# (Exercise 2) Before you arrive for the *Measurements in Biology* lab exercise, please

# 1. Read the lab thoroughly. Note all safety guidelines.

1. Answer these preparatory questions:

What safety procedures must you follow during this lab period?

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| --- | --- | --- |
| Identify the metric base units for: |  | State the value of each of these prefixes: |
| length\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | centi\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| mass\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | milli\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| volume\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | micro\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| temperature\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |  | micro\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
|  |  | nano\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

How many liters of cola are left in a 12-ounce can that is half full? Show your work.

You walk 4.5 feet to reach the sink in the lab. How many centimeters did you walk? Show your work.

##### **How is area calculated?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

#### **What is a meniscus?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Why is it important to read the volume of a graduated cylinder at eye level? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Imagine that you are a biologist who needs to obtain fast and accurate measurements of tadpoles in a natural population. In the field you cannot access an electronic balance, but you do have a graduated cylinder. How could you measure the size of the tadpoles in the field?

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If the meniscus in a 5 mL pipet is at 3 mL, how much liquid is in the pipet? \_\_\_\_

#### 

0

1

2

3

4

What is the formula for density?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Consider these measurements of the lengths of leaves from a plant you are studying in lab:

2.51 cm What is the mean? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1.10 cm What is the median? \_\_\_\_\_\_\_\_\_\_\_\_\_\_

5.35 cm What is the range? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

0.79 cm What is the variance? \_\_\_\_\_\_\_\_\_\_\_\_\_

4.95 cm What is the standard deviation? \_\_\_\_

1.32 cm

1.82 cm

The mean and median are not identical. What does this tell you about your data?\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Keeping in mind what you read about significant figures and measurements, you measured the leaves with a 10cm ruler having 1-mm divisions. What would be the smallest definite (not estimated) measurement that could be read from the instrument used to measure length?

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Multiply 10.232 x 44.50342. Record your answer with the correct number of significant digits. Explain your reasoning.

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Would it be equally correct and appropriate to represent the number 100 as 100.00? Explain your answer.

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