

Name: Key Period: _____

Chapter 2 Study Guide: Intro to Matter

Differentiate Pure Substances vs. Mixtures

1. Miss Fudukos is planning on making a pizza for the 7th and 8th grade Jivin Geneva. The following materials are all she had in the Foods Room to work with:

- Baking Soda (NaHCO_3)
- A package of four cheese mix (Swiss, Parmesan, Mozzarella, and Romano)
- Tap Water (H_2O & Ca & Cl)
- Pizza Dough with cracked black pepper
- Tomato sauce (Tomato, Salt, Pepper, Oregano)

a) Classify the ingredients as pure substance or mixtures and give evidence for your choices.

Baking Soda – pure substance. It's a pure substance because it is a compound and is composed of elements which are also pure substances.

Four cheese – Mixture. It's a mixture because it is made of more than one type of cheese and can be physically separated.

Tap water – Mixture. It's a mixture because it is made of more than just H_2O . It has other substances in it and can be separated through physical means.

Pizza dough with pepper – Mixture. It's a mixture because it is made of more than just one thing that is physically combined.

Tomato Sauce – Mixture. It's a mixture because it is made of more than just one thing and can be physically separated.

Analyze Physical Characteristics of Reactants

b) Identify 2 physical characteristics for each item.

Baking Soda – white, fine powder.

Four cheese – white, solids at room temperature.

Tap water – clear, odorless.

Pizza dough with pepper – sticky, solid, black specks.

Tomato Sauce – Red, liquid.

Analyze Chemical Characteristics of Reactants

2. As Miss Fudukos was carrying the items out of the pantry, she tripped and the items landed in a bucket of vinegar. Using what you know about the chemical characteristics of each item, predict what will happen to each ingredient.

Baking Soda – Will react by bubbling up and foam.

Four Cheese – No reaction

Tap Water – No reaction

Pizza dough – No reaction

Tomato sauce – No reaction

Differentiate Pure substances vs. Mixtures

3. After the accident, she went back into the pantry and got the same ingredients. She tossed the baking soda, water, and tomato sauce into a bowl. Before stirring, she wanted to classify what was in the bowl. Help her understand if it is a homogenous mixture, heterogeneous mixture or pure substance. Be sure to give reasons to support your identification.

It is a heterogeneous mixture because you can see the different parts in the new substance and they are only physically together, not chemically.

4. Once satisfied she poured the contents of the bowl into a blender and turned it on. When done, she was very proud. “Look”, she said. “It’s a magic blender!!! It made all the ingredients disappear!” True, you could no longer see the individual ingredients.

- a) Identify if it is a Homogenous mixture, heterogeneous mixture or pure mixture. Explain why. Why is it not the other 2?

It is a homogeneous mixture because homogeneous mixtures are mixtures that are so finely mixed you cannot see the separate parts. As Miss Fudukos said, “it made all the ingredients disappear”. We know the ingredients didn’t vanish. They simply were so well mixed you could no longer see the different parts. If it was a homogeneous mixture you would be able to see the different parts. It couldn’t be a pure substance because we know that the mixture is made of multiple substances.

- b) Did the blender chemically or physically change the contents?? Explain.

The blender only physically changed the contents by mixing them together. The substances did not change into new substances. For example the baking soda is still baking soda. It hasn’t changed into a new substance just because it has been mixed with the other ingredients.

5. She then poured the contents onto the pizza dough, and put the cheese on top. Miss Fudukos then put the pizza into the preheated oven and let it cook for an hour and a half. After about 30 minutes she noticed the kitchen filling up with smoke. After running around the classroom yelling fire she turned the oven off and removed the flaming, burning pizza. Blowing the fire out, she witnessed the burnt and blackened ashes of the pizza.

- a) Classify the “pizza”is it a Homogenous mixture, heterogeneous mixture or pure substance? EXPLAIN!!!

It is a homogeneous mixture because it is all burnt and blackened ashes. You can no longer tell the difference between the crust, the cheese, and the tomato sauce. Therefore, it cannot be a heterogeneous mixture because you cannot see the different parts, it now looks uniform throughout. It is definitely NOT a pure substance because it is composed of different things.

Analyze chem and phys properties of products and reactants

- b) Has the pizza or product at this point undergone a chemical change or a physical change or both? EXPLAIN!!!

JTH!!! It has undergone a chemical change because the dough is no longer sticky or thick. It has now become crispy. The cheese has also been burnt beyond recognition, we can no longer get it back to its original state. Physically it has also changed because it has changed in its form and appearance.

Describe the physical characteristics of an object.

6. A boating company that has several cruise ships wants to enhance its safety features by developing a container that will have life saving materials stored in it in case of a ship wreckage. The requirements for the container are that the material must be able to float on water, not be very flexible. The materials listed below are the top four finalists. Which one should the company choose? Provide support for your conclusion.

Material A: A black rubber made from old car tires.
The mass for a 20 mL piece is 18.3 grams.

Material B: A white hard plastic that is created from old under the sink piping.
The mass for a 50 mL piece is 80 grams

Material C: A yellow sponge material made from old kitchen sponges.
The mass is 10 grams for a 25 mL piece.

Material D: A metal taken from recycled flying saucer sleds that has
a mass of 25 grams for a volume of 45 mL

- A. Which will be the best material to use that meets all of the requirements? Be sure to support your answer. Show your work!

Material A:

① $D = ?$
 $m = 18.3g$
 $V = 20mL$

② $D = \frac{m}{V}$

③ $D = \frac{18.3g}{20mL}$

④ $0.915g/mL$

Material B:

① $D = ?$
 $m = 80g$
 $V = 50mL$

② $D = \frac{m}{V}$

③ $D = \frac{80g}{50mL}$

④ $1.6g/mL$

Material C:

① $D = ?$
 $m = 10g$
 $V = 25mL$

② $D = \frac{m}{V}$

③ $D = \frac{10g}{25mL}$

④ $0.4g/mL$

B. Why are the other materials not usable? Explain what would work and not work about each. Explain why & Show your work!

Material A has a density that is less than water's density but it doesn't meet the flexibility requirement.

Material B is too dense but meets the not flexible requirement.

Material C fits the density requirement but is flexible like material A.

This is why material D is the best choice.