

ScE7.3 : Mixtures and Solutions

ScE7.3.1 : Substances and Mixtures

ScE7.3.2 : Solutions and Concentrations

ScE7.3.3 : Separating Mixtures

ScE7.3.1 : Substances and Mixtures

1. Pure substances and mixtures p.2 (p.229, 232, 242)
2. Homogeneous and heterogeneous mixtures p.3 (p.234, 242).
3. Solid, liquid and gaseous solutions p.4 (p.243)
4. Alloys p.5 (p.243)
5. Mixtures and light p.6 (p.244-245)
6. **Lab Activity** : *Classifying homogeneous and heterogeneous liquid mixtures.*
7. Particles in pure substances, homogeneous and heterogeneous mixtures p.7-10 (p.236-7, 242)



Terms

alloy	homogeneous mixture	solution
mixture	mechanical mixture	pure substance
heterogeneous mixture		

1. _____ : contains a single substance, so only one kind of particles.
2. _____ : contains two or more substances, so two or more types of particles.
3. _____ , also called _____ : a mixture where you can see the different substances (either just with your eyes, or with a microscope) because particles of some substances stay clumped together.
4. _____ , also called _____ : a mixture where you only see one thing, because the particles of the different substances are so completely mixed together.
5. _____ : a solid solution containing two or more metals.

Substances and Mixtures

With your group, do the activity **Classify This!** using the cards provided by your teacher. Then listen to your teacher's classification and complete the following table.

Pure Substances	Mixtures

1. Explain the difference between the two categories.
2. Is the juice from a freshly squeezed orange a pure substance, or a mixture? Explain why.
3. Is vinegar a pure substance or a mixture? Explain why.

Homogeneous and Heterogeneous Mixtures

Now take the MIXTURES from the previous activity, and subdivide them again in two categories. Then again listen to your teacher's classification and complete the table below.

Heterogeneous Mixtures = Mechanical Mixtures	Homogeneous Mixtures = Solutions

1. Explain the difference between a homogeneous and a heterogeneous mixture.

2. What is the other word for “heterogeneous mixture”?
3. What is the other word for “homogeneous mixture”?
4. Is a bowl of granola homogeneous or heterogeneous? Why?

5. Is clean seawater homogeneous or heterogeneous? Why?

6. Is milk homogeneous or heterogeneous? Why?

Solutions and States of Matter

Use your textbook to answer the following questions using the pages indicated.

1) Name the three states of matter (you know this from last unit!)

2) Name 4 liquid solutions found on p.243.

3) Name the substances found in seawater. (p.243)

4) Name a gas solution. p.243.

Name the substances contained in air.

5) What is an **alloy**? (p.243)

6) How many karat is pure gold? (picture on p. 243)

What percentage gold is 14-karat gold?

7) Go to p.234 and look at the picture 7.3. Name the alloy this frying pan is made of and the metals that it contains.

8) Read p.240. What is the name of the alloy scientists first thought was used to make the blade?

What metals make this alloy?

When was this alloy invented?

What is the blade actually made of?

Alloys

Compare the following metals : **gold, silver, bronze, iron, steel, copper, aluminium, brass**. Search for these metals in the periodic table (grade 9 textbook, p. 50).

The metals that are found in the periodic table are elements, therefore pure substances. The other metals are alloys. Classify the metals listed above in the following table.

Pure Metals	Alloys

a. Why is it impossible to tell if a metal is a pure substance or an alloy just by looking at it?

b. How are alloys made?

Mixtures and Light

With your group, classify the cards showing liquid and gas mixtures according to the table below. Label each mixture as homogeneous (HO) or heterogeneous (HE).

	Clear	Cloudy/opaque
Liquids		
gases		

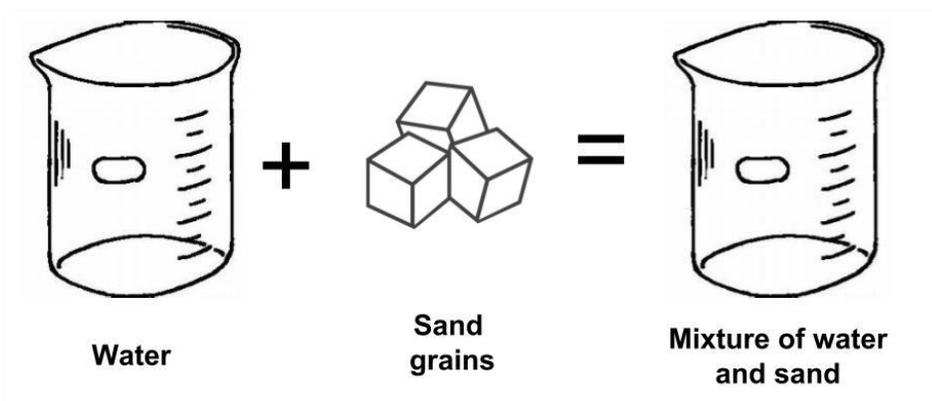
Listen to your teacher and copy the notes for the following questions.:

1. Explain the difference between clear, cloudy, and opaque.
2. What is the Tyndall effect?
3. If a gas or liquid mixture is **clear**, is it homogeneous or heterogeneous? Explain.
4. If a gas or liquid mixture is **cloudy or opaque**, is it homogeneous or heterogeneous? Explain.

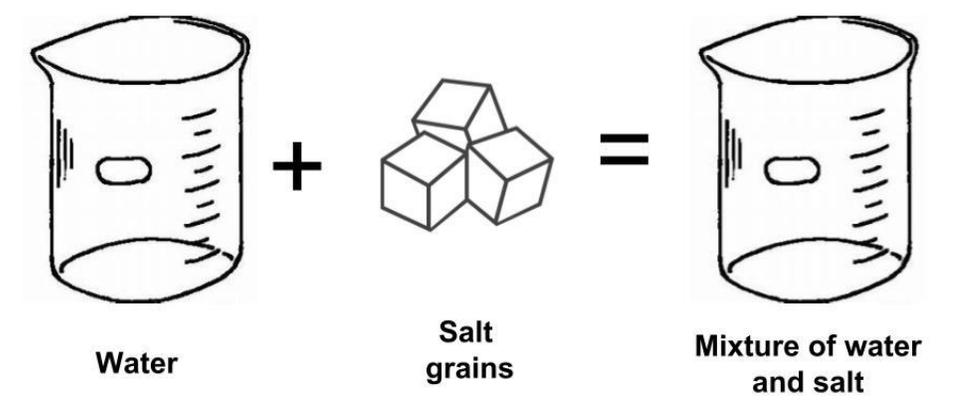
Mixtures and Particle Theory

1. Describe the difference between a pure substance and a mixture using particle theory.

2. Sketch the particles in each substance to show the arrangement of the particles in a mixture of **sand** and water, which is an example of **heterogeneous** mixture.



3. Sketch the particles in each substance to show the arrangement of the particles in a mixture of **salt** and water, which is an example of **homogeneous** mixture.

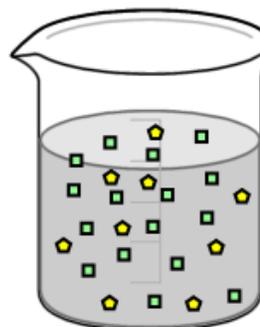
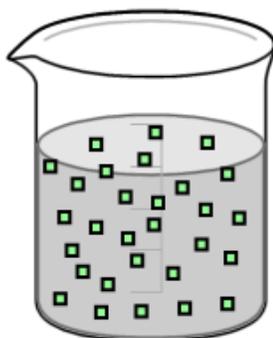
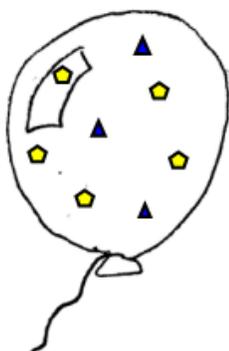
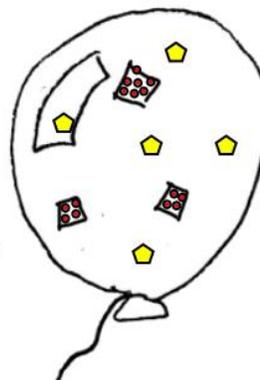
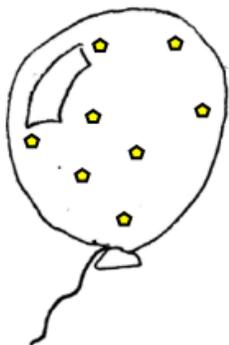


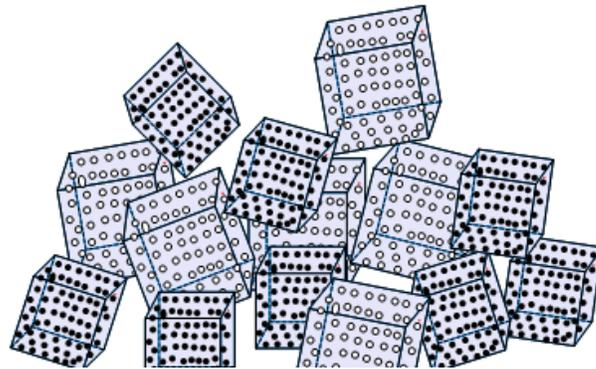
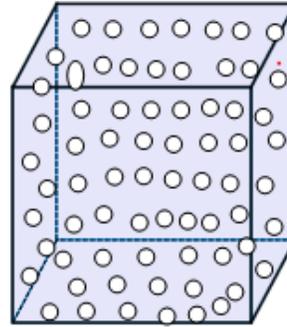
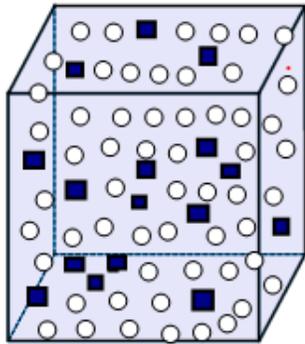
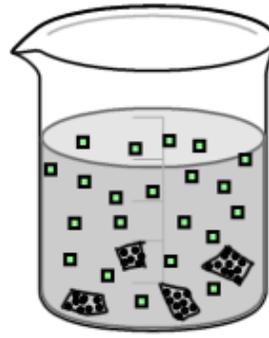
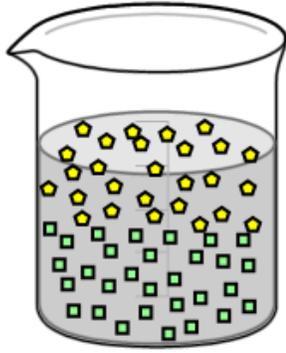
4. Describe in words the difference between a homogeneous and a heterogeneous mixture using particle theory.

Interpreting Molecule Sketches

Interpret the following sketches of molecules by considering, as appropriate

- Is it a pure substance or a mixture?
- If it is a pure substance, is it a solid, liquid, or gas?
- If it is a mixture, is it homogeneous or heterogeneous?
- Are the different parts of the mixture solids, liquids, or gases?

