

Name \_\_\_\_\_

APES Topic 5 – Toxicology

Date \_\_\_\_\_

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## Determining Toxicity AND Dimensional Analysis



### PART I. Definition Check

1. What does LD<sub>50</sub> mean and how do scientists determine the LD<sub>50</sub> of a chemical?
2. In what units is the LD<sub>50</sub> expressed? \_\_\_\_\_
3. What are some of the ethical concerns regarding research for lethal doses?

### PART II. Determining Lethal Doses: Use dimensional analysis to complete the calculations in the data charts below

The LD<sub>50</sub> for acetaminophen (Tylenol) = 2402 mg/kg (rat, administered orally)

The LD<sub>50</sub> for ibuprofen (Advil) = 200mg/kg (rat, administered orally)

To use LD<sub>50</sub>, you will need to convert measurements of body weight from pounds to kilograms  
(1 kg = 2.2 lbs) do the following calculations:

1. How many kg does a 132-lb human weigh? \_\_\_\_\_
2. How many kg does a 22-lb child weigh? \_\_\_\_\_

## ACETAMINOPHEN

	Calculations made	Answer
1. How many mg of Tylenol would be lethal to a 132-lb adult?		
2. How many 500mg tablets of Tylenol would be lethal for 132-lb adult?		
3. How many mg of Tylenol would be lethal to a 22-lb child?		
4. How many 500mg tablets of Tylenol would be lethal for a 22-lb child?		

**IBUPROFEN**

	Calculations made	Answer
1. How many mg of ibuprofen would be lethal to a 132-lb adult?		
2. How many 500mg tablets of ibuprofen would be lethal for 132-lb adult?		
3. How many mg of ibuprofen would be lethal to a 22-lb child?		
4. How many 500mg tablets of ibuprofen would be lethal for a 22-lb child?		

**Part III: Summarizing**

1. a. Which is more toxic, acetaminophen or ibuprofen? \_\_\_\_\_

b. Mathematically, how great is the difference in their toxicities?

2. Besides dosage, what other factors should be considered when determining the toxicity of a substance on a person?

3. How many Flintstone vitamin tablets would be a lethal dose of vitamin A for a 22-lb child?  
 Each Flintstone vitamin tablet contains 0.9 mg of vitamin A and the LD<sub>50</sub> of vitamin A = 2000 mg/kg.  
 Use dimensional analysis to show work in the area provided.