Q200 – Introduction Into Scientific Inquiry
May 18, 1998

Fact Sheet: Measurement (metrics and length)

Length: used to measure dimensions of objects in space

Types of measurement:

1. Relative
   a. Pace: the distance of two strides; varies with individuals
   b. Foot: initially the 'standard' length of a king's foot
   c. Yard: distance from the king's outstretched hand to the back of his neck.
   d. Inch: distance from the tip of a king's thumb to the thumb knuckle

   When a new king came into power, what happen to the standard?

2. Metric System:
   a. was proposed in 1670 by Gabriel Mouton, Vicar of Lyons, France. It was adopted by French National Assembly.
   b. A measuring system based on number 10 and its multiples
   c. Initially a meter was determined as one ten millionth of the distance from the equator to the North Pole along the Meredian intersecting Paris. Later, it was determined that this distance was not accurate, but many people had a standard to measure by.
   d. Today: a meter is the length of the path traveled by light in a vacuum during a time interval of 1/299,792,458 of a second.
   e. A meter is based on the speed of light and time.

In this exercise, you will determine your pace. One pace equals two strides, that is, two steps of normal walking.

1. Walk the distance of the tape. Count how many paces it took.
2. Repeat number 1 two more times
3. Record your paces.

Trial	Number of Paces	Meter	Feet
1			
2			
3			
Total			
Average = (1+2+3)/3			

What factors (variables) affect one's pace?

Measure and record the following lengths

Object to measure	SI units	British Engineering Units
1. Pace		
2. Thumb		
3. Hand		
4. Arm		
5. Height		

Physical Geology G110
Summer 1; Quiz #1
May 19, 1998

True/False. Identify each statement as true or false

_____1. A rock can be defined as an aggregate of minerals.

_____2. The angles between the faces of a mineral crystal vary with the size of the crystal.

_____3. The earth is estimated to be approximately 4.6 billion years old.

_____4. Mineral cleavage refers to planes of weak bonding.

_____5. The silica tetrahedra is composed of Si (silicon) and Mg (magnesium).

_____6. In covalent bonding, the electrons are shared between adjacent atoms.

_____7. All minerals are crystalline, but don't always occur as crystals.

_____8. The number of protons in an atom generally equal the number of electrons.

_____9. The unifying theory of geology is called the scientific method.

____10. The Big Bang Theory proposes that the universe began by a huge explosion.

Multiple Choice. Select the best answer.

1. Atoms containing different number of neutrons but the same number of protons are:
a. ions b. isotopes c. minerals d. elements e. radioactive

2. Silicate minerals are classified by their:
a. color, streak, and luster
b. atomic number, atomic mass number, and atomic weight
c. cleavage, specific gravity, and hardness
d. arrangement of their silica tetrahedron

3. All of the following will scratch glass except:
a. diamond b. quartz c. topaz d. fluorite e. corundum

4. An atom is composed of
a. electrons, ions, and isotopes
b. isotopes, electrons, and anions
c. ions, electrons, and cations
d. electrons, neutrons, and protons
e. none of the above

5. The four most abundant elements in the Earth's crust are:
a. silicon, iron, gold, nitrogen
b. oxygen, magnesium, nitrogen, iron
c. oxygen, silicon, aluminum, iron
d. none of these groups

Short Answer. Answer each briefly

1. List four criteria necessary for a substance to be considered a mineral (geologically speaking).

1._____
2_____
3_____
4_____

2. Name the members of the silicate family (Hint: there are five. For extra credit provide a mineral example for each).

1._____
2._____
3._____
4._____
5_____

3. List four physical properties used to identify minerals and how these properties are helpful.

1._____
2._____
3._____
4._____

Extra Credit:

1. Why are manhole covers round?