Essential Question: How are elements, compounds, and mixtures related?

S8P1b. Describe the difference between pure substances (elements and compounds) and mixtures

Matter is anything that has mass and takes up space (volume)

There are different types of Matter: Pure Substances (elements and compounds) and Mixtures

The composition (structure) of a substance determines its Matter type.

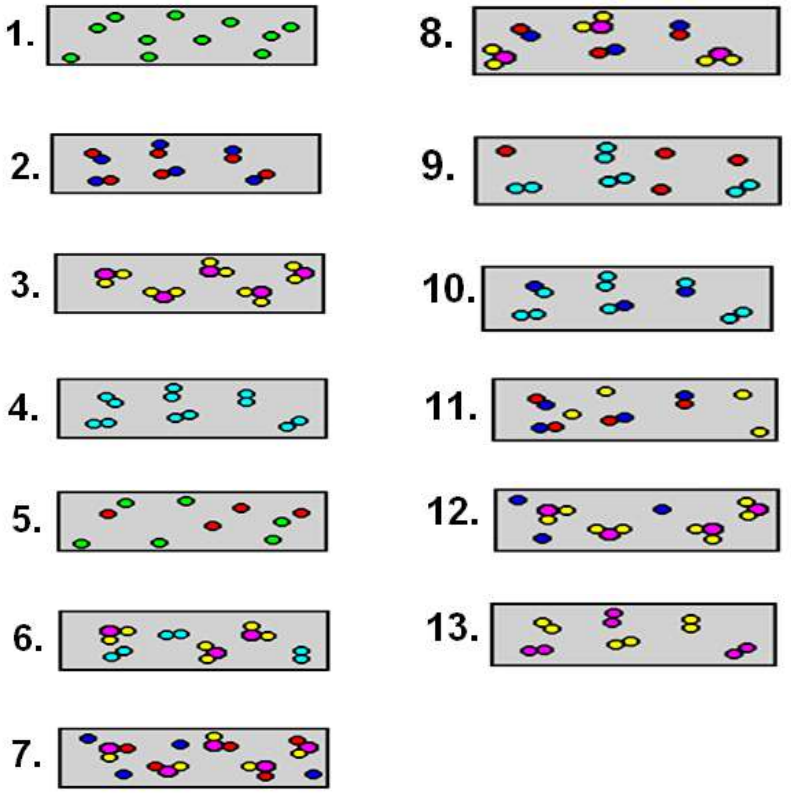
Elements, Compounds, and Mixtures Activating Strategy [see resources]

Elements, Compounds, and Mixtures Activating Strategy

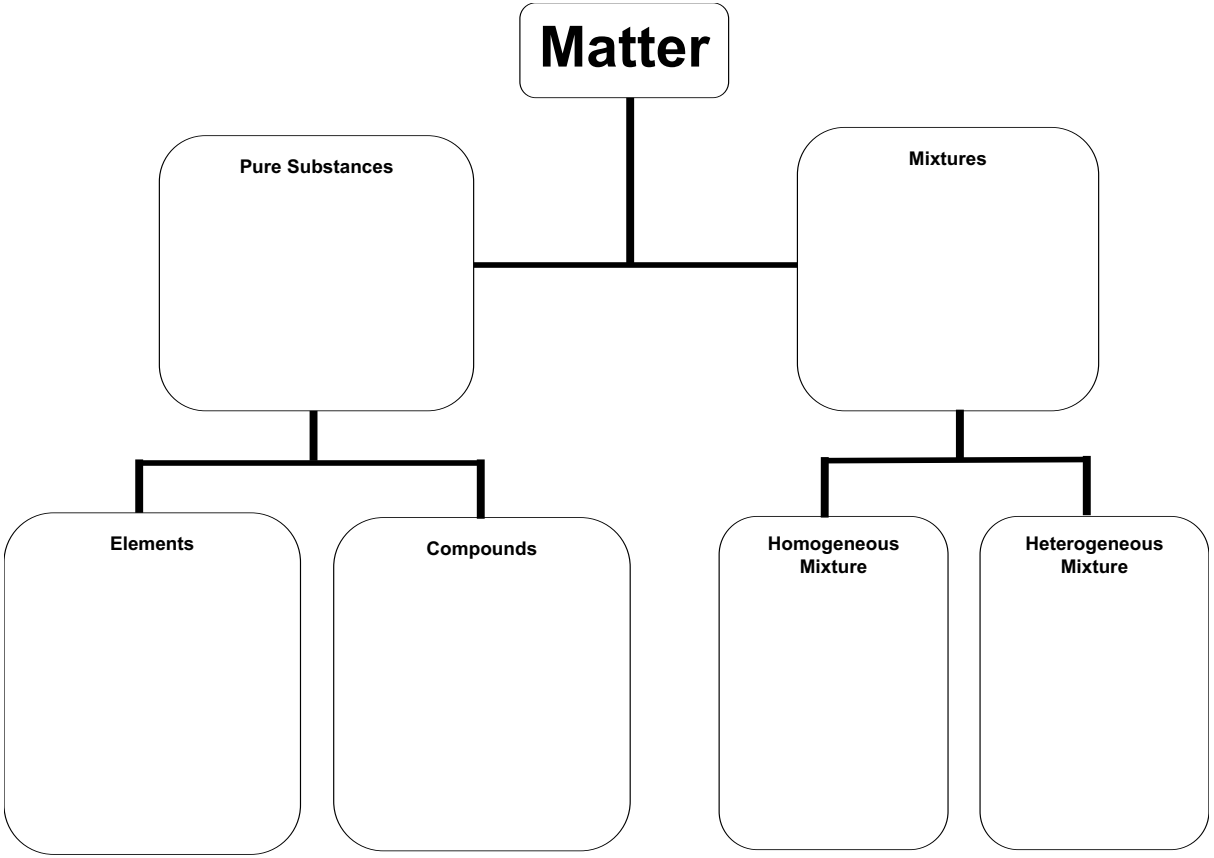
Directions:

