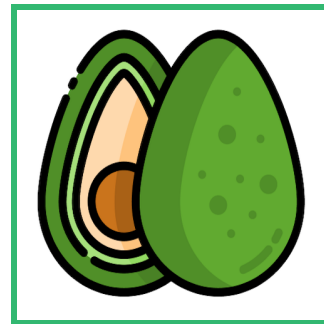


You're Mole-arious!

A GuacaMOLE Lesson Plan

Set Up Time: 30 minutes

Lesson Time: 80 minutes



Materials for a Class of 30 Students (15 Pairs):

15 x	Piece of Hubba Bubba Gum	1 x	Balance
15 x	Piece of Extra Bubble Gum	30 x	Calculator
15 x	Piece of Bazooka Gum	1 x	Classroom Projector
3 x	Disposable Weigh Boat	30 x	Student Packet

Engage (GuacaMOLE “Connect”)

Students watch a short video about the history of bubble gum and answer questions about the article.

Explore

Students research the type of sugar found in each piece of gum. Then, they measure the grams of sugar in each piece of gum.

Explain (GuacaMOLE “Learn”)

Students learn about comparing amounts of different chemicals using moles and Avogadro's Constant.

Elaborate

Students calculate the molar mass of each type of sugar in each piece of gum. Then, they calculate the number of moles and molecules of sugar in each piece of gum.

Evaluate (GuacaMOLE “Practice”)

Students complete practice problems about mole calculations. Students work on their own to complete these practice problems.

Name: _____



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GuacaMOLE Engage

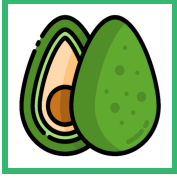
Visit guacamole.one/connect.php to watch the video.

The Aztecs and Mayans first made chewing gum, or “chicle,” by tapping latex trees to extract the rubber. The ancient Greeks chewed resin and bark from the mastic tree to clean their teeth and freshen their breath. How do modern people make gum?

Answer the questions while watching the video “How Bubblegum Is Made” (0:00 - 4:40):

1. Where does the chewy gum base come from in today's gum?
2. What are the two sweeteners added to the gum in the video?
3. What does the extruder do?
4. How many pieces of gum can the machine wrap in a minute?
5. Why is bubble gum usually pink?

Name: _____



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GuacaMOLE Explore

Determine the Type of Sugar

- ☐ Use your resources to research the ingredients in each piece of gum.
- ☐ Record the sugar that is used to make each piece of gum taste sweet.
- ☐ Find the molecular formula for each type of sugar.

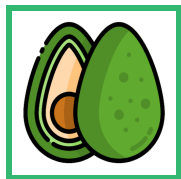
Brand of Gum	Name of Sugar	Molecular Formula of Sugar

Measure the Mass of Sugar

- ☐ Turn on the balance and place the weigh boat on the balance. Press the "zero" button to zero the balance.
- ☐ Remove the wrapper from the piece of gum. Record the mass of the unchewed gum.
- ☐ Chew the gum until it no longer tastes sweet. Then, start the timer and continue chewing for 3 more minutes.
- ☐ Record the mass of the chewed gum.
- ☐ Subtract the mass after chewing from the mass before chewing to find the difference. The difference is the number of grams of sugar in the gum.

Brand of Gum	Mass Before Chewing (g)	Mass After Chewing (g)	Difference (Mass of Sugar) (g)

Name: _____



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GuacaMOLE Explain

Visit guacamole.one/learn.php and click on the "Moles" topic.

Moles

What is a Mole?

A mole is _____

How is a Mole Useful?

Molar Mass

What is Molar Mass?

Molar mass is _____

How is Molar Mass Calculated?

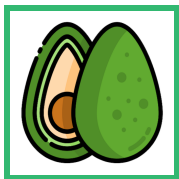
Mole Conversions

What is a Mole Conversion?

A mole conversion is _____

How are Mole Conversions calculated?

Name: _____



You're Mole-arious!

GuacaMOLE Elaborate

Molar Mass Calculations

Use the space below to calculate the **molar mass** of each type of sugar you identified in the pieces of bubble gum.

Hints:

1. The molar mass of a molecule is the sum of the molar masses of the atom it contains.
2. The molar mass of atoms can be found on the periodic table.

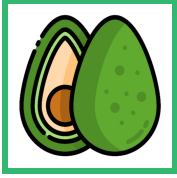
Mole Calculations

Use the space below to calculate the number of **moles** and **molecules** of sugar in the pieces of bubble gum.

Hints:

1. You measured the mass of sugar in grams.
2. Convert from grams to moles using the molar mass you calculated above.

Name: _____



You're Mole-arious!

GuacaMOLE Evaluate

Visit guacamole.one/practice.php and click the "Moles" topic.

Question #1:

Your Work:

Question #2:

Your Work:

Question #3:

Your Work: