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Outline

- What are trees good for? Work with a buddy!
- How do plants make food?
- What are fossil fuels and where do they come from?
- **Activity**: The Carbon Cycle Game
- What is the greenhouse gas effect?
- Today's Vocabulary: Biomass & Biofuel
- **Activity**: How many trees would it take to fly from Lambeau Field to Soldier Field?

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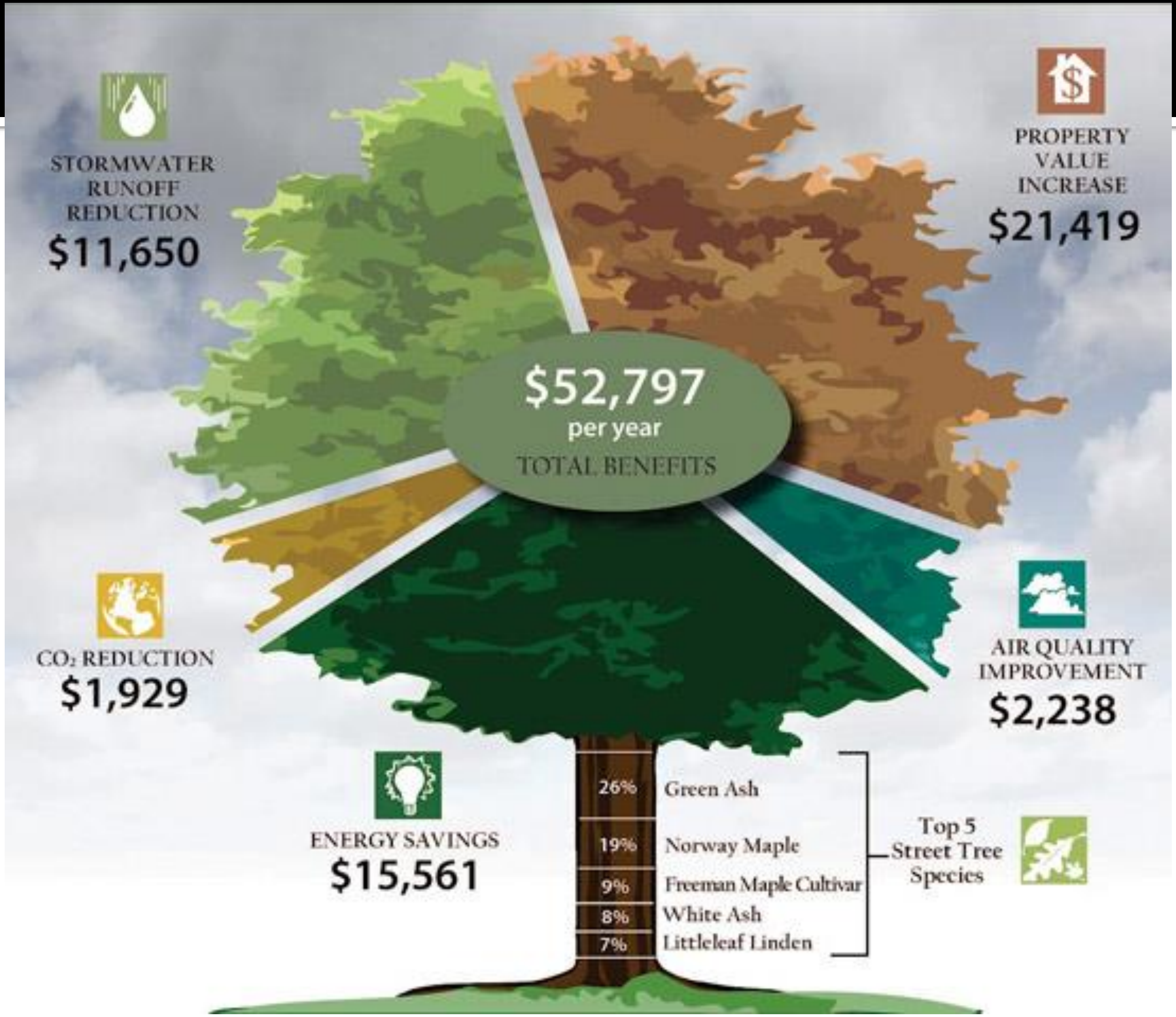
Activity: Concept Map

- Work with a buddy to draw or list things that trees are good for.
- These could be things we make out of trees or services that trees provide us or other animals.
- Take 10 minutes to get all your ideas on paper (made out of a tree!!)



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Concept Map

- Forest Products
  - Lumber
  - Veneer
  - Cabinets
  - Pencils
  - Paper
  - Rubber
- **Biomass**
- **Biofuel**
- Ecosystem Services
  - Flood mitigation
  - Wildlife habitat
  - Reduced **energy** costs
  - **Photosynthesis – provides O^2**
  - Air quality improvement
- **Carbon dioxide sequestration**
- **Carbon sink**

