Marvelous Explorations through Science and Stories ® (MESS)

http://eclkc.ohs.acf.hhs.gov/hslc

Welcome to the webinar! Today we are going to describe an exciting early childhood science resource called Marvelous Explorations through Science and Stories, also known as MESS.

I am Betty Dunckel and I am Shari Ellis. Together we will walk you through this introduction to MESS.

Agenda

- What is MESS?
- Why science in early childhood education?
- What is good early childhood science?
- How does MESS work?
- Investigating Science
- Conclusion
- Q & A

Our presentation today will take a look at what MESS is and the importance of integrating science into early childhood. We will discuss some good practices of early childhood science, and talk about how MESS works. We will then look at the *Investigating Water Teacher's Guide* and review some of the components of the Guide. You may have already downloaded a copy of this Guide from the ECLKC for reference. After our conclusion, we will open it up for any questions or comments you may have.

What is *MESS?*

Science-centered curriculum enhancement

What is MESS? Where did it originate? Where is it available?

MESS is a flexible resource designed to help teachers incorporate more science into their classrooms. It offers an approach that research shows best supports the development of science understanding and process skills. This approach may be applied to any area of science children may be interested in. This practical tool suggests topics or questions to be investigated, materials, books, integrated experiences, and ways to engage families.

MESS was developed by the Florida Museum of Natural History at the University of Florida in partnership with local Head Start programs and two public library systems in Florida.

Funded by the Administration for Children & Families as a Head Start Innovation and Improvement Project in 2004, it is available as a free resource on the ECLKC.

Visit ECLKC website to access this video

Cozette White, Head Start Center Director, describes the opportunities she sees for science.

Why Focus on Science In Early Childhood?

- Young children are already engaged in science!
- Children learn best when we intentionally create appropriate learning environments.
- Adults play a key role as facilitators of children's early explorations.

Why is it important to focus intentionally on science in early childhood?
One reason is that young children are already engaged in scientific explorations. Science is about understanding the world and how it works. From the first days of life, infants are engaged in making sense of the world around them. And, of course, some basic science understandings develop naturally as children interact with the world around them. But children are most likely to develop deep understanding of science ideas and use science skills proficiently when adults intentionally create learning environments that support the development of those ideas and skills.

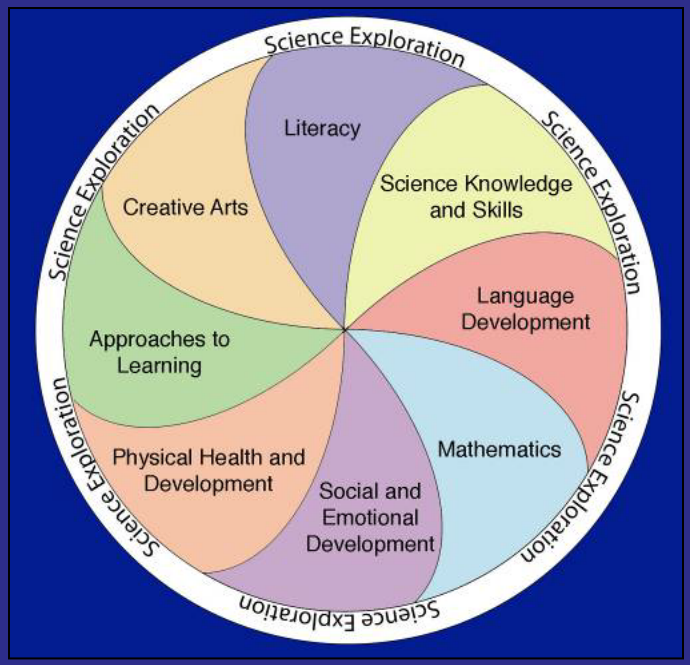
Science Skills Are Useful In Many Situations

Science process skills include:

- Using the senses to learn
- Observing
- Classifying
- Investigating
- Predicting
- Sharing ideas and discoveries with others

Another reason that science is important in early childhood is that the thinking skills used in science are also useful in many situations outside of science. These thinking skills—also called science process skills—include using the senses to learn, observe, classify, investigate, make predictions, and discuss one's ideas and discoveries with others.

Science Supports Development Across Domains



Yet another reason that science is important in early childhood is that science supports the development of skills across many domains.

Visit ECLKC website to access this video

Head Start Center Director, Cozette White, describes how science engages children.

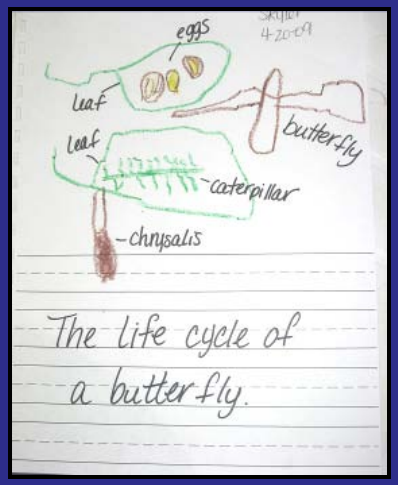
Science Fosters Language Development

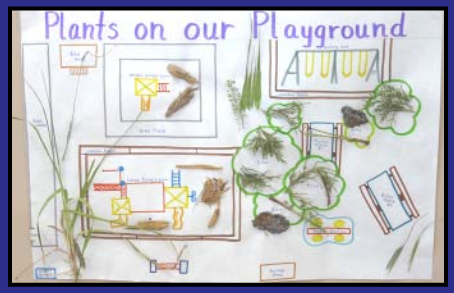
- Science talk includes sophisticated vocabulary, extended conversations, and references beyond the immediate “here and now.”
- These are all associated with vocabulary growth and later reading comprehension.

One of the original goals of MESS was to increase children’s school readiness by fostering the development of language and literacy skills because science involves sophisticated vocabulary, extended conversations, and discussions beyond the immediate “here and now.”

