

Investigating Water

TABLE OF CONTENTS

ABOUT DELTA SCIENCE MODULES

Program Introduction	iii
Teacher's Guide	iv
Delta Science Readers	vi
Equipment and Materials Kit	vii
Scope and Sequence	viii
Assessment Features	ix
Process Skills	x
Communicating About Science	xi
Integrating the Curriculum	xii
Meeting the Standards	xiii
What We Believe	xiv

INVESTIGATING WATER OVERVIEW

About Investigating Water	1
Overview Charts	
Hands-on Activities	2
Delta Science Reader	4
Science Background	5
Materials List	7

HANDS-ON ACTIVITIES

Activity Summary	9
Schedule	10
Preparing for the Activities	
Classroom Management	11
Advance Preparation	11
Materials Management	12
Activities	
1. Properties of Water	13
2. Water Drops	21
3. Climbing Water	27
4. What Shape Is Water?	35

5. Sink or Float?	41
6. Making Bubbles	47
7. What Dissolves in Water?	55
8. Thick and Thin	63
9. Water as Ice	71
10. Where Does Water Go?	81
11. Water Out of Nowhere	89
12. Cleaning Water	95

Assessment

Activities 1–12	101
-----------------------	-----

Glossary	107
-----------------------	-----

DELTA SCIENCE READER

Overview	109
Before Reading	110
Guide the Reading	111
After Reading	115

TEACHER RESOURCES

References and Resources	117
Science Safety	119
Standards Correlations	121

COPYMASTERS

Student Activity Sheets	
Assessment Activity Sheets	
Assessment Summary Chart	
School-Home Connection	



About **Investigating Water**

DeltaScienceModules, THIRD EDITION

Students explore water, the most abundant substance on Earth, using many tools and techniques, so be prepared for splashes and spills. After using their senses to determine some of water's properties, students pour, mix, filter, and freeze water. They watch water climb, bubble, condense, and take different shapes. They learn how to use pipets and wire wands, vials, and funnels, becoming familiar with scientific procedures and equipment. Experimental setups and trials help your water detectives operationally define such scientific vocabulary as *sink*, *float*, *dissolve*, and *evaporate*. They also compare water to other liquids and experiment with filtering muddy water.

In the Delta Science Reader *Investigating Water*, students read about the properties of water. They learn that water can exist as a solid, a liquid, or a gas and find out how water changes from one state to another. They observe that objects either sink or float in water and that some substances dissolve in water. They also read about scientists who study glaciers in Antarctica. Finally, students discuss the importance of water to living things and ways to conserve water.

Overview Chart for Hands-on Activities

Hands-on Activity	Student Objectives
1 Properties of Water <i>page 13</i>	<ul style="list-style-type: none"> • discuss rules for working with water • use their senses to explore water • describe some properties of water
2 Water Drops <i>page 21</i>	<ul style="list-style-type: none"> • use a pipet to make water drops • describe the shape of water drops • discover that water drops tend to stick together
3 Climbing Water <i>page 27</i>	<ul style="list-style-type: none"> • observe water moving up a paper towel • explain how water is able to travel up a paper towel • apply what they learned to a new situation in which celery pulls water up its length
4 What Shape Is Water? <i>page 35</i>	<ul style="list-style-type: none"> • observe that water flows downhill • experiment with pouring water from one container to another • observe and draw the shape of water in different containers • explain how water is able to flow through a funnel
5 Sink or Float? <i>page 41</i>	<ul style="list-style-type: none"> • operationally define <i>sink</i> and <i>float</i> • predict and observe whether objects float or sink • discover why an object is more likely to float, or more likely to sink
6 Making Bubbles <i>page 47</i>	<ul style="list-style-type: none"> • compare plain and soapy water • blow bubbles using a traditional bubble wand • examine bubble behaviors • predict and observe the shape of bubbles blown with oddly shaped wands
7 What Dissolves in Water? <i>page 55</i>	<ul style="list-style-type: none"> • operationally define <i>dissolve</i> • predict whether or not substances will dissolve in water • observe and describe what happens when different substances are mixed with water
8 Thick and Thin <i>page 63</i>	<ul style="list-style-type: none"> • compare the rate at which drops of water and drops of liquid detergent run down paper • compare the rate at which objects fall through columns of water and columns of liquid detergent • infer that some liquids are thicker than others
9 Water as Ice <i>page 71</i>	<ul style="list-style-type: none"> • predict what will happen to water when it is put in the freezer • observe that water expands when frozen • examine the effect of heat on the melting process
10 Where Does Water Go? <i>page 81</i>	<ul style="list-style-type: none"> • observe water streaks disappear from the board • predict what will happen to cups of water left standing for a week • operationally define <i>evaporation</i> • compare the rates of evaporation from covered and uncovered cups and in warm and cool temperatures • infer that water enters the air when it evaporates
11 Water Out of Nowhere <i>page 89</i>	<ul style="list-style-type: none"> • observe moisture collecting on the outside of an ice-filled plastic cup • infer that the water that forms during condensation comes from the air • describe conditions that cause condensation
12 Cleaning Water <i>page 95</i>	<ul style="list-style-type: none"> • compare different ways to clean muddy water • construct a water filter to clean a water sample • determine which filter works best
Assessment <i>page 101</i>	<ul style="list-style-type: none"> • See page 101.

Investigating Water

Process Skills	Vocabulary	Delta Science Reader
communicate, observe, compare	properties	pages 2–3
observe, infer		pages 2–3
observe, infer	absorb	
predict, experiment, use variables, observe, communicate	shape	pages 2–3
predict, observe, define based on observations, classify	float, sink	page 12
compare, observe, predict	bubble	
define based on observations, predict, observe	dissolve	page 13
compare, experiment, infer		page 12
predict, observe, infer	expand, freeze, ice, melt	pages 4–5, 6–7, 8–9, 14
define based on observations, predict, observe, infer, compare	evaporation	pages 4–5, 10–11
observe, infer, communicate	condensation	pages 10–11
compare, make and use models, observe	filter	page 15

See the following page for the Delta Science Reader Overview Chart.

Overview Chart for Delta Science Reader

Investigating Water

Selections	Vocabulary	Related Activity
Think About...		
What Is Water? <i>page 2</i>	flow, water, wet	Activities 1, 2, 4
Water Can Change <i>page 4</i>	gas, liquid, solid	Activities 9, 10, 11
Water Can Freeze <i>page 6</i>	freeze optional: temperature	Activity 9
Water Can Melt <i>page 8</i>	melt	Activity 9
Water Can Evaporate <i>page 10</i>	evaporate, water vapor	Activities 10, 11
What Sinks? What Floats? <i>page 12</i>	float, sink	Activities 5, 8
What Dissolves in Water? <i>page 13</i>	dissolve	Activity 7
People in Science		
• Ice Scientists <i>page 14</i>		Activity 9
Did You Know?		
• We Need Water <i>page 15</i>		Activity 12

See pages 109–116 for teaching suggestions for the Delta Science Reader.

ACTIVITY SUMMARY

In this Delta Science Module, students are introduced to the many characteristics and properties of water. Students are fascinated by this familiar liquid they thought they knew so much about!

ACTIVITY 1 Students explore water using a variety of materials, including straws, cups, and tongue depressors. Using these tools, students describe some properties of water—how it feels, smells, sounds, and looks.

ACTIVITY 2 Students are introduced to the high degree of cohesion of water. Students learn that water drops have their own characteristic shape and observe how water drops like to “stick” together. By comparison, students find that it is difficult to divide water drops in two.

ACTIVITY 3 Students learn that water can be absorbed by some materials. Students find that not only do paper towels absorb water, but water can actually flow up a paper towel. Students use this knowledge to explain how the leaves of a celery stalk turned red after the stalk had been sitting in red water for a few hours.

ACTIVITY 4 Students pour water from one container into another. In doing so, they learn that water pours easily. Students also learn that water, or any liquid, does not have its own shape. Instead, water takes the shape of its container.

ACTIVITY 5 Students investigate the dynamics of floating and sinking. Students predict and then test which among an assortment of objects will sink and which will float. They also begin to appreciate the two forces that determine whether an object will sink or float: the downward force of the object’s weight against the water and the upward push of the water against the object.

ACTIVITY 6 Students compare the properties of plain and soapy water. Students then use bubble wands to make bubbles and investigate their behavior and properties.

ACTIVITY 7 Students test whether or not different solids dissolve in water. Students also observe that some of the properties of water change when something is dissolved in it.

ACTIVITY 8 Students learn that different liquids have different thicknesses. Using two different techniques, they compare the thicknesses of water and dishwashing detergent.

ACTIVITY 9 Students learn that water exists as both a liquid and a solid. They learn that water expands when it freezes and see what factors will speed up the melting process.

ACTIVITY 10 Students study the process of evaporation by observing how water disappears out of an open cup over time. Students also conduct an experiment to investigate factors that speed up the rate of evaporation.

ACTIVITY 11 Students discover that the water that appears on the outside surface of a cup of ice water comes from the air. After defining the term condensation, students learn the conditions under which condensation occurs.

ACTIVITY 12 Students observe two simple ways to filter muddy water. They construct their own filter and use it to “clean” a sample of muddy water. Students are then challenged to explain why their filter worked.