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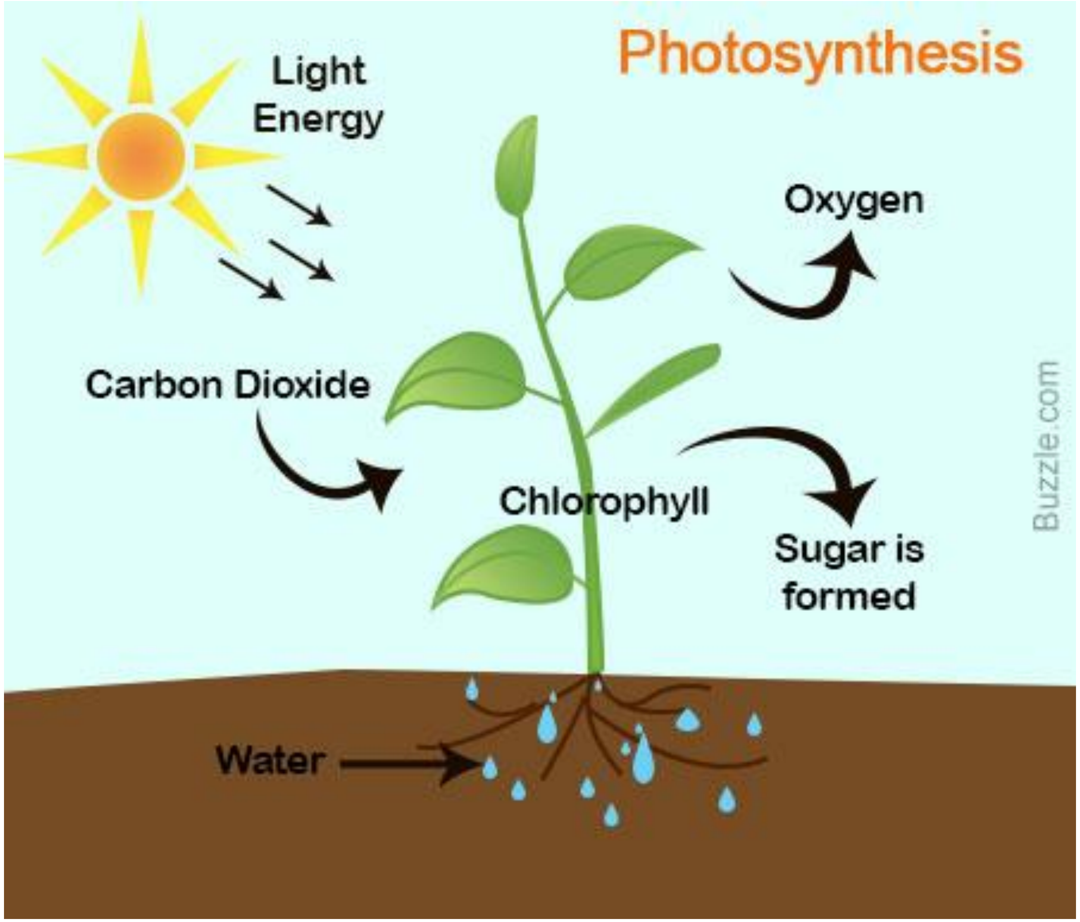
Photo=light; synthesis=put together



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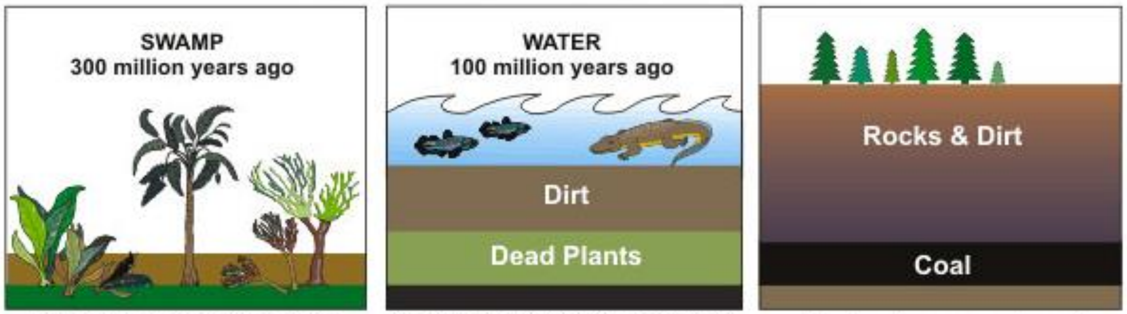
Fossil Fuels: How are they formed?

HOW COAL WAS FORMED

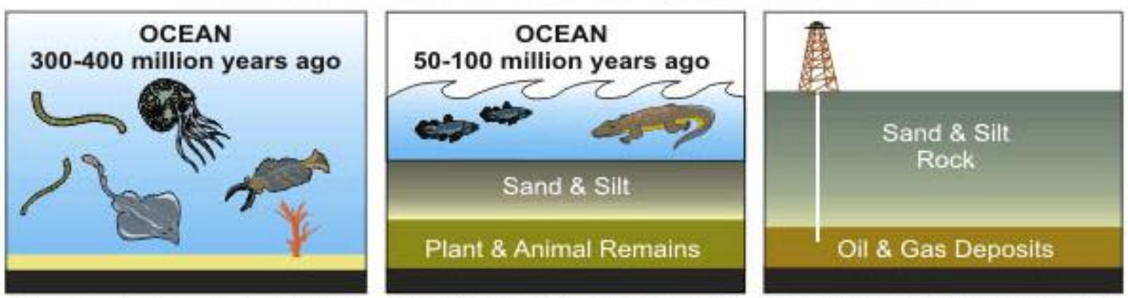


Before the dinosaurs, many giant plants died in swamps.

Over millions of years, the plants were buried under water and dirt.

Heat and pressure turned the dead plants into coal.

PETROLEUM & NATURAL GAS FORMATION



Tiny sea plants and animals died and were buried on the ocean floor. Over time, they were covered by layers of silt and sand.

Over millions of years, the remains were buried deeper and deeper. The enormous heat and pressure turned them into oil and gas.

Today, we drill down through layers of sand, silt, and rock to reach the rock formations that contain oil and gas deposits.

