**Chapter 1 Review**

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| **Time (days)** | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| **Species 1** | 2 | 9 | 16 | 95 | 245 | 259 | 260 | 260 | 260 |
| **Species 2** | 3 | 4 | 8 | 34 | 97 | 165 | 215 | 260 | 300 |

Construct a line graph using the following data. You will do two lines on one graph.

1. For the first 40 days, what type of growth do both species exhibit (exponential or logistic)? How do you know?
2. After minute 40, what seems to happen to Species 1? How does this compare with Species 2? Use the terms Exponential and Logistic in your answer.
3. For species 1, does there appear to be a carrying capacity (K)? If so, what is it? How do you know?
4. For species 2, what do you expect to happen in the future as far as the species growth? How do you know this will happen?
5. How does the rate of growth compare for the two species?

Caffeine appears to have a profound effect on most people. I am designing an experiment to test the effects of caffeinated coffee on test subjects. Half the samples receive decaffeinated coffee, and the other half receive caffeinated coffee. Upon ingestion of the substance, the caffeinated subjects performed 50% better on their test than those who drank the placebo.

1. What is the purpose of the scientific method?
2. Construct a hypothesis for the above example.
3. What is the controlled group in the experiment? Also, list ways that this experiment can be controlled.
4. What are the dependent and independent variables in this experiment?
5. Why is it important to perform multiple trials in an experiment?
6. What are some ways to make the experimental group more complex/interesting?
7. List, in order from largest to smallest, the metric units. What do each of the base units (meter, liter, gram) measure?
8. Convert the following into centimeters AND put your answers in scientific notation: 45.0 dam, 2400 mm, 0.00043 Mm, 0.004909 km, 245.09 nm
9. Estimate the potential petroleum consumption (in gallons of gasoline per year) if given the following assumptions:
   1. The mileage rate for the average car is 20 miles per gallon of gasoline
   2. The average car is driven 5,000 miles per year
   3. The US has 200 million cars
   4. 20% of US cars could be replaced with electric vehicles
10. It has been observed that the emission of methane from flatulation is approximately 50 kg of CH4 per year per 100 humans.
    1. Given a density of 400,000 humans per hectare in the city of LA, calculate the amount of methane emitted, in kilograms, by humans inhibiting a 25,000 m2 city. (1 hectare = 10,000 m2)
11. Use the following assumptions to help you answer the questions below:
    * 1. The area of the San Joaquin Valley where avocados grow is 4.0x104 m2
      2. The rate of growth for avocados is 15.0 dm/year
      3. The average density of avocados is 5x103 kg/m3
12. Calculate the current San Joaquin Valley increase in volume, in m3, of avocados every year.
13. Calculate the current annual global increase in mass, in kg, of avocados.
14. If a dry spell hits the San Joaquin valley, and 45% of the crops are affected, how much less mass (in kg) would there be of avocados?
15. *This question compares standard internal combustion engine (ICE) cars to new electric vehicles (BEV).*

**The charger supplies energy to the BEV battery at an average rate of 4.0 kilowatts (kW) and fully charges the BEV battery in 7.0 hours. The car will run for 100 miles on a full charge. The cost of electricity is $0.11 per kilowatt-hour (kWh).**

* 1. Assume that the fuel efficiency of the ICE vehicle is 25 miles per gallon (mpg) and that gasoline costs $4 per gallon (gal). Calculate the cost of gasoline per mile for an ICE car.
  2. Calculate the cost of the electricity to fully charge the BEV battery. Assume that the battery is not charged to begin with.
  3. Calculate the cost of electricity per mile to drive the BEV.

1. Define sustainability. What does this word mean to you? In what realms of the environment does it apply?
2. What are the two types of resources, give one example of each.
3. What are two types of pollution, give one example of each.
4. What is laissez-faire capitalism? Why is this type of capitalism successful economically, but harmful environmentally?
5. Using fast-food as an example, why is it important to understand the FULL cost of the product (internal AND external consts)?
6. What is GNP? Why does this create harmful conditions to the environment?
7. What is the purpose of the World Bank? Why can this “noble cause” be a disastrous cause as well?
8. How do positive feedback loops differ from negative feedback loops? Give one example of each.
9. How does the Law of Supply and Demand work?
10. Who is John Muir and why is he an important figure in environmentalism?
11. What are the “Commons?” Why is there such tragedy surrounding them?
12. Give three reasons why the Industrial Revolution has caused harm to the environment.
13. Why are certain things considered to have inherent value, whereas others are labeled to have instrumental value?