- Make copies of the Substance Pictures for groups of 2-3 in each class period
- Cut out the Substance Pictures and place them in baggies or envelopes for groups
- Groups will be asked to take the Substance Pictures and form three groups. A group for Elements, Compounds, and Mixtures.
- Make sure students understand that this is an activating strategy so they may or may not already know all the information. They are to make their best guess as long as they can justify their grouping methods.
- Once finished, have groups share some of their thoughts with other groups about the activity. You may or may not want to go over answers, but you need to discuss as a class some of the differences they noticed in the Substances
- By the end of the lesson on Element, Compounds, and Mixtures, students should be able to do this activity again.

Substance Pictures



While viewing the lesson, record your notes on the Graphic Organizer Provided by the teacher. [see resources]



Characteristics of Pure Substances

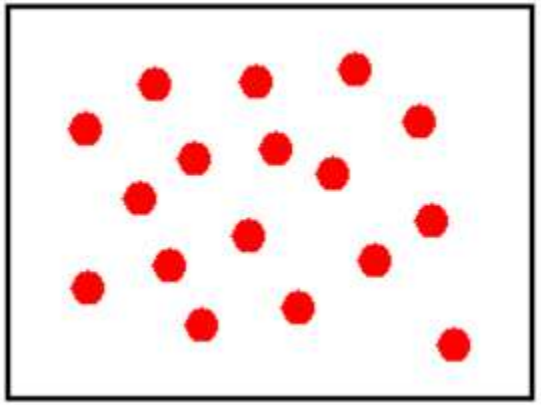
- Fixed composition
- Distinct properties
- Cannot be separated into simpler substances by physical methods
- Can only be changed in identity and properties by chemical methods
- Properties do not vary one sample to another sample

Types of Pure Substances:

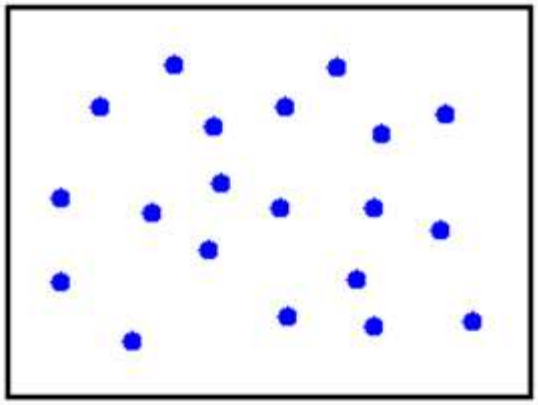
Elements And Compounds

Elements

- Made up of one type of atom
- Cannot be broken down by physical and chemical methods
- Examples: Oxygen, Nitrogen, Carbon