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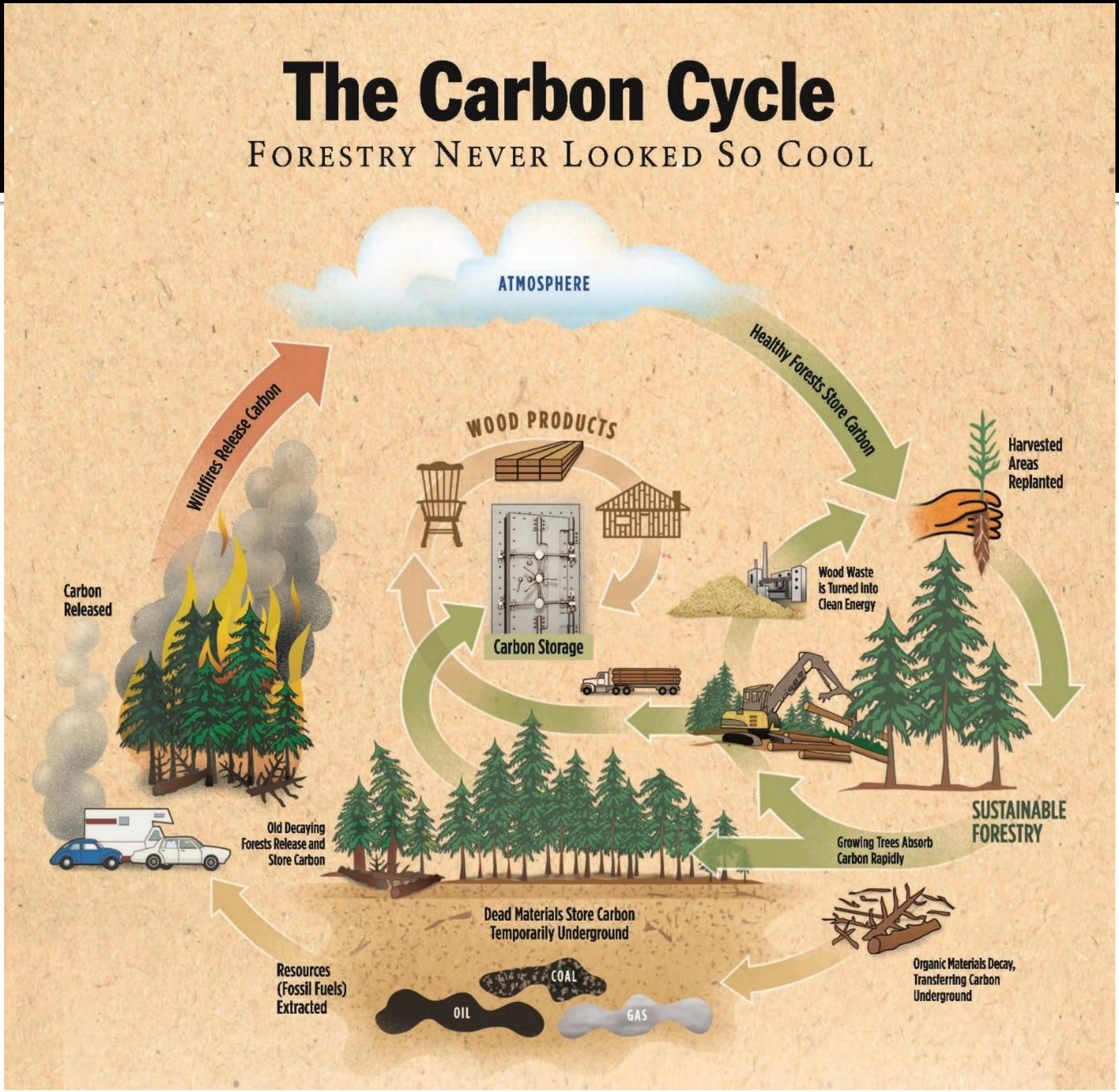
The Carbon Cycle
Forestry Never Looked So Cool
ATMOSPHERE
Wildfires Release Carbon
Healthy Forests Store Carbon
WOOD PRODUCTS
Harvested Areas Replanted
Carbon Released
Carbon Storage
Wood Waste Is Turned Into Clean Energy
Old Decaying Forests Release and Store Carbon
SUSTAINABLE FORESTRY
Growing Trees Absorb Carbon Rapidly
Dead Materials Store Carbon Temporarily Underground
Resources (Fossil Fuels) Extracted
COAL
OIL
GAS
Organic Materials Decay, Transferring Carbon Underground

Activity – Act out the Carbon Cycle

- Where can carbon be found on Earth?
- Let's review how carbon can move:
  - Physical processes
  - Chemical processes – burning
  - Biological processes – photosynthesis & respiration
  - Dissolving in and release from water
  - Decomposition

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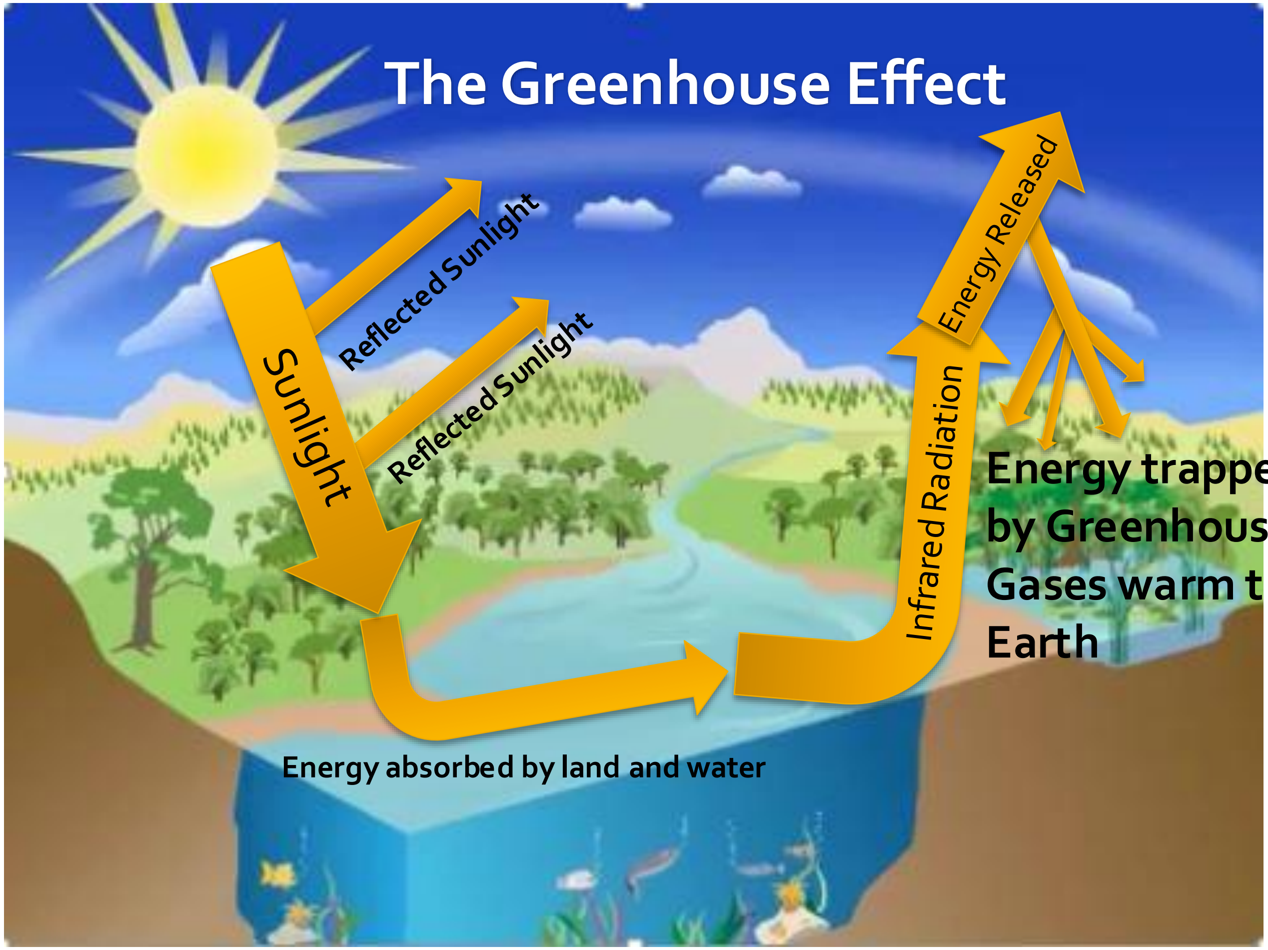
Activity – Act out the Carbon Cycle

- Equal number of students at each station
- Each station has a dice
  - Each student rolls the die individually and records what/where they (as a carbon atom) will move
  - Follow the instructions on the station sign to know where to go next
- Follow the directions and record rolling the dice 10 times
- We'll see where carbon ends up in the cycle

The Greenhouse Effect



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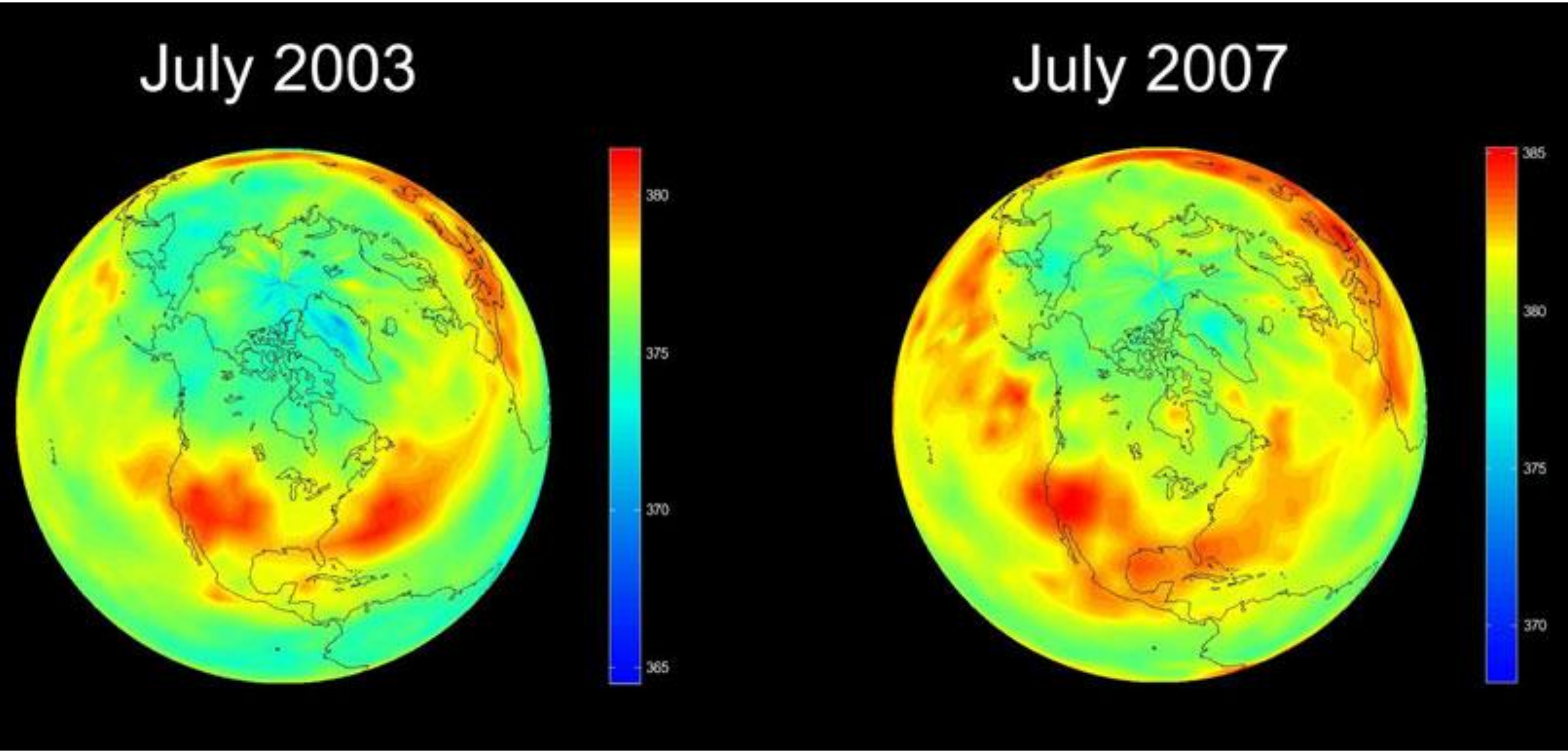
Carbon Dioxide Concentrations over North America



