WINTER BREAK LEARNING PACKET

STEM

7TH GRADE STUDENT

DEC 22ND – JAN 5TH

DEPARTMENT OF CURRICULUM & INSTRUCTION

Week One: December 22-26, 2025

Welcome to Your Winter Break STEM Challenge Packet!
Have fun exploring these activities and remember, always get your parents' permission and have adult supervision for every experiment. Stay curious and enjoy your break!

7.PS1.2 Collect and analyze data about the physical properties of the components of a mixture to use as evidence that the identities of the components change during a chemical reaction.

Overview:

Students will investigate the chemical changes that occur during cookie baking by experimenting with ingredient variations and observing the resulting physical properties.

Objective(s):

Students will analyze their experience with baking cookies to explain how

- chemical reactions occur when ingredients combine and heat is applied.
- physical properties (texture, color, size) change as evidence of chemical change.
- ingredients like baking soda, sugar, and eggs play specific roles in chemical reactions.

Materials:

- 2 ¼ Cups All-Purpose Flour
- 1 Teaspoon Baking Soda
- 1 Teaspoon Salt
- 1 Cup (2 Sticks) Butter, Softened
- ¾ Cup Granulated Sugar
- ¾ Packed Brown Sugar
- 1 Teaspoon Vanilla Extract
- 2 Large Eggs
- 2 Cups Chocolate Chips
- 2 Mixing Bowls
- Measuring Cups
- Measuring Spoons
- Something to mix with
- Baking Sheet
- Readworks Article: "Mix the Old with the New"

Pre Activity Question

1. What do you think happens to the ingredients when heat is applied in the oven? Do they just melt, or do they transform into something new?

Pre Activity Reading: Read the following article and answer the questions that follow.

Mix the Old with the New

by ReadWorks

Chefs in busy restaurants do a lot of different things. They check the inventory of ingredients used for each popular dish. They may supervise a kitchen staff, making sure their assistants are working well as a team. They may ensure that diners are not waiting too long for their food. They may taste the food before it leaves the kitchen. They do a lot and think about everything that goes into the food and experience their restaurant serves.

But they may not think about how they and their staff change the properties, structure and **state** of matter of food... but they are doing that with many dishes they serve.

Do you know how to change the properties, structure and **state** of matter of a substance? If you have made ice before, the answer is yes.

When you put an ice tray filled with water in a freezer, the temperature of the water in that ice tray lowers. The freezer makes a physical change of **state** to the water by turning it from a liquid to a solid.

When we cook, we change many things about the food we are preparing. These could be any number of properties: size, shape, mass, color or temperature. We can change the physical or chemical nature of the food. We can even change the **state** of matter the food is currently in to another state of matter.

STATES OF MATTER

There are four common **states** of matter we see almost every day: solid, liquid, gas and plasma. We can observe all four of them in a kitchen. A solid is as simple as an ice cube, or frozen water. Melt that ice cube, and you produce water, a liquid. Boil that water, and you produce steam, or water vapor. Believe it or not, plasma can be found in kitchens too. It's found in fluorescent lights, neon signs and plasma televisions. Other examples of plasma include the sun and lightning.

CHEMICAL CHANGES

A chemical change produces something from other materials and occurs on the **molecular** level. Some examples of chemical changes that take place in a kitchen are frying an egg, grilling fish or burning that egg or fish. When you smell onions sautéing in a pan or catch a whiff of the chicken roasting in the oven, the scent coming from the food is also a chemical reaction. Hopefully the scents you smell are only appetizing ones.

There are undesirable chemical changes that occur in the kitchen, too. If you smell the odor of rotting food, you've got a chemical change that needs some addressing! After you wash your metal pots and pans, make sure they dry properly. If they don't dry, the metal could react to the oxygen in the air and rust. Rust is evidence of another chemical change you don't want in your kitchen.

