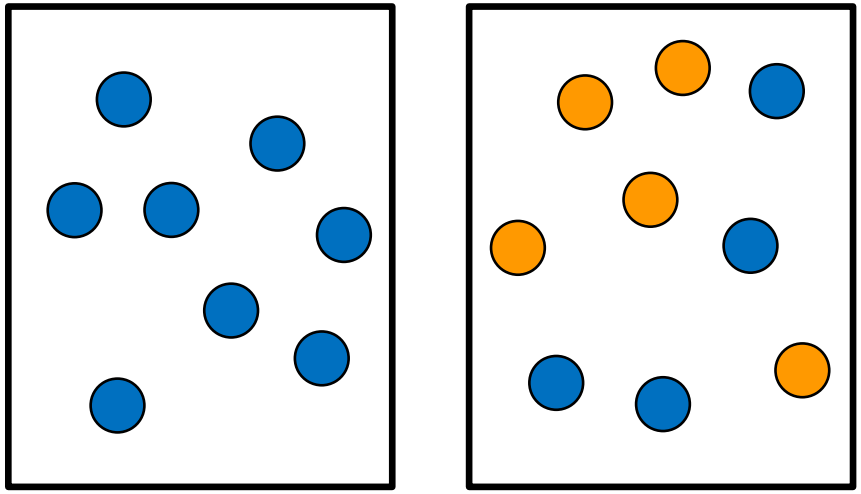
Essential Question

How can we tell how pure a sample is?

Pure Substance vs. Mixture

- Pure substance: one type of particle
- Mixture: two or more types
- In a mixture, the amounts can vary



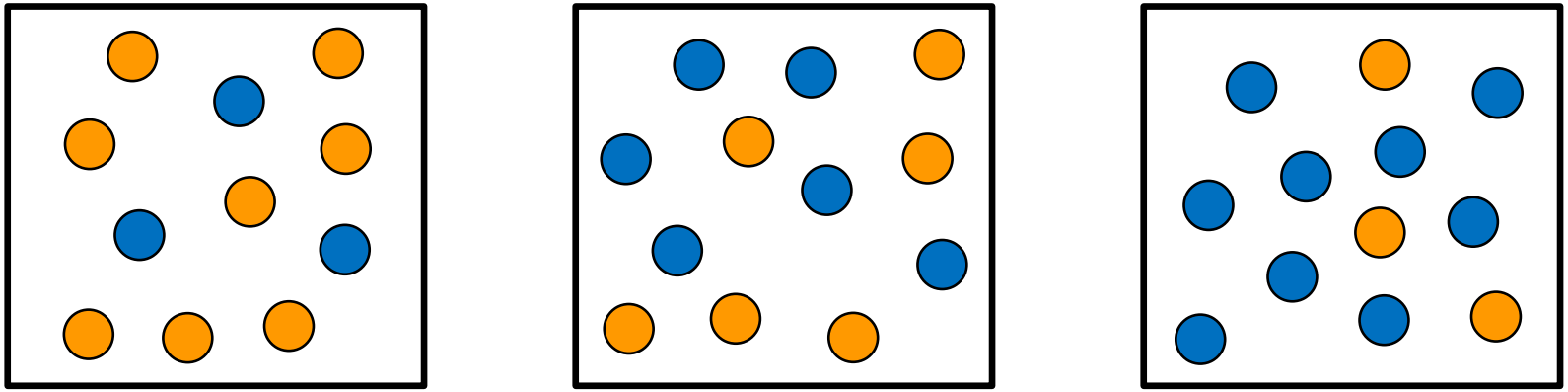
Pure substance

Mixture

Mixtures Can Vary

- A compound has a fixed composition
- A mixture does not

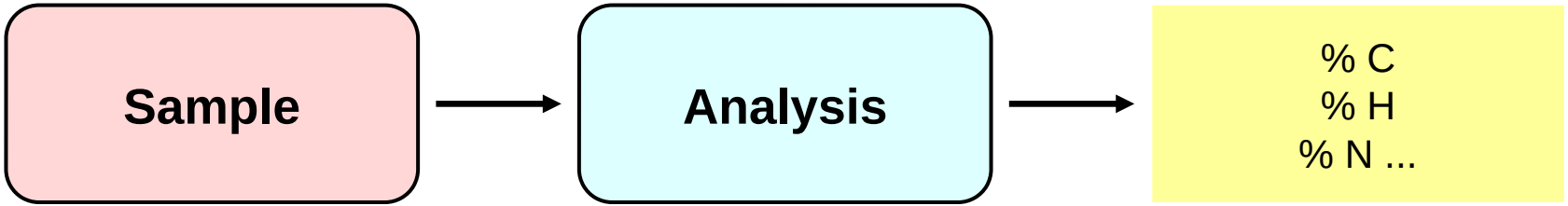
salt sugar



Mixture A **Mixture B** **Mixture C**

Elemental Analysis

- Measures the mass of each element in a sample
- Compare to what a pure compound should be
- Tells us the composition and the purity



