

Chapter 1 Section 3: Tools and Techniques

Key Vocabulary Terms



SI

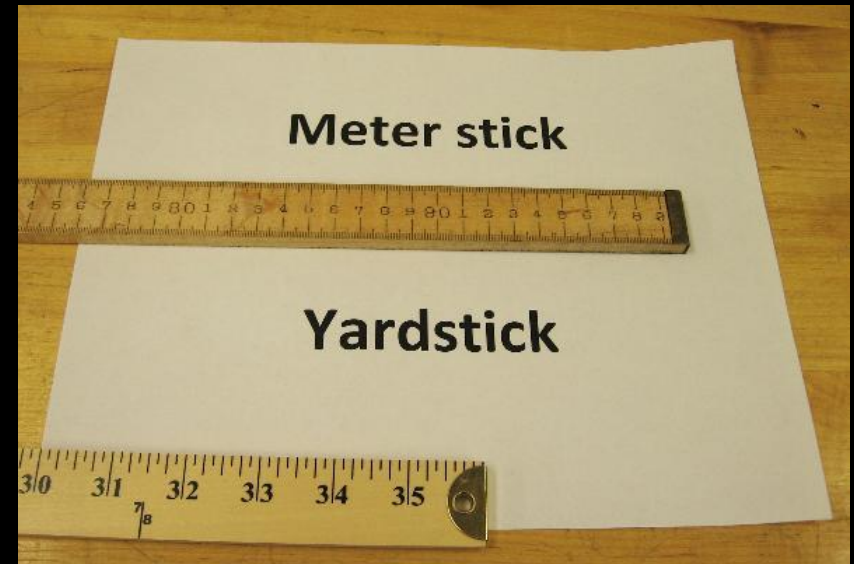
The International System of Units is used by all scientists because scientists need to share a common measurement system. SI is also preferred by scientists because it is scaled in multiples of 10, which makes the system easy to use.



Meter (m)

SI basic unit for length.

Since 1983, it is defined as the length of the **path** travelled by **light** in vacuum in $1/299,792,458$ of a second



Liter (l)

SI basic unit for
volume



Gram (g)

SI basic unit for
mass/weight



Kilo-

A factor of 1,000

10^3 or

times 1,000

Deci-

A factor of 0.1

10^{-1} or

$1/10$

Centi-

A factor of 0.01

10^{-2} or

$1/100$

Milli-

A factor of 0.001

10^{-3} or

1/1,000

Chapter 1

Section 3:

Tools and Techniques



Notes

YOUR TURN



- With a partner, read the Chapter 1 Section 3 Active Reading – Tools & Techniques
- 1st - Take turns reading the questions aloud to each other, alternating questions.
- 2nd - Take turns reading the selection aloud to each other, alternating sentences or paragraphs.

YOUR TURN



- As you read **discuss** the content.
- **Reread and discuss each question. Write down the best answer** to the question using full descriptive sentences.
- Be prepared to share your ideas with the class.

Metric Units of Lengths and Equivalents

Unit	Prefix	Metric equivalent	Real-life equivalent
Kilometer (km)	<i>Kilo-</i>	1,000 m	About two-thirds of a mile
Meter (m)		1 m (SI base unit)	A little more than a yard
Centimeter (cm)	<i>Centi-</i>	0.01 m	About half the diameter of a Lincoln penny
Millimeter (mm)	<i>Milli-</i>	0.001 m	About the width of a pencil tip
Micrometer (μm)	<i>Micro-</i>	0.000001 m	About the length of an average bacterial cell
Nanometer (nm)	<i>Nano-</i>	0.000000001 m	About the length of a water molecule

Think, Share, Write #3

How are prefixes used in names of SI units?

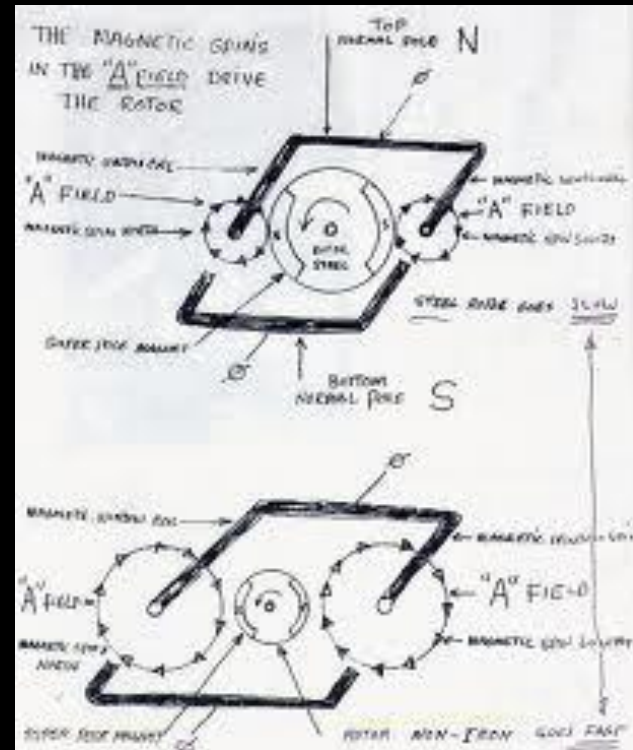
Think, Share, Write #3

How are prefixes used in names of SI units?

Answer

Lab Techniques

In the lab, scientists always keep detailed and accurate notes and perform precise measurements.



Lab Techniques

Many scientists also use specialized tools, such as microscopes, and specialized procedures, such as sterile technique.



Lab Techniques

Scientists use microscopes to view objects and organisms that are too small to see with the unaided eye.



Lab Techniques

Sterile technique is a method of keeping unwanted microorganisms out of a lab in order to minimize the risk of contamination.



Think, Share, Write #4

When might sterile technique be used in a lab?

Think, Share, Write #4

When might sterile technique be used in a lab?

Answer

Lab Techniques

Scientists also collect data remotely using devices such as satellites. These devices help scientists conduct research that would not have been possible in the past.



Safety

Scientists must use caution when working in the lab or doing field research to avoid things like chemical burns, exposure to radiation, exposure to infectious disease, animal bites, or poisonous plants.



Safety

Carefully follow all guidelines and procedures for working safely in the lab. Know the location and proper operation of all lab safety equipment.



Safety

If an accident occurs while in the lab, remain calm. Make sure you are safe and that no one else is in danger. Then inform your teacher.



Think, Share, Write #5

List at least five actions that you can take in the laboratory to ensure your safety.

Think, Share, Write #5

List at least five actions that you can take in the laboratory to ensure your safety.

Answer

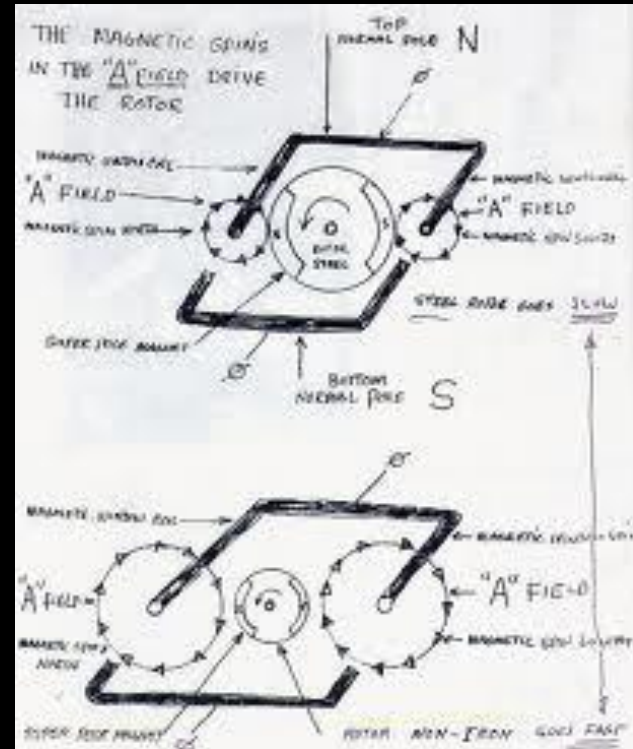
Summary

The International System of Units is used by scientists because scientists must share a common measurement system. SI is scaled in multiples of 10, which makes the system easy to use.



Summary

In the lab, scientists keep detailed and accurate notes and perform precise measurements. Scientists also use specialized tools and procedures.



Summary

Scientists use caution to avoid hazards such as chemical burns, exposure to radiation, exposure to infectious disease, animal bites, or poisonous plants.



Section Review

- 1. Explain** why scientists use SI units for measurement.

Section Review

2. Describe two (2) kinds of microscopes.

Section Review

3. Summarize the steps that you should take if an accident occurs in the lab.

Section Review

4. Inferring Conclusions - In general, measurement systems that are based on powers of 10 are the easiest for people to use. Infer why these systems are easiest to use.

Section Review

5. Analyzing Information - Why is reading the lab procedure before starting an experiment considered an important part of lab safety?

Section Review

6. Performing Conversions - A scientist pours 3.48 milliliters (mL) of hydrochloric acid into a beaker. How many liters of hydrochloric acid did the scientist pour into the beaker?