

## Unit 6- Geology, Soil Science, and Fossil Fuels

### **UNIT 6 EXAM: A-DAY 1/27/14 B-DAY 1/28/14**

**\*\*\* EVERYTHING MUST BE WRITTEN IN COMPLETE SENTENCES**

#### **Chapter 9: DUE A-DAY 1/8/14 B-DAY 1/9/14**

1. Describe the methods used in traditional agriculture.
2. Contrast subsistence agriculture with intensive agriculture.
3. How does industrialized agriculture differ from traditional agriculture?
4. What processes are most responsible for the formation of soil?
5. Describe the three types of weathering that may contribute to soil formation.
6. Name the five primary factors thought to influence soil formation.
7. Describe one effect of each of the five primary factors.
8. How are soil horizons created?
9. What is the general pattern of distribution of organic matter in a typical soil profile?
10. Why is erosion generally considered a destructive process?
11. Name three human activities that can promote soil erosion.
12. Describe four kinds of soil erosion by water.
13. What factors affect the intensity of water erosion?
14. What farming techniques can help reduce the risk of erosion due to conventional cultivation methods.
15. How does terracing effectively turn steep and mountainous areas into arable land?
16. Explain the method of no till-farming. Why does this method reduce soil erosion?
17. How do fertilizers boost crop growth?
18. How can large amounts of fertilizer added to soil also end up in water supplies and the atmosphere?
19. Describe the effects of overgrazing on soil.
20. What conditions characterize sustainable grazing practices?

#### **FRQ 1 DUE A-DAY 1/10/14 B-DAY 1/13/14**

Bill and Angela are in APES class together at Fremont High School and both of their families are getting a new car. Bill's family is purchasing a \$21,000 car that will get an average of 30 miles per gallon, taking into account their typical combination of city and highway driving. Angela's family is purchasing a \$24,000 hybrid car that gets 50 miles per gallon based on their driving habits. The car Bill's family purchased has an annual estimated maintenance cost of \$900, while, because of the projected need to replace the batteries approximately every 10 years, the estimated annual maintenance cost of the hybrid Angela's family purchased is \$1500.

- a) If both cars are driven an average of 15,000 miles per year, **estimate** the annual costs of operating both cars when gas prices are
  - i) \$3 per gallon
  - ii) \$5 per gallon
- b) When gas prices are \$5 per gallon, **calculate** the time in years that it will take for the total costs of both cars to be equal.
- c) **Describe** ONE environmental benefit and ONE environmental cost of hybrid vehicles. (pg. 566- 567)
- d) It has been estimated that the true cost of gasoline, once all of the hidden costs are added to the price at the pump, could be as high as \$16 per gallon. **Describe** TWO of the hidden costs that contribute to the true cost of gasoline. (pg 551-562)
- e) **Describe** what makes a resource renewable or nonrenewable. Give a specific example of a renewable resource and of a nonrenewable resource. (pg 3-4)

## **Chapter 19: DUE A –DAY 1/16/14 B-DAY DUE 1/17/14**

1. Why are fossil fuels our most prevalent source of energy today?
2. Why are they considered nonrenewable sources of energy?
3. How are fossil fuels formed?
4. How do environmental conditions determine what type of fossil fuel is formed in a given location?
5. Why are fossil fuels often concentrated in localized deposits?
6. Describe how net energy differs from energy returned on investment (EROI).
7. Why are these concepts important when evaluating energy sources?
8. Describe how coal is used to generate electricity.
9. Why is natural gas often extracted simultaneously with other fossil fuels?
10. What constraints on its extraction does it share with oil?
11. How have geologists estimated the total amount of oil beneath the Arctic National Wildlife Refuge (ANWR) 1002 area?
12. How is this amount different from the “technically recoverable” and “economically recoverable” amount of oil?
13. How do we create petroleum products? Provide examples of several of these products.
14. What is Hubbert’s peak?
15. Why do many experts think we are about to pass the global production peak of oil?
16. What consequences could there be for our society if we do not transition soon to renewable energy sources?
17. List 3 environmental impacts of fossil fuel production and consumption.
18. Compare some of the contrasting views of scientists regarding environmental impacts of drilling for oil in ANWR.
19. Describe two main approaches to energy conservation and give a specific example of each.

## **FRQ 2: DUE A-DAY 1/23/14 B-DAY DUE 1/24/14**

The Arctic National Wildlife Refuge (ANWR) on Alaska’s North Slope is frequently in the news because petroleum geologists estimate that there are billions of barrels of economically recoverable oil beneath the surface of its frozen tundra. According to a 1998 United States Geological Survey (USGS) estimate, ANWR could contain up to 10 billion barrels of technically recoverable oil. Oil company officials advocate opening the refuge to oil exploration and the subsequent development of its petroleum resources. Environmentalists argue that oil exploration and development will damage this fragile ecosystem and urge Congress to protect ANWR by designating it as a wildness area.

- (a) The United States consumes approximately 20 million barrels of oil per day. According to the USGS estimate, for how many days would the technically recoverable oil resources in ANWR supply the total United States demand for oil?
- (b) Make an **argument** for or against drilling for oil in the ANWR region. (REMEMBER ARGUMENT MEANS AT LEAST 4 SENTENCES)
- (c) **Identify** TWO activities that would be associated with the development of ANWR petroleum resources and **describe** a substantial environmental impact of each in ANWR.
- (d) **Identify** and **describe** TWO major uses of the 20 million barrels of oil that the United States consumes each day, and for each use **describe** a conservation measure that would substantially reduce United States consumption.