Finding Percent Purity

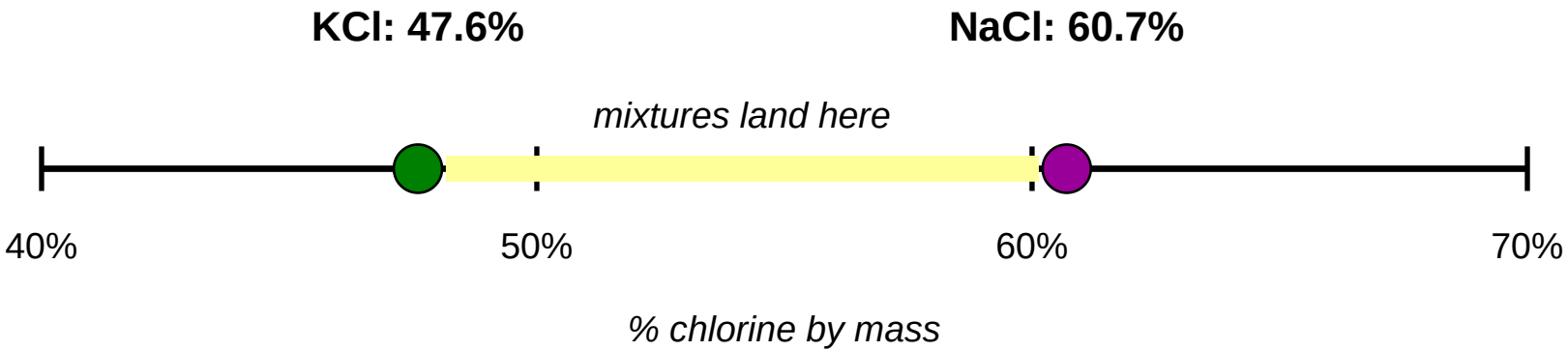
- Assume the impurity has none of the element you measured
- Use the element's mass to find the compound's mass

$$\% \text{ purity} = (\text{mass of pure compound} \div \text{mass of sample}) \times 100$$

Purity can never be more than 100%

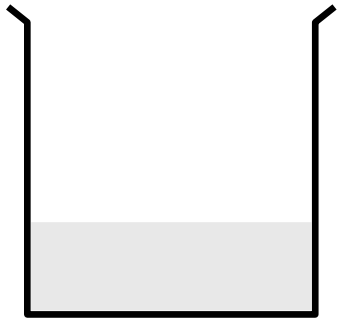
Comparing Mass Percents

- A mixture's mass percent is between its parts' values



Example: Purity of a Sample

A 2.00 g sample of impure NaCl contains 1.10 g of chlorine. The impurity contains no chlorine. What is the percent by mass of NaCl in the sample?



2.00 g sample

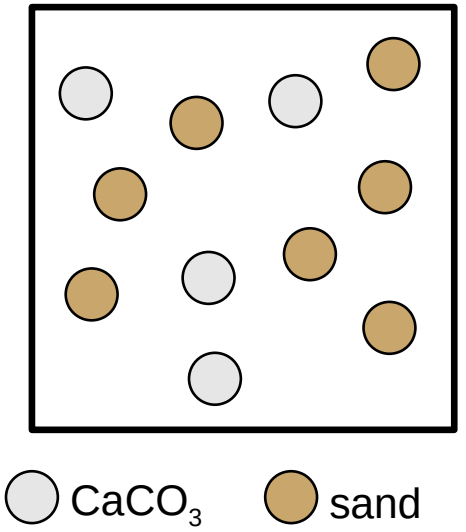
Example: Identifying a Mixture

A sample is either pure KCl or a mixture of KCl and NaCl. Analysis shows it is 52.0% chlorine by mass. Is the sample pure KCl? Justify your answer.

52.0% Cl

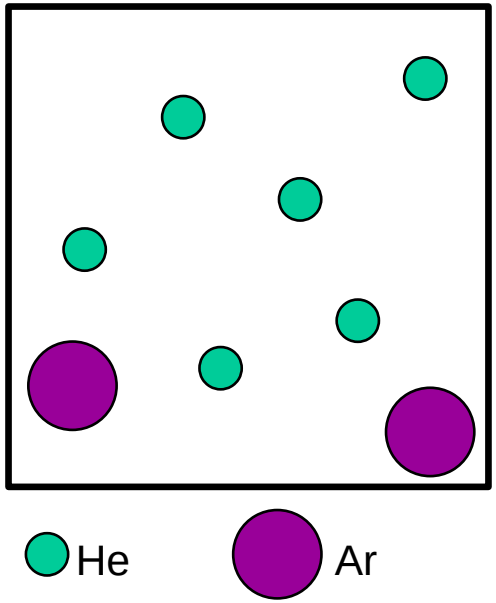
Example: Mass of an Element in a Mixture

A 5.00 g mixture is 40.0% $CaCO_3$ by mass. The rest is sand, SiO_2. What mass of calcium is in the mixture?



Example: Particle Diagram

The diagram shows a mixture of helium and argon atoms. Which gas is present in the greater amount in moles? Which gas makes up the greater mass?



Composition of Mixtures

Big Ideas

- Pure substance: one type of particle
- Mixtures can have any ratio of parts
- Elemental analysis reveals purity
- A mixture's % falls between its parts

