

At A Glance

Learning Intentions	Materials Are Everywhere	Natural Or Man-Made?	Waterproof Or Waterlogged?	Use Your Senses	Let's Go Green!	Constructing A Birdfeeder	Sources Of Energy	Energy From The Sun	Food Energy	Energy Use & Conservation	Force And Motion	The Friction Effect!	Magnetic Force	Let's Get Magnetized!	Exploring The Poles	Primary & Secondary Colors	Let's Get Painting
Knowledge and Understanding Content																	
• become familiar with the physical properties of materials	•	•	•	•	•												
• make connections between material properties and their function	•	•	•	•		•											
• identify and describe materials that make up objects and structures as supporting frameworks						•											
• identify sources of energy							•			•							
• demonstrate an understanding that the sun provides light and heat energy								•									
• demonstrate an understanding that people get energy from food and release energy									•								
• demonstrate that different forces can change speed or direction of a moving object											•						
• identify and describe the effects of friction on the motion of objects over different surfaces												•					
• demonstrate and describe the effects of magnets on different materials													•	•			
• determine the orientation of magnet poles and demonstrate the attraction or repelling of poles															•		
• identify and evaluate methods for creating color																•	•
• describe color and evaluate its application to different materials																	•
Thinking Skills and Investigation Process																	
• make predictions, formulate questions, and plan an investigation	•		•		•	•	•	•		•	•	•	•	•	•	•	•
• gather and record observations and findings using drawings, tables, written descriptions	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•
• recognize and apply safety procedures in the classroom	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Communication																	
• communicate the procedure and conclusions of investigations using demonstrations, drawings, and oral or written descriptions, with use of science and technology vocabulary	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Application of Knowledge and Skills to Society and the Environment																	
• plan and carry out a course of action to minimize waste in the environment					•	•											
• identify ways to reduce personal energy consumption										•							
• identify forces and motion in the immediate environment and the world											•	•					



Table of Contents

At a Glance™	2
Table of Contents	3
Teacher Assessment Rubric	5
Student Self-Assessment Rubric	6
Introduction	7
Materials Are Everywhere	
Teacher Notes	8
Student Activities	9
Natural Or Man-Made?	
Teacher Notes	11
Student Activities	12
Waterproof Or Waterlogged?	
Teacher Notes	17
Student Activities	18
Use Your Senses	
Teacher Notes	21
Student Activities	22
Let's Go Green!	
Teacher Notes	27
Student Activities	28
Constructing A Birdfeeder	
Teacher Notes	31
Student Activities	32
Sources Of Energy	
Teacher Notes	34
Student Activities	36
Energy From The Sun	
Teacher Notes	40
Student Activities	41
Food Energy	
Teacher Notes	46
Student Activities	47
Energy Use And Conservation	
Teacher Notes	49
Student Activities	50





Table of Contents

Force And Motion

Teacher Notes	52
Student Activities	53

The Friction Effect!

Teacher Notes	58
Student Activities	60

Magnetic Force

Teacher Notes	65
Student Activities	66

Let's Get Magnetized!

Teacher Notes	71
Student Activities	72

Exploring The Poles

Teacher Notes	78
Student Activities	79

Primary And Secondary Colors

Teacher Notes	85
Student Activities	86

Let's Get Painting

Teacher Notes	90
Student Activities	91





Student's Name: _____ Date: _____

Teacher Assessment Rubric

Success Criteria	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding Content				
Demonstrate an understanding of the concepts, ideas, terminology definitions, procedures and the safe use of equipment and materials	Demonstrates limited knowledge and understanding of the content	Demonstrates some knowledge and understanding of the content	Demonstrates considerable knowledge and understanding of the content	Demonstrates thorough knowledge and understanding of the content
Thinking Skills and Investigation Process				
Develop hypothesis, formulate questions, select strategies, plan an investigation	Uses planning and critical thinking skills with limited effectiveness	Uses planning and critical thinking skills with some effectiveness	Uses planning and critical thinking skills with considerable effectiveness	Uses planning and critical thinking skills with a high degree of effectiveness
Gather and record data, and make observations, using safety equipment	Uses investigative processing skills with limited effectiveness	Uses investigative processing skills with some effectiveness	Uses investigative processing skills with considerable effectiveness	Uses investigative processing skills with a high degree of effectiveness
Communication				
Organize and communicate ideas and information in oral, visual, and/or written forms	Organizes and communicates ideas and information with limited effectiveness	Organizes and communicates ideas and information with some effectiveness	Organizes and communicates ideas and information with considerable effectiveness	Organizes and communicates ideas and information with a high degree of effectiveness
Use science and technology vocabulary in the communication of ideas and information	Uses vocabulary and terminology with limited effectiveness	Uses vocabulary and terminology with some effectiveness	Uses vocabulary and terminology with considerable effectiveness	Uses vocabulary and terminology with a high degree of effectiveness
Application of Knowledge and Skills to Society and Environment				
Apply knowledge and skills to make connections between science and technology to society and the environment	Makes connections with limited effectiveness	Makes connections with some effectiveness	Makes connections with considerable effectiveness	Makes connections with a high degree of effectiveness
Propose action plans to address problems relating to science and technology, society, and environment	Proposes action plans with limited effectiveness	Proposes action plans with some effectiveness	Proposes action plans with considerable effectiveness	Proposes action plans with a high degree of effectiveness





