

Western Engineering Outreach

Edible Slime

Grade 6-8

Meet Today's ENG HERO!



Paul Charpentier - Associate Professor at Western University

Dr. Charpentier's main area of research is developing new "green nanotechnologies" for environmentally-friendly and alternative energy applications. Research is being carried out in several key areas to develop novel nanomaterials and nanomedicines synthesized using green enabling solvents such as supercritical carbon dioxide and ionic liquids for emerging applications. These novel materials formed using techniques in polymer synthesis, self-assembly and particle design have applications in many areas including solar devices, self-cleaning coatings, catalytic and biomedical applications. To find out more about Dr. Charpentier: https://www.eng.uwo.ca/chemical/faculty/charpentier_p/index.html

Learning Goal:

Students will consider how pure substances and mixtures are used in our everyday lives!

Curriculum Connections: Grade 7 - Pure Substances and Mixtures

Materials Needed:

- Corn syrup
- Powdered sugar
- Unflavored gelatin packets
- Cornstarch
- Candy corn



Engineering and Science Connections:

Today we will become chemical engineers! Chemical engineers help create and research all different kinds of things that have chemicals in them. They create synthetic flavors such as blue raspberry and ice cream flavors.

Today we will be creating a candy corn slime mixture, but what is a mixture? Well to understand what a mixture is we first have to understand what a pure substance is first!

A pure substance is a type of matter which exists in its most basic or purest form and cannot be broken down further. Examples of pure substances include water, gases like carbon dioxide, oxygen and metals like platinum, gold and silver. Each pure substance has its own set of unique chemical and physical properties which helps us in identifying it.

Types of pure substances

Pure substances can be divided into two categories - elements and compounds.

Elements are made up of the same types of atoms. The known elements listed in the periodic table can be considered pure substances. Examples of elements include hydrogen, oxygen, gold, silver

Compounds are made up of different types of atoms joined together by chemical bonds. Examples of compounds include water, glucose, salt and carbon dioxide.

So now what is a mixture?

Mixture is a combination of two or more pure substances where each substance keeps its own identity upon mixing. Mixtures are present almost everywhere on Earth. Look at rocks, the ocean, rivers or even the atmosphere. All of them are mixtures! In other words, anything that you can mix together is a mixture. Even the foods you eat.

Why is it called a mixture?

It means the fundamental chemical structure of the components in a mixture does not change upon mixing.

Examples of mixtures

Although water is a pure substance, if you put sand into a glass of water, it would turn into a mixture. Each of the components of a mixture can be separated from one another. You can always separate the sand from water by filtering it. If you take a mixture of salt and water, you can separate it by evaporating the water, to get salt in the container. Air, too, is a mixture of different gases such as carbon dioxide, oxygen, nitrogen and water vapour etc. Blood is a mixture made up of different types of blood cells and plasma.

Types of mixtures

Homogeneous mixture - The components of a homogeneous mixture have a uniform composition, and cannot be seen separately. The prefix 'homo' means same and it tells us that when two substances combine extremely well

with one another, they form a uniform mixture. For example, sugar and water do not chemically react and form another compound although the water does turn sweet!

Heterogeneous mixture - The components of a heterogeneous mixture do not have a uniform composition and can be viewed separately without losing their identity. For example, if you mix water and oil, you can see them separately in the mixture.

What is a polymer?

Have you ever heard the tale of The Three Little Pigs? This fable shows that building a house from bricks is far better than sticks or straw. If you look closely at a brick house, you'll see that each brick is uniform. They are layered in a repeated pattern to design that house. Bricks can be used to build many structures, from sidewalks to very large buildings. There are many structures found in nature or made by humans that are made in a similar way, like polymers. Polymers are very big molecules made up of many smaller molecules layered together in a repeating pattern. In fact, the word polymer is Greek for 'many parts.' The smaller molecules that come together to form polymers are called monomers—small units that link together over and over to form a large polymer. Think of monomers like paper clips that link together to form a chain, and the chain is a polymer. Polymers are made of many monomers linked together. Polymers can result in some very unique materials, both naturally occurring and man-made.

Video Recommendation: The Great Picnic Mix Up: Crash Course Kids #19.1

<https://www.youtube.com/watch?v=iAOPzbiYPUM>

Activity:

Pure Substances and mixtures Jeopardy Game

With a friend, play against each other in a 1 on 1 Jeopardy game!

Head to this link to get started <https://jeopardylabs.com/play/pure-substances-mixtures>

How to Play Jeopardy?

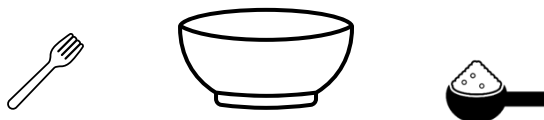
1. Play individually or in groups.
2. Pick a category and a point value.
3. Click on the chosen box for the question.
4. Give the answer in the form of a question before clicking again.
5. To see if you are correct, click again for the answer.
6. Click the "Back to Board" button on the slide to return to the main board.
7. If the student or team is correct, they are awarded the point value of the question. (Click the "Score" button located on the main board to add the point value to the appropriate team score.)

8. The dollar values disappear after each question.
9. Continue until all questions have been answered. The team with the most points wins.

Time to begin

In today's main activity we will be creating some edible slime!

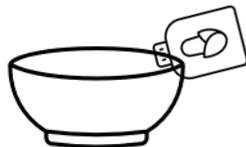
1. Add 1/2 a cup of powdered sugar and 1/2 a cup of cornstarch to a bowl. Mix with a spoon or fork.



2. Add 1/2 of the gelatin packet to the mixture and stir.



3. Pour in just enough corn syrup to transform the powder into a runny paste. The exact amount used will vary.



4. Once the edible slime mixture is runny, heat it in the microwave for about 60 seconds.



5. Pop the bowl of slime into the refrigerator for about 30 minutes to an hour.



6. Once the slime cools, remove it from the refrigerator. Test the edible slime's elasticity.

7. If the edible slime is too sticky, add a bit more cornstarch to thicken it.

8. If the slime is too thick, add a bit more corn syrup to bring it back to a slime-like consistency.

9. Once you are happy with the edible slime texture, add your candy corn pieces to the mixture



Debrief

Since the slime has a high sugar content, it will be stickier than traditional slime. The slime will stretch and pull like most slime recipes, but it doesn't quite have the same stretchiness to it that traditional slime has. The reason for this is due to chemistry. Traditional glue slime creates stretchy polymer chains that are plastic-like. While sugar can stretch when heated, it typically will never have the elasticity of traditional slime.

What Did You Learn?



- What is Chemical Engineering?
- What is a pure substance and what is a mixture?
- Examples of pure substances and mixtures
- What is a polymer?

Future Learning



- Research how water treatment centers filter our drinking water
- Research different types of polymers found in the environment

Share your creations!

We would love to see what you made. Email us at discover@uwo.ca or tag us on social media.

Instagram: @westernueng

Twitter: @westernueng

Facebook: @westernueng

Thanks for discovering with us!