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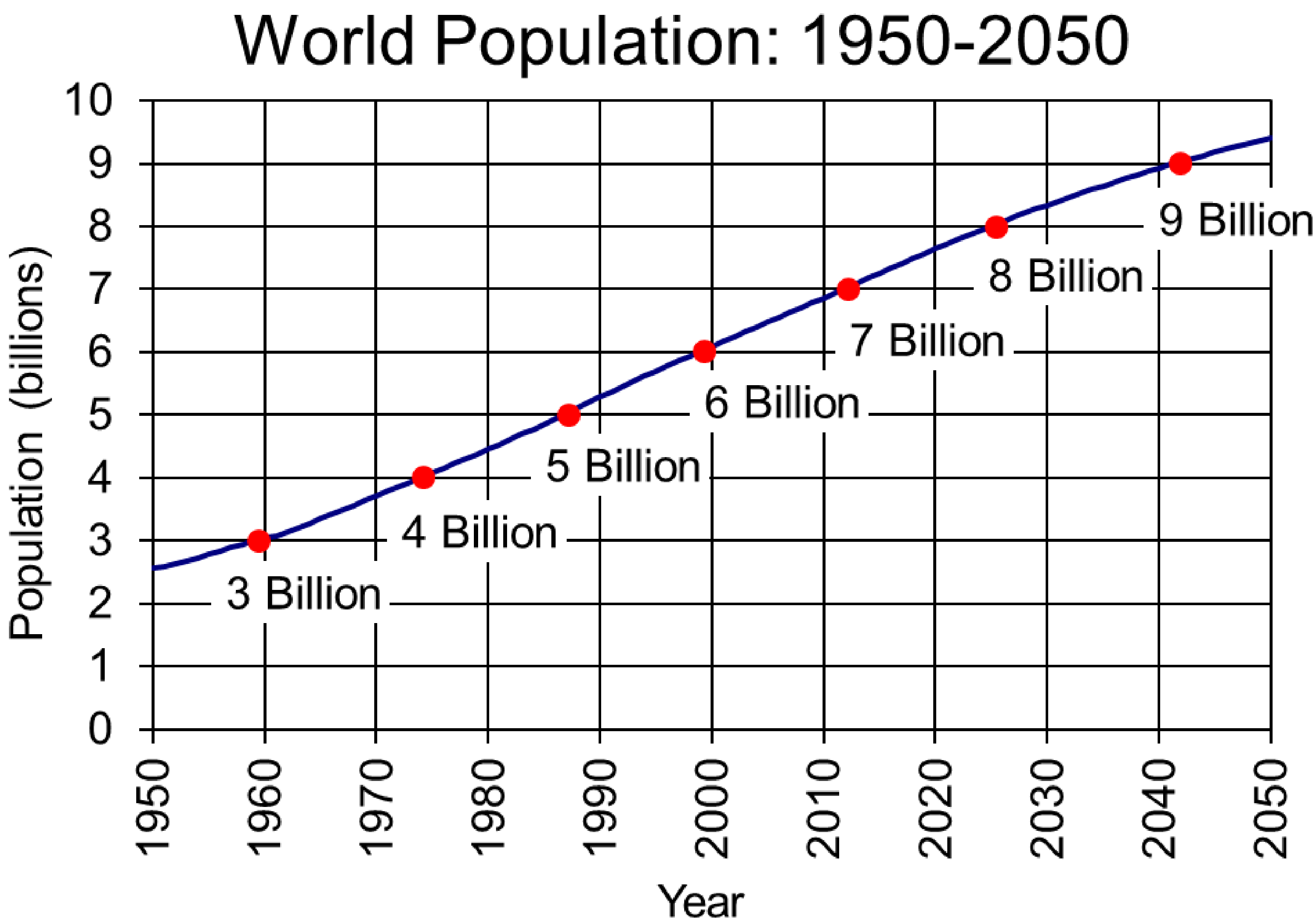

Source: U.S. Census Bureau, International Data Base, July 2015 Update.

