

# Changes in Matter



REVERSIBLE

Reversible & Irreversible Changes



IRREVERSIBLE

8 Hands-On Science Stations



Print +  
Digital



2nd Grade Science

| NGSS 2-PS1-4





# What Students Learn



Students explore how matter changes through hands-on science activities.



**1** Identify changes in matter



**2** Observe how heating and cooling change matter



**3** Recognize reversible changes



**4** Recognize irreversible changes



**5** Sort real-world examples



**6** Explain ideas using science vocabulary



Students investigate examples like:



melting ice



freezing water



cooking eggs

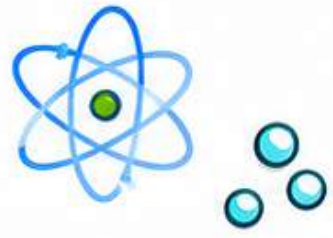


baking food



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# What's Included



Everything you need for a complete 2nd grade science unit.

1

## 8 Science Stations



Hands-on practice with key concepts

2

## Reading Passages



Included in 3 student-friendly formats

3

## Big Idea Posters



Visual support for important concepts

4

## Vocabulary Cards



Two formats for easy review

5

## Differentiated Questions



Multiple response options for learners

6

## Hands-On Activities



Meaningful investigations and practice

7

## Teacher Notes + Materials Checklist



Easy prep and simple planning

8

## Print + Digital Resources



Flexible for classroom or digital use

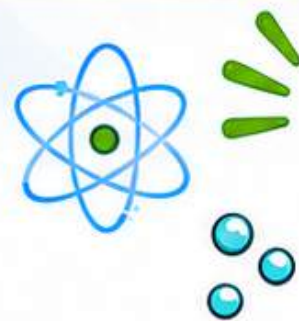


Perfect for science block, centers, review, or small groups.



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# How Students Learn the Concept



A simple flow teachers can use to guide instruction.

## 1 Learn About Matter



Introduce matter and how it can change.

## 2 Observe Changes



Students notice what happens when materials change.

## 3 Investigate Heating and Cooling



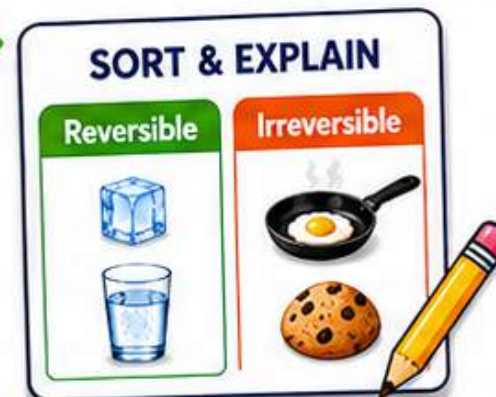
Hands-on activities help students explore changes caused by heat and cold.

## 4 Decide if the Change Can Be Reversed



Students determine whether the material can return to its original form.

## 5 Apply Learning to New Examples



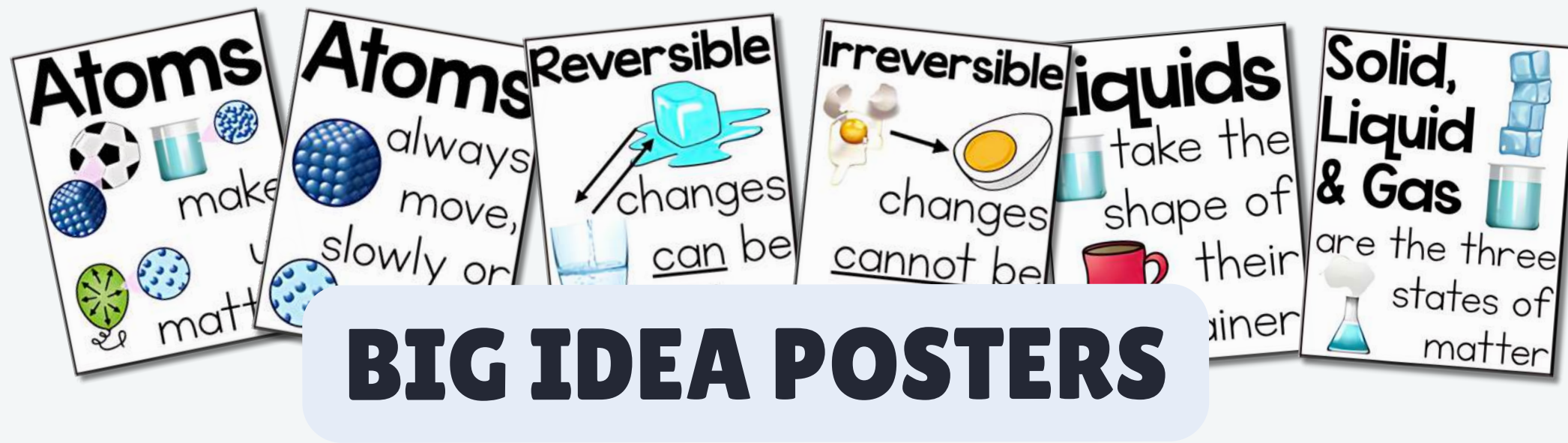
Students sort, explain, and respond to new real-world examples.

