

Name: \_\_\_\_\_ Date: \_\_\_\_\_ Period: \_\_\_\_\_

### Lethal Dose: Toxicity (LD 50)

Purpose: To calculate and compare the toxicity of various substances and to understand why it's importance to learn concentration of substances/solutions.

#### Part 1: Studying the LD50 chart

LD<sub>50</sub>: the amount of a toxic agent (as a poison, virus, or radiation) that is sufficient to kill 50 percent of a population of animals usually within a certain time—called also *median lethal dose*.

1. Study the LD chart, which substance is most lethal? \_\_\_\_\_
2. How did you figure out the answer? \_\_\_\_\_

#### Part 2: Determining Lethal Dose for Aspirin

Aspirin is a common fever and pain reliever. However, too much of it can be toxic. Your job is to figure out how much of aspirin is toxic to a child and to a teenager. Assume that the lethal dose for rats applies to humans as well.

LD<sub>50</sub> is measure in milligrams of the substances per kilogram of body weight. Your first step is to convert measurements of body weight from pounds to kilograms.

1. What is the mass of a 132 lb human in kilograms?
2. How much does a 22 lb child weigh in kilograms?
3. The LD<sub>50</sub> for aspirin is 200 mg/kg (rat, oral)
  - A. How many milligrams of aspirin would be a lethal dose for a 132 lb adult?
  - B. how many 500 mg tablets of aspirin would be a lethal dose for a 132 lb adult?
  - C. How many milligrams of aspirin would be a lethal dose for a 22 lb child?
  - D. How many 500 mg tablets of aspirin would be a lethal dose for a 22 lb child?

**Part 3: Determining Lethal Dose of Caffeine**

There are 25mg of caffeine,  $C_8H_{10}N_4O_2$  in a can of regular soft drink. The LD<sub>50</sub> for caffeine,  $C_8H_{10}N_4O_2$ , is 140mg/kg.

- a. How many cans of regular soft drink can a 65kg person drink in a short period of time before exceeding the lethal dose?
  
  
  
  
  
  
  
  
  
  
- b. What is your weight in kilograms?
  
  
  
  
  
  
  
  
  
  
- c. How many cans of soda will be your LD?

**Part 4: Determining Lethal Dose of Vitamin D-3**

There is 0.010mg of Vitamin D in each Vitamin D tablet. The LD<sub>50</sub> for Vitamin D is 42.0mg/kg (rat, oral).

- a. Determine the lethal dose for a 140 lb person.
  
  
  
  
  
  
  
  
  
  
- b. Would 400 tablets of vitamin D be a lethal dose for a 140 lb person? Explain reasoning.