



The Environment

Unit 3



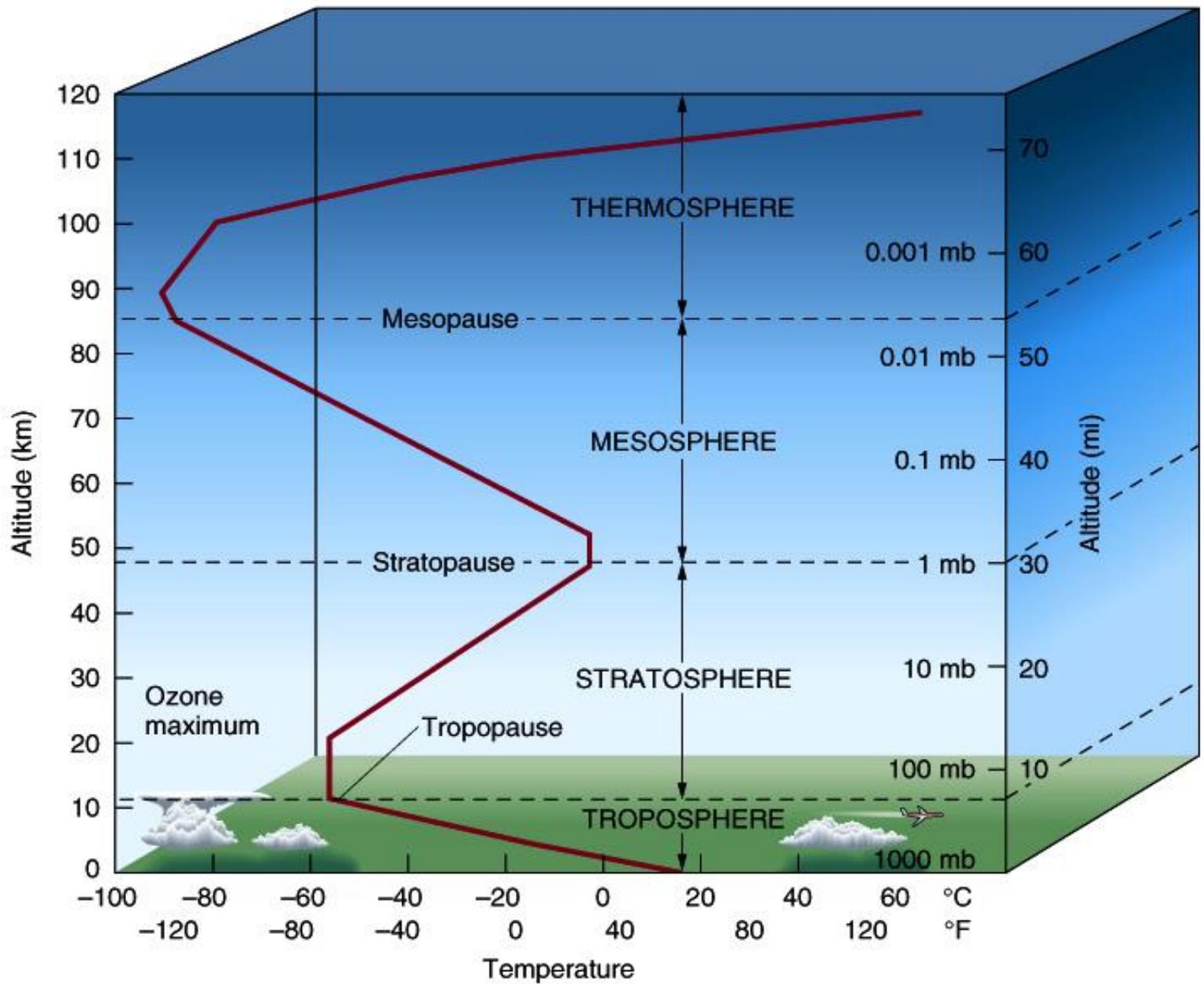
THE ATMOSPHERE

- The "Deets"
- Atmospheric Poisons
- Acid Rain
- Ozone

The “Deets”

- Approx. 120 km thick
- Mixture of particles, gases and aerosols
- Protects us from UV rays