Helps teachers visualize the lesson flow from introduction to application.

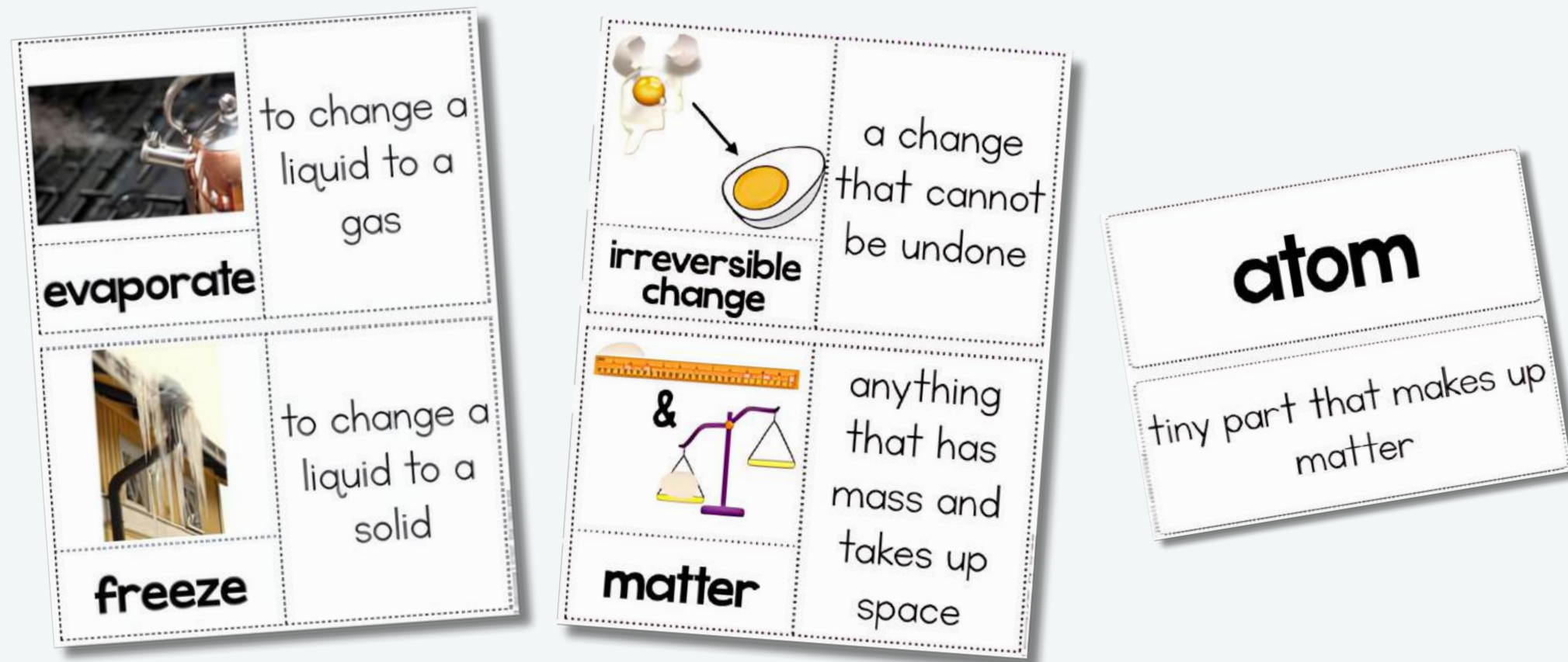


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## VOCABULARY CARDS IN TWO FORMATS



### Use the posters & cards for:

- **Anchor Charts:** Display as visual reminders of key science concepts.
- **Class Discussions:** Use them to introduce and reinforce lessons on states of matter.
- **Student Reference:** Provide a quick reference during experiments or activities.
- **Vocabulary Building:** Highlight essential science terms and definitions.
- **Interactive Activities:** Use as prompts for hands-on experiments or inquiry-based learning.

# READING PASSAGES IN THREE FORMATS

FULL-PAGE,  
REGULAR SIZE



LARGE FORMAT FOR DISPLAY  
OR READING ON DEVICE



1/2-PAGE  
MINI-BOOK



# PLAY

[illegible]

**Watch a Video**

Use your computer to watch  
States of Matter

**#1 Watch a Video**  
What are the states of matter?  
a. Gases  
b. Solids  
c. Liquids  
d. All of the above

**#3 Watch a Video**  
What happens when you cool a gas down?  
a. It boils.  
b. It warms up.  
c. It becomes a liquid.  
d. It becomes a solid

**#2 Watch a Video**  
How do gas molecules move?  
a. Fastest  
b. Slowest  
c. In the middle  
d. Just a little bit

**#4 Watch a Video**  
What happens when you freeze water?  
a. It warms up.  
b. It becomes a solid.  
c. It turns into a gas.  
d. It becomes a liquid.

# Watch a Video

Name: \_\_\_\_\_

1. What are clouds?

2. What are the forms of water?

3. What happens when you heat water?

4. What does evaporate mean?

5. How are clouds made?



Words to use:

- vapor
- clumps
- sun
- water
- rises
- droplets
- stick
- form / forms
- solid
- liquid
- gas

clouds

droplets

water

liquid

gas

## Watch a Video

Fill in the blank with the correct word from the word bank. Not all words will be used.

1. Clouds are big clumps of water \_\_\_\_\_.
2. Water can be found in three forms: solid, \_\_\_\_\_, and gas.
3. When you heat \_\_\_\_\_, it turns into water vapor.
4. Evaporate means turn into \_\_\_\_\_.
5. Water vapor rises into the sky and turns into water droplets. The droplets stick together to form \_\_\_\_\_.

What are Clouds Made Of? Name: \_\_\_\_\_



clouds      droplets      water      liquid      gas

© Jessica Hamilton & Jill Eubank What I Have Learnt

# WATCH A VIDEO

# WATCH

## WATCH & PLAY STATION



# Investigate Station



A closer look at one of the hands-on science stations



## Teacher Notes

### Investigate Egg-celent States of Matter

Teacher Notes

#### Materials

- ▶ Student sheets
- ▶ Colored pencils
- ▶ Raw egg
- ▶ Hard boiled egg
- ▶ Bowls (labeled-- "Raw Egg" and "Cooked Egg")
- ▶ Tray (optional, to help contain the mess)
- ▶ Paper towels

If you have a child with an egg allergy, talk to the child's parents about this activity. They will not be ingesting eggs, but there are rare occasions when a child has a contact allergy with eggs. If that is the case, have another student crack open the egg for this investigation.

Included is a cut and paste worksheet in addition to the activity sheet and differentiated responses.

Easy-to-follow notes help teachers prep materials and guide the investigation.

## Student Directions

### Investigate Egg-celent States of Matter

Student Instructions

Today, you are going to investigate changes. You are going to see what happens when an egg is changed.

#### Before the Change: Raw Egg

1. Find the raw egg.
2. Draw the outside of the egg on your Activity Sheet.
3. Crack open the raw egg into the bowl.
4. Draw the inside of the egg on your Activity Sheet.

#### After the Change: Hard-Boiled Egg

1. Find the hard-boiled egg.
2. Draw the outside of the egg on your Activity Sheet.
3. Crack open the hard-boiled egg into the bowl.
4. Draw the inside of the egg on your Activity Sheet.

Simple directions walk students through comparing a raw egg and a hard-boiled egg.

## Completed Example

### Investigate

Egg-celent States of Matter

Name: Ava

Activity Sheet

#### Before the Change: Raw Egg

Draw the outside of the egg:



Draw the inside of the egg:

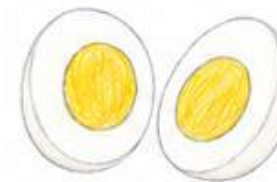


#### After the Change: Cooked Egg

Draw the outside of the egg:



Draw the inside of the egg:



Use complete sentences to describe how the raw egg looked.

The raw egg had a brown shell.  
Inside, the yolk was runny.  
The white was clear and slimy.

Use complete sentences to describe how the cooked egg looked.

The hard-boiled egg was white on the outside.  
Inside, the yolk was yellow and solid.  
The white was firm.

Was this a reversible or irreversible change? How do you know?

This is an irreversible change.  
You cannot turn a hard-boiled egg back into a raw egg.

A completed sample shows what student work can look like.

## Students will:

- ✓ observe a raw egg and a hard-boiled egg
- ✓ draw what they see
- ✓ describe the changes
- ✓ decide if the change is reversible or irreversible



★ Hands-on, meaningful, and easy to implement! ★

★ 2nd Grade Science | NGSS 2-PS1-4 ★

# DIFFERENTIATED WORKSHEETS

**Investigate** Egg-celent States of Matter

Name: \_\_\_\_\_

Answer the following questions. Look back at the reading if you need help.

1. How do the atoms in ice move?
2. How close together are the atoms in a liquid?
3. How do the atoms in air move?
4. What happens when you heat water?
5. What is reversible change?

**Investigate** Egg-celent States of Matter

Name: \_\_\_\_\_

Words to Use: undone, far apart, steam, spread out

1. The atoms in \_\_\_\_\_ do not move much.
2. The atoms in a \_\_\_\_\_ are more spread out.
3. The atoms in \_\_\_\_\_ move far apart.
4. When you heat water it turns into \_\_\_\_\_.
5. A reversible change is a change that can be \_\_\_\_\_.

undone ice liquid s

**Investigate** Egg-celent States of Matter

Teacher Notes

**Materials**

- ▶ Student sheets
- ▶ Colored pencils
- ▶ Raw egg
- ▶ Hard boiled egg
- ▶ Bowls (labeled-- "Raw Egg" and "Cooked Egg")
- ▶ Tray (optional, to help contain the mess)
- ▶ Paper towels

If you have a child with an egg allergy, talk to the child's parents about this activity. They will not be ingesting eggs, but there are rare occasions when a child has a contact allergy with eggs. If that is the case, have another student crack open the egg for this investigation.

Included is an cut and paste worksheet in addition to the activity sheet and differentiated responses.

**Investigate** Egg-celent States of Matter

Student Instructions

Today, you are going to investigate changes. You are going to see what happens when an egg is changed.

**Before the Change: Raw Egg**

1. Find the raw egg.
2. Draw the outside of the egg on your Activity Sheet.
3. Crack open the raw egg into the bowl.
4. Draw the inside of the egg on your Activity Sheet.

**After the Change: Cooked Egg**

1. Find the cooked egg.
2. Draw the outside of the egg on your Activity Sheet.
3. Crack open the cooked egg into the bowl.
4. Draw the inside of the egg on your Activity Sheet.

|        |                                                    |
|--------|----------------------------------------------------|
| ice    | The atoms in _____ do not move much.               |
| liquid | The atoms in a _____ are more spread out.          |
| air    | The atoms in _____ move far apart.                 |
| steam  | When you heat water it turns into _____.           |
| undone | A reversible change is a change that can be _____. |

## FILL-IN POCKET-CHART SENTENCES

**Investigate** Egg-celent States of Matter

Name: \_\_\_\_\_

Glue the word that matches the state of matter, solid, liquid, gas.

**Cut & Paste**

Glue either heat up or cool down to show the change.

Tell whether it is a reversible or irreversible change.

**Investigate** Egg-celent States of Matter

Name: Ava

**Activity Sheet**

| Before the Change: Raw Egg  | After the Change: Cooked Egg |
|-----------------------------|------------------------------|
| Draw the outside of the egg | Draw the outside of the egg  |
| Draw the inside of the egg  | Draw the inside of the egg   |

Use complete sentences to describe how the raw egg looked.

The raw egg had a brown shell.  
Inside, the yolk was runny.  
The white was clear and slimy.

Use complete sentences to describe how the cooked egg looked.

The hard-boiled egg was white on the outside.  
Inside, the yolk was yellow and solid.  
The white was firm.

Was this a reversible or irreversible change? How do you know?

This is an irreversible change.  
You cannot turn a hard-boiled egg back into a raw egg.

## TEACHER'S NOTES

## STUDENT'S DIRECTION

## ACTIVITY SHEET

# INVESTIGATE STATION



# RESPONSE OPTIONS

Diagram I Scream for Ice Cream Student Instructions

- How do gas atoms move?
- How do liquid atoms move?
- What happens to atoms that move very slowly?
- What happens when something evaporates?
- What is a reversible change?

Diagram I Scream for Ice Cream Student Instructions

- Gas atoms move \_\_\_\_\_
- Atoms that move very slowly move close together. They become a \_\_\_\_\_
- When something freezes, it turns into a \_\_\_\_\_
- When something evaporates, it turns from a \_\_\_\_\_ to a \_\_\_\_\_
- A reversible change is a change that can be undone \_\_\_\_\_ for \_\_\_\_\_

Diagram I Scream for Ice Cream Student Instructions

- How do gas atoms move?
  - Very fast
  - Far apart
  - Fill up their container
  - All of the above
- How do liquid atoms move?
  - Slower
  - Far apart
  - Fill up their container
  - All of the above
- What happens to atoms that move very slowly?
  - Become a gas
  - Become a solid
  - Freeze to a liquid
  - Turn into new atoms
- What happens when something evaporates?
  - Turns from a liquid to a gas
  - Turns from a solid to a gas
  - Condenses to a solid
  - Melts to a liquid

# ACTIVITY SHEET

Diagram I Scream for Ice Cream Student Instructions

Choose the picture that fits the sentence.

Ice cream starts in the liquid state. It is milk with sugar. Sugar is dissolved in milk.

The ice cream maker whips the liquid. This adds air. Air is in the gas state. Tiny air bubbles makes it fluffy.

The milk freezes now in \_\_\_\_\_ It is \_\_\_\_\_

\_\_\_\_\_ warms up. \_\_\_\_\_ melts. The \_\_\_\_\_ (bubbles) goes \_\_\_\_\_ cream and sugar

# DIRECTIONS

Diagram I Scream for Ice Cream Teacher Instructions

**Materials**

- Student sheets
- Scissors
- Glue

The information presented in this station is a good precursor to 2-ESS2.C. In 2-ESS2.C, students will learn about how water changes state in the water cycle. You may want to review this station, 2-PS1B, with them when you get to 2-ESS2.C.

# READING

Diagram I Scream for Ice Cream Student Instructions

Milk mixed with sugar makes sweet milk. It can become ice cream. To do this, you mix it very fast. You mix it in a special freezer. After 30 minutes, it turns into ice cream. This is how an ice cream maker works.

The ice cream maker is mixing the milk. It puts tiny air bubbles into the milk. This turns it into ice cream. Ice cream and milk are different. They are made of different matter.

Diagram I Scream for Ice Cream Student Instructions

**Matter** is anything that has mass and takes up space. All matter is made of atoms. Atoms are always moving. Some atoms move very fast. This makes them spread far apart. These atoms fill up their container. They are a **gas**.

When atoms move slower, they are closer together. They become a **liquid**.

Some atoms move very slowly. They are very close together. They become a **solid**.

Diagram I Scream for Ice Cream Student Instructions

Changing the temperature of matter changes its state. When you add heat to a solid, it turns to a liquid. The solid **melts** to a liquid.

Liquid can be changed to a solid. This happens when liquid becomes very cold. It freezes and turns into a solid.

When you add heat to a liquid, it turns to a gas. The liquid **evaporates** and becomes a gas.

Diagram I Scream for Ice Cream Student Instructions

Gas can be made cool again. It then turns into a liquid. Gas **condenses** to a liquid when it becomes cool.

These are all examples of **reversible** changes. Reverse means "go back." A reversible change is a change that can go back. It can be undone.

An ice cube melts to water. It can be frozen again. It can go back to being an ice cube.

You are going to see how matter changes state when ice cream is made.

# DIAGRAM STATION

# Read

## Lemonade and Cake

To make lemonade, you need lemons, sugar, and water. First, you squeeze the lemons. Pour the juice into a glass. Next, you add water. Fill the glass to near the top. Then you put sugar in the glass. Stir with a spoon until you can't see the sugar. Now you have lemonade!

