2 Pure Substances and Mixtures

A pure substance is made up of only one type of particle. While there are a limited number of pure substances in the world, the number of mixtures is endless. In this unit, you will examine the difference between pure substances and mixtures.

After completing this unit, you will

- understand that the particle theory of matter can explain the difference between a pure substance and a mixture.
- understand how pure substances are different from mixtures.

Vocabulary

pure substance: matter with only one type of particle
mixture: matter with two or more types of particles

Can I have a bowl of mixture?

Fruit salad is a mixture. Do you mean you want a bowl of fruit salad?
Most substances we see in our daily lives are mixtures. Pure substances are rarely found in nature. Water, a common substance in the world, exists in various types.

Look for different kinds of water in stores. Check their labels to see what is in them and record their contents.

Mineral/Spring water: water that contains minerals
Iceberg water: pure water

A. Determine whether each substance is a “pure substance” or a “mixture”.

1. a bowl of fruit salad: ___________________

2. steel rod
   - carbon: __________________
   - iron: __________________
   - steel: __________________

3. Composition of Air
   - oxygen: __________________
   - nitrogen: __________________
   - air: __________________
B. Read the paragraph. Then complete the diagram with the words in bold and the pictures.

All matter is either a pure substance, which contains one type of particle, or a mixture, which contains more than one type of particle. A mixture can be a solution, where the parts join together, or it can be a mechanical mixture, where we can see the different parts.

C. Colour the particles to match the descriptions.
D. Read the paragraphs. Then answer the questions.

One of the most valued pure substances in our time – and perhaps in the history of the world – is gold. Since gold is lustrous and beautiful, it has been used for centuries to make coins, ornaments, and artwork. As the most malleable metal known and an excellent conductor of electricity, gold is also widely used in industry. Additionally, it is not subject to the corrosive effects of air, water, and most chemicals, which means that it does not react with them; therefore, gold objects that were beautiful, shiny, and valuable thousands of years ago are still so today.

Most other pure substances, however, do become corroded. Copper roofing reacts with air to develop a green coating, as seen on the Parliament Buildings in Ottawa; and products made from the metal iron, such as ships and cars, eventually become unusable because iron rusts when it reacts with air and water.

1. About Gold:
   - ___________ substance
   - malleability: high / low
   - lustre: high / low
   - conductivity: high / low
   - reactivity with air, water, and most chemicals: high / low / no

2. Write two more pure substances mentioned in the paragraphs and describe their properties and uses. Then write an example of your own.

   a. ___________ pure substance
   b. ___________ pure substance
   c. ___________ pure substance