Both sophisticated vocabulary and extended conversations are associated with vocabulary growth and reading comprehension.

Science Supports Literacy Development





Science also provides many opportunities to support the development of children's literacy skills. MESS science explorations often begin or end by referring to books.

Science lends itself well to shared writing. And asking children to represent their ideas and discoveries in drawings and journals fosters the development of early writing skills and science understanding. Investigations also involve the use of other representational tools such as maps and models.

Science Supports Social Emotional Development

Because science is also a social activity, science supports the development of social and emotional skills as children learn to share materials, work together, wait their turns, and participate in discussions.

Science Fosters Curiosity, Persistence, and Motivation To Learn

Science explorations foster positive attitudes toward learning and dispositions that have long-lasting impacts on success in school and beyond. These include curiosity, persistence in solving problems, and motivation to learn more.

Visit ECLKC website to access this video

Teri Harper, Head Start Education Manager, describes her observations of children in MESS classrooms.

Why is Science So Often Neglected?

- Teacher discomfort and uncertainty
- Fear and anxiety
- Inappropriate models of science
- Lack of appropriate resources

Given the importance of science in early childhood, why is science so often neglected?

Our work suggests that it is not a lack of interest. Most teachers are interested in doing science with young children and report that they enjoy the science that they already do. But, teachers also express some anxiety about science. Some of this anxiety reflects a basic fear of science—perhaps based on prior school experiences. Other teachers are concerned that they do not know how to teach science well. This latter concern may stem from inaccurate models of what science should look like in early childhood. Teachers may think that science with young children should look like the science they did in school. This "lecture" model does not work well with older students, and it surely is not appropriate with young children. Or, they may equate science with whiz bang demonstrations such as chemical reactions that make everyone go "ah" and overlook the everyday opportunities for science that already exist in their classrooms.

Why is Science So Often Neglected? (cont.)

Another obstacle to good science in early childhood may be lack of resources. There are many books teachers can turn to for activities—not to mention the internet—but these resources typically do not help teachers understand the science behind the activities. Moreover, the activities are generally not placed in a broader context needed to help teachers understand how to set the stage for the activity through either books, conversation, or prior explorations. Similarly, there is little attention given to how to follow-up after the activities with books, discussion, or by doing further investigations or integrating the ideas throughout the curriculum.

Visit ECLKC website to access this video

Ann Crowell, Director, Head Start and Preschool Education, Alachua County, describes some of the background work that helped her teachers better incorporate science into their classrooms. Elba Carrillo, a Head Start teacher in Marion County, describes her experiences.

How Can *MESS* Help?

- Targets appropriate areas of exploration
- Provides background information
- Identifies books and materials
- Suggests ways to approach science questions

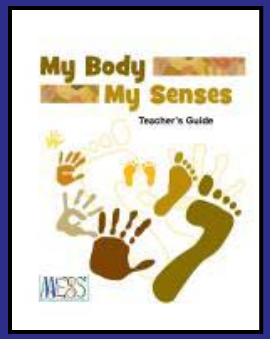
So, how can MESS help? MESS is designed to increase teacher comfort with science and to improve the quality of science in the classroom. We will discuss this in more detail in a moment, but briefly—MESS helps teachers select questions to explore. MESS also provides background information to help teachers facilitate children's explorations. MESS recommends books and materials to support science, and suggests ways to approach each question.

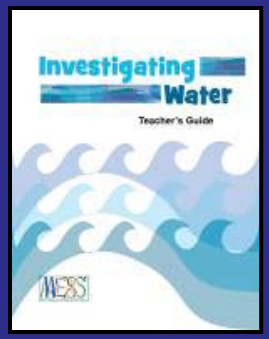
Development of *MESS*

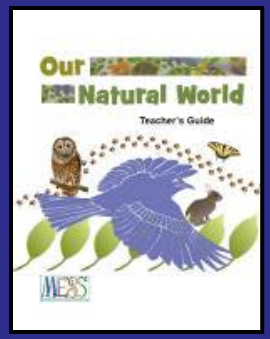
- Field-tested in over 80 classrooms
- Funded since 2001 by grants from government agencies and private foundations
- 2004 Head Start Innovation and Improvement Project (IIP), Administration for Children and Families
- Recipient of Head Start Region IV Family Literacy Award and National Head Start Family Literacy Award in 2006

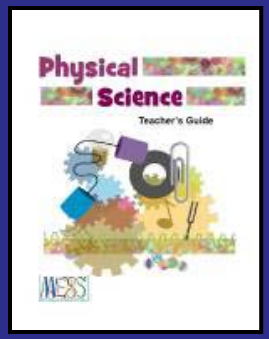
MESS has been in development for 9 years, 3 of them as an IIP. It has been field-tested in over 80 Florida Head Start classrooms and informed by classroom observations, teacher workshops, and interviews with teachers, education coordinators/curriculum specialists, and parents. These efforts have been made possible by funding from both government agencies and private foundations, and we gratefully acknowledge that support. We are very pleased that MESS is also the recipient of two family literacy awards.

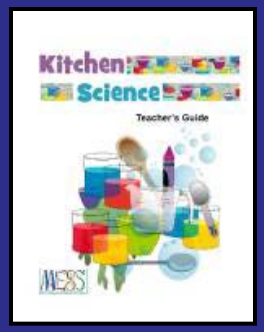
MESS Resources

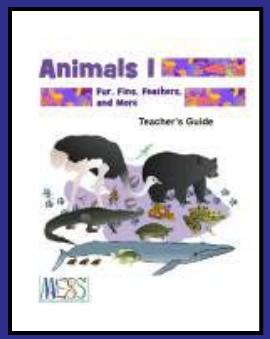


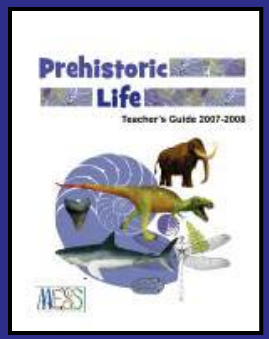


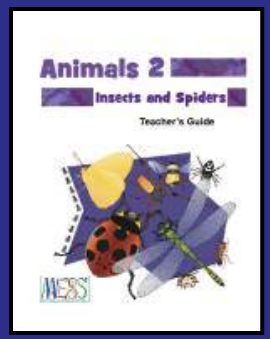


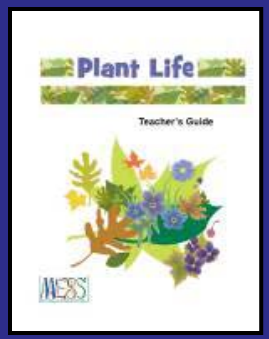












What science topics does MESS cover?

