6th Grade Unit 4 part 3

*Lesson 6: How is climate affected by energy from the sun and variations on Earth’s surface?*

*Vocab: weather, climate, latitude, topography, elevation, surface currents*

*Climate- weather conditions (temp., humidity, precipitation) on average for a place*

*weather conditions in an area over a long period of time*

*Weather- conditions from day to day*

Climate is determined by:

* Temp.
  + Average temp. Is misleading it doesn’t show the range of temps
  + Can give hints to the plants and animals that can live there
  + Range gives you more info
* Precipitation
  + Any water that falls from the sky
  + Average precip. Is misleading and doesn’t show the pattern
  + Rainy season allows certain plants to grow

Sun’s energy and climate

* The latitude (the horizontal lines north and south of the equator) of a place determines how much of the sun’s light it will get
* The closer to the equator the more direct the light hits making the place warmer
* The sun powers the water cycle (causing evaporation)
* The sun powers the wind (creating uneven heating of the surface that lead to air pressure differences that push air away from high pressure spots

Surface features and climate

* Topography- the surface features of a place (ex. Mts. and deserts)
* Topography influences wind movements and energy (heat)
* Elevation (the height above sea level) affects precipitation as air cools when it climbs a mt.
* Flat land allows air to move easily creating thunderstorms and tornados
* Mts. force warm moist air up quickly causing condensation and rain to fall on one side of the mt. creating a very dry side on the other side creating a desert; called the rain shadow
* High elevation is colder and drier, low elevation is warmer and more humid

Large bodies of water and climate

* Water absorbs and releases energy more easily than land
* Helps to moderate the temp of nearby areas
* Makes a smaller range of temps (less extreme changes)

Currents and climate

* Move water and w/ it heat energy and nutrients around Earth
* Surface currents (current at the surface)
* Cold currents cool the land, warm currents warm it

Major climate zones

* Tropical
  + Hot (avg. 18C or 64F or higher)
  + 3 sub-climates
    - Rain forest, desert, and savanna
    - From 23.5 S to 23.5 N tropics of cancer and capricorn
* Temperate
  + Cool (avg. 18C-10C or 64F-50F)
  + 5 sub-climates
    - Marine west coast, steppe, humid subtropical (florida), humid continental, mediterranean
    - Between tropical and polar
* Polar
  + Cold (avg. rarely above 10C or 50F)
  + 3 sub-climates
    - Subarctic, tundra, polar ice cap

*Lesson 7: What are the causes and effects of climate change?*

*Vocab: Ice age, greenhouse effect, global warming*

Natural causes of climate change

* Movement of tectonic plates
  + Slow process leads to long term climate change
  + Changes as the continent moves to a new location
  + Ex. fossil ferns in Antarctica
* Particles in the atmo.
  + Fast process
  + Volcanoes erupting, asteroids hitting earth

Climate patterns

* Sun cycle
  + Sunspot cycles are 11 years
  + Sunspot is a cool dark spot on the sun
  + Affects earth temps and might affect rain
* El nino and la nina
  + El nino ocean gets hotter in tropical area while other areas get cooler
  + Makes hot temps dryer and cool temps wetter
  + La nina ocean gets cooler
  + This cycle alternates and cause flooding and droughts
  + Mainly affect pacific ocean areas
* Ice ages
  + Period of time where ice sheet spread further than the polar region
  + Every 200 million years
  + Last between 2 million and 20,000 years ago
  + Many hypotheses about their cause

Human causes of climate change

* Atmosphere is a balanced system
* Humans add certain gases called greenhouse gases to atmo. when we burn fossil fuels
* The gases create the greenhouse effect (the process by which gases in the atmo. Absorb and radiate heat [as light] back to the earth)
* CO2, water vapor, methane (farts), nitrous oxide
* Good thing but too much is bad
* Deforestation takes away trees that use up the CO2
* Trees often removed by burning which puts more carbon in the atmo.

Predicted effect

* Global warming- gradual increase in avg. global temps
* Avg temps have risen .8 degrees in the last 100 years
* Record temps all over earth
* When ice on land melts ocean level
  + During a melt in Iceland sea levels rose 10-20 cm
  + Predict 60 cm rise by 2100
* Changes ecosystems and cause extinctions
* Species move further north to colder temps leaving their habitats
* Species expand habitats into warmer areas
* Might help agriculture in some areas

Use computer models and weather data to predict climate changes

Reduce your impact

* Reduce gas emissions
  + Drive less/car pool
  + Use less plastics
  + Eat less meat (reduces methane the most powerful greenhouse gas)
  + By recycled products
* Reduce rate of deforestation
* New technologies
  + Green fuel and energy

Economic and political issues

* Costs a lot to fix
* People don’t like limits on their lives and choices