

WEEK 4: SUSTAINABILITY

How can the built environment help the natural environment?



What Is SUSTAINABILITY?

Write on the board what you think of when you think of the word
“Sustainability”

Did your classmates write anything you hadn't thought of?

+ Two Aspects of Sustainability

SUSTAINABLE ACTION

- You know these!
 - Recycle your used materials
 - Use reusable bags, bottles, etc.
 - Turn electronics and lights off when you are not using them
 - Don't buy things that you do not need

SUSTAINABLE DESIGN

- Do you know about these yet?
 - Creating products/structures that have the least negative impact on the health of people, the economy of an area, and the environment
 - Meeting the needs of the present generation without depleting the ability of future generations to meet their own needs

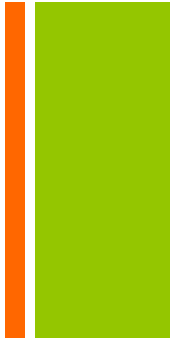
+ Sustainable Design (Green Design)

- Introduction to sustainable design:
 - <https://www.youtube.com/watch?v=MyIOtsx3wDs>



Now that you have a broad understanding of what sustainable design is, let's look at sustainable building practices and how we can help to green our food spaces!

+ What Makes a Space Sustainable?



- Location & Transportation
- Sustainable Site
- Water Efficiency
- Energy Efficiency
- Materials
- Resources
- Indoor Air Quality
- There is more to it, but these are a great start!



LOCATION & TRANSPORTATION



Public Transportation



- Is it in an area where you can walk to many of the places that you need to go?
- Is there public transportation available nearby?
- Does your structure encourage alternative transportation by providing bike racks?

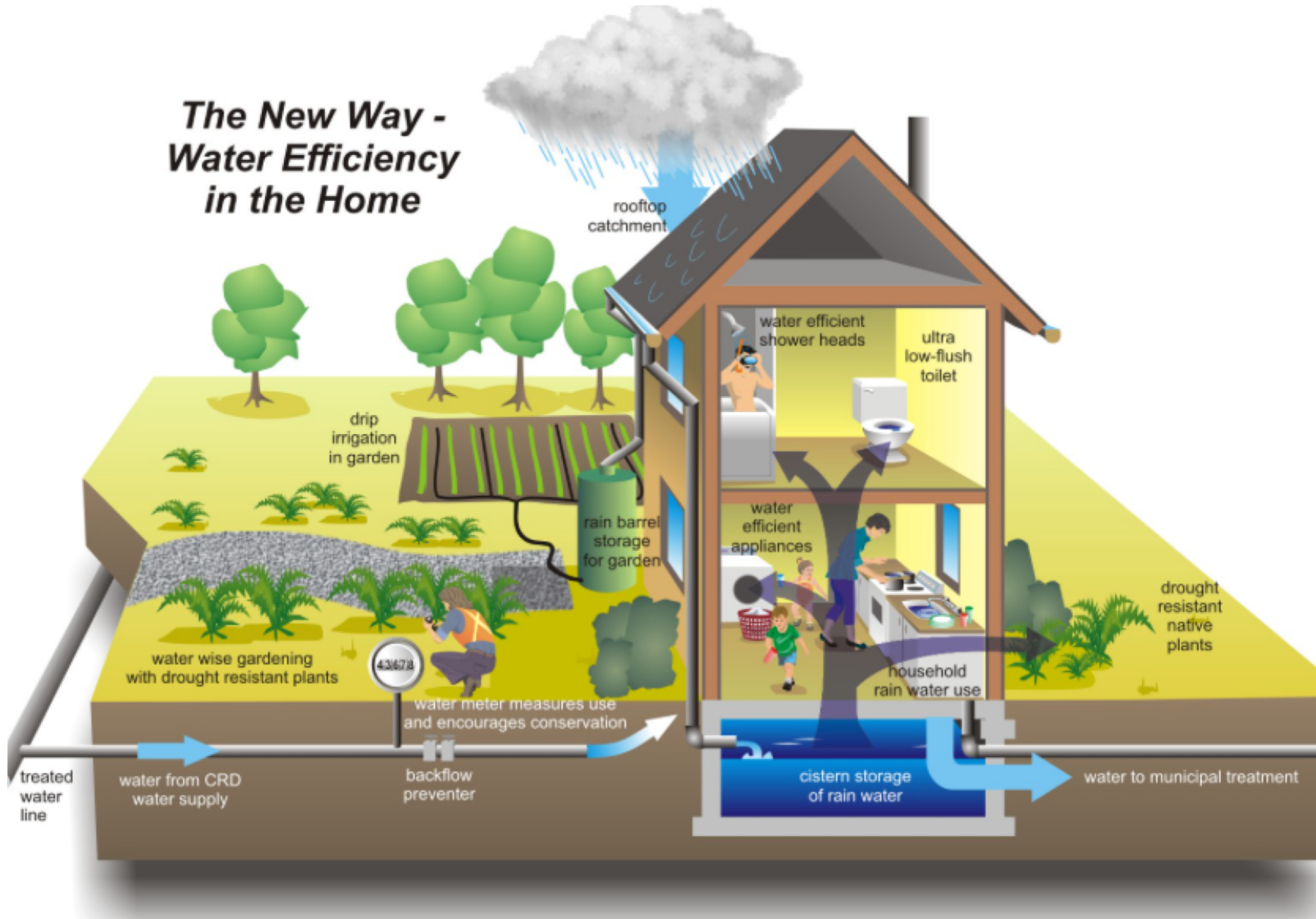
+ SUSTAINABLE SITE

Adaptive Reuse in Denver



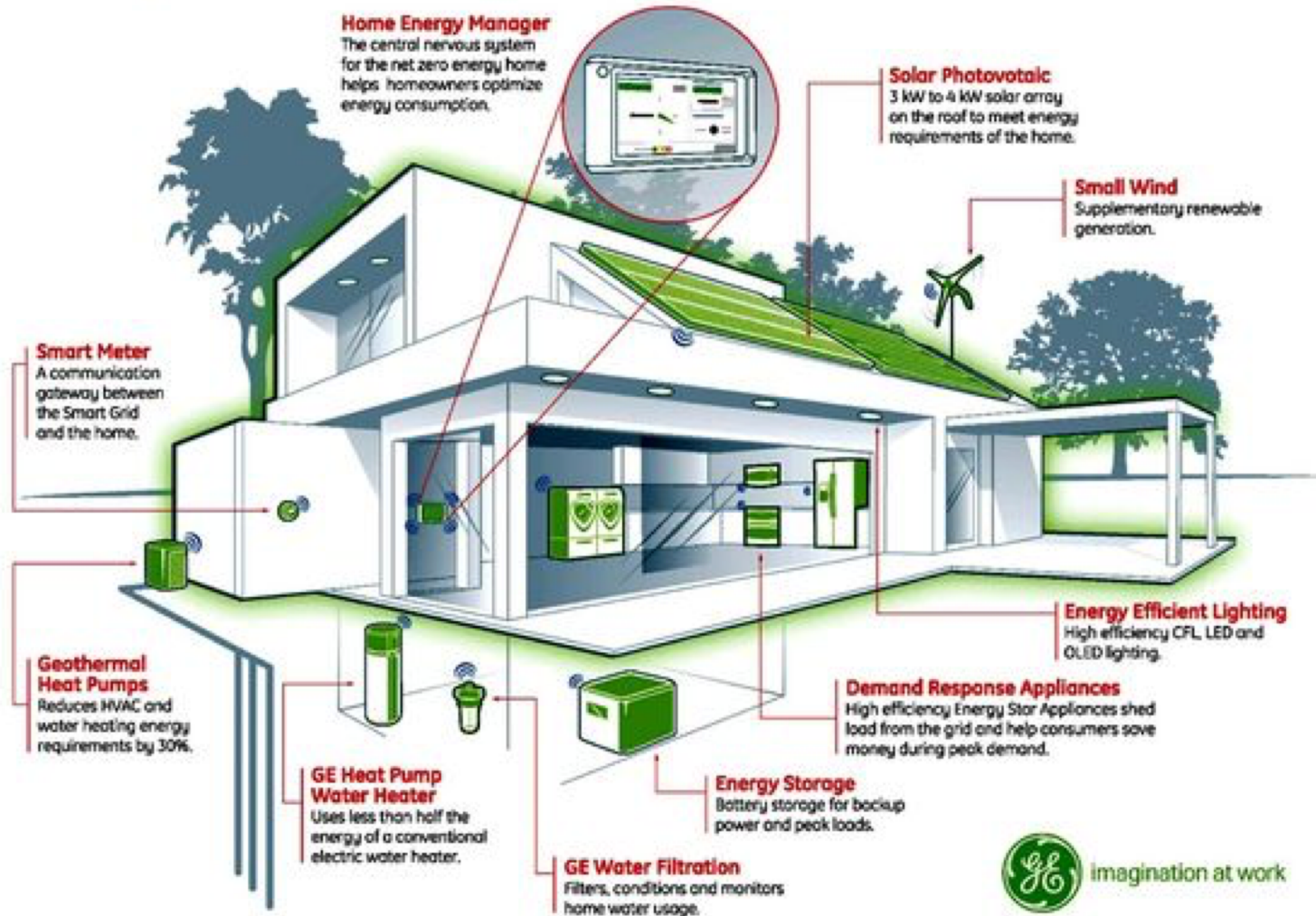
- Does your site already exist? This means not destroying any natural land to build.
- Does your site help manage rainwater? This can be achieved with pervious pavement, rain gardens, and green roofs, along with other strategies.

