**Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Period\_\_\_\_\_\_\_Date\_\_\_\_\_\_\_\_\_\_\_\_**

Chapter 4 Guided Notes: Earth’s Resources

Section 4.1: Energy and Mineral Resources

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resources can be replenished over fairly short spans of times, such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_resources take \_\_\_\_\_\_\_\_\_\_\_of years to form and accumulate
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that may be used as fuel including \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Coal

* Formed when \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ transform \_\_\_\_\_\_\_material over millions of years
* Four stages of development: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Used to generate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and production of \_\_\_\_\_\_\_\_\_\_\_\_\_
* Mined three different ways\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Advantages of Coal:
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, in US can provide about \_\_\_\_\_\_\_ years
	+ \_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Disadvantages of Coal:
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- \_\_\_\_\_\_from the \_\_\_\_\_\_\_ when burning coal
		- Releases \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, about \_\_\_\_\_% efficient from coal to electricity

Natural Gas and Petroleum

* Formed from remains of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that were buried in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_--
* Formation begins when large quantities of \_\_\_\_\_\_\_\_\_\_ become buried in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_; over \_\_\_\_\_\_\_\_\_\_\_\_\_ of years, chemical reactions slowly transform some of the organic remains into the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ form
* \_\_\_\_\_\_\_\_\_\_\_: geologic structure that allows large amounts of \_\_\_\_\_\_\_\_\_to accumulated
	+ All have two things in common
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: allows oil and gas to collect in \_\_\_\_\_\_\_quantities
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: near impenetrable so keeps oil and gas from escaping to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- \_\_\_\_\_\_\_\_\_\_\_\_ in an uparched series of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Advantages of Petroleum
	+ \_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Disadvantages of Petroleum
	+ \_\_\_\_\_\_\_\_emissions, recovery process not \_\_\_\_\_\_\_\_\_\_\_\_, drilling endangers\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_
* Advantages of Natural Gas
	+ Burns cleaner that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_% less\_\_\_\_\_\_\_ than other fossil fuels
* Disadvantages of Natural Gas
	+ Inability to recover all in-place gas from producible\_\_\_\_\_\_\_\_\_, lack of \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Tar Sands and Oil Shale

* \_\_\_\_\_\_\_derived from tar sand and oil shales could become good substitutes for dwindling petroleum supplies
* \_\_\_\_\_\_\_\_\_\_\_\_: mixtures of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ combined with \_\_\_\_\_\_ and varying amounts of back, thick tar called \_\_\_\_\_\_\_\_\_\_\_
	+ Can be pumped out \_\_\_\_\_\_\_\_\_\_\_
	+ Requires lots of \_\_\_\_\_\_\_\_\_\_\_\_
	+ Can lead to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ponds
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_: rock that contains \_\_\_\_\_\_\_\_mixture of hydrocarbons called \_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_ of world’s supply in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Formation of Mineral Deposits

* Some of the most important mineral deposits form through \_\_\_\_\_\_\_\_\_\_\_\_ processes and from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_solutions
	+ \_\_\_\_\_\_\_ is a useful \_\_\_\_\_\_\_\_\_mineral that can be mined at a profit
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ just a few deposits produced by igneous processes
	+ Hydrothermal solutions
		- \_\_\_\_\_\_\_\_\_\_\_
		- Hydrothermal deposits form from hot, \_\_\_\_\_\_\_\_\_\_\_\_\_\_fluids that are left during the \_\_\_\_\_ stages of movement and cooling of \_\_\_\_\_\_
		- Examples: \_\_\_\_\_\_\_\_deposit in \_\_\_\_\_\_Dakota; \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_ deposits in \_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_ deposits in Michigan
* \_\_\_\_\_\_\_\_\_Deposits
	+ Formed when \_\_\_\_\_\_\_\_\_\_heavy minerals settle \_\_\_\_\_\_\_from moving \_\_\_\_\_\_\_ while less \_\_\_\_\_\_\_ particles remain suspended and continue to move
	+ Usually involve minerals that are heavy but also \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Common Sites: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Best known example of placer deposit: \_\_\_\_\_\_\_\_\_\_\_\_