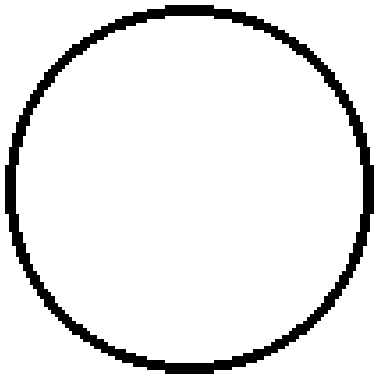


Sample of the Element Lead



Sample of the Element Chlorine

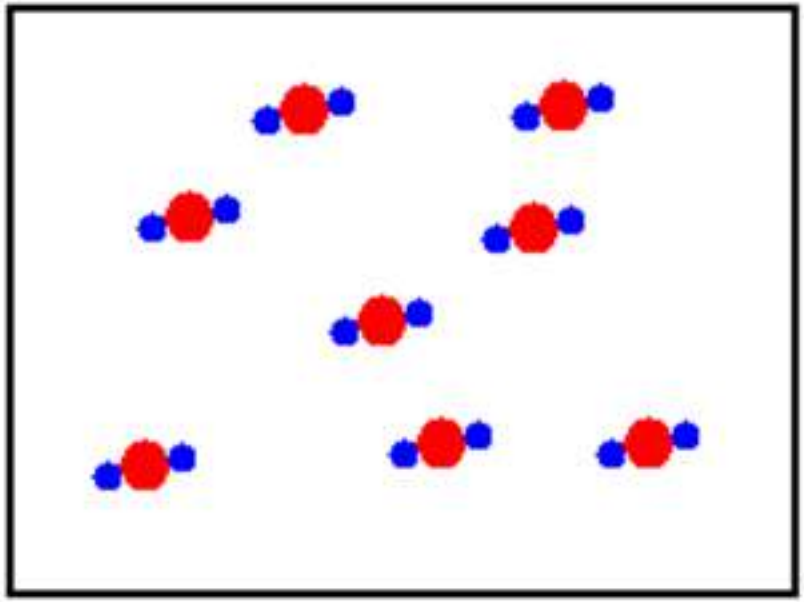
Compounds

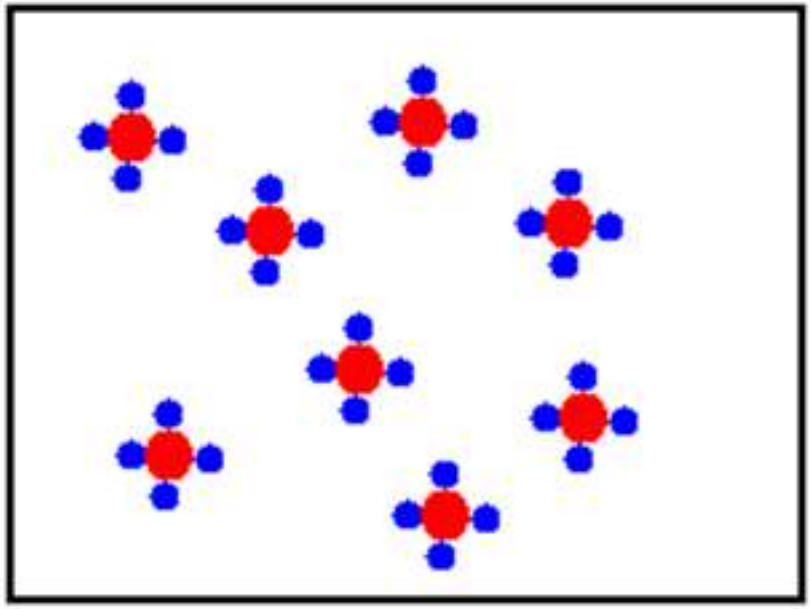


- Form when two or more different elements join (bond) together chemically
- Composition is identical in each sample
- Can be separated only by chemical methods
- Properties of a compound are totally different than the properties of the elements that form them
- Examples: Water, Carbon dioxide, Sugar

Animated images and notes from http://www.chem.purdue.edu/gchelp/atoms/elements.html

Compounds





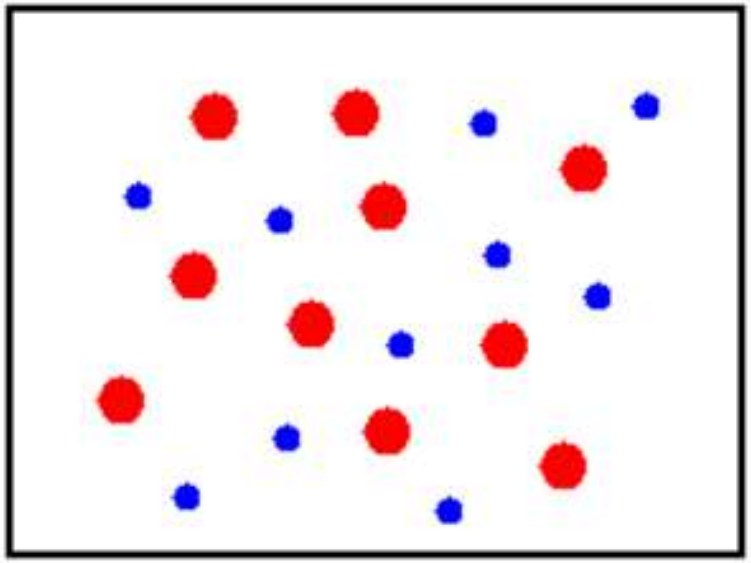
Elements and Compounds Study Jams Video

http://studyjams.scholastic.com/studyjams/jams/science/matter/elements-and-compounds.htm