PHYSICAL CHANGES

Physical changes in the kitchen do not produce a new substance. Changes in **state** or phase are physical changes. For example, cutting vegetables, or even dissolving salt in a hot soup are examples of physical changes. In general, physical changes can be reversed using physical means. In the example of dissolving salt in a hot soup, evaporating the water naturally or applying heat to boil off the water can return the salt to its original **state** of matter.

When water is boiled, steam is created. That steam is water vapor, or the gas phase of water. That change from a liquid to a gas is an example of a physical change.

Let's say you're making a smoothie with strawberries, bananas, kale and orange juice. When you're cutting the fruits and vegetable into smaller pieces, it's a simple physical change. When you add them to the blender with the orange juice, the physical change that takes place during blending is more complex, and you now have a liquid. You can even go full-circle and turn your liquid smoothie into a solid by turning it into popsicles in the freezer.

A DIFFERENT KIND OF COOKING

There are some chefs in this world who reject or reinterpret traditional cooking techniques and cuisines. They push the boundary of food with new techniques to create entirely new combinations of flavor and texture. They take **states** of matter, physical changes, and chemical changes of food to a whole different level.

MOLECULAR GASTRONOMY

While some chefs may not actively think about the science behind the food they serve, others are using a modern style and science of cooking called **molecular gastronomy**. **Molecular gastronomy** is a scientific discipline that studies the physical and chemical processes that occur while cooking. Chefs who practice **molecular gastronomy** study and apply scientific principles when cooking and preparing their dishes. Their goal is to use their knowledge to make a tasty and unique dining experience.

They are concerned about *how* to make food delicious as well as *what* makes food delicious. To understand this, they have to consider many factors. Some of these factors include how their ingredients are grown, processed and transported. Where did the seeds used to grow the fruit come from? What kind of dirt and how much water did this vegetable receive? After harvest, was it ever put in a plastic bag? Was it sent by air, truck, and/or boat? What negative effects did transportation have on the produce?

Only after all that is determined do many **molecular gastronomy** chefs finally get to the cooking part of their craft. They want to understand how ingredients change with different cooking techniques. They want to know how all of a person's senses, not just taste, play in to the enjoyment or dislike of food. They go deeper and learn how the brain interprets the signals our senses send to ultimately determine the flavor tasted. They even experiment with how food is presented, who prepares it, and what mood the diner is in.

Many of these factors are what most chefs consider anyway, but what really differentiates **molecular gastronomy** chefs is in the preparation and presentation steps. And when it comes down to it, a **molecular gastronomy** chef is many things at once: a little physicist, a sprinkle of chemist, a dash of agriculturist, a spoonful of biologist, and a heap of psychologist to top it off. That's a solid list of ingredients that hopefully turns into fun and tasty food.

PREPARATION

Molecular **gastronomy** chefs look at how ingredients are changed by different cooking methods. These cooking methods affect the eventual flavor and texture of food ingredients.

One method is called direct spherification. This is the process of turning a liquid into little caviar-like balls. Employing gelling solutions like sodium alginate, liquids like fruit and vegetable juices, and even milk, are dropped into calcium chloride and water to form a thin shell around the liquid. This jelly membrane creates the ball that pops with the liquid's intense flavor when eaten. The spheres are fragile and are usually served immediately.

Another method is a variation on the existing technique of using foams. Well-known foams include whipped cream and mousse, and also involve the use of air or another gas to create lighter texture and feel when eaten. A variation on the foaming technique is to make foam that is made of mainly air. You can make foams out of almost anything. It can have so much air that it resembles big soap bubbles. This changes the texture into something lighter while allowing the flavor to remain. Steak bubbles, anyone?

A recipe that combines the foam and spherification techniques is Apple Caviar with Banana Foam served on a spoon. Combining apple juice in the form of spheres and banana foam whisked with heavy cream, milk, sugar and gelatin, this spoonful is not your typical dessert!

