**Planetary convections**

- Convection in mantle is due to the heat from the core escaping upwards through the layers
- Ex boiling water in a pan
- Outer crust of ocean is basaltic
- Crust of continental is granite
- Lithospheric mantle are peridotite
- Limestone from calcium carbonate that dissolves can lead to sink holes
- Most of earth's crust is silicon aluminum and oxygen

**Earth chem**

- You will almost never find native iron in rocks of the earth's crust
- Native iron is pure iron
- You don't find it in the crust because it reacts with oxygen so much
- Diamonds are tetrahedral carbon atoms
- Graphite is layered carbon atoms
- Most crustal minerals are aluminal silicates
- Tetrahedral link by their corner oxygen atoms to produce new structures
- Granite is of quartz, hornblende, and feldspar
- Igneous rocks form from melts, depths in crust, allowing larger crystals,
- Rocks closer to surface are more fine grained or glassy
- Sedimentary rocks are fragments of other rocks put back together
- Metamorphic rocks formed from altering preexisting rocks

**Plate tectonics**

- In the past 30 years has become the leading topic of understanding the earth
- Has even led to change the kind of air that flows in a land, changing the geographic identity of said place as well as climate
- You get volcanoes when one plate goes under the other, forming a trench, thereby recycling it
- There is always earthquakes
- Ocean plates can be returned or mantle via subduction
- This causes earthquakes, severity determined by depth of subduction of plate
- Ex of convergence is Juan de fuca under the west of the US, creating Mt saint Helen's
- Transform boundary is plates sliding past each other
- No volcanoes but loads of earthquakes
- Passive boundaries, both plates moving in  same direction at nonconflicting speed, but some few earthquakes, but causes buildups of ground, floods are more common here

- Movement of plates is about 5cm per year
- North American plate rotates, we do not know why

**Water, Weather, Glaciers**

In the cells of air convection

Ascending winds create precipitation

Descending winds create dryness

Earth rotation produces curves

97.2% of water is in oceans, 2.15% is glacier, .62% ground water

We have drinkable water because of the controlled processes of the water cycle

North American Basins

Hierarchial:

Stroubles Creek

New River

Kanawha

Ohio

Mississippi

Great Basin does not go anywhere

Infiltration (water seeping into ground) creates groundwater, which contributes to water table and vice versa

May react with subsurface rock

**Hot spots**

Current understanding suggests plumes of hot rock from deep in the mantle

Burn holes in plates that pass over them

Can cause plates to change direction for some reason we know not

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**Cryosphere : Frozen subset**

Surface water that stays frozen becomes glaciers, mountain and continental

Glaciers are a secondary water reservoir, and very sensitive to climate

By coring glaciers, scientists can study the layers of ice to learn about past geological history

National Academy of Scientists

Assessment of hazards in the US between 1975-1994