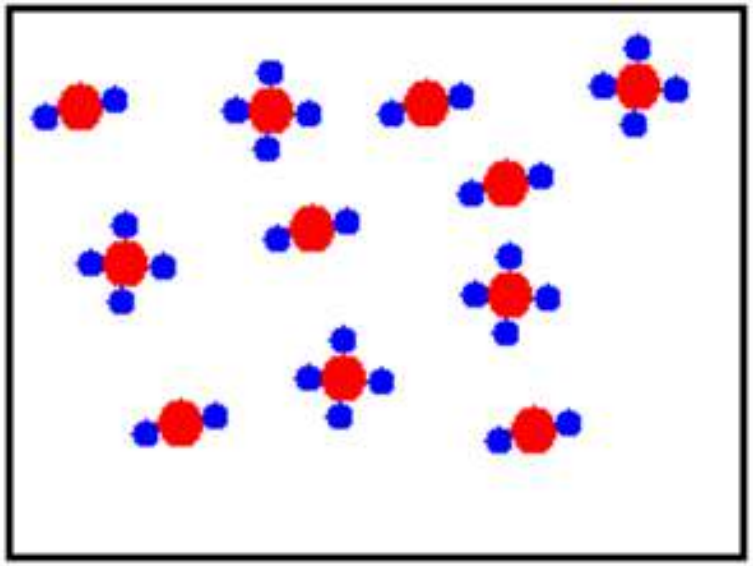
Mixtures

- Form when elements and/or compounds are combined physically
- Properties of a mixture are related to its components
- Composition varies from sample to sample
- Can be separated by physical methods
- Examples of Mixtures: Tea, Perfume, Air, Salad, Beach sand, oil and vinegar salad dressing, etc.

Mixtures



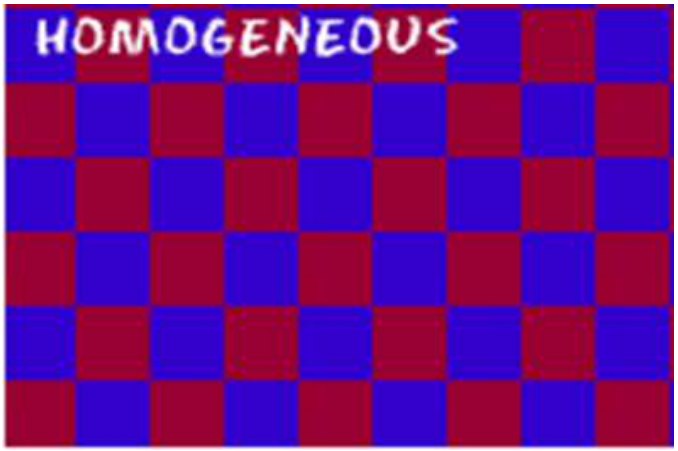
Mixture of Different Elements

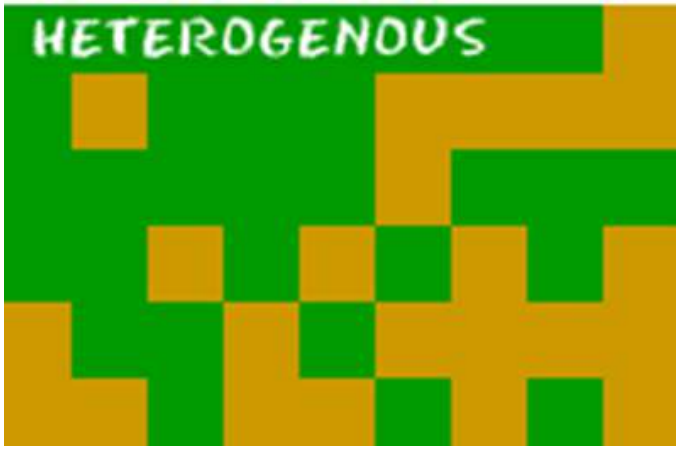


Mixture of Different Compounds

Mixtures

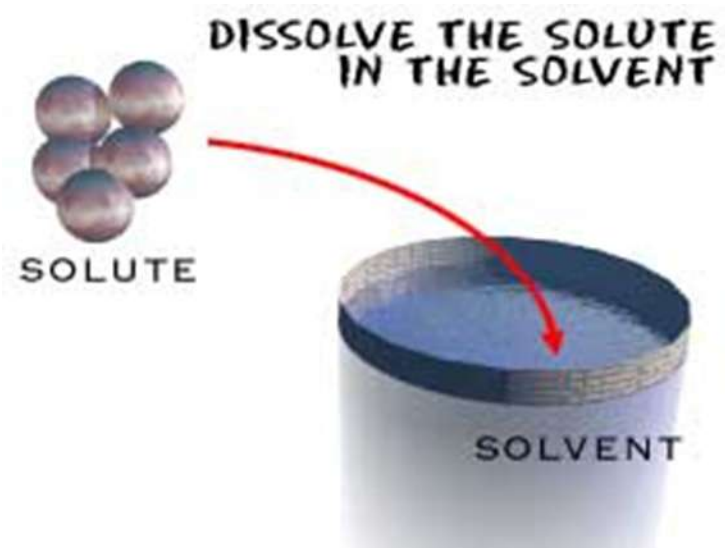
Mixtures are often referred to as homogeneous or heterogeneous.

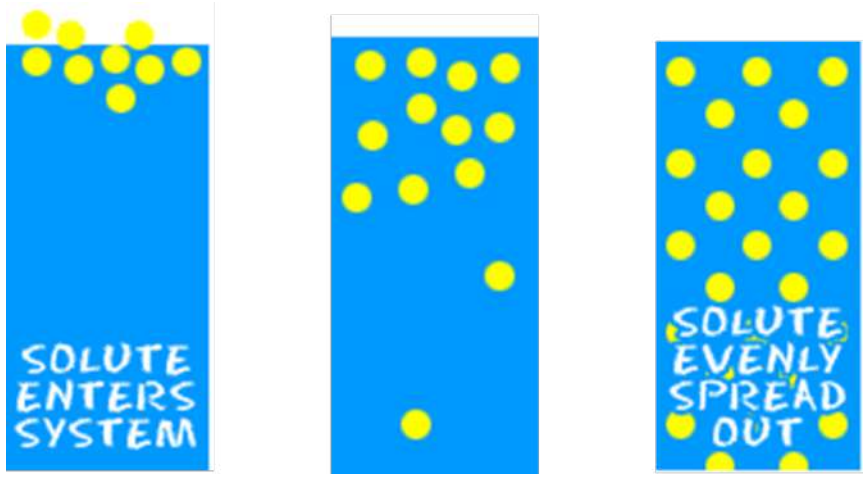




Mixtures

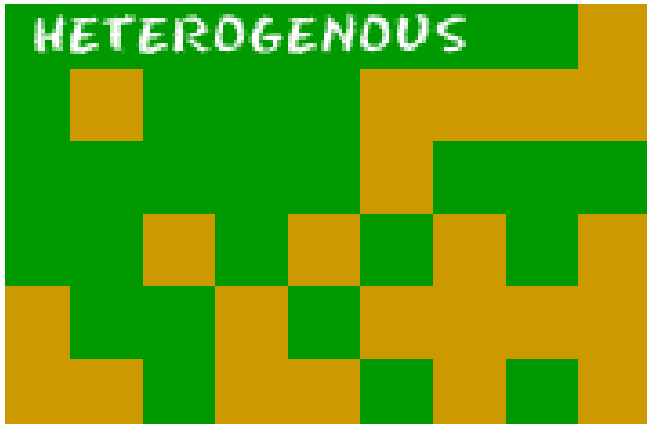
- Homogeneous mixtures (Solutions) have a uniform distribution.
- For example: Tea, Perfume, Air





Mixtures

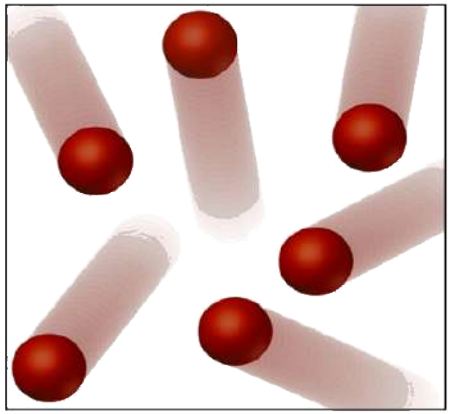
- Heterogeneous mixtures do not have a uniform distribution.
- Parts are often visible
- For example:
  Salad, Beach Sand,
  Oil and Vinegar dressing



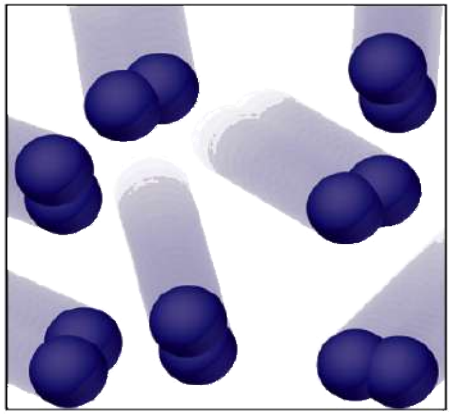
Mixtures Study Jams Video

http://studyjams.scholastic.com/studyjams/jams/science/matter/mixtures.htm

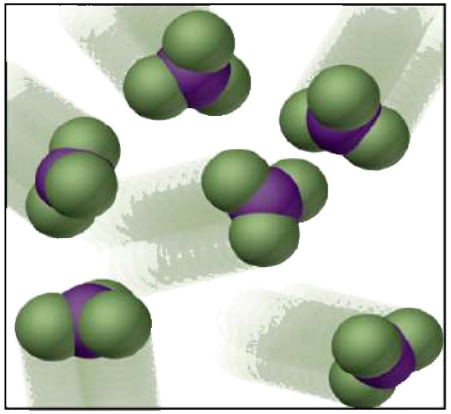
Distinguishing between Elements, Compounds, and Mixtures