Some **molecular gastronomy** cooking methods involve temperature regulation. One method is called sous-vide and entails cooking food, like meats, in airtight plastic bags in a water bath. This ensures the entire piece of meat is cooked evenly and also retains its juices. Cooking times when using the sous-vide method don't have to, but can increase dramatically. Some chefs choose to tenderize tough meats like beef brisket with a sous-vide water bath that lasts for two to three days.

Although it may seem like weird science or just plain ridiculous, **molecular gastronomy** chefs want to explore new possibilities in the kitchen. Combining new and old cooking techniques, new equipment and technologies, and various sciences, these chefs may be inventing the food of the future. Whether they are successful or not, they are definitely making things fun.

GOOD FOOD IS GOOD FOOD

Whether a chef uses traditional or new cooking methods, the fundamentals of cooking are the same. Both traditional and **molecular gastronomy** chefs change the properties of the food they serve. They change the **states** of matter, properties and structure of food to, hopefully, serve a great meal.

Vocabulary

gastronomy

noun

definition: the study or practice of eating well.

molecular

adjective

definition: concerning, caused by, or consisting of molecules.

state

noun

definition: the condition of a person or thing.
The old house was in a bad state.

Spanish: estado

ReadWorks® Name: ______________________________ Date: ______________

1. Before you start reading...

Here are the vocabulary words that will be in this reading. Let's see how well you already know them.

Check the box that shows how well you know each word. It's ok if you don't know them yet (this is not graded)!

	Don't know it	Have heard of it but not sure of its meaning	Know something about its meaning	Know it well
gastronomy				
state				

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2. Word Changer

Words have different forms when we use them in different ways. Write the correct vocabulary word, in its correct form, in each blank.

He studied ____________________ in his education as a chef.

The old house was in a bad ____________________ .

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3. After reading and exploring the words through some activities...

Do you know these words better? Check the box that shows how well you know each word. It's ok if you don't know them yet (this is not graded)!

	Don't know it	Have heard of it but not sure of its meaning	Know something about its meaning	Know it well
gastronomy				
state				

Answer Key to Word Changer:

- He studied **gastronomy** in his education as a chef.
- The old house was in a bad **state**.

Name: ______________________________ Date: ____________

1. What do chefs change with many dishes they serve?

A. the properties, structure, and state of matter of food

B. the bulbs in fluorescent lights and neon signs

C. the chemical composition of sodium alginate and calcium chloride

D. the amount of time they allow their pots and pans to dry after washing them

2. What does the passage describe?

A. The passage describes how to cook beef brisket and fried eggs.

B. The passage describes molecular gastronomy and changes in food.

C. The passage describes the average day of someone who works for a chef.

D. The passage describes what molecular gastronomy chefs like to eat.

3. A change in the state of matter of something is an example of a physical change. Solid, liquid, gas, and plasma are states of matter.

What can be concluded from this information?

A. Changing water from liquid to solid is an example of a physical change.

B. Changing water from liquid to solid is an example of a chemical change.

C. Frying an egg and grilling a fish are both examples of physical changes.

D. Changing water from liquid to gas is an example of both a physical change and a chemical change.

4. What kind of changes do chefs make to food?

A. Chefs make chemical changes only.

B. Chefs make physical changes only.

C. Chefs make chemical and physical changes.

D. Chefs never make any changes to food.

5. What is this passage mostly about?

A. the chemical change that occurs when dishes do not dry

B. the physical change that occurs when water is boiled

C. a cooking method called sous-vide

D. chefs, cooking, and changes in food

6. Read these sentences: "When you put an ice tray filled with water in a freezer, the temperature of the water in that ice tray lowers. The freezer makes a physical change of state to the water by turning it from a **liquid** to a solid."

What does the word **"liquid"** mean above?