When you make lemonade, you make changes. The lemon juice and sugar change in the water. They dissolve in the water.

Some atoms move very slowly. They are close together. These atoms make up **solids**. Sugar is a solid.

Some atoms move a little more. These atoms are farther apart. They make up **liquids**. Water is a liquid.

Some atoms move very fast. They spread far apart. These atoms make up **gases**. Steam is a gas.

Dissolve means to mix with a liquid and become part of it.

Words to Use:  
cake  
liquid  
very slowly  
water  
steam

# Model

## Lemonade and Cake

1. The atoms in sugar move \_\_\_\_\_.

2. The atoms in \_\_\_\_\_ are farther apart from each other.

3. The atoms in \_\_\_\_\_ move very fast, causing them to spread far apart.

4. The atoms in \_\_\_\_\_ move very fast, causing them to spread far apart.

5. Baking a \_\_\_\_\_ is an irreversible change.

6. Cut out the cake pictures. Glue them in order below. This is a reversible / irreversible change (circle one).

7. Cut out the water pictures. Glue them in order below. This is a reversible / irreversible change (circle one).

### #1 Read

#### Lemonade and Cake

What does dissolve mean?

- To mix with a liquid and become part of it
- To add heat and turn into a gas
- To melt from a solid to a liquid
- To not be able to change back

### #2 Read

#### Lemonade and Cake

How do the atoms in sugar move?

- Very fast
- Not at all
- Very slowly
- In between fast and slow

### #3 Read

#### Lemonade and Cake

How far apart are the atoms in water?

- No atoms in water
- Very close together
- As far apart as possible
- Farther apart from each other

### #4 Read

#### Lemonade and Cake

What state of matter is steam?

- Solid
- Gas
- Liquid
- Air

READ

MODEL

# Model

## Changing Matter

Most things are made of matter. Matter is made of atoms. Atoms can be solid, liquid, or gas. These are the three **states of matter**. Atoms always move. They move faster when they are warmer. When atoms cool, they move slower.

Some atoms move very fast. They spread far apart. These atoms make a **gas**. Steam is a gas. The atoms move as far apart as possible.

When gas cools down, the atoms slow down. They move closer together.

# Model

## Changing Matter

The liquid can cool even more. The atoms slow down. They move very little. They become a **solid**. Solid water is ice. A solid does not change shape. An ice cube is square. If it is put in a round glass, it stays square.

# Model

## Changing Matter

Before the Change: Glue the dots in the egg. Show how far apart the atoms are.

The Change: egg cooks

After the Change: The egg becomes \_\_\_\_\_  
Glue the dots on the egg. Show how far apart the atoms are.

### #1 Model

#### Changing Matter

What happens to atoms when they are warmer?

- They freeze.
- They move faster.
- They change to a solid.
- They move more slowly.

### #2 Model

#### Changing Matter

How do gas atoms move?

- Very fast
- Not at all
- Very slowly
- A little faster than solids

### #3 Model

#### Changing Matter

Describe liquids.

- Atoms are close together.
- Atoms move more slowly.
- They take the shape of their container.
- All of the above

### #4 Model

#### Changing Matter

What happens when you cool down a liquid?

- It melts.
- It becomes a gas.
- It becomes a solid.
- The atoms move faster.

READ & MODEL STATION

## Explore Yummy Changes

You can heat up a solid. This will make the atoms move faster. When atoms move faster, they spread out. These atoms make up **liquids**.



When something is liquid, it can change shape. It takes the shape of its container. Milk is in a jug with corners. It is in the shape of the jug. It gets poured into a round glass. Its shape is now the same as the glass.

A liquid can be heated up. This makes the atoms move very fast. Now the atoms spread out as far as possible. These atoms make up **gases**.



When something is a gas, it can change shape. It fills up its container from top to bottom. Air fills a hot air balloon. It pushes out on all sides. Air pushes on the sides until it is filled up.

## Explore Yummy Changes

Have you ever left a chocolate bar in the sun? What happens to it? It becomes a liquid. You can't hold it in your hand any more. Why does this happen? It has to do with atoms that move.



Most things we can see are made of atoms. Even things we cannot see are made of atoms. **Atoms** are the tiny parts that make up matter. They always move.