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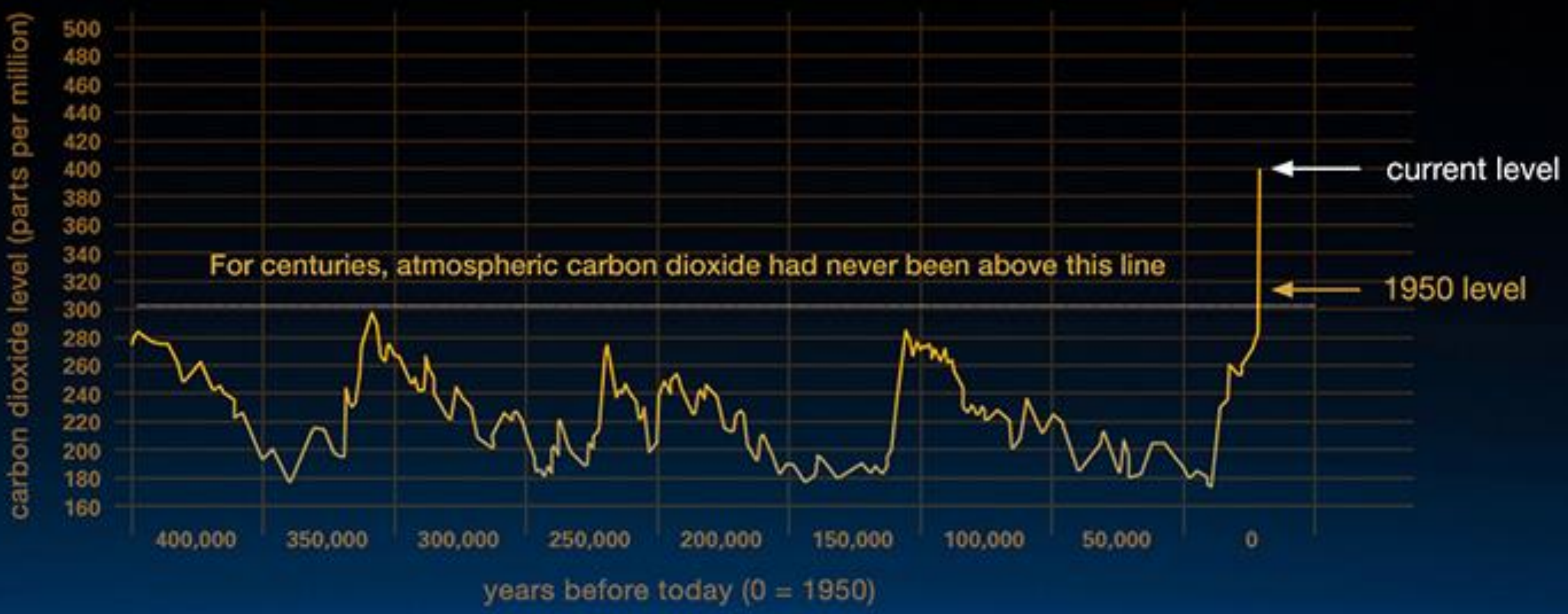
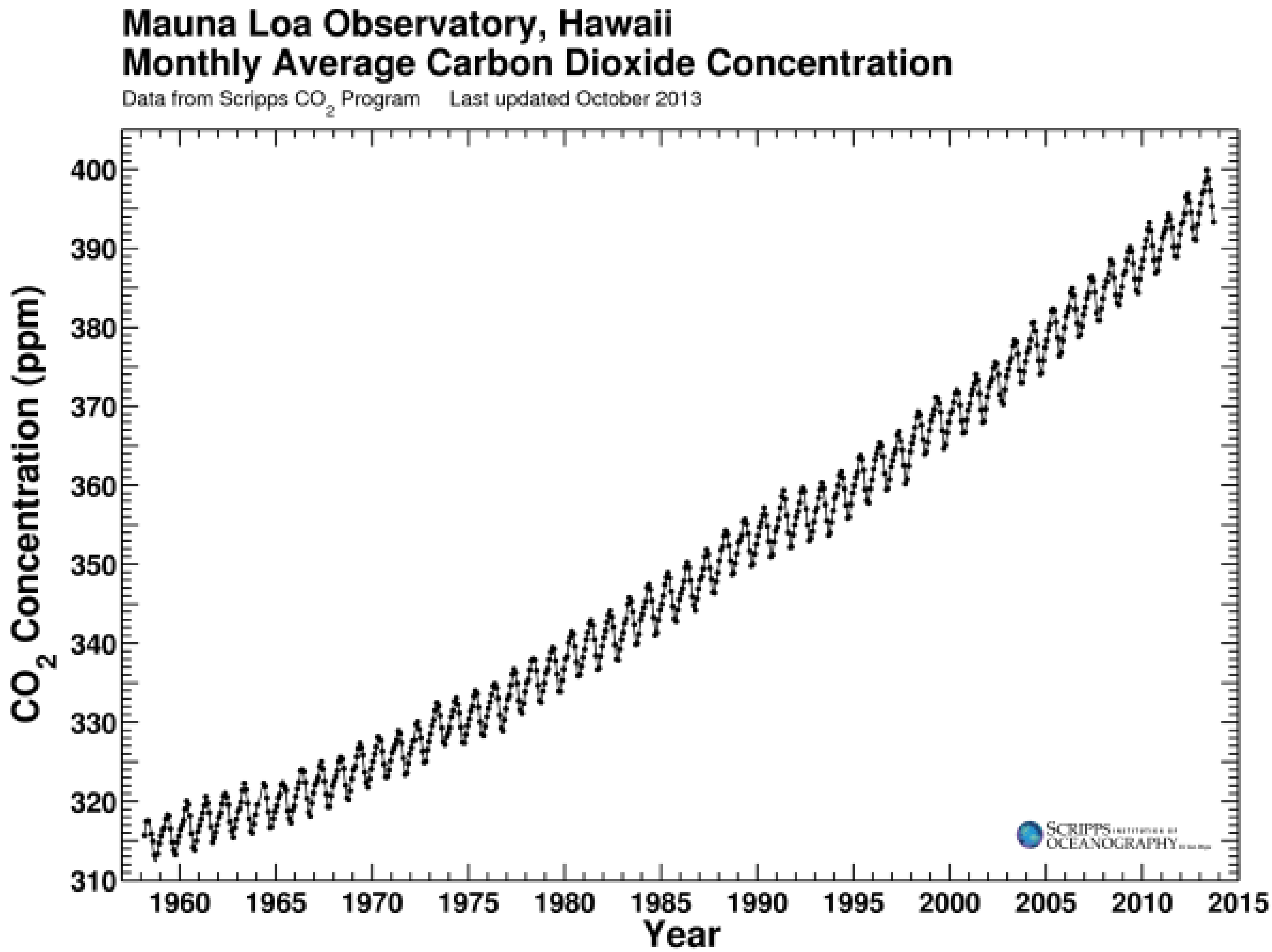
Historic Atmospheric CO_2 Concentrations