As you can see, we have developed MESS materials for nine science topics and an Introduction Guide to MESS to provide additional information about why science is important during early childhood, how science can support learning in many domains, ways adults can foster children's interests and understanding of science, things to consider when selecting science books, and more. The MESS resources are *My Body/My Senses*, *Investigating Water*, *Our Natural World*, *Physical Science*, *Kitchen Science*, *Animals 1: Fur, Fins, Feathers, and More*, *Prehistoric Life*, *Animals 2: Insects and Spiders*, and *Plant Life*.

Criteria for *MESS* Resources

- Is the science topic of interest to young children?
- Is the topic developmentally appropriate for preschoolers?
- Does the topic support in-depth exploration?
- Are there high-quality books available to support exploration of the topic?
- Does the topic support science inquiry or object-based learning?

Several criteria were used to select the Mess topics. They include:

Is the science topic of interest to young children?

- We initially selected a larger set of topics in consultation with our local Head Start teachers.
- With our IIP funding, we focused our efforts on this smaller set of topics.

Criteria for *MESS* Resources (cont.)

Is the topic developmentally appropriate for preschoolers?

Does the topic support in-depth exploration?

Are there high-quality books available to support exploration of the topic?

Does the topic support science inquiry or object-based learning?

- As a museum-based program, we were interested in selecting topics for which objects could be used to enrich children's study.

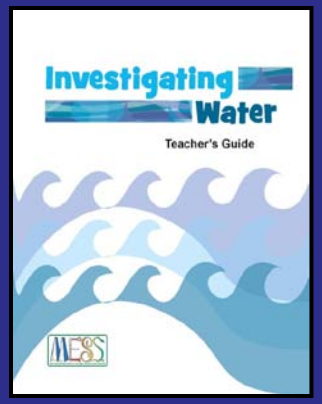
- For example, one topic that was in our initial set because of teacher interest was "Space." We chose not to further develop those materials because space is a difficult concept for preschoolers to understand, there are few quality age-appropriate books available on the topic, and it is pretty difficult to engage in hands-on exploration of space!

Early Childhood Learning and Knowledge Center (ECLKC)
http://eclkc.ohs.acf.hhs.gov/hslc

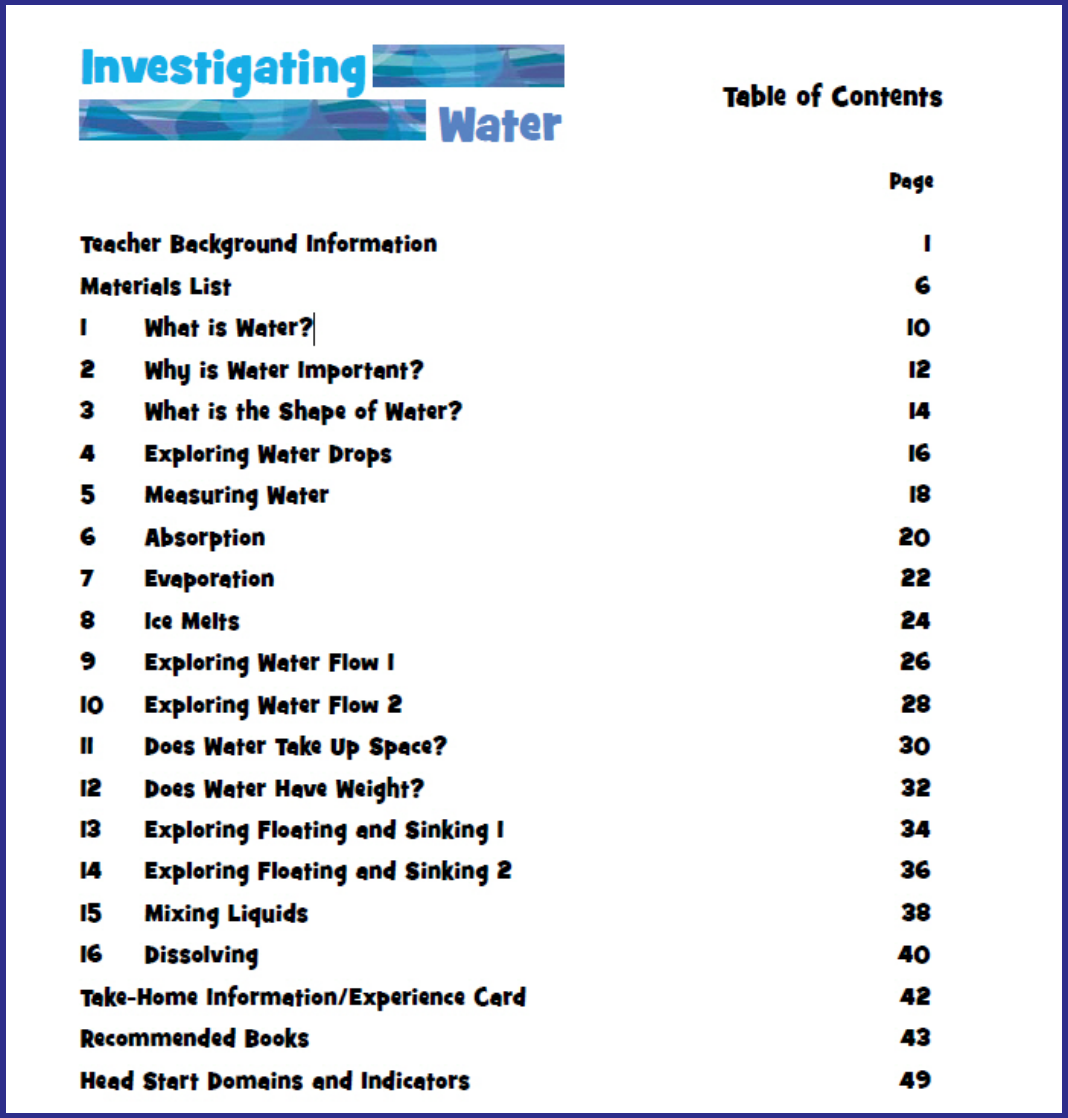
The MESS Teacher's Guides for each of the 9 science topics are available on the ECLKC, along with other documents listing materials and books that we recommend to support MESS and other science experiences.