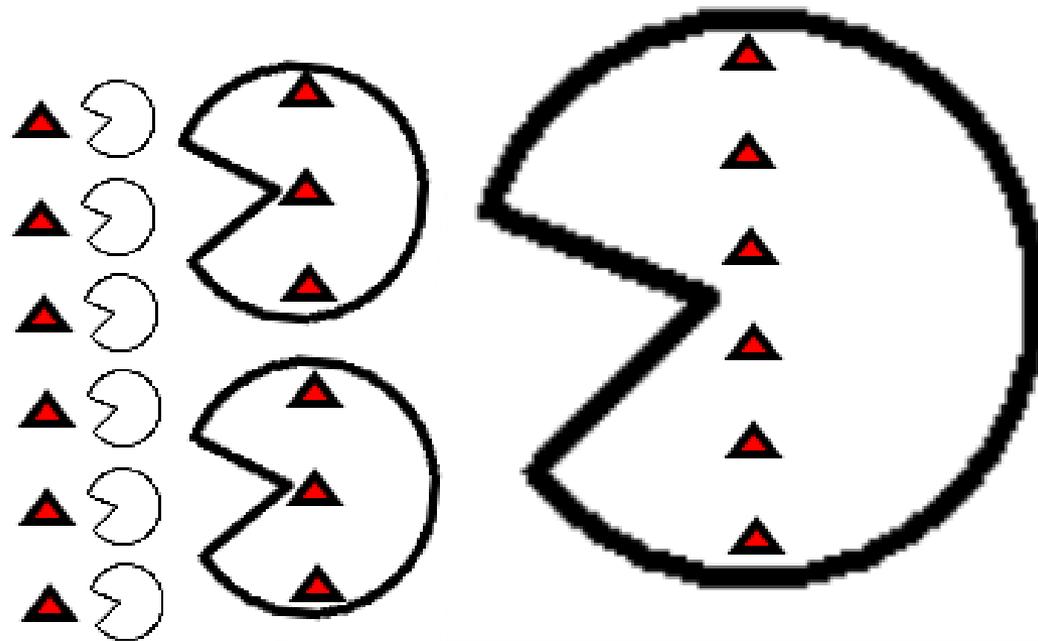


Atmospheric Poisons

- **POPs (Persistent Organic Pollutants)**
 - Chemicals used in pesticides and industrial chemicals
 - They evaporate, travel with air currents, and condense elsewhere. This is known as the **Grasshopper Effect**.
 - POPs are worse in polar climates, since there is less evaporation.

Atmospheric Poisons

- Poisons are amplified by **bioaccumulation**.
- The higher you get on the food chain, the more amplified the toxins get.



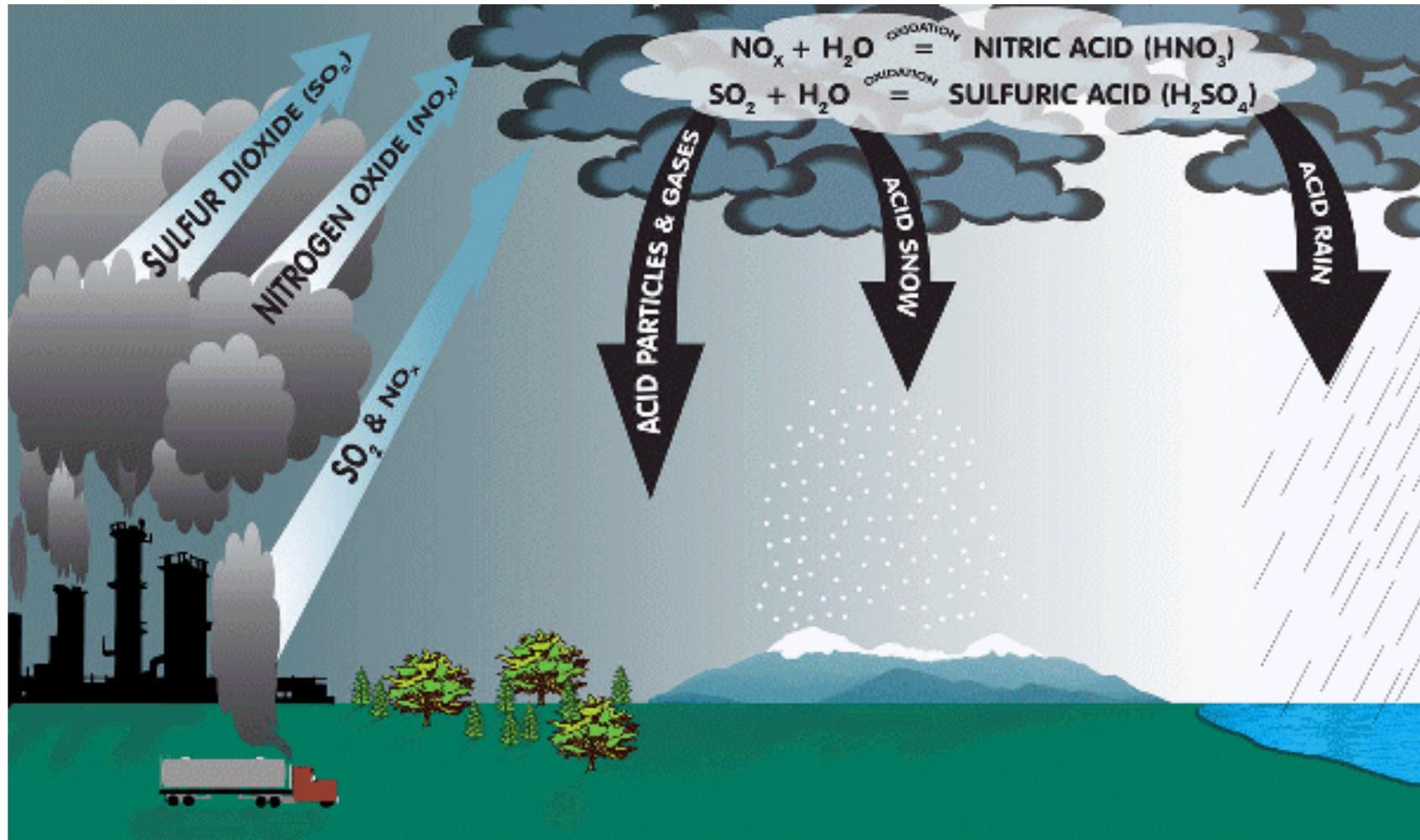
Poisons: What's Being Done?

- Creation of regulations for the manufacture and use of POPs.
- Arctic Monitoring Assessment Program to collect data on Arctic contaminants and provide advice on preventative measures.
- However, POPs are cheaper and easier to use than alternatives, so phasing them out has been slow.

Acid Rain: Causes

- Burning Fossil Fuels creates Sulfur Dioxide and Nitrogen Oxides
- These combine with water in the atmosphere to create Nitric Acid and Sulfuric Acid.
- These acids fall with rain and snow, harming the ecosystems.

Acid Rain Cycle



Acid Rain Effects

Aquatic

Deformities, Death of aquatic life

Terrestrial

Removes waxy coat on leaves and damages them
Soil microorganisms are damaged
Animals suffer as habitat becomes damaged

Human

Respiratory problems from inhaling HNO_3 and H_2SO_4

Material

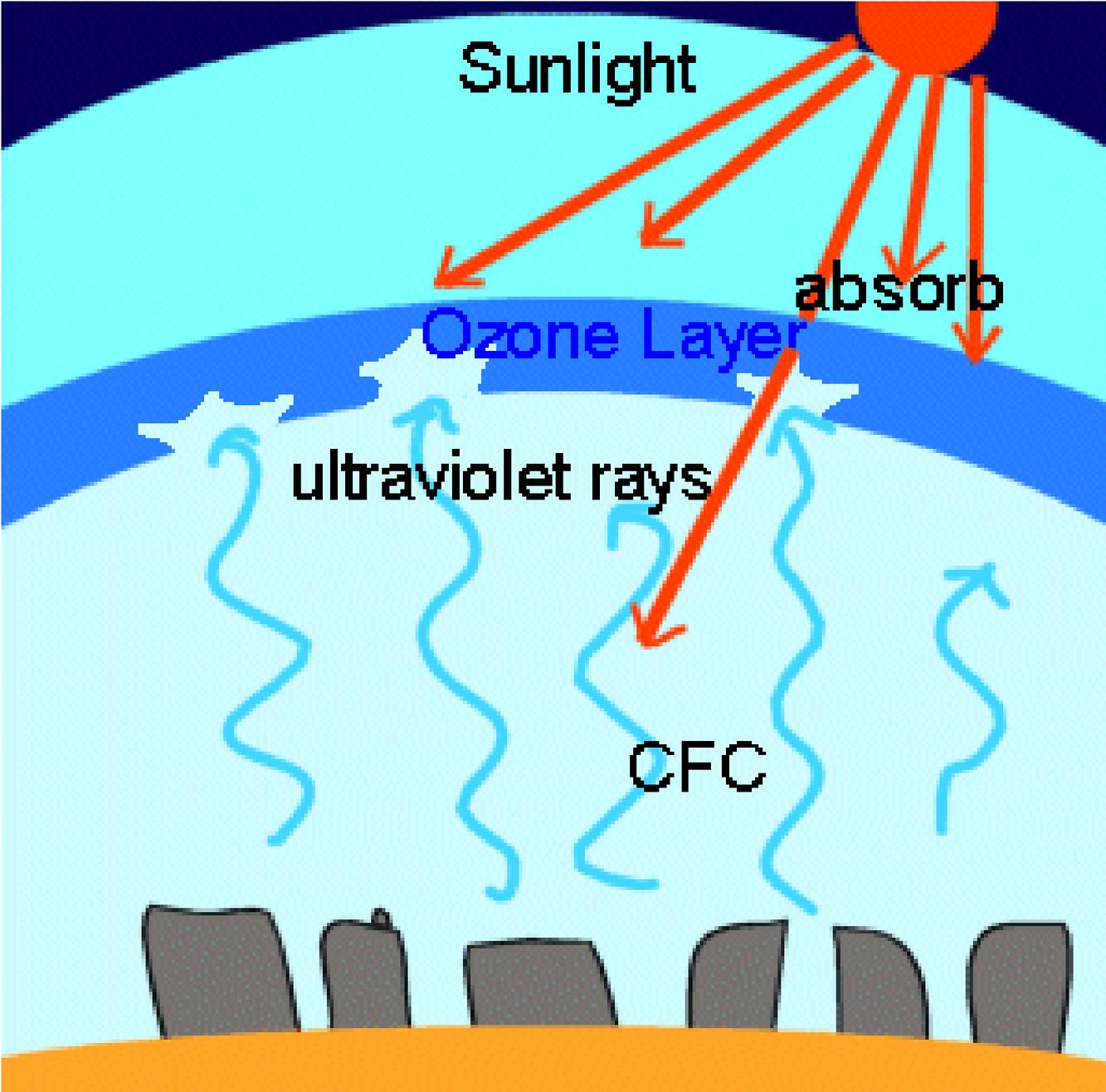
Corrosion of Metal
Stone is damaged

Acid Rain: What's Being Done?

- Eliminate SO₂ and NO₂ emissions
 - Catalytic Converters
 - Test vehicle emissions regularly
 - Reduction Targets
- **FAIL**
 - Gov't funding for public transit is NOT working so well because governments get pressured by automobile manufacturers, oil companies, and people who want lower taxes.

Ozone Layer Depletion: Causes

- The Ozone Layer absorbs harmful UV radiation before it gets to the earth's surface.
- **CFCs (Chlorofluorocarbons)** destroy the ozone in the atmosphere, making a hole for UV rays to get through.



Ozone Layer Depletion: Effects

- UV-B Rays
 - Causes sunburns, cancer, eye cataracts
 - Weakens the immune system.
 - Reduces crop yields
 - Damages phytoplankton (basis of the food chain)
 - Damages hatching fish and frogs eggs

Ozone: What's Being Done?

- Montreal Protocol, 1987
 - Cut the production of Ozone Depleting Substances.
 - All industrialized countries met deadlines to phase out CFCs and gave financial support to developing countries to do so as well.
 - “One of the most successful multilateral treaties ever.”
 - Possibly by 2070 - a full return of ozone layer



WATER

Blue Gold

Water Crisis

Although Canada has ample fresh water, many other parts of the world do not. The world's fresh water supply is being depleted.

How?

I. Pollution

- Chemicals are used in farming to counter a diminishing water supply, but pollute the little water that *is* available.
- Sulfur dioxide emissions cause acid rain.
- Industries create waste that run into rivers.
- We are destroying wetlands that normally purify water.

2. Mining the Groundwater

- We are pumping 15x more water from the ground than is being sent back into the ground through the water cycle.
 - Agriculture
 - Soft drinks
 - Bottled Water
- Removing water from its natural watershed and exporting it to another place eventually causes desertification.

3. Deforestation

- Forests hold the water in the ground. Without them, the water just runs off the surface.
- Without trees, we lose a valuable part of the cycle: Transpiration

4. Urbanization

- Rain cannot be absorbed into the pavement. It runs into sewers and causes the ground to dry up.
- Suburbs overwhelm the ground water supply

5. Water Diversions

- There are 50,000 large dams worldwide.
- Dams prevent rivers from carrying nutrients downstream. The soil erodes as a result. It cannot absorb water, so the water runs into the oceans.
- Headpond water behind a dam becomes stagnant.

What does this mean for Canada?

- Do we export our water and sell it?
- Do we hoard our water and prepare for a future war?



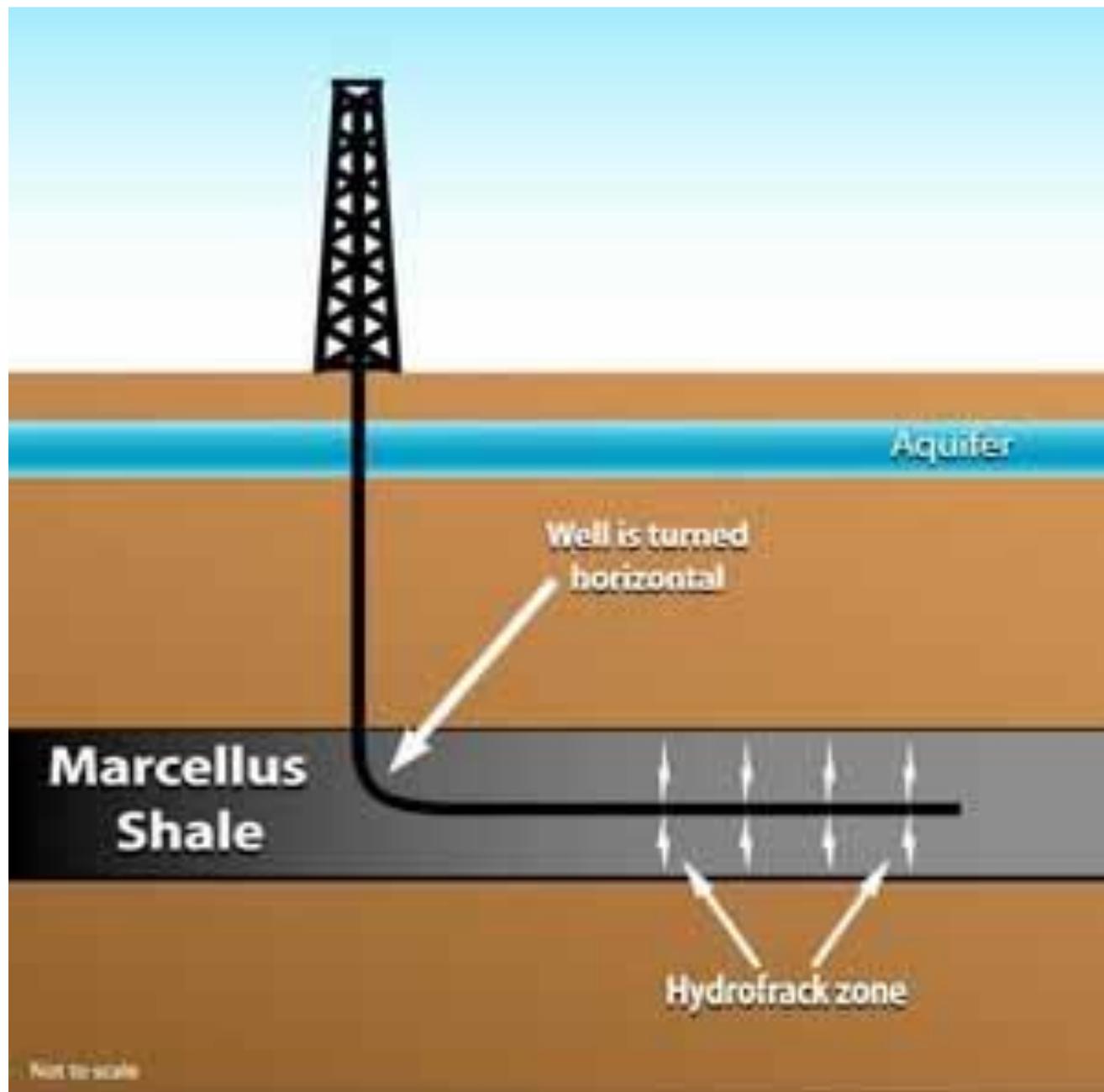
RESOURCES

Hydraulic Fracturing Terms

- **Shale-** Rock formations miles underground that contain natural gas deposits
- **Wellbore-** A hole drilled for the purpose of exploration or extraction of a resource.
- **Well Casing-** A casing within a wellbore that protects the ground water
- **Aquifer-** Where the groundwater is stored.

Hydraulic Fracturing

- Commonly known as “Hydrofracking” or just “fracking”
- Involves drilling a wellbore, and then pumping pressurized water and chemicals into the wellbore to create fractures in the rock.
- These fractures can release natural gas.



How HydroFracking Works

- <https://www.youtube.com/watch?v=VY34PQUiwOQ> 6:36 mins

Pros and Cons

- Make a t-chart, listing the pros and cons of hydrofracking.

| Pros | Cons |
|------|------|
| | |
| | |

- Then write $\frac{3}{4}$ page on which side you would take and why.
- <http://www.cbsnews.com/video/watch/?id=7054210n> (13:26 mins long)



Renewable Energy Resources

What are some renewable energy resources that exist?

What prevents people from using them?