Keeling Curve: 1958-Now



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Forestry in WI

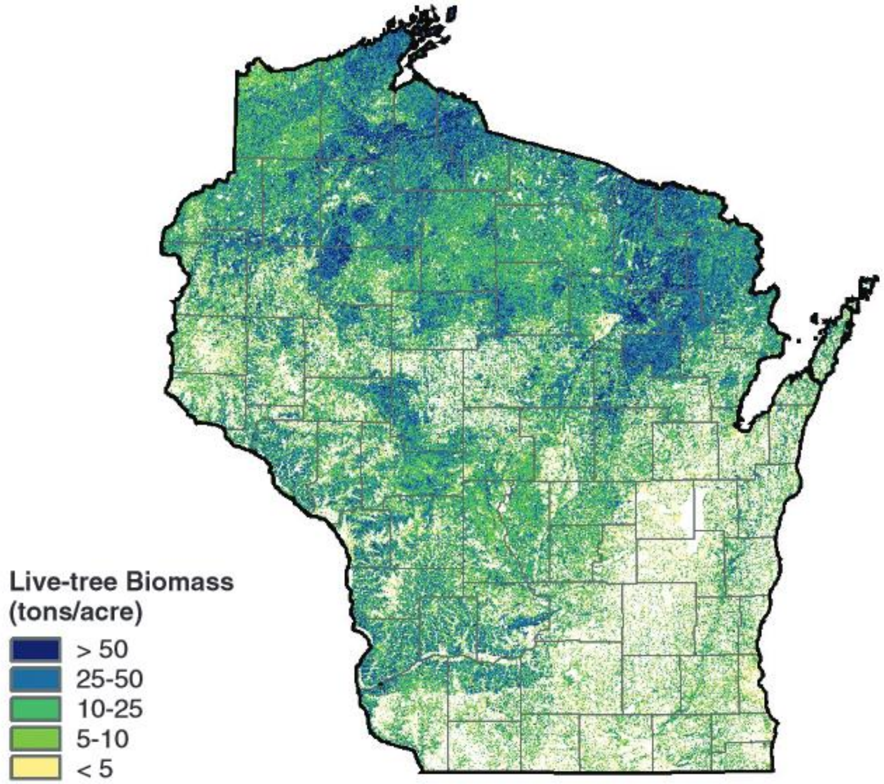
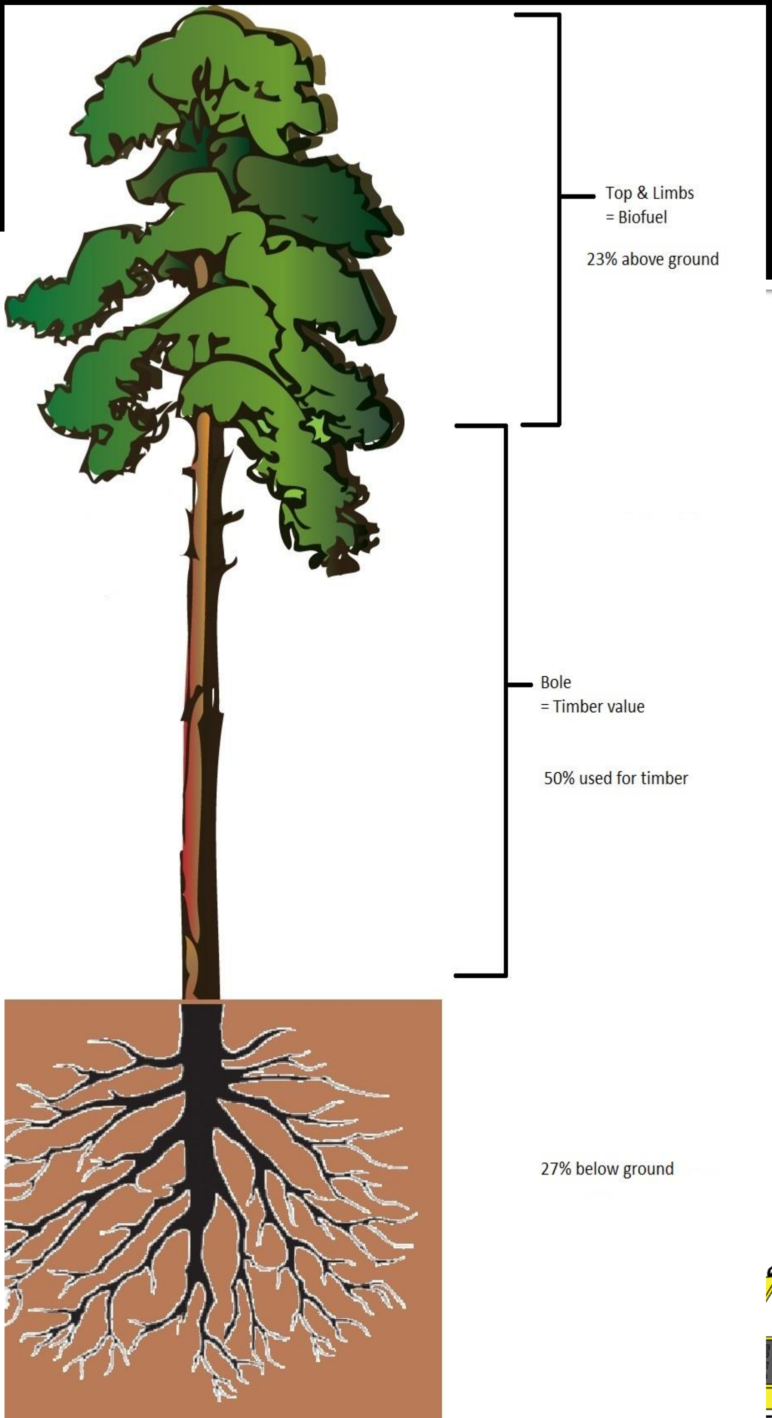


Figure 15.—Spatial distribution of live-tree biomass on forest land, Wisconsin, 2009.



U.S. Forest Service. (2012). *Wisconsin's Forests 2009*. (Resource Bulletin NRS-67). Washington, DC: U.S. Government Printing Office.

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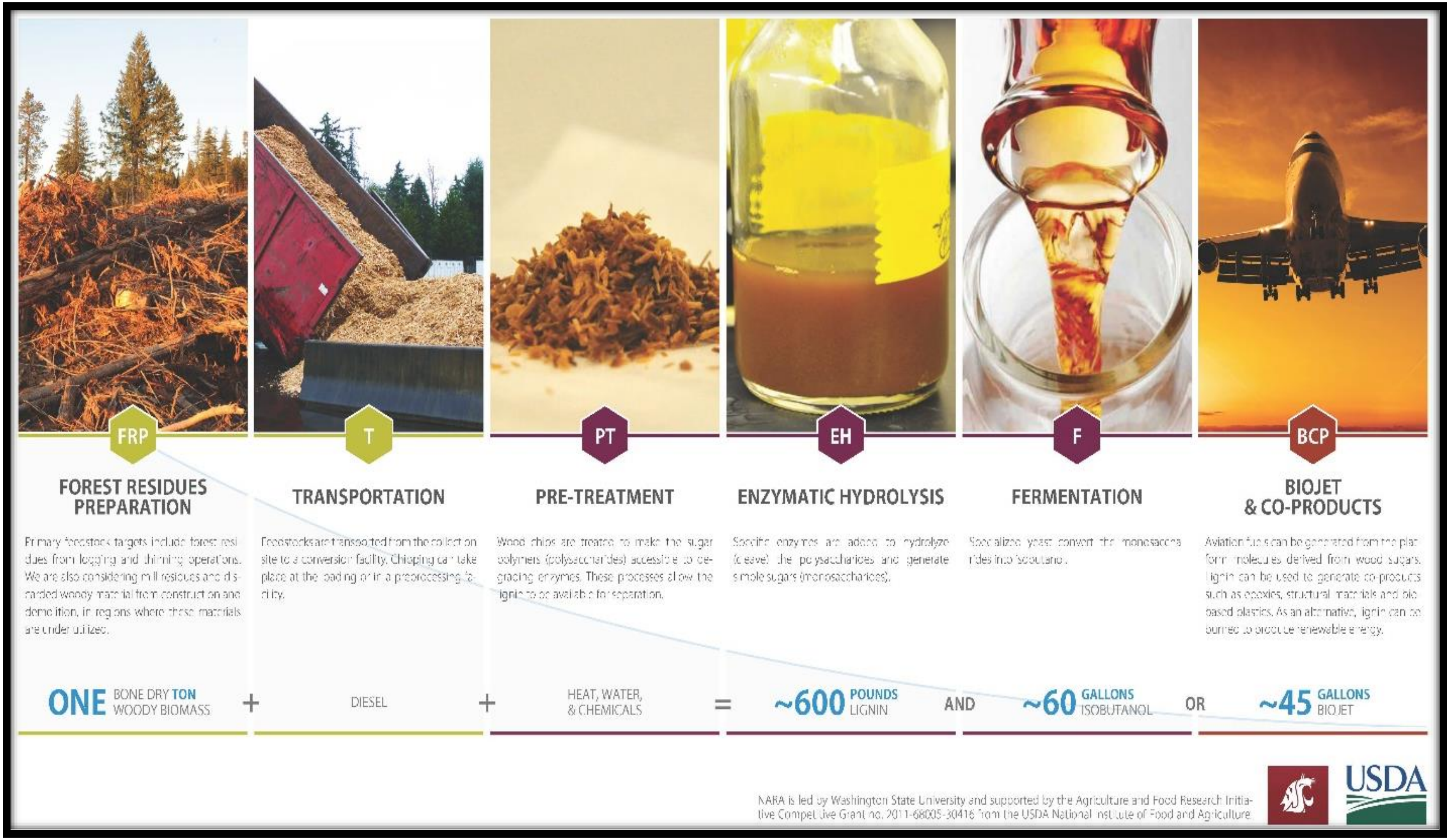

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1 Ton of Woody Biomass

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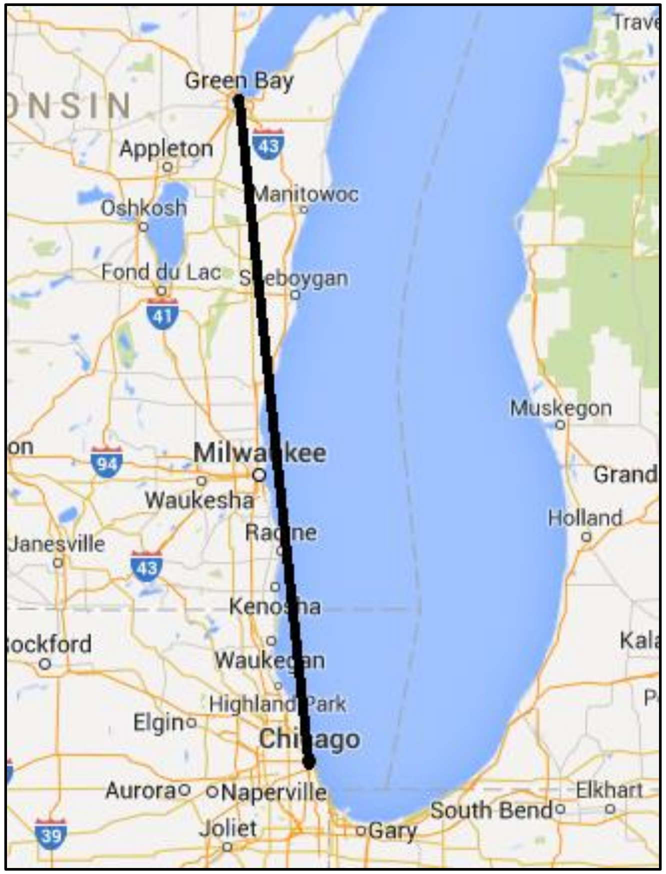
How many trees would it take…



- One 747 jumbo jet
- 175 miles
- From Lambeau Field to Soldier Field
- Using only the extra stuff from logging!

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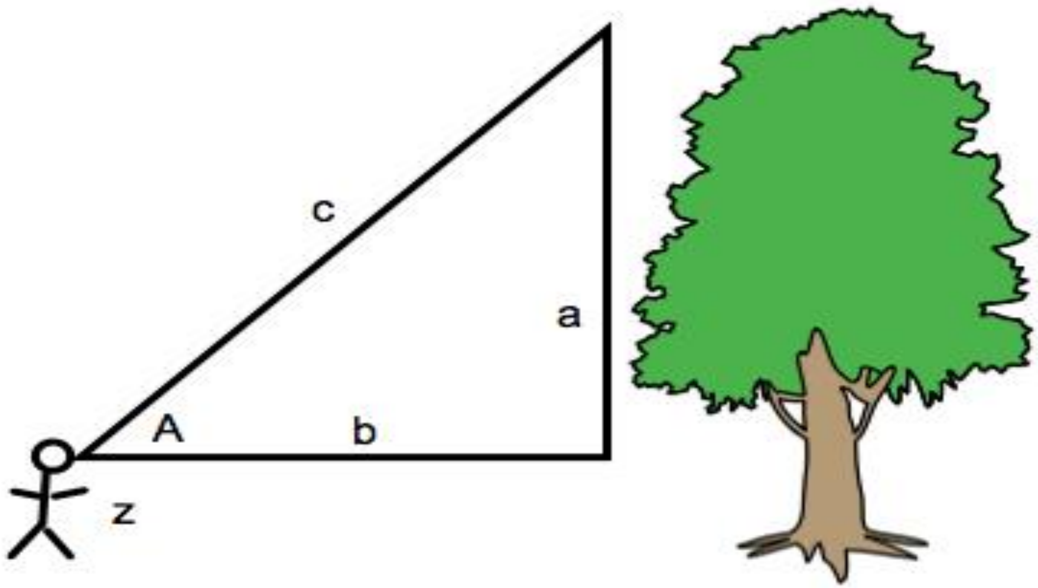
Determine the height of a tree



Find a place to stand where you can see the top of your tree. Measure the distance from the base of the tree to where you stand with the meter tape.

(b): _________________ m

Find the angle on clinometer from your eye to the top of your tree

(A):__________ degrees

Measure the distance from ground to observer's eyes

(z):_________ m

Height of tree = H = (tan(A))*b + z

H = ________________m

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Value of a Tree

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Lesson adapted from Science Scope Magazine. March 2014: 37(7) 27-35.