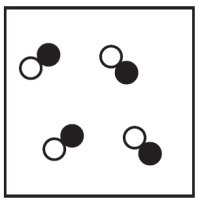
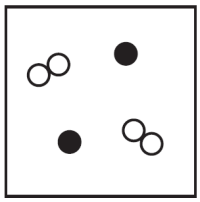
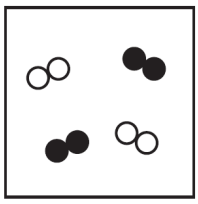
Name:_____ **Particle Diagram (Bead) Laboratory** **20 points**

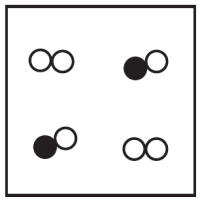
1. Which particle diagram represents a mixture of an element and a compound?

Key
○ = an atom of an element
● = an atom of a different element

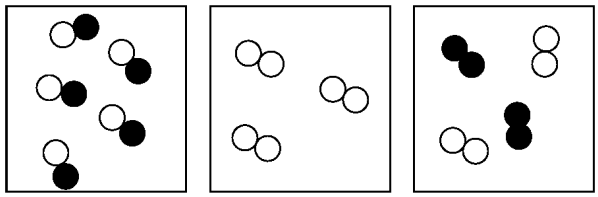
A) 

B) 

C) 

D) 

2. Given the diagrams *X, Y,* and *Z* below:



Key
Atom of element A = ○
Atom of element B = ●

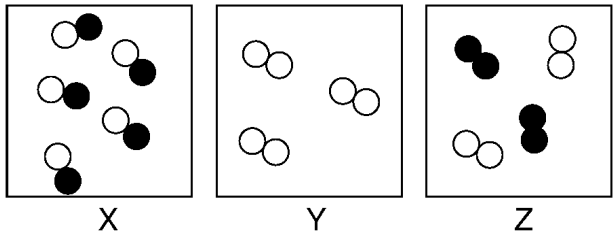
Which diagram or diagrams represent a mixture of elements *A* and *B*?

A) *X,* only
B) *Z,* only
C) *X* and *Y*
D) *X* and *Z*

3. Describe diagrams *X, Y,* and *Z* using the following terms:

Pure substance
Compound
Element
Mixture of elements
Mixture of compounds

You may use more than one term for each diagram.



Key
Atom of element A = ○
Atom of element B = ●

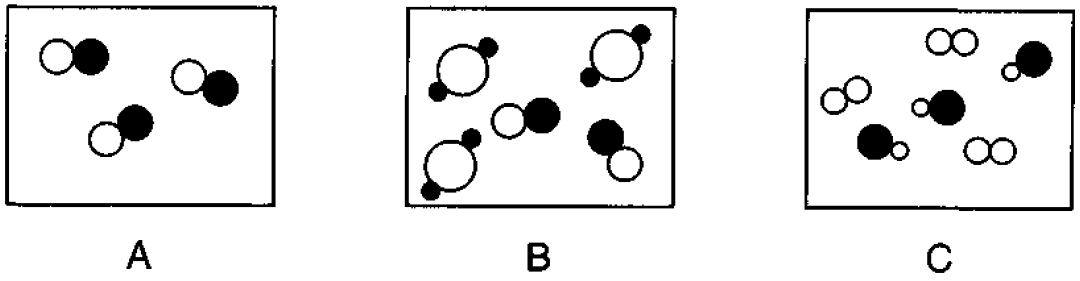
X _____

Y _____

Z _____

Particle Diagram (Bead) Laboratory

Base your answers to questions **4** through **6** on the pictures below:



4. Explain, in terms of the *composition*, why sample *A* represents a pure substance.

5. Contrast sample *A* and sample *B*, in terms of *compounds* and *mixtures*. Include both sample *A* and sample *B* in your answer.

6. Explain why sample *C* could represent a mixture of fluorine and hydrogen chloride.

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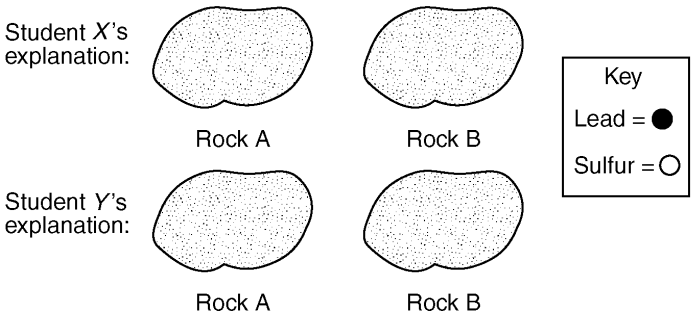
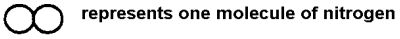
7. On a field trip, Student *X* and Student *Y* collected two rock samples. Analysis revealed that both rocks contained lead and sulfur. One rock contained a certain percentage of lead and sulfur by mass, and the other rock contained a different percentage of lead and sulfur by mass. Student *X* stated that the rocks contained two different mixtures of lead and sulfur. Student *Y* stated that the rocks contained two different compounds of lead and sulfur. Their teacher stated that both students could be correct.

   Draw particle diagrams in *each* of the rock diagrams *below* to show how Student *X*'s and Student *Y*'s explanations could both be correct. Use the symbols in the key provided *below* to sketch lead and sulfur atoms.



8. Base your answer to the following question on Base your answers to the following questions on the diagram of a molecule of nitrogen shown below:



   a Draw a particle model that shows at least six molecules of nitrogen gas.
   b Draw a particle model that shows at least six molecules of liquid nitrogen.
   c Describe, in terms of particle arrangement, the difference between nitrogen gas and liquid nitrogen.
   d Good models should reflect the true nature of the concept being represented. What is a limitation of two-dimensional models?