Some atoms move very slowly. They sit close together. These atoms make up **solids**. When something is solid, it does not change shape. A piece of chocolate is a square. You can put it in a round bowl. It will stay a square shape in the bowl.

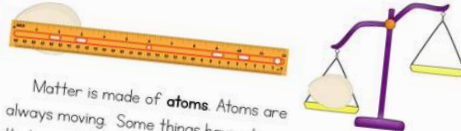


# EXPLORE

## Sort Can It Change Back?

Student Instructions

Ice cream, eggs, leaves, and water seem very different. But they are all made of matter. Matter is anything that takes up space and has mass.



Matter is made of **atoms**. Atoms are always moving. Some things have atoms that move very slowly. These atoms stay close together. They make up **solids**.



If you heat up a solid, the atoms move faster. This makes the atoms spread out more. The solid turns into a **liquid**.



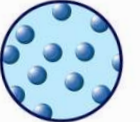
## Sort Can It Change Back?

Student Instructions

Liquids take the shape of their container. An ice cube melts in a glass. It turns into water. The ice cube was square. As a liquid, it is now round. It takes the shape of the round glass.



Liquids can be heated up. When this happens, the atoms in liquids move very fast. They spread out as far as possible. The liquid turns into a **gas**.



Gases take the shape of their container. Air is a gas. When air fills a balloon, all sides push out.



Solid, liquid, and gas are the three **states of matter**. They can change from one state to another. A solid melts to a liquid. A liquid freezes to a solid.

## Explore Yummy Changes

Name: \_\_\_\_\_

Atoms in \_\_\_\_\_ move very slowly.

2. When you heat up a solid, it changes to a \_\_\_\_\_ fill their container from top to bottom.

3. \_\_\_\_\_

4. A reversible change happens when water changes to \_\_\_\_\_

5. An irreversible change is a change that cannot \_\_\_\_\_

solids be undone liquid steam

## Explore Yummy Changes Ice Cream Activity Sheet

Name: \_\_\_\_\_

Before you explore, draw the bowl of ice cream:

After you heat it up, draw the bowl of ice cream:

After you cool it down, draw the bowl of ice cream:

Circle one: \_\_\_\_\_ / irreversible change. (circle one)

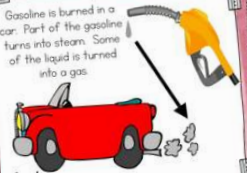
m outside. It is a hot day. His ice cream keeps melting bowl that would help him keep his ice cream frozen.

# SORT

## Sort Can It Change Back?

Student Instructions

Gasoline is burned in a car. Part of the gasoline turns into steam. Some of the liquid is turned into a gas.



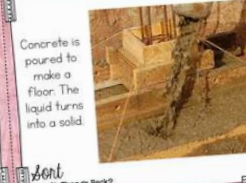
Ice melts and becomes water. The solid turns into liquid.



Chocolate chunks melt to liquid chocolate. The solid turns into liquid.



Concrete is poured to make a floor. The liquid turns into a solid.



Saltwater is dried out. Salt is left behind. A liquid is turned into a solid.



Flour, sugar, and eggs are mixed and cooked. They make waffles. Liquid turns to solid.



## Sort Can It Change Back?

Student Instructions

Many times, these changes are **reversible changes**. Reverse means "go back." A reversible change is a change that can go back. It can turn back into what it used to be.



Sometimes there are changes that are not reversible. These are **irreversible changes**. Ir- means "not." An irreversible change is a change that cannot go back. It cannot be changed back. These things cannot go back to what they used to be.

# EXPORT & SORT STATION

# YOU WILL LOVE THIS BECAUSE



## Hands-On Exploration

Each science center is a mini laboratory. Students touch, mix, and observe. Teachers witness those “aha” moments.



## Aligned with NGSS

These lesson plans aren’t just random; they’re laser-focused on Next Generation Science Standards. No more curriculum guesswork!



## Critical Thinking

Simplifies complex topics with engaging, student-friendly content that helps students grasp the differences between reversible and irreversible changes

# TEACHERS LOVE IT!



*These activities have been great for review. It is so hard to find activities to complete for distance learning and this was a big help.*

**Ashley Faïson**



*This was exactly what I needed! I love the clean looking posters and the station activities were easy to navigate through.  
Thank you!*

**TchrBrowne**