We are very pleased that the MESS resources will be available nationally. We have already received positive comments about the three Guides that are currently available on the ECLKC.

Investigating Water



One of the currently available Teacher's Guide is *Investigating Water*. You may find it helpful to follow along with your printed copy. We will go through that Teacher's Guide to identify the key components. It is our goal for you to have a clear understanding of the Guide so that you can adapt this and other science resources to your particular situations.



Investigating Water

Table of Contents

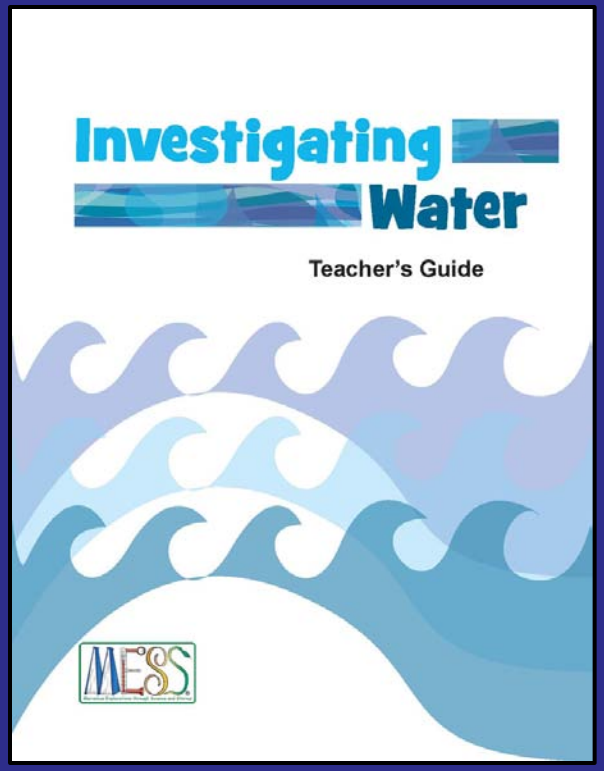
A glance at the Table of Contents reveals a couple important points.

One is that the MESS resources do not include all possible experiences, or totally unique experiences. We describe many experiences that teachers probably already include in their classrooms such as exploring melting or floating and sinking. We embed these experiences in a more in-depth exploration of the science topic over time. This allows teachers and children to focus on important science concepts in depth, link those concepts together, and provide opportunities for children to review and practice using new knowledge and skills before the teacher moves on to another science topic. Children can apply their learning as they explore new topics.

Teacher's Guide Format

Background Information
Materials List
Core Experiences
- ✓ Aim
- ✓ Science Concept
- ✓ Vocabulary
- ✓ Approach
- ✓ Extensions
- ✓ Science Center
- ✓ Integrated Experiences

Take-Home Experience
Recommended Books
Head Start Domains and Indicators
from the Child Outcomes Framework



Each of the nine MESS Teacher's Guides has the same format and key components. We are going to use the *Investigating Water Teacher's Guide* to individually highlight the components.

Visit ECLKC website to access this video

Two teachers describe how they use the Guides to prepare before working with their children.

Teacher Background Information

Investigating Water

Teacher Background Information

What is the focus of this Kit?
This Kit focuses on the properties of water and its importance for all living things. Experiences in this Kit offer children opportunities to explore how liquid water moves and interacts with other materials, and how water can change its shape and form.

What science concepts are covered in this Kit?
- We learn about our world by observing, questioning, investigating, describing, and discussing our findings.
- We use tools to collect data and extend our senses.
- All living things need water.
- Water takes the shape of its container.
- Water clings to itself.
- Water behaves differently on different surfaces.
- Water changes its form reversibly.
- Water flows.
- Water takes up space.
- Water has weight.
- Some objects float in water and some objects sink.
- Some things mix with water and other things do not.

What can I do to support children's explorations?
Children have been learning by playing with water for as long as we can remember. We now know, however, that adults can help children explore water more productively by:
- designing a stimulating environment,
- focusing attention,
- asking questions to guide exploration,
- encouraging children to express their ideas in words and drawings,
- helping make connections between actions and results,
- showing enthusiasm, and
- modeling curiosity.

1

Investigating Water

What are the properties of water?

Water flows. One property of **liquid** water is that it flows. Because of gravity, water naturally flows down, but it can be made to move upward—as when we suck on a straw–if enough force is applied.

Water clings to itself. Water **molecules** are attracted to one another. This attraction is called **cohesion**. To observe this attraction, squeeze small drops of water onto wax paper. As you pull the drops closer together, they will merge into one larger drop. This larger drop will resist being divided. If you gently press on the drop with your finger, it will flatten but it will not break.