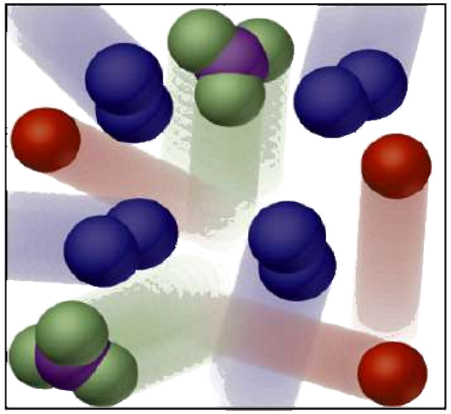
(a) Atoms of an element



(b) Molecules of an element



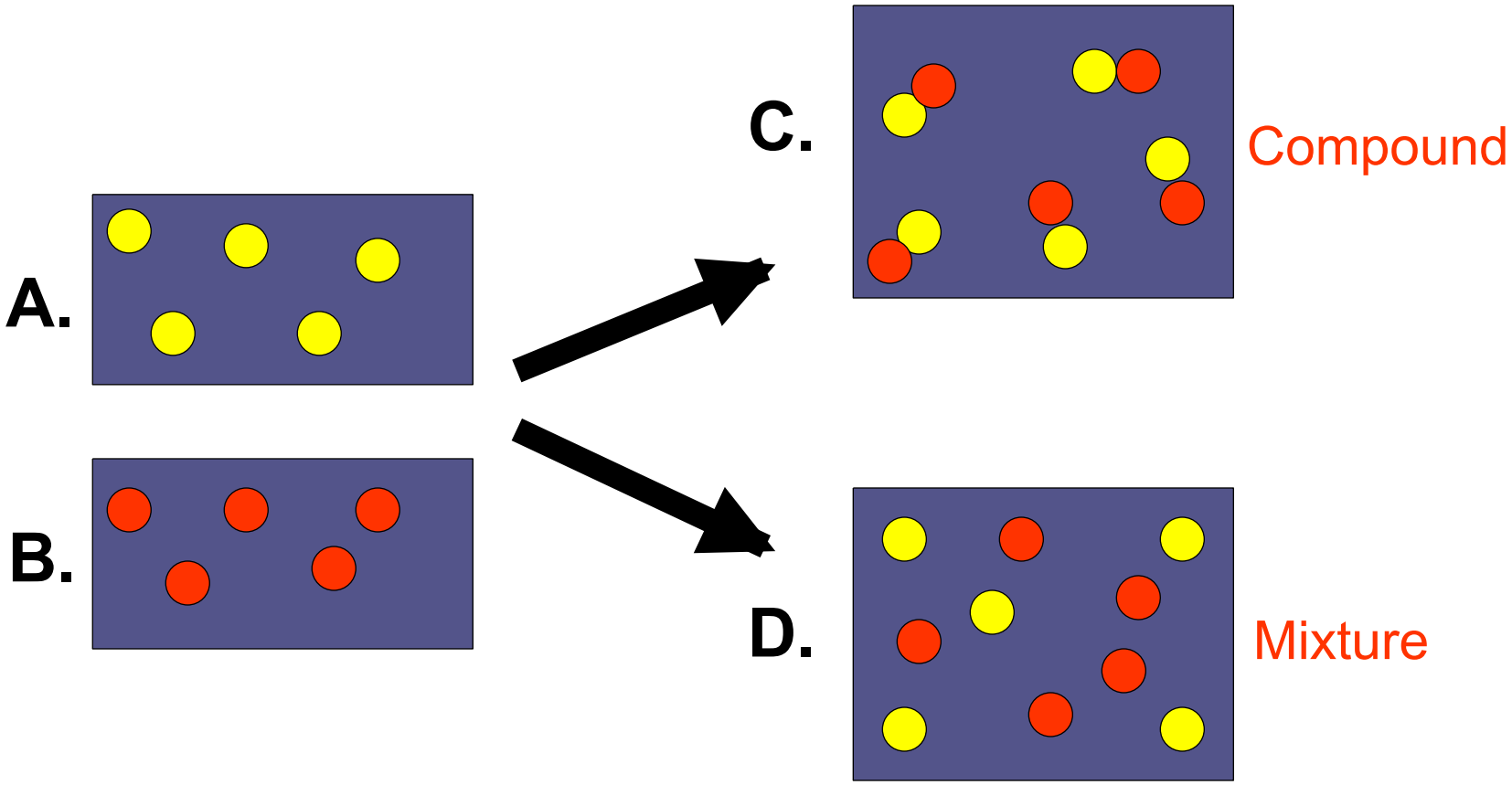
(c) Molecules of a compound



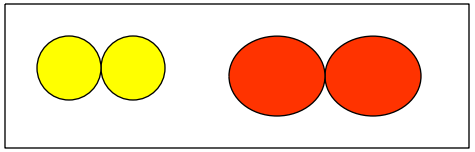
(d) Mixture of elements and a compound

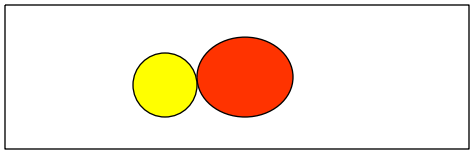
Distributed Summarizing

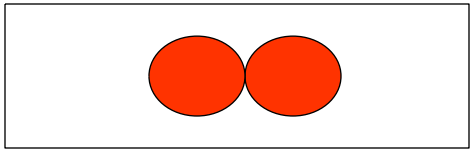
The diagram below shows how two elements can be mixed together…Which is a Compound? A Mixture?

