

Introduction to the Mole

Name _____

Show all of your work!

We all know that there are 12 things in a dozen. You might also know that there are 144 things in a gross. In chemistry you will learn that there are 6.02×10^{23} things in a mole.

$$1 \text{ dozen} = 12$$

$$1 \text{ gross} = 144$$

$$1 \text{ mol} = 6.02 \times 10^{23}$$

- 1) How many eggs are there in 5 dozen?

- 2) How many apples are there in 4 gross?

- 3) How many atoms are there in 6 moles?

- 4) If you have 108 eggs, how many dozen do you have?

- 5) If you have 720 pizzas, how many gross do you have?

- 6) If you have 1.8×10^{24} atoms, how many moles do you have?

Beans are small so it would be difficult to accurately weigh just one bean. We can however find the mass of one gross of beans. Count out 144 beans and weigh them. This is the mass of one gross of beans.

1 gross of beans = _____ grams

- 7) Calculate the mass of 7 gross of beans.

8) Calculate the mass of 0.75 gross of beans.

9) If you have 100 grams of beans, how many gross do you have?

Atoms are also too small to weigh one at a time, but we can weigh one mole of atoms.

1 mole of carbon atoms = 12 grams

10) Calculate the mass of 3 moles of carbon atoms.

11) Calculate the mass of 0.50 moles of carbon atoms.

12) If you have 48 grams of carbon, how many moles do you have?

It would be difficult to measure the volume of a single bean, but we can measure the volume of one gross of beans. Put 144 beans into a graduated cylinder and measure the volume.

1 gross of beans = _____ mL

13) Calculate the volume of 4 gross of beans.

14) If you have 250 mL of beans, how many gross do you have?

A single atom does not take up much space, but we could measure the volume of one mole of atoms.

1 mole of helium = 22.4 Liters

15) Find the volume of 9 moles of helium

16) If you have 67.2 liters of helium, how many moles do you have?

Some problems that take more than one step.

17) If you have 864 beans, how many gross do you have? What is the mass to these beans?

18) If you have 90 grams of beans, how many gross do you have? How many beans is this?

19) If you have 1.2×10^{23} carbon atoms, how many moles of carbon do you have? What is the mass of these atoms?

20) If you have 84 grams of carbon, how many moles do you have? How many atoms of carbon is this?

21) If you have 112 liters of helium, how many moles do you have? How many atoms is this?

22) If you have 4.8×10^{24} atoms of helium, how many moles do you have? How many liters is this?