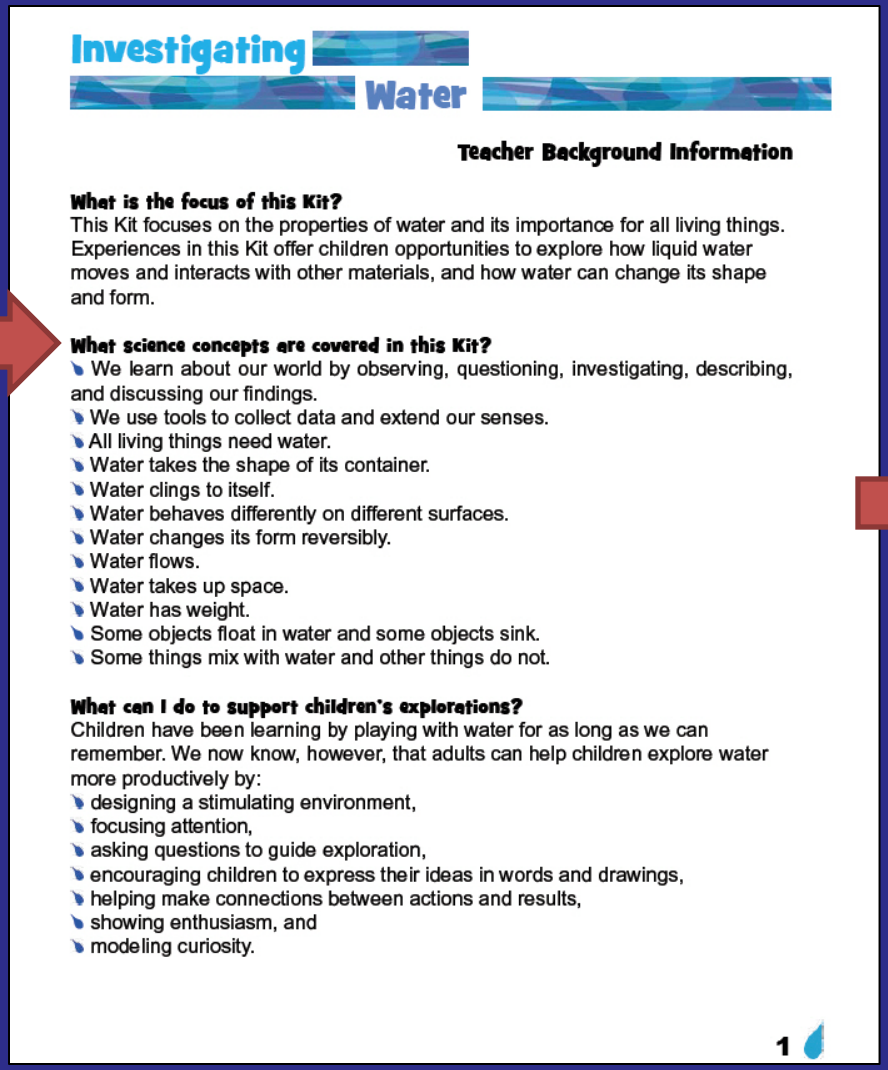
Surface tension results from the attraction among water molecules at the surface. Surface tension creates a skin-like barrier between air and the water molecules below. You can observe surface tension by pouring water into a glass until it is very full. If you look carefully, you will see a dome over the rim of the glass. Surface tension keeps the water from spilling over. The surface tension of water is strong enough to support insects travelling on top of the water. Soap and oil weaken surface tension by reducing the strength of the attraction between water molecules.

Water behaves differently on different surfaces. **Adhesion** is the attraction of water molecules to other materials. Water is more strongly attracted to some materials than others, depending on their composition. When water sticks to something such as a paper towel, the drops are pulled apart. This is the property of water that makes things wet. Another property of water is that it can move into other materials. Water is readily absorbed by materials that have a lot of air pockets to hold the water. Dry materials also absorb more water than things that are already wet.

Water changes its form reversibly. Water is found in three forms—**solid**, **liquid**, and **gas**. Because water in its gaseous state is invisible, this form of water is difficult for young children to comprehend. They can, however, observe **evaporation**, the process that changes water into a gas. This process requires heat. Heat makes the water molecules move apart and break free of the bonds that hold them together, resulting in a gas. The warmer the water, the more quickly it will evaporate.

2

Now let's examine the Teacher Background Information section included in each MESS Teacher's Guide.



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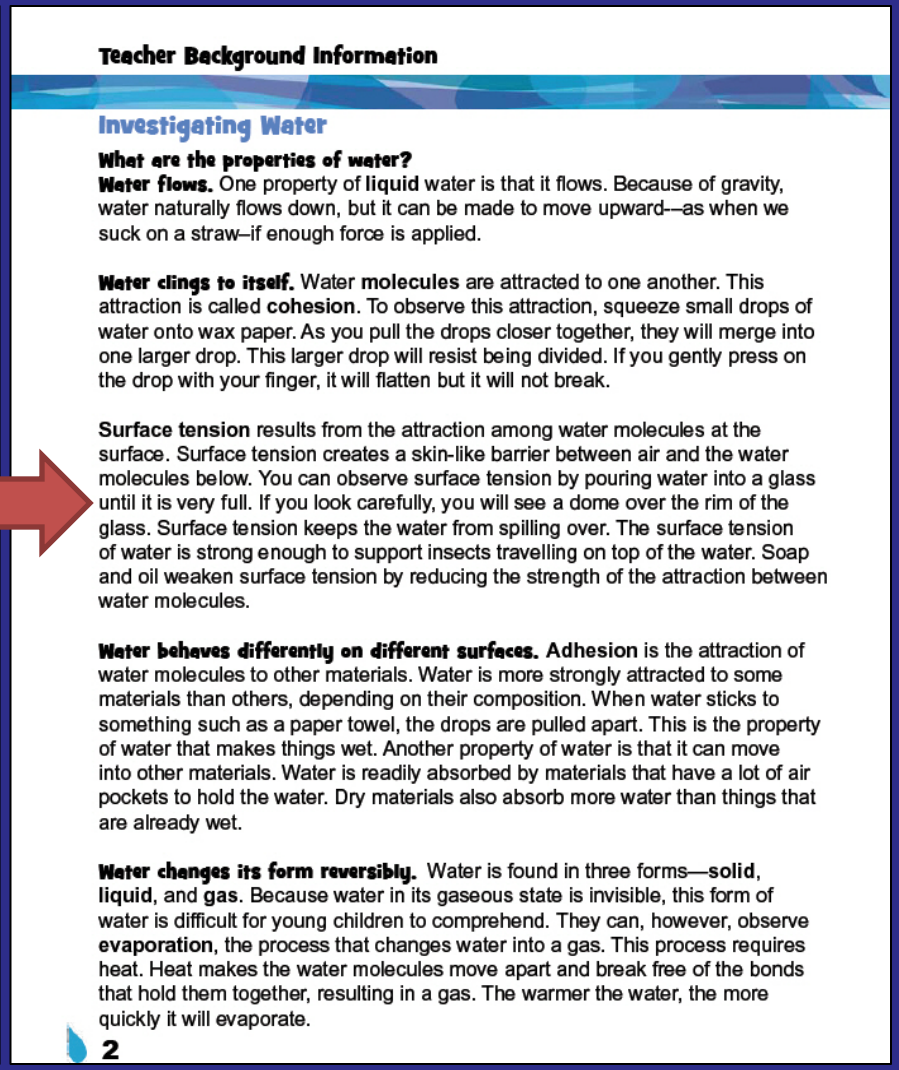