A. a large amount of money

B. a loud explosion that causes a lot of damage

C. a fluid, or something that flows

D. a gas, or something that floats in the air

7. Choose the answer that best completes the sentence below.

Chopping up a fish is an example of a physical change; _______, grilling a fish is an example of a chemical change.

A. as a result

B. for instance

C. including

D. on the other hand

Answer Key to Multiple Choice Questions:

1. A
2. B
3. A
4. C
5. D
6. C
7. D

COOKIE CHEMISTRY

Adapted from
4h.okstate.edu/projects/science-and-technology/lets-get-chemical/site-files/files/lets-get-chemical-cookie-chemistry-new-logo.pdf

This section introduces the concept of ingredient roles in cookie baking and connects them to physical and chemical changes:

Flour
Flour is important in creating the texture of your cookies. It's what makes cookies chewy, crispy and crumble. Flour also contains gluten, which is the protein that helps to hold cookies together.

Baking Soda
Baking soda serves as the leavening agent. A leavening agent is a substance used in dough or batter to make it rise. Other examples of leavening agents include yeast and baking powder.

Salt
Salt will help with flavoring, but it also controls the rising of cookies. Without this flavor enhancer, the secondary flavors in a cookie fall flat as the sweetness takes over. Salt also strengthens the protein in a dough, making cookies more chewy.

Butter
Butter is what makes cookies tender and contributes to the flavor. Butter is about 80% fat and 18% water, which is what causes cookies to spread and melt down in the oven.

Granulated Sugar
Granulated sugar makes cookies brown by carmelizing and crispier by absorbing some of the moisture in the cookie dough. Granulated sugar also helps the cookies spread as it melts.

Eggs
Eggs are a major source of moisture and protein in cookie dough. The liquid in eggs gives a cookie structure by bonding with the starch and protein from flour. The protein from eggs helps to keep cookies chewy.

Vanilla Extract
Vanilla is used in cookies for the yummy flavor! Real vanilla and imitation vanilla contain the same flavor molecules, but real vanilla extract has a more complex flavor because of other molecules from the plant.

Brown Sugar
Brown sugar adds a carmelized flavor and mkaes cookies chewy and moist. This is because brown sugar contains molasses. Molasses adds moister, and because it's slightly acidic, causes the proteins in cookie dough to firm up

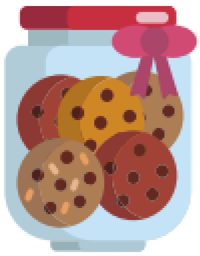
Chocolate Chips
Chocolate chips are completely optional. They can be the star of the sho, or you can bake cookies without them, its all up to preference! You can choose different chips like peanut butter, white chocolate, dark chocolate and more.

4-H STEM

Key Idea: Each ingredient plays a specific role in texture, flavor, and chemical reactions during baking.

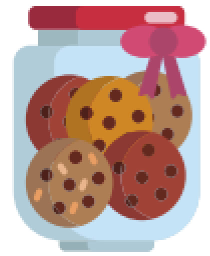
Complete the Cookie Chemistry activity using the following directions.

COOKIE CHEMISTRY



Ingredients:

- 2 ¼ Cups All-Purpose Flour
- 1 Teaspoon Baking Soda
- 1 Teaspoon Salt
- 1 Cup (2 Sticks) Butter, Softened
- ¾ Cup Granulated Sugar
- ¾ Packed Brown Sugar
- 1 Teaspoon Vanilla Extract
- 2 Large Eggs
- 2 Cups Chocolate Chips
- 2 Mixing Bowls
- Measuring Cups
- Measuring Spoons
- Something to mix with
- Baking Sheet

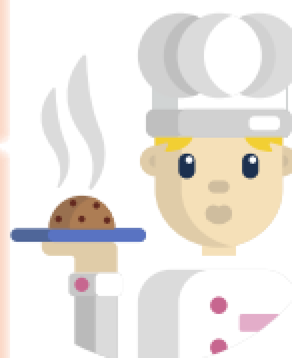


Instructions:

- Preheat oven to 375° F
- Mix dry ingredients in a bowl (flour, baking soda and salt)
- Mix together wet ingredients in a seperate bowl (sugar, brown sugar, vanilla , butter and eggs)
- Add dry ingredients into the wet ingredients slowly, mixing as you add to ensure they are evenly distributed.
- Add and mix in chocolate chips.
- Place rounded teaspoons of cookie dough about 2 inches apart on an ungreased cookie sheet.
- Bake for 9-11 minutes or until golden brown.
- Give them time to cool before enjoying!

