WHAT IS MATTER? 4 FEBRUARY 2014

Lesson Description

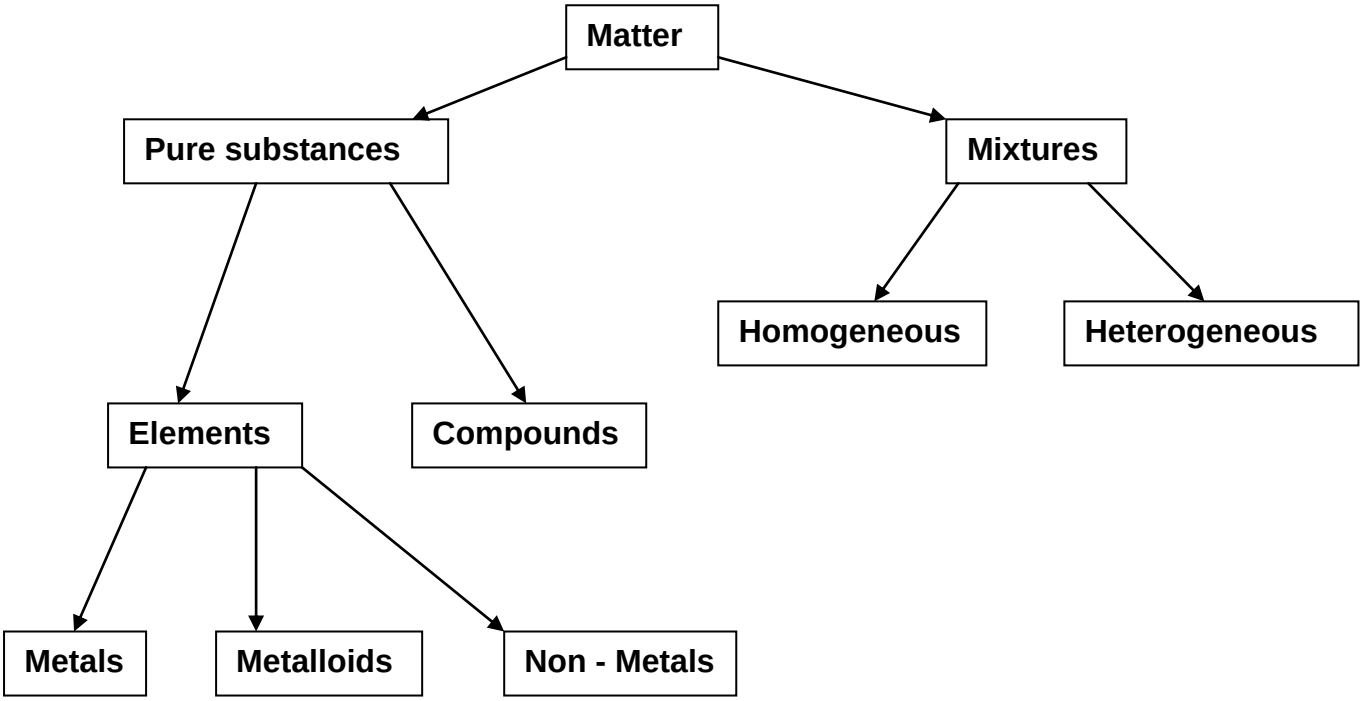
In this lesson we:

- Define and classify matter
- Observe differences between mixtures, compounds and elements
- Use data about the physical properties of matter to classify different samples

Summary

Classification of Matter

Matter includes all substances that have mass and volume and can exist in different states (solid, liquid or gas). The diagram below shows different types of matter:



Comparing Mixtures and Compounds

Compounds	Mixtures
Pure substances	Impure substances
Cannot be separated by physical methods	Can separate by physical methods
Fixed ratio of components	Random ratio of components

Test Yourself

Select the most correct answer from the options given. Write down only the correct letter.

Question 1

Which of the following are properties of all metals?

A Magnetic
B Conduct electricity
C Silver, shiny colour
D Solids at room temperature

Question 2

Sulphur is a bright yellow crystalline solid at room temperature. It does not conduct electricity even when melted. How would you classify this substance?

A Metal
B Mixture
C Non-metal
D Ionic compound

Question 3

Compounds .....