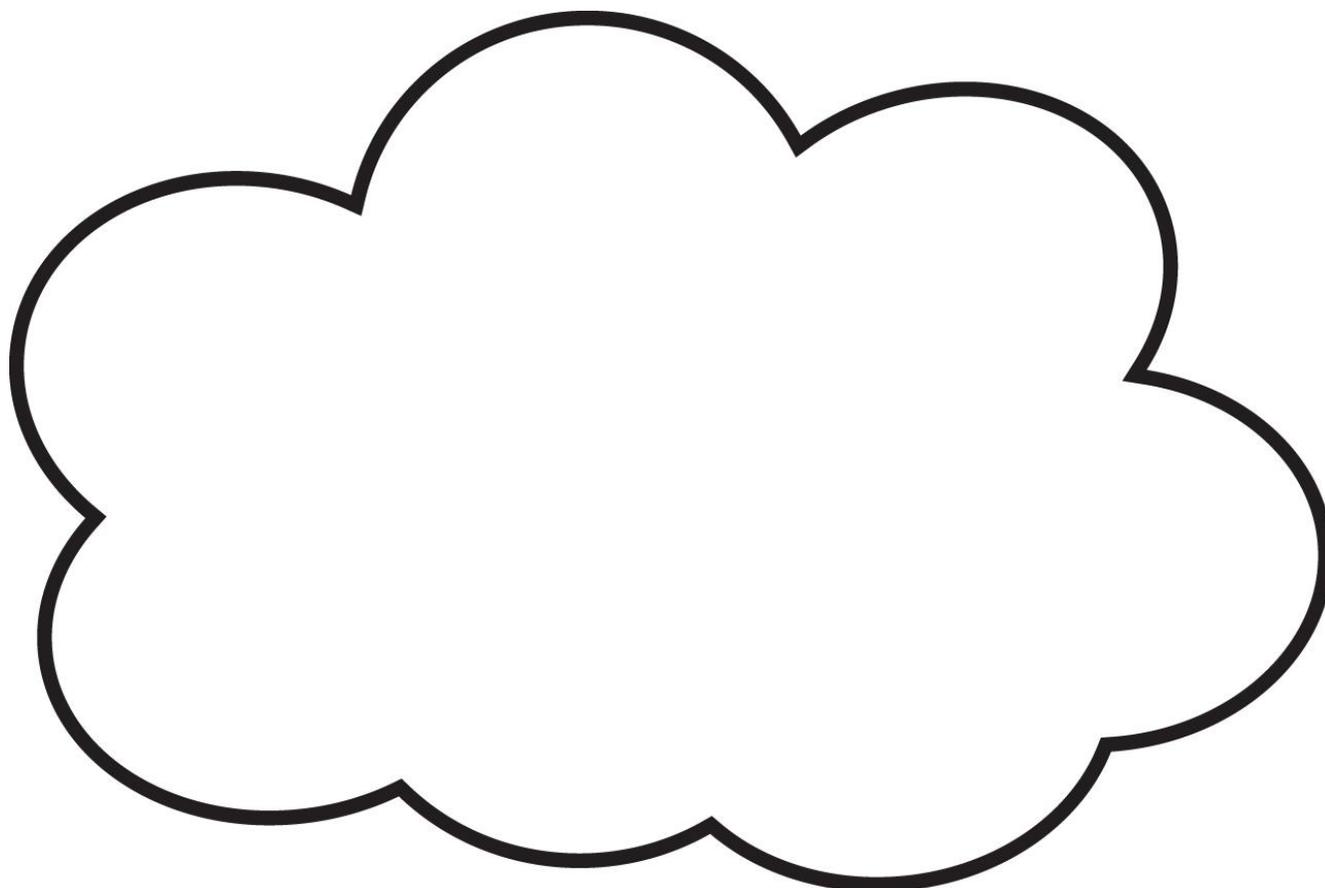




Extension : A More Complicated Mixture, Fog

Air is a gaseous solution of several gases, including oxygen, nitrogen, and carbon dioxide. In fog, the air also contains a large number of tiny suspended droplets of water. Each droplet contains many molecules of water

- a. Is fog a pure substance or a mixture? Explain.
- b. Is fog homogeneous or heterogeneous? Explain.
- c. Sketch the arrangement of molecules in fog according to the description above. Use different symbols or colours for each kind of molecule, and include a legend. Your sketch should include 4 different types of molecules :
 - Water molecules
 - Oxygen molecules
 - Nitrogen molecules
 - Carbon dioxide molecules



Review

1. What is the difference between a pure substance and a mixture?
2. Name two examples of pure substances.
3. Name two examples of mixtures.
4. What is the difference between a homogeneous and a heterogeneous mixture?
5. Give another term for **homogeneous mixture**.
6. Give another term for **heterogeneous mixture**.
7. Name two heterogeneous mixtures that you can eat.
8. Name one heterogeneous mixture you can drink.
9. Name one solution you can drink.
10. Name one example of a homogeneous mixture that is a gas.
11. Name one example of a homogeneous mixture that is a liquid.
12. Name one example of a homogeneous mixture that is a solid.
13. Define alloy.
14. Name two examples of alloys.
15. If a gas or liquid mixture is **clear**, is it homogeneous or heterogeneous? Explain.
16. If a gas or liquid mixture is **cloudy or opaque**, is it homogeneous or heterogeneous? Explain.

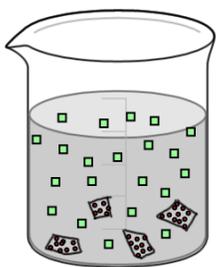
17. Explain the difference between a pure substance and a mixture using particle theory.

18. Explain the difference between a homogeneous and a heterogeneous mixture using particle theory.

19. Use sketches to show the difference between the molecules in a homogeneous mixture (for example water + salt) and a heterogeneous mixture (for example water + sand).

20. Complete the table by answering the questions for each example.

Example	Questions <ul style="list-style-type: none">• Is it a pure substance or a mixture?• If it is a pure substance, is it a solid, liquid, or gas?• If it is a mixture, is it homogeneous or heterogeneous?• Are the different parts of the mixture solids, liquids, or gases?
Dusty air	



White vinegar, which contains water with 5% acetic acid