Vocabulary:

- Wet Ingredients: butter, granulated sugar, brown suagar, eggs, vanilla extract
- Dry Ingredients: flour, baking soda, salt
- Leavening Agent: Substance used in dough or batter to make it ride.



Challenge!

While your cookies are baking, do an experiment with cookie ingredients! Add, subtract or substitute your cookie ingredients and make your own recipe to see what happens to your cookies. Be creative! Some examples of cookie experiments are:

- Baking cookies without leavening agents
- Baking cookies with different types of flour
- Baking cookies with all brown sugar and no granulated sugar

4-H STEM

Resources: FineCooking.Com Baking Better Cookies Through Chemistry

Explanation of the Activity and Outcome:

In this activity, you investigated chemical changes that occur when baking cookies. Baking is more than just heating dough—it involves chemical reactions that create new substances with different properties.

When you mixed the ingredients, you created a mixture of flour, sugar, butter, eggs, and baking soda. At this stage, the components retained their original properties. However, when you placed the dough in the oven, heat triggered several chemical reactions:

- **Baking soda reacted with moisture and acids, producing carbon dioxide gas. This caused the cookies to rise and become light and airy.**
- **Proteins in eggs coagulated, giving the cookies structure and firmness.**
- **Sugars caramelized and the Maillard reaction occurred, changing the color to golden brown and creating new flavor compounds.**
- **Butter melted and interacted with other ingredients, affecting texture and spread.**

These changes are **irreversible,** and the dough cannot return to its original state. This demonstrates **that** baking is a chemical change because new substances with different properties were formed.

Key Takeaways

- Heat drives chemical reactions in baking.
- Evidence of chemical change includes:
  - Color change (browning)
  - Gas formation (rise)
  - New smell and flavor
  - Irreversible transformation
- Each ingredient plays a specific role in these reactions.

Writing Assignment: The Science Behind Cooking

Prompt: Chemical Changes in Cooking

Choose another food you have cooked or seen cooked (such as scrambled eggs, bread, pasta, cakes, or roasted vegetables). Describe the chemical changes that occur during the cooking process. Include at least three pieces of evidence that show a chemical reaction happened. Explain why this process is considered a chemical change rather than a physical change.

Requirements:

- Use scientific vocabulary (chemical reaction, physical property, new substance).
- Mention observations like color change, texture change, new smell, or gas formation.
- Write in complete sentences and organize your response into a short paragraph on a separate sheet of paper.

Week Two: December 29, 2025-January 2, 2026

7.PS1.1 Evaluate and communicate information that all substances in the universe are made of many different types of atoms that combine in various ways.

Overview:

In this activity, you will use gumdrops and toothpicks to model **elements, compounds, and mixtures**. Each gumdrop represents an atom, and the colors show different types of atoms. Toothpicks represent bonds.

Objective(s):

Students will use models to:

1. Visualize how atoms combine in different ways.
2. Understand the difference between elements, compounds, and mixtures.
3. Explain these relationships using analogies.

Materials:

- Pack of Gumdrops containing at least 5 assorted colors
- 9 toothpicks
- 7 clear zip lock bags
- Labeling pen
- 1 set of instructions

Background Information

Everything around you—air, water, food, even your desk—is made of atoms. These atoms can join together in different ways to form **elements**, **compounds**, and **mixtures**. Today, you'll model these combinations using gumdrops and toothpicks to see how matter is built at the **atomic** level.