A can be broken down into elements
B are the building blocks of all matter
C always have higher melting points than the elements used to make them
D are a random combination of elements

Question 4

The components of a homogeneous mixture:

A always exist together in the same fixed ratio
B exist together in equal amounts
C are all of the same phase before the mixture forms
D combine together in different ratios

Question 5

A compound that is a liquid at room temperature. Which of the following temperatures could be the melting point of the compound?

A -18^0C
B 30^0C
C 100^0C
D 250^0C

Question 6

State weather the following are true or false. Explain your answer

a.) A compound is not a pure substance

b.) All mixtures can be separated into their components

c.) An element can be broken down into simpler forms of matter

d.) All gases at room temperature are mixtures

e.) Silicon is an example of a metalloid

Improve your Skills

Question 1

The table below gives the melting point and boiling point of different substances.

Substance	Melting Point (^{0}C)	Boiling Point (^{0}C)
Water	0	100
Nitrogen	-210	-195.8
Carbon	3500	4827
Ethanol	-114	78.37
Carbon dioxide	-78	-57
Mercury	-38.83	356.7
Pentane	-130	36.1
Butane	-140	-1

a.) Which substances will be liquids at room temperature (25^{0}C)?

b.) At what temperature will pentane and butane both be solids?

c.) Suggest reasons why mercury and ethanol are both used in thermometers to measure temperature.

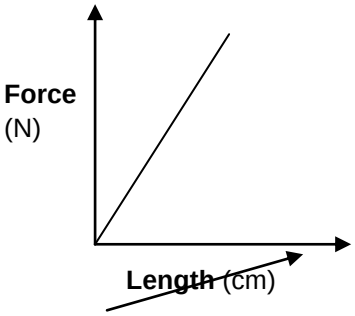
d.) At what temperature does carbon dioxide exist as a liquid?

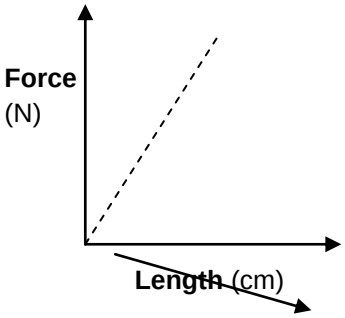
e.) Which substance is the strongest?

Question 2

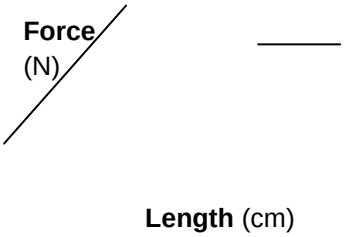
The sketch graphs below illustrate what happens when substances X, Y and Z experience a stretching force. The solid line shows the length of the sample when a force is applied and the dashed line indicates what happens when the force is removed.

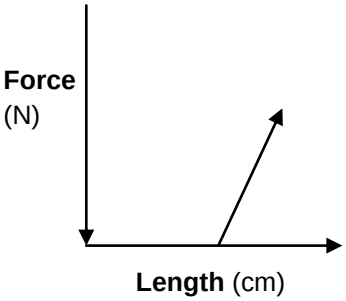
Material X



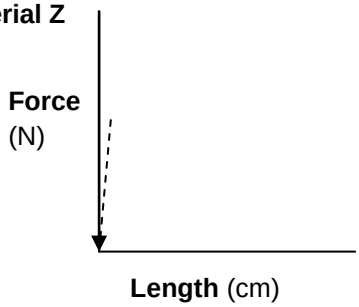


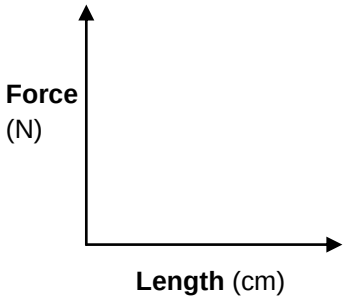
Material Y





Material Z





Use the graphs to answer the following questions

a.) Which material is the weakest?

b.) Which material is brittle?

c.) Which material is most elastic?

d.) Which material is most likely to be metallic?

Links

Mindset Video Series: Investigating Materials http://www.mindset.co.za/learn/s28/t15536/t57539

Periodic Table and data on elements http://www.webelements.com/