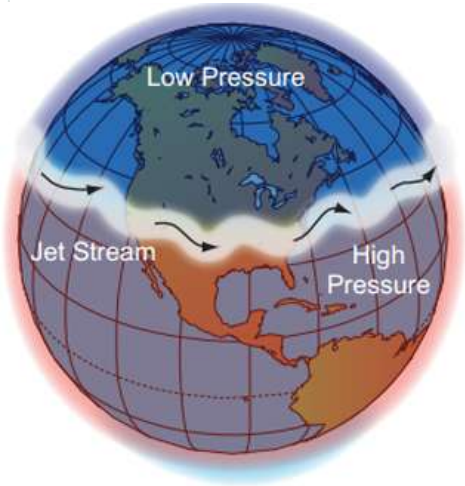
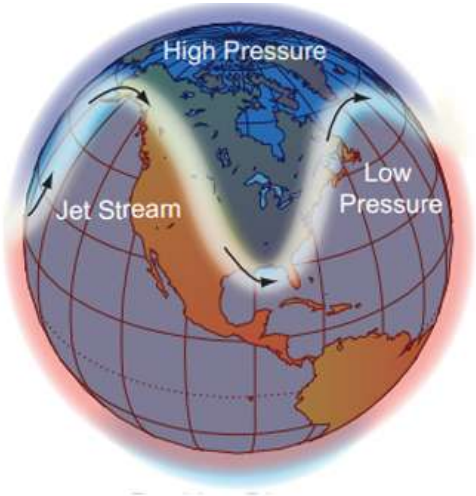


Image 10 : Les contrôles sur la Population Humaine Population vs Les Catalyseurs de l'augmentation de la Population

F. Climate Change

- Find a world map that shows the pattern of temperature change for a period of at least 100 years. Share this map with your counselor, and discuss three factors that scientists believe affect the global weather and temperature.





- Climate ≠ weather
- <u>Global is key</u>
- Climate change means:
  - Less stability of jet streams
  - More severe weather events
  - Less predicable weather patterns

Requirement #5

Sustainability Merit Badge

Homework: Requirement #5

- A. After completing requirements 1 through 4, have a family meeting. Discuss what your family has learned about what it means to be a sustainable citizen. Talk about the behavioral changes and life choices your family can make to live more sustainably. Share what you learn with your counselor.
- B. Discuss with your counselor how living by the Scout Oath and Scout Law in your daily life helps promote sustainability and good stewardship.

Requirement #6

Sustainability Merit Badge

Homework:
Sustainability Careers

- Learn about career opportunities in the sustainability field. Pick one and find out the education, training, and experience required. Discuss what you have learned with your counselor and explain why this career might interest you.

Recycling Coordinator

- Government entity (city, county, school district, state)
- Goal: to raise recycling rates and ensure residents and businesses in my community have access to convenient and safe recycling and disposal of waste
- Educate! Presentations, newspaper, web, social media, events
- Run recycling centers (County level)
- Work with other departments and entities to coordinate efforts

http://www.ecojobs.com/

Congratulations, you… still have a bunch of stuff to do

- Get this PowerPoint at http://tiny.cc/sustBSA
  - Also all videos and links posted there
- Use your requirements sheet and "homework" sheet to determine which reqs. to do at home
  - Some will take 2 weeks or 1 month, so start this weekend!
- Email the follow-up requirements to LeighBehrensBSA@gmail.com by **May 15**
- After that you will get your completed or partial blue card back

Contact Info

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Sustainability Merit Badge
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