Section 4.2: Alternate Energy Sources

* Solar Energy
	+ Two advantages:
		- Solar energy’s fuel ( )is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Solar energy is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Disadvantages:
		- Solar energy is not \_\_\_\_\_\_\_\_
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ How some work:
		- Active solar \_\_\_\_\_\_\_\_\_\_\_\_\_\_
			* Roof mounted devices, collect \_\_\_\_\_\_\_ from sun that can be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to areas where it is needed by circulating \_\_\_\_\_\_\_\_\_\_\_\_\_\_ through piping
			* Also used to heat water
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_cells
			* Convert sunlight’s energy into \_\_\_\_\_\_\_\_\_\_\_\_\_
* Nuclear Energy
	+ In nuclear \_\_\_\_\_\_\_\_\_\_, the \_\_\_\_\_\_\_\_\_\_\_\_ of heavy atoms like \_\_\_\_\_\_\_\_\_\_\_\_\_\_ are bombarded with \_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ The uranium nuclei \_\_\_\_\_\_\_ into smaller nuclei and emit \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Advantages:
		- \_\_\_\_\_ emissions, fuel can be \_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Disadvantages:
		- Potential of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, problem with where to put \_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_can cause damage and leaks at plants, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Wind Energy
	+ In the next \_\_\_\_\_\_\_\_\_ years, wind power could meet between \_\_\_\_\_\_\_\_\_\_\_\_% of the country’s demand for electricity
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ alternate energy source
	+ Advantages
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, not many emissions (still need \_\_\_\_\_\_\_\_\_ that is produced from \_\_\_\_\_\_\_\_\_\_)
	+ Disadvantages
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, turbines may be \_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ availability
* Hydroelectric Power
	+ Power generated by \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ The water held in a \_\_\_\_\_\_\_\_\_\_\_\_\_behind a dam is a form of stored energy that can be released through the dam to produce \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- The \_\_\_\_\_\_water flow that results, drives \_\_\_\_\_\_\_\_\_\_\_\_and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- Negative Effects: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- We’ve built all the dams we can! \_\_\_\_\_% of US rivers are dammed
* Geothermal Energy
	+ Harnessed by tapping natural underground reservoirs of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Hot water is used directly for \_\_\_\_\_\_\_\_\_\_\_\_\_\_and to turn turbines that generate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_gets \_\_\_\_\_% of energy from geothermal
	+ No harmful products, little maintenance after construction of plants
	+ \_\_\_\_\_\_\_\_\_ be built everywhere
* Tidal power
	+ Harnessed by constructing a dam across the \_\_\_\_\_\_\_\_\_\_\_\_of a bay or an estuary in \_\_\_\_\_\_\_\_\_\_\_\_areas
	+ The strong in and out flow of tidal water drives \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Section 4.3: Water, Air, and Land Resources

The Water Planet

* Each day people use fresh water for drinking, cooking, bathing, and growing food
* Water covers \_\_\_\_\_\_\_\_% of Earth’s surface
* <\_\_\_\_\_\_% of water is usable \_\_\_\_\_\_\_\_\_\_water
* Freshwater Pollution
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_source pollution comes from a \_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_ location, such as factory pipes
	+ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_source pollution is pollution that does \_\_\_\_\_have a specific point of \_\_\_\_\_\_\_\_\_\_\_
	+ \_\_\_\_\_\_\_\_\_\_ is the water that flows \_\_\_\_\_\_ the land rather than seeping into the \_\_\_\_\_\_\_\_, often carrying \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pollution
* Water pollution can lead to:



Earth’s blanket of Air

* The chemical composition of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_helps maintain life on Earth
* Pollution in the Air
	+ The increase of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the atmosphere has altered the \_\_\_\_\_\_\_ cycle and contributed to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_-the unnatural warming of the \_\_\_\_\_\_\_\_\_\_\_ atmosphere
	+ Through a series of chemical reactions, these pollutants in the air are converted to \_\_\_\_\_\_\_\_ that are a major cause of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Burning of fossil fuels also produces \_\_\_\_\_\_\_\_
* Global Warming could result in big changes in Earth’s environment
	+ These changes could include:
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(CFCs) once used in air conditioners and plastic foam production destroy \_\_\_\_\_\_\_\_ in the stratosphere layer of the atmosphere
	+ Could result in increased health problems like cataracts and skin cancer because more of the suns UV radiation would reach Earth’s \_\_\_\_\_\_\_\_\_\_

Land Resources

* Earth’s land provides \_\_\_\_\_\_\_\_\_\_\_\_, as well as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ resources
* Damage to land resources
	+ \_\_\_\_\_\_\_\_\_ produce many mineral resources, but mines are destroying \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	+ Mines also cause \_\_\_\_\_\_\_\_\_\_\_\_ and pollution that contaminates soil and water and destroys \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Section 4.4: Protecting Resources

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the careful use of resources
* Pollution prevention means stopping pollution from entering the environment
* Starting in the \_\_\_\_\_\_\_\_\_\_, the federal government passed several laws to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ pollution and protect resources
	+ In \_\_\_\_\_\_, the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(CWA) required industries to reduce or eliminate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_pollution into surface waters
	+ The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_of 1974 helped protect drinking resources
* In the 1970’s, Congress passed the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the nation’s most \_\_\_\_\_\_\_\_\_\_\_ air pollution act
	+ Established six “criteria” for pollutants known to cause health problems:
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* Caring for Land Resources
	+ Protecting land resources involves preventing pollution and managing land resources wisely
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_- is partly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_material that can be used as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is the collecting and processing of \_\_\_\_\_ items so that they can be made into \_\_\_\_\_\_ products
	+ Recycling Facts:
		- \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_tons of municipal waste per year
		- Average American produces \_\_\_\_\_\_\_lbs of trash per day
		- US Recycles about \_\_\_\_\_\_\_ of all waste
		- \_\_\_\_\_\_% of paper products recycled
		- \_\_\_\_\_\_\_% energy saved by recycling an aluminum can compared with manufacturing a new one