Name: _____

Date: _____

Student Self-Assessment Rubric

Put a check mark (✓) in the box that best describes you:

	Always	Almost Always	Sometimes	Needs Improvement
• I am a good listener.				
• I followed the directions.				
• I stayed on task and finished on time.				
• I remembered safety.				
• My writing is neat.				
• My pictures are neat and colored.				
• I reported the results of my experiment.				
• I discussed the results of my experiment.				
• I know what I am good at.				
• I know what I need to work on.				

1. I liked _____

2. I learned _____

3. I want to learn more about _____



Introduction

The activities in this book have two intentions: to teach concepts related to physical science and to provide students the opportunity to apply necessary skills needed for mastery of science and technology curriculum objectives.

Throughout the experiments, the scientific method is used. The scientific method is an investigative process which follows five steps to guide students to discover if evidence supports a hypothesis.

1. Consider a question to investigate.

For each experiment, a question is provided for students to consider. For example, "Does direct sunlight affect water temperature?"

2. Predict what you think will happen.

A hypothesis is an educated guess about the answer to the question being investigated. For example, "I believe that direct sunlight warms up the temperature of water." A group discussion is ideal at this point.

3. Create a plan or procedure to investigate the hypothesis.

The plan will include a list of materials and a list of steps to follow. It forms the "experiment."

4. Record all the observations of the investigation.

Results may be recorded in written, table, or picture form.

5. Draw a conclusion.

Do the results support the hypothesis? Encourage students to share their conclusions with their classmates, or in a large group discussion format.

The experiments in this book fall under seventeen topics that relate to four aspects of physical science: **Materials, Objects, and Building Things; Energy in Our Lives; Force and Motion; and Creating Color.** In each section you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted. Suggestions for differentiation are also included so that all students can be successful in the learning environment.

Assessment and Evaluation:

Students can complete the Student Self-Assessment Rubric in order to determine their own strengths and areas for improvement. Assessment can be determined by observation of student participation in the investigation process. The classroom teacher can refer to the Teacher Assessment Rubric and complete it for each student to determine if the success criteria outlined in the lesson plan has been achieved. Determining an overall level of success for evaluation purposes can be done by viewing each student's rubric to see what level of achievement predominantly appears throughout the rubric.





Materials Are Everywhere

Learning Intention:

Students will learn about the physical properties of matter and make connections between material properties and function.

Success Criteria:

- identify the different types of materials that objects are made from
- make a prediction and investigate what materials some objects in the classroom are made from
- gather, record, and sort the data in a chart
- make conclusions about the materials used to make objects
- make connections to the environment

Materials Needed:

- a small object made of each material (paper, plastic, glass, wood, metal, rubber, stone, foam, fabric)
- a copy of “Materials Are Everywhere” worksheet 1 and 2 for each student
- pencils

Procedure:

1. Introduce to students, the different material types that objects can be made from by showing examples of different objects that are made of paper, plastic, glass, wood, metal, rubber, stone, foam, or fabric.
2. Instruct students to make a prediction about what materials they think they will find the most in their classroom, and record this on their worksheet by circling their choice in the Word Box on worksheet 1. Next, students will explore and record in the chart, some objects in their classroom and the material each object is primarily made from.
3. Using worksheet 2, guide students to make observations about their findings by instructing them to sort and classify their data in the graph. Students will then make conclusions about the data in their graphs.

Differentiation:

Slower learners may benefit by focusing on making a list of only three different types of materials (e.g. plastic, wood, metal) and locating objects in the classroom that are made of only those determined materials.

For enrichment, faster learners can identify an object in their chart that could be made of a different material, then choose a different material and design what this object would look like if it was made out of the material of their choosing.



Materials Are Everywhere

All objects are made of materials. Some examples of materials are paper, plastic, glass, wood, metal, rubber, stone, foam, and fabric. Objects made of these materials are everywhere. Let's investigate some objects in the classroom to see what materials were used to make them.

Let's Predict ???

Which material do you think you will find the most in your classroom? Circle your answer in the Word Box.

Word Box				
paper	glass	metal	stone	fabric
plastic	wood	rubber	foam	

Let's Investigate 🔍

In the chart, make a list of some objects in your classroom. Then, using words from the Word Box, tell what materials the objects are made of.

OBJECT	MATERIAL
book	paper
desk legs	



Which objects in your chart could be made of a different material?

Let's Observe 

Look at the list of materials in your chart. Place an "X" in the right column of the graph below for every time the material was used.

metal	paper	plastic	wood	rubber	glass	foam	fabric	stone

Let's Conclude 

What material is used most often in your classroom?

Do you think using this material helps the environment?



Let's Get Painting!

Learning Intention:

Students will learn to describe colors and work with different materials to create, modify, and apply color.

Success Criteria:

- investigate and describe how to get different thicknesses of paint
- describe and compare the adherence of paint to different surfaces
- record observations in drawings and through written descriptions
- make conclusions about color modification and application

Materials Needed:

- Styrofoam plates or aluminum trays
- paint brushes and paint of any color
- sheets of white paper and newspaper
- pieces of white fabric (at least two for each student)
- plastic containers (at least one for each student)
- beets, cut in half (one half needed for each student)
- white cotton t-shirts (one for each student)
- elastic bands, large stir sticks, rubber gloves
- different colors of fabric dye (Tintex dye) and pails of water to dye t-shirts in
- a copy of "Let's Get Painting" worksheet 1 and 2 for each student
- a copy of "Painting Different Surfaces" worksheet 3 and 4 for each student
- a copy of "Fun With Color!" worksheet 5 and 6 for each student
- pencils

Procedure:

1. Explain to students that they are going to investigate what happens when water is added to paint. Read through the list of what materials are needed and what to do sections on worksheet 1. Students will conduct the investigation, record observations, and make conclusions about the effects of different thicknesses of paint on worksheet 2.
2. Explain to students that the next experiment will be to investigate how well paint adheres to different surfaces such as paper, fabric, and plastic. Read through the question, materials needed, and what to do sections on worksheet 3. Students will conduct the investigation, then record observations and conclusions on worksheet 4.
3. Give students a cut beet and piece of white fabric to experiment with. They will blot the beet onto the fabric to create a design, then draw their observations on worksheet 5.
4. Read through tie dyed t-shirt instructions on worksheet 6 with the students. Have fun and be creative!

Differentiation:

Slower learners may benefit by pairing up with a peer to make and record observations for the investigations. Having a list of descriptive words related to color and texture, posted as reference for vocabulary while completing that task would be a further accommodation.

For enrichment, faster learners could explore with paint further by testing its adherence to other surfaces such as wood, cardboard, or metal.



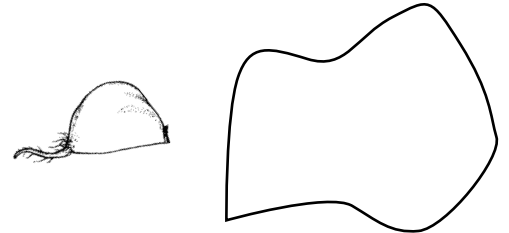


Fun With Color!

Color can be found in some vegetables. Vegetable dye is a natural way to add color to fabric. Let's investigate this idea!

MATERIALS NEEDED

- a beet cut in half
- a piece of white cotton fabric



WHAT TO DO

1. Place the beet (cut side down) onto the white fabric. Continue to blot it on your piece of fabric so that it makes a design.
2. Record your observations by drawing what you created.

Let's Observe

This is a picture of the design I created on my piece of fabric.

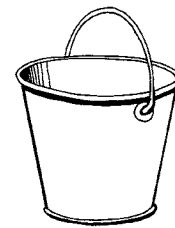
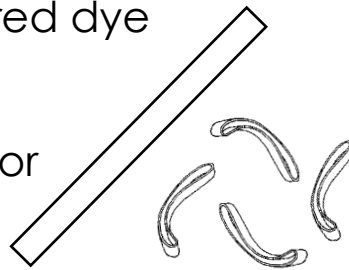
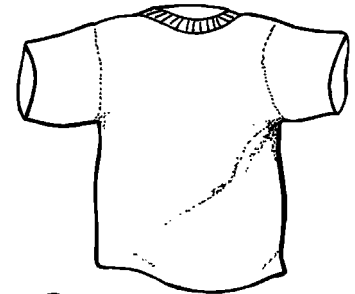


Fun With Color!

We've learned a lot about color, now let's get really creative and make a colorful tie dyed t-shirt!

MATERIALS NEEDED

- a white cotton t-shirt
- elastic bands
- pails of water (one for each color of dye)
- packages of different colored dye
- large stir sticks
- rubber gloves
- newspaper to cover the floor



WHAT TO DO

1. Wring sections of the t-shirt and tie them with elastic bands.
2. Prepare dye according to package directions. Be sure to wear rubber gloves to protect your hands! Use a large stir stick to stir the dye in the pail.
3. Place the t-shirt in the dye for 20 minutes.
4. Remove the t-shirt from the dye and let it sit on newspaper for a day.
5. The next day, untie all the elastic bands to see your colorful creation!
(The shirt may be a little damp, so hang it to dry).