

Directions: These assignments are designed to challenge your memories with problems from the “past” that are not allowed to be forgotten. You can use your notes or the BASICS, but please don’t just copy. These will be graded, but if you copy yourself to a 10/10, will you really know it, will you really be challenging yourself, will you really be learning? What’s the point? Learning is fundamental to being in high school. Above all else, don’t be evil.

Moles are central to chemistry. Do these calculations now. Answers in boxes, attach work on white paper.

- A. If you measure 147.25 grams of iron, how many moles of iron do you have?
- B. If you have 2.25×10^{24} atoms of aluminum, how many moles of aluminum do you have?
- C. If you have 73.65 Liters of methane gas at STP, how many moles of methane do you have?
- D. If you measure 147.25 grams of iron, how many atoms of iron do you have?
- E. If you have 2.25×10^{24} atoms of aluminum, how many grams of aluminum do you have?
- F. If you have 73.65 Liters of methane gas at STP, how many grams of methane do you have?

A	B	C
D	E	F

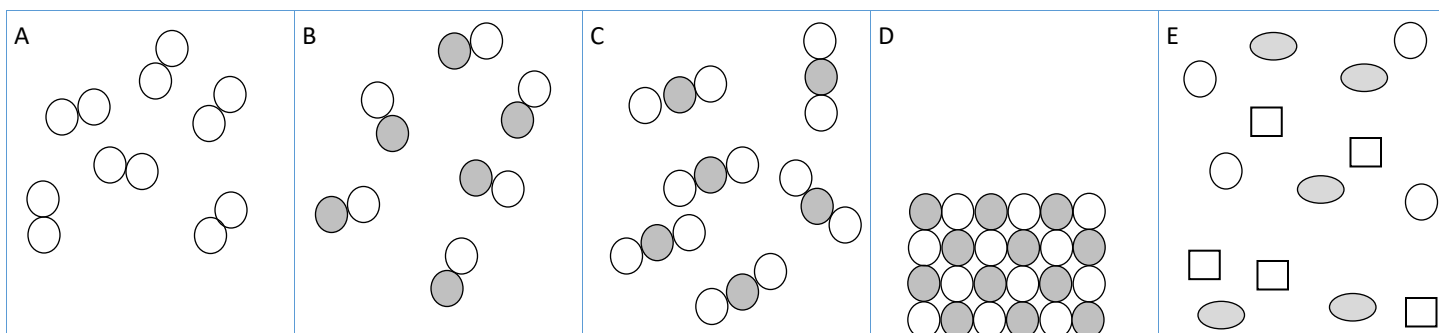
How many atoms are in each of these molecules or formula units? Some are weird on purpose, but all are real.

Name	Formula	Total # atoms	Name	Formula	Total # atoms
Actinium (III) oxide	Ac_3O_2		Barium bromate dihydride	$\text{Ba}(\text{BrO}_3)_2 \cdot 2\text{H}_2\text{O}$	
Silver Molybdate	Ag_2MoO_4		Barium potassium chromate	$\text{BaK}_2(\text{CrO}_4)_2$	
Aluminum carbonate	$\text{Al}_2(\text{CO}_3)_3$		Indium tungstate	$\text{In}_2(\text{WO}_4)_2$	
kaolin	$\text{Al}_2\text{Si}_2\text{O}_5(\text{OH})_4$		Beryl	$\text{Be}_3\text{Al}_2(\text{SiO}_3)_6$	

To separate a mixture, which is NOT chemically bonded together, one must take advantage of a difference in physical properties. Name several physical properties you could use to separate mixtures such as:

1. Sand and salt _____
2. Salt and water _____
3. Octane from crude oil _____
4. Iron from powdered sulfur _____
5. Silver chloride from water _____
6. Zinc from copper in brass _____
7. Mineral oil from water _____

Using these particle diagrams, answer the questions below. Some have no answer, some one, some more than one answer. Be smart and be careful.



Which box, or boxes might have...

- | | |
|---|--|
| 8. carbon dioxide gas in it? _____ | 9. chlorine gas in it? _____ |
| 10. solid silver chloride in it? _____ | 11. a pure substance in it? _____ |
| 12. a mixture in it? _____ | |
| 14. methane gas in it? _____ | 15. oxygen in it? _____ |
| 16. $\text{MgO}_{(s)}$ in it? _____ | 17. $\text{NaCl}_{(s)}$ in it? _____ |
| 18. $\text{H}_2\text{O}_{(l)}$ in it? _____ | 19. O_3 (ozone), in it? _____ |