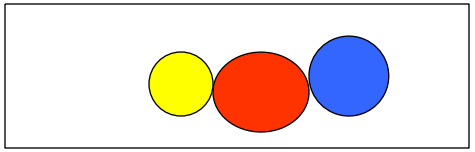


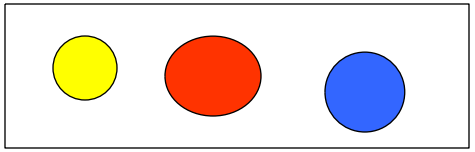
Match the Picture to the Description

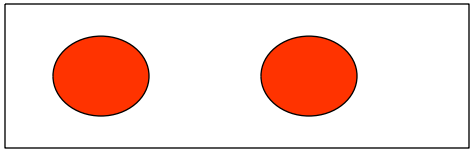












Compound of 2 Elements

Mixture of Molecules

Element Molecule

Compound of 3 Elements

Element/ Atoms

Mixture of Atoms

Elements, Compounds, and Mixtures Matching Pairs Activity

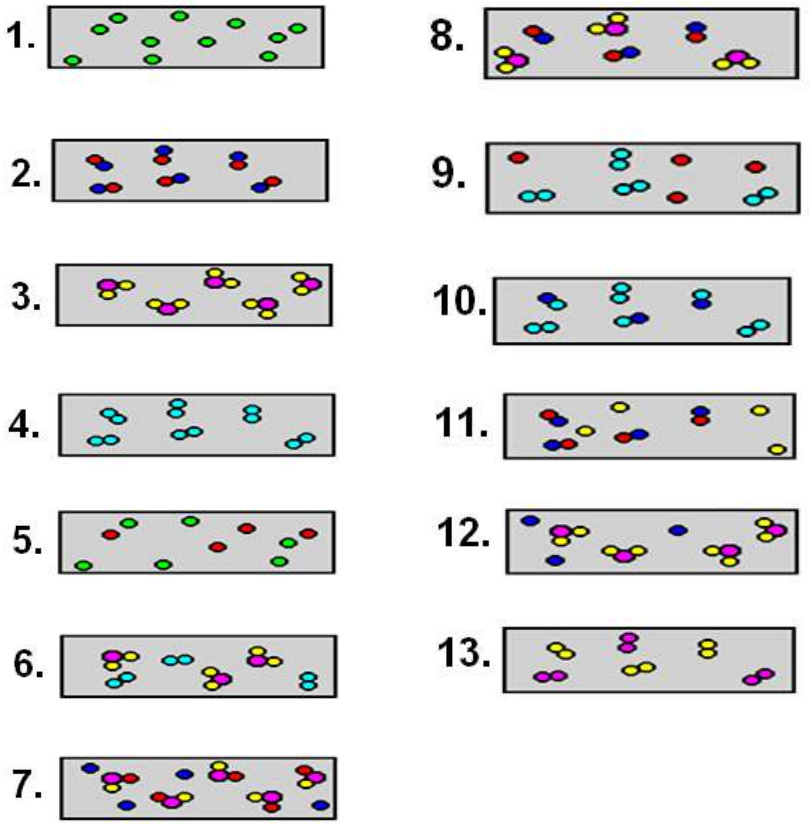
[see resources]

Elements, Compounds, and Mixtures Matching Pairs Activity

Directions:

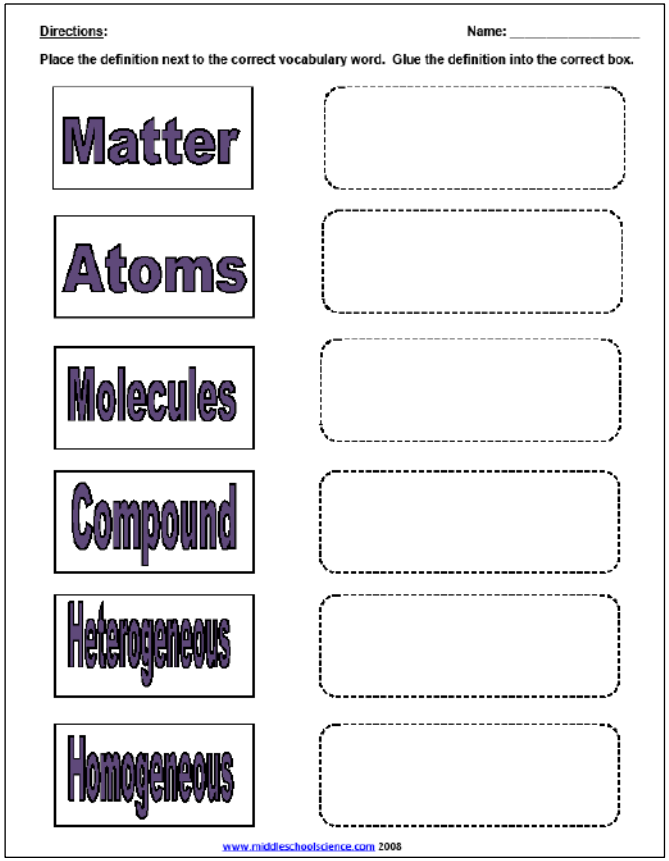
- Make copies of both the Substance Pictures and the Substance Descriptions for groups of 2-3 in each class period
- Cut out the Substance Pictures and Substance Descriptions and place them in baggies or envelopes for groups
- Groups will match the numbered Substance Pictures with their correct Substance Description.
- When a group is finished, their work must be checked by the teacher.

Substance Pictures



Additional Review Activities
[see resources]

Vocabulary Matching Pairs



Directions: Name: _____

Place the definition next to the correct vocabulary word. Glue the definition into the correct box.

Matter	
Atoms	
Molecules	
Compound	
Heterogeneous	
Homogeneous	

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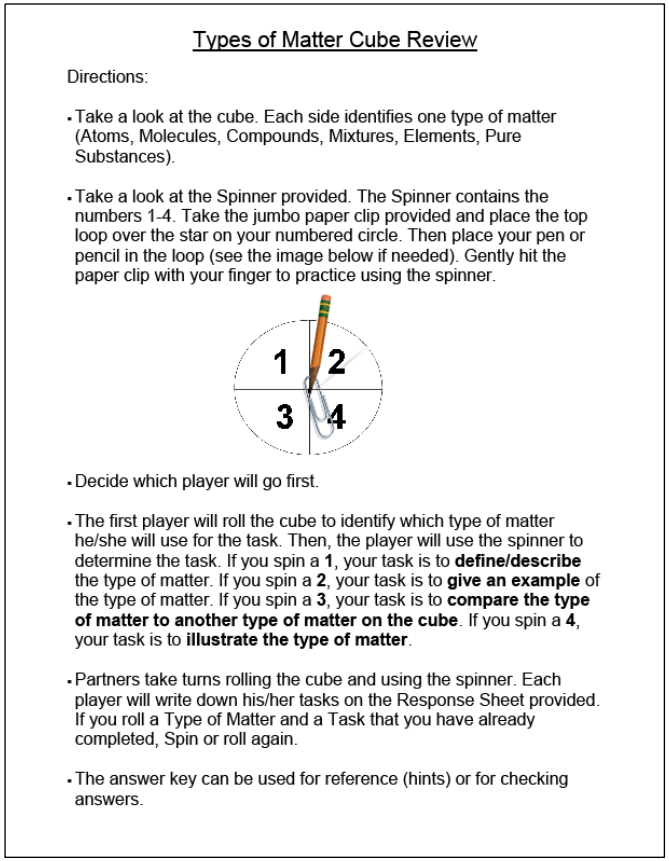
Types of Matter Cube Review



Types of Matter Cube Review

Directions:

- Take a look at the cube. Each side identifies one type of matter (Atoms, Molecules, Compounds, Mixtures, Elements, Pure Substances).
- Take a look at the Spinner provided. The Spinner contains the numbers 1-4. Take the jumbo paper clip provided and place the top loop over the star on your numbered circle. Then place your pen or pencil in the loop (see the image below if needed). Gently hit the paper clip with your finger to practice using the spinner.

- Decide which player will go first.
- The first player will roll the cube to identify which type of matter he/she will use for the task. Then, the player will use the spinner to determine the task. If you spin a **1**, your task is to **define/describe** the type of matter. If you spin a **2**, your task is to **give an example** of the type of matter. If you spin a **3**, your task is to **compare the type of matter to another type of matter on the cube**. If you spin a **4**, your task is to **illustrate the type of matter**.
- Partners take turns rolling the cube and using the spinner. Each player will write down his/her tasks on the Response Sheet provided. If you roll a Type of Matter and a Task that you have already completed, Spin or roll again.
- The answer key can be used for reference (hints) or for checking answers.

Summarizing Strategy: Elements, Compounds, & Mixtures Constructed Response [see resources]

Elements, Compounds, and Mixtures Constructed Response

Use the list of substances below to answer the following question.

- Water
- Table salt (NaCl)
- Pure gold ring
- Pizza
- Air
- Carbon dioxide (dry ice)
- Nitrogen

a. Categorize each substance as an element, a compound, or a mixture.
b. Explain how each substance belongs in the category you chose.