Why This Activity?

Scientists use models to understand things too small to see. By building your own models, you'll learn:

- How atoms combine to form substances.
- The difference between elements, compounds, and mixtures.
- Why the arrangement of atoms matters.

How to Build Your Models

You will use **gumdrops** (atoms) and **toothpicks** (bonds) to create models of **elements, compounds, and mixtures**. Follow these steps:

Student Instructions: (Steps listed here match the procedure steps listed on the next page)

Before beginning the following steps, choose a color to represent each **element. (See next page)**

1. **Break Toothpicks:**
   Break 9 toothpicks in half to make 18 pieces. These represent **bonds**.

2. **Make Oxygen Molecules (O_2):**
   Use **Color 1 gumdrops**. Connect two gumdrops with a toothpick to form one molecule. Make **4 molecules** and place them **in a bag labeled O_2 Element**. **(Bag 1)**

3. **Make Hydrogen Molecules (H_2):**
   Use **Color 2 gumdrops**. Connect two gumdrops with a toothpick to form one molecule. Make **2 molecules** and place them **in a bag labeled H_2 Element**. **(Bag 2)**

4. **Make Iron Atoms (Fe):**
   Use **Color 3 gumdrops**. Put **2 gumdrops together** without toothpicks to make **two atoms**. Put them **in a bag labeled Fe Element**. **(Bag 3)**

5. **Make Salt Molecules (NaCl):**
   Use **Color 4 (Na)** and **Color 5 (Cl)** gumdrops. Connect one of each color with a toothpick. Make **4 molecules** and place them **in a bag labeled Salt** (**NaCl) Compound**. **(Bag 4)**

6. **Make Water Molecules (H_2O):**
   Use **2 gumdrops of Color 2 (H)** and **1 gumdrop of Color 1 (O)**. Connect them in a V-shape using toothpicks to form one molecule . Make **4 molecules** and place them in a bag labeled **H_2O Compound**. **(Bag 5)**

7. **Create Saltwater Mixture:**
   Take **2 NaCl molecules from Bag 4** and **2 H_2O molecules from Bag 5**. Put them together **in a bag labeled Saltwater Mixture**. **(Bag 6)**

8. **Create Dissolved Oxygen Mixture:**
   Take **2 O_2 molecules from Bag 1** and **2 H_2O molecules from Bag 5**. Put them together **in a bag labeled Dissolved Oxygen Mixture**. **(Bag 7)**

Classification of Matter: Elements, Compounds, or Mixtures

Objective Visualize the difference in composition of elements, compounds, and mixtures

Background The subscript in a chemical formula indicates how many atoms are present. For example, H_2O contains two atoms of hydrogen and one atom of oxygen.

Materials Gum drops containing at least 5 different colors, 9 toothpicks, 7 clear zip lock bags, a labeling pen; 1 set of instructions.

Color 1 ________________ = 12, represents Oxygen

Color 2 ________________ = 12, represents Hydrogen

Color 3 ________________ = 2, represents Iron

Color 4 ________________ = 4, represents Sodium

Color 5 ________________ = 4, represents Chlorine

OK to use different colors.

Safety Students should not eat the candy during the activity. Students should not place plastic bags over their faces.