+ WATER EFFICIENCY



+ ENERGY EFFICIENCY

GE Targets Net Zero Energy Homes by 2015



+ MATERIALS

Nonconventional (Sustainable)

Conventional
(Less Sustainable)

ROOFING

WALLS

INSULATION

Nonconventional



Rammed Earth

Conventional



Tar/Asphalt



"Green"

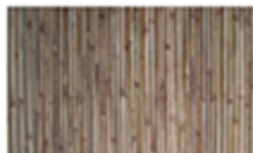


Metal Sheeting



Thatched

Nonconventional



Bamboo

Conventional



Wood



Fiber-Reinforced Mortar



Steel



Recycled Plastic



Concrete

Nonconventional



Straw Bale

Conventional



Fiberglass



Adobe



Polyurethane Foam



Recycled Cotton

- Recycled & renewable materials are the best option. They divert waste from landfills and encourage the use of renewable resources.

+ RESOURCES

Compost Bins



- How much waste is your space creating? How are you working to minimize it?
- Are you participating in a recycling program?
- Are you utilizing composting?
- What other creative ways can help minimize the amount of waste that leaves your space?

+ INDOOR AIR QUALITY

The Good and Bad of Indoor Air Quality



ASBESTOS

SYMPTOMS: Long term exposure can cause chest and abdominal cancer and various lung diseases.
SOLUTIONS: Trained and qualified removal contractors.

PESTICIDES AND CLEANING PRODUCTS

SYMPTOMS: Irritates the eyes, nose and throat. Can damage central nervous system and kidneys, and can increase risk of cancer.
SOLUTIONS: Use products as directed. Mix strong products outdoors and store outside, or use **Ventilation**.

CARBON MONOXIDES (GAS AND COMBUSTIBLES)

SYMPTOMS: Causes fatigue, chest pain, impaired vision and coordination, headaches, dizziness, confusion, nausea, can be fatal in high amounts.
SOLUTIONS: **Ventilation**, **Plants** and **Electromagnetic Energy Cells**, a CO detector and properly maintained gas systems checked annually for leaks or cracks.



LEAD

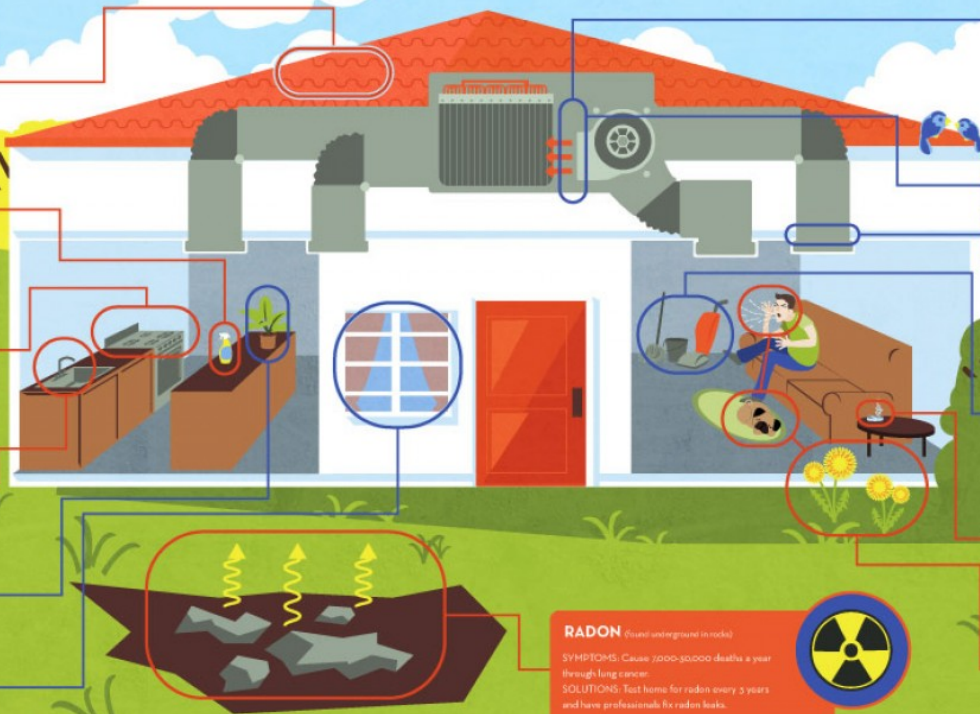
(Found in lead paint, dust and tap water)
SYMPTOMS: Affects mental and physical growth, kidneys and blood cells. High amounts can cause convulsions, coma and death.
SOLUTIONS: Keep homes dust free with **Filters**, **Vacuums** and **Mops**. Leave lead-based paint undisturbed, let professionals remove it if needed.