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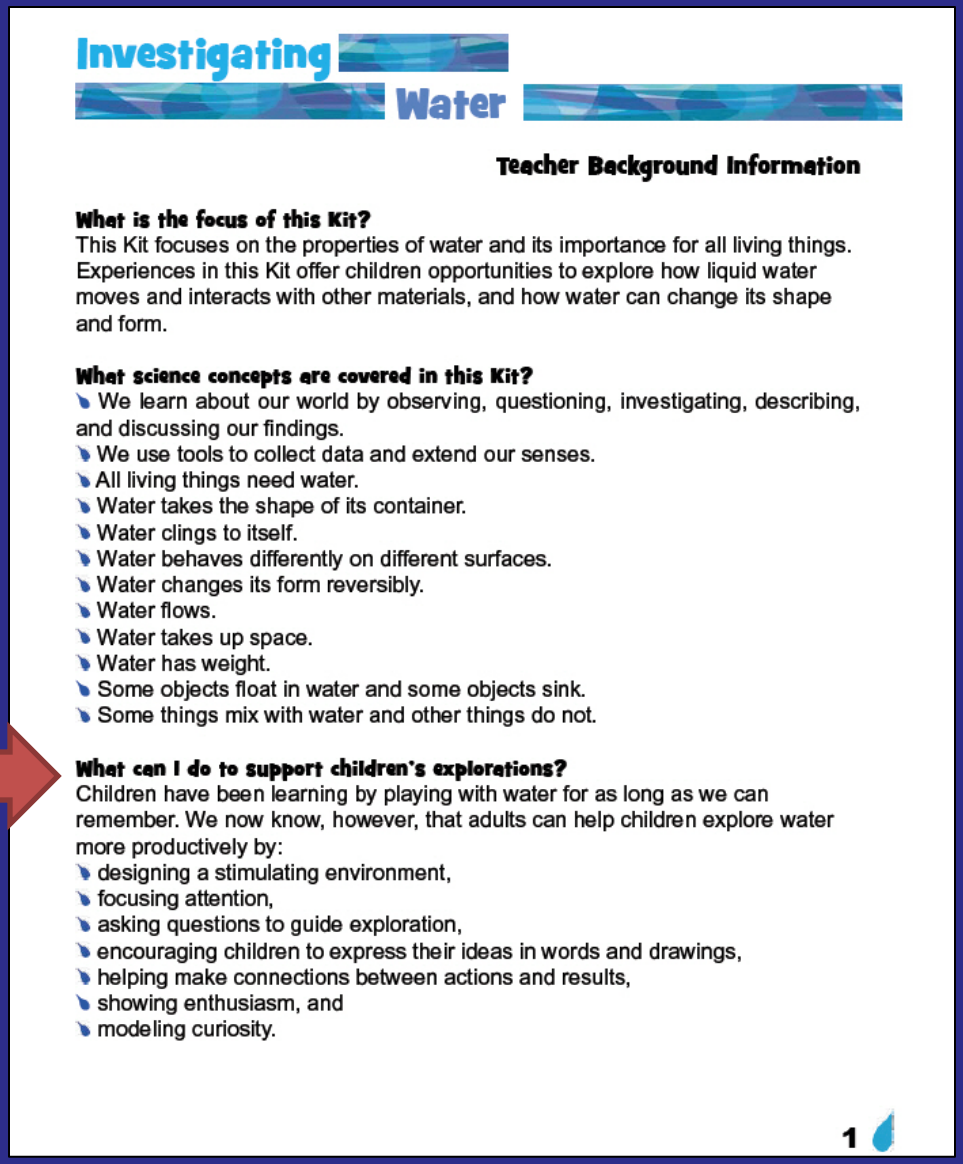
2

- In this section, the science concepts are listed. There are usually five concepts, but some topics—such as water—involve more.
  These concepts were identified after extensive review of the National Science Teachers Association standards (NTSA) and state science early learning standards.