Procedure

1. Break the 9 toothpicks in half, this will represent 18 bonds. All will be used.
2. Use ***Color 1*** candy and toothpicks to make 4 molecules of oxygen (O_2) and place in bag labeled *O_2 Element*. Make your observations.
3. Use ***Color 2*** candy and toothpicks to make 2 molecules of hydrogen (H_2) and place in bag labeled *H_2 Element*. Make your observations.
4. Use ***Color 3*** candy to make 2 atoms of iron (Fe) and place in bag labeled *Fe Element*.
5. Use ***Color 4*** and ***Color 5*** candy to make 4 molecules of salt (NaCl) and place in bag labeled *Salt (NaCl), Compound*. Make your observations.
6. Use ***Color 1*** and ***Color 2*** candy to make 4 molecules of water (H_2O) and place in bag labeled *Water (H_2O), Compound*. Make your observations.
7. Label 1 bag *Salt Water, Mixture*. Take 2 molecules of NaCl and 2 molecules of H_2O, and place in bag. Make your observations.
8. Label 1 bag *Dissolved Oxygen, Mixture*. Take 2 molecules of O_2 and 2 molecules of H_2O, and place in bag. Make your observations.

Observations: Draw, using colored pencils or markers, the contents of each bag. Be sure to label each drawing accordingly.

Use the space below to draw your models.

Bag 1	Bag 2	Bag 3
Bag 4	Bag 5	Bag 6
Bag 7		

Analysis Questions

1. Look at the three bags labeled **Element** **(Bags 1, 2, and 3)** and answer the following questions.
   a. What do the three bags have in common? (Observe the contents of the bag only. Hint: look at the color of the candy in the bag.)

   b. How does each bag represent **elements**?

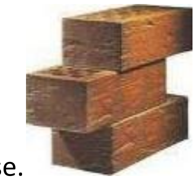
2. Look at the two bags labeled **Compound** **(Bags 4 and 5)** and answer the following questions.
   a. What two things do they have in common? (Observe the contents of the bag only. Hint: look at the color of the candy in the bag and the placement of the toothpicks.)

   b. How does each bag represent a **compound**?

3. Look at the two bags labeled **Mixtures** **(Bags 6 and 7)** and answer the following questions.
   a. What do they have in common? (Observe the contents of the bag only. Hint: again, look at the colors of the candy in the bag and the placement of the toothpicks.)

   b. How does each bag represent a **mixture**?

4. In your own words, what is the difference between **elements, compounds, and mixtures**? Use 2-4 complete sentences.

5. Explain the analogy: An element is to a compound as a brick is to a house. 

Bonus: Complete your own analogy:

Elements and compounds are to mixtures as a ______________________ and __________________ are to __________________________.

Answer Key for Analysis Questions

1. Elements:
   a. All gumdrops in each bag are the same color.
   b. Each bag represents a single type of atom.

2. Compounds:
   a. Gumdrops of different colors connected by toothpicks; fixed arrangement.
   b. Represents atoms chemically bonded in a specific ratio.

3. Mixtures:
   a. Multiple colors, some connected and some not.
   b. Represents substances physically combined, not chemically bonded.

4. Difference:
   Elements = one type of atom; Compounds = chemically bonded atoms; Mixtures = physical blend of substances.

5. Analogy:
   A brick is a single unit (element), houses (mixture) are built from bricks, wood, and other items that maintain their same properties.

Explanation of the Activity and Outcome

In this activity, you investigated the composition of matter and how atoms combine to form elements, compounds, and mixtures. Using gumdrops and toothpicks as models, you created representations of these different types of substances.

When you examined the bags labeled Element, you noticed that each bag contained gumdrops of the same color. This represents an element because all atoms in an element are identical.
For the bags labeled Compound, you saw gumdrops of different colors connected by toothpicks. This shows that compounds are formed when atoms of different elements chemically bond in fixed ratios.
Finally, the bags labeled Mixture contained gumdrops of various colors, some connected and some not. This illustrates that mixtures are combinations of elements and/or compounds that are physically blended but not chemically bonded.

Through this modeling activity, you visualized how atoms combine in different ways to form all substances in the universe.

Key Takeaways

- Elements are made of one type of atom.
- Compounds are made of two or more types of atoms chemically bonded.
- Mixtures are physical combinations of elements and/or compounds without chemical bonding.
- The analogy “An element is to a compound as a brick is to a house” shows that simple building blocks combine to form more complex structures.