



Table of Contents

Introduction	3
Lesson: What's Cooking?	4
Fun with Popcorn – Level A	5
Fun with Popcorn – Level B	6
Lesson: Identifying Matter by Sound and Feel	7
Parent Letter for Sound and Feel Containers	9
Sound and Feel Containers List	10
What's Inside the Container? Data Sheet	11
Sound and Feel Answers	12
Lesson: Identifying Matter by Smell	13
Parent Letter for Smell Containers	14
Smell Containers List	15
What's Inside the Container? Data Sheet	16
Lesson: Identifying Matter by Taste	17
Taste Guess List	
Lesson: Identifying Matter by Touch	19
Lesson: From Solid to Liquid	21
The Story of My Ice Cube Data Sheet	22
Lesson: Liquid to Gas	23
What Happened to the Water? Data Sheet	25
Lesson: From Gas to Liquid	26
Lesson: Dance of the Molecules (<i>Demonstration, Lesson, Student Activities</i>)	28
Lesson: Liquid + Solid = Gas	34
Which One Fizzes? Data Sheet	36
What Will Rust?	37
Parent Letter for Rust Test	38
Will This Rust? Data Sheet	39
Lesson: Food + Oxygen = Oxidation	40
Will It Change? Data Sheet	41
Lesson: Chemical Magic	42
Chemical Magic Data Charts	44
Lesson: Tasty Chemical Changes	45
Tasty Chemical Changes Data Chart	47
Teacher and Student Resources	48



Introduction

Everything is made of matter, and all matter occupies space. The amount of matter in an object is called mass. Earth's gravity gives the mass of the object weight. If that object were to go to into space, where there is no gravity, it would lose its weight but not its mass.

The physical properties of certain kinds of matter can be recognised through the senses of touch, sight, smell, taste or hearing. Matter usually exists in three states – solid, liquid and gas. There are four more, rare stages of matter which only exist in extreme high or low temperatures. They are: plasmas, superfluids, superconductors, and Bose–Einstein condensates.

Matter can undergo physical change by changing the temperature. For example, water turns to ice when frozen, this ice melts into water when it gets warm, and then evaporates into vapour (gas) when heated even more.

Matter is made up of chemical elements. It can change chemically, as in the case of cooking, when various matter is combined to produce a cake.

The solid objects we use every day are made up of molecules and crystals. These structures consist of atoms that are linked together. An atom is made up of particles called protons, neutrons and electrons. Protons and neutrons, which make up most of the atom's mass, are composed of pointlike units known as quarks. Scientists have not yet determined if quarks can be broken down into smaller bits. Electrons are also considered to be pointlike. Particles smaller than an atom are called subatomic particles.

Differences in electric charges hold the atom together. Protons have a positive charge, and neutrons are electrically neutral, so the nucleus as a whole is positively charged. Electrons are negatively charged. Because opposite charges attract, an electric force tends to keep the electrons in place.

Electrons whirl around the nucleus in layers called electron shells. The electrons in the outermost shells are not tightly bound to the nucleus. As a result, some outer electrons can be shared by two atoms in a chemical bond, a linking of atoms. The atoms in molecules are bound in this way. Outer electrons can also jump from one atom to another, producing positive and negative ions (charged atoms). Ions can bond to form crystals, such as table salt, which is a crystal consisting of positive sodium ions and negative chloride ions.



The activities in this book allow students to investigate matter through their senses and simple experiments. They learn about the properties of matter and the physical and chemical changes.



What's Cooking?

Teacher Information

The senses of sight, smell, touch, taste and hearing are investigated in this lesson. Students participate in a fun activity that introduces them to the study of matter. They learn to identify popcorn through the use of their senses. They describe their experiences and document their observations as they learn about the properties of popcorn. Students will conclude that the physical properties of certain matter can be recognised by their senses.

Overview: *Students investigate the physical properties of popcorn.*

Materials

- popcorn maker
- Fun with Popcorn Level A and B data sheets (pages 5 and 6)

Lesson Preparation

- Begin to make popcorn so it will be well underway as the students enter the classroom.

Activity

1. As students enter the classroom they should smell but not see the popcorn being made. Have them get seated and then use the following questions to discuss the popcorn with them.
 - How do you know popcorn is being made? (*the smell and popping sound*)
 - What do you use to smell the popcorn? (*nose*)
 - How is the smell of popcorn reaching your nose? (*through the air*)
 - What do you use to hear the popcorn popping? (*ears*)
 - How is the sound of the popping reaching your ears? (*also through the air*)
2. Show them the popcorn and then ask how they can be sure it is popcorn. (*They can see it.*)
3. Ask them what they use to see the popcorn. (*eyes*)
4. List the senses on the board beside the part of the body used for that sense.
5. Have the students tell you what other senses they could use to be sure this is popcorn (*taste and feel or touch*). Add these to the list of senses and parts of the body.
6. Distribute popcorn, asking each student to take one piece, feel it, and then describe how it feels to a partner.
7. Have students chew the popcorn slowly before swallowing. Let them describe the taste to a partner.

Closure

- Distribute Level A or Level B data sheet to each student according to ability. Let the students complete the data sheet to summarise the use of their senses which helped them investigate the properties of popcorn.