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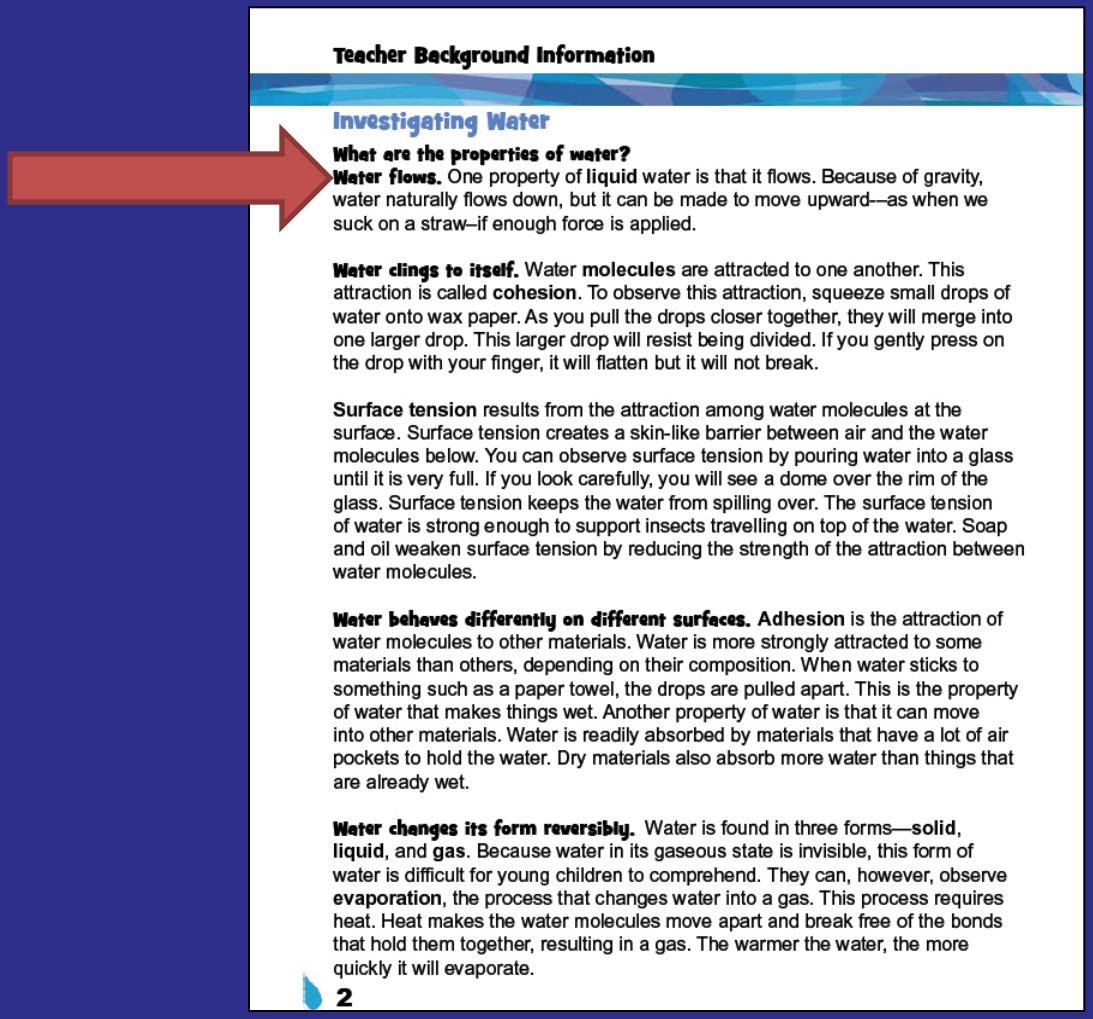
The background also includes specific suggestions for effective strategies for approaching each topic in the classroom.



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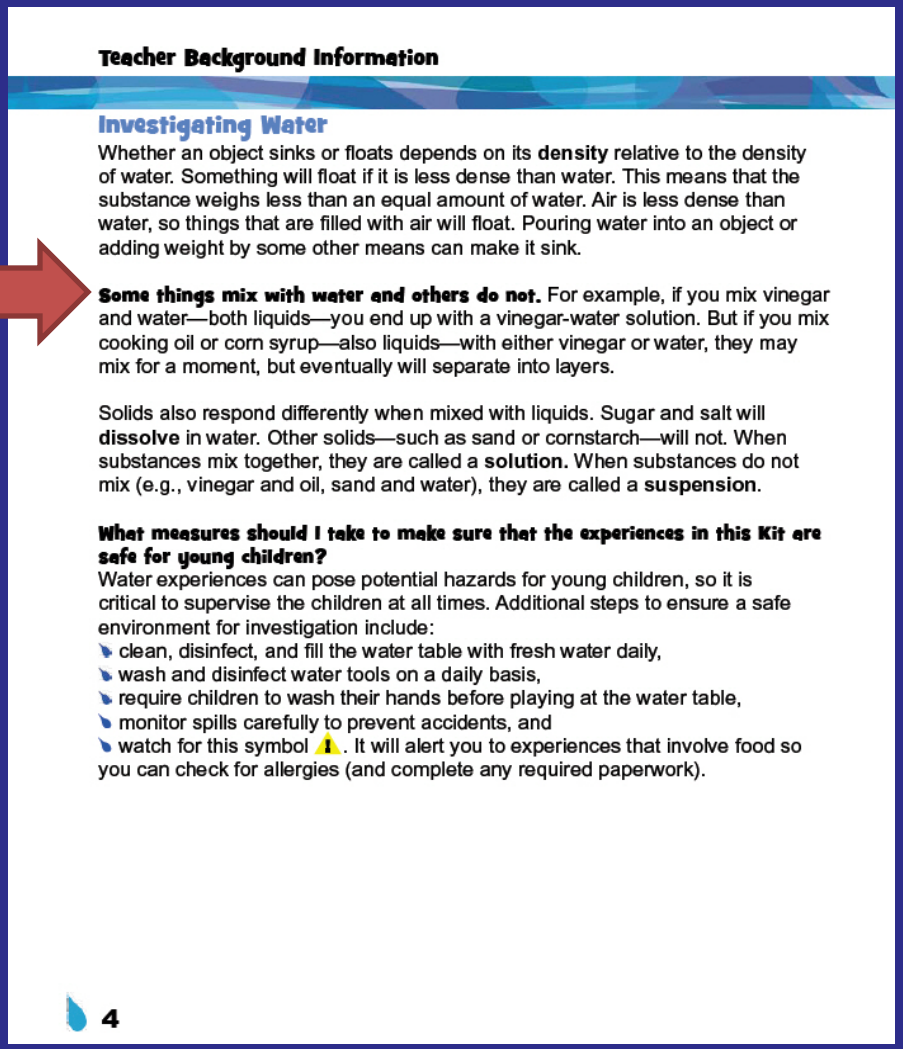
2

This section provides an overview of the science content covered. We provide enough information so a teacher can feel confident and comfortable.

- Since it would be impossible to anticipate all the questions that might arise as the children and teacher explore together, we did not try to cover all areas comprehensively. Teacher feedback indicates that most often the background information is enough to get teachers started.

Teacher Background (cont.)



Teacher Background Information

Investigating Water

Whether an object sinks or floats depends on its **density** relative to the density of water. Something will float if it is less dense than water. This means that the substance weighs less than an equal amount of water. Air is less dense than water, so things that are filled with air will float. Pouring water into an object or adding weight by some other means can make it sink.

Some things mix with water and others do not. For example, if you mix vinegar and water—both liquids—you end up with a vinegar-water solution. But if you mix cooking oil or corn syrup—also liquids—with either vinegar or water, they may mix for a moment, but eventually will separate into layers.

Solids also respond differently when mixed with liquids. Sugar and salt will **dissolve** in water. Other solids—such as sand or cornstarch—will not. When substances mix together, they are called a **solution.** When substances do not mix (e.g., vinegar and oil, sand and water), they are called a **suspension.**

What measures should I take to make sure that the experiences in this Kit are safe for young children?

Water experiences can pose potential hazards for young children, so it is critical to supervise the children at all times. Additional steps to ensure a safe environment for investigation include:

- clean, disinfect, and fill the water table with fresh water daily,
- wash and disinfect water tools on a daily basis,
- require children to wash their hands before playing at the water table,
- monitor spills carefully to prevent accidents, and
- watch for this symbol ⚠. It will alert you to experiences that involve food so you can check for allergies (and complete any required paperwork).

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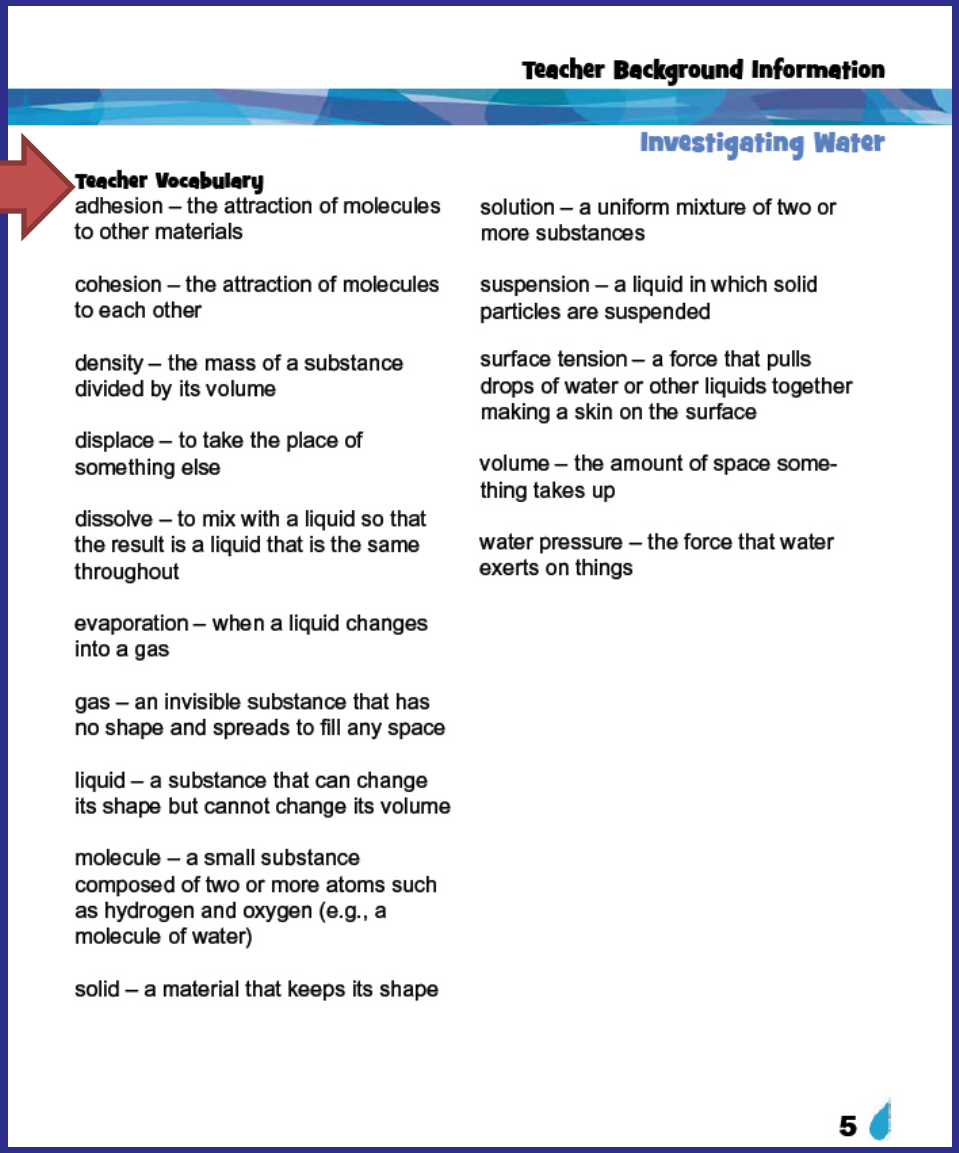