PLANTS

Removes carbon dioxide in air and produce oxygen. Helps filter pollutants in water and ground.

VENTILATION

Can clear a room of harmful toxins in the air and circulates outside air indoors.



UV LIGHTS

Destroys biological pollutants such as viruses, bacteria, allergens, and molds that are airborne or growing on AC parts.



ELECTROMAGNETIC ENERGY CELLS

Removes surface and airborne bacteria, viruses and mold in the home. Reduces gas and odor particles in the air.



FILTERS

Removes pollutant particles in the air. Filter efficiency is based on its MERV rating, the higher the MERV number the more particles it removes from the air.



VACUUMS/MOPS

Removes or disinfects biological pollutants such as viruses, bacteria, allergens, and molds on floors.

SMOKE (FIRST AND SECOND HAND)

SYMPTOMS: Irritates the eyes, nose and throat. Can cause lung cancer and heart disease.
SOLUTIONS: Use outdoors whenever possible. **Ventilation**, **Filters**, **UV Lights** and **Electromagnetic Energy Cells** should be used.



BIOLOGICAL (POLLENS AND PETS)

SYMPTOMS: Irritates the eyes, nose and throat. Can cause asthma, bronchitis and other infectious diseases.
SOLUTIONS: **Ventilation**, **Filters**, **UV Lights** and **Electromagnetic Energy Cells** should be used.

RADON

(Found underground in rocks)
SYMPTOMS: Cause 21000-30000 deaths a year through lung cancer.
SOLUTIONS: Test home for radon every 3 years and have professionals fix radon leaks.



+ Sustainable Play Spaces



- Lion's Park in Alabama
- University students used 2000 recycled steel drums that had been donated to create this play space

+ Sustainable Play Spaces



- Wikado Playground in The Netherlands
- Old windmills and modern wind turbines were creatively reused to create this maze-like play structure

+ Sustainable Play Spaces



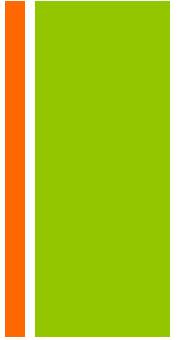
- Rubber Tree Playground in Thailand
- This play space is made entirely of discarded tires and held together with a bamboo frame
- The play space was created for refugee children on the border of Thailand and Myanmar

+ Sustainable Play Spaces



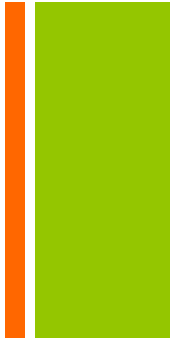
- The Geopark in Norway
- This play was built in the base of Norway's oil industry and took advantage of discarded components of oil rigs

+ Sustainable Play Spaces



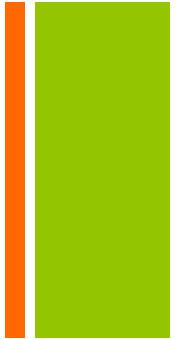
- Carlos Teixeira's 'The Other, The Same' installation in Brazil
- The labyrinth in this photo was created with recycled cardboard

+ Sustainable Play Spaces



- Tempelhofer Feld in Berlin, Germany
- This giant park was created on the reclaimed site of their old airport, so you can bike, walk, or windsurf on the old runways

+ Additional Resources



- LEED LEGO Activity:

<http://practiceofarchitecture.com/2013/09/03/using-legos-to-teach-the-next-generation-about-green-building/#jp-carousel-738>

- This would be an awesome activity to do if you have the time for it. The University of Illinois created a LEED Certification System for a Lego Home and it will really enforce how that system works and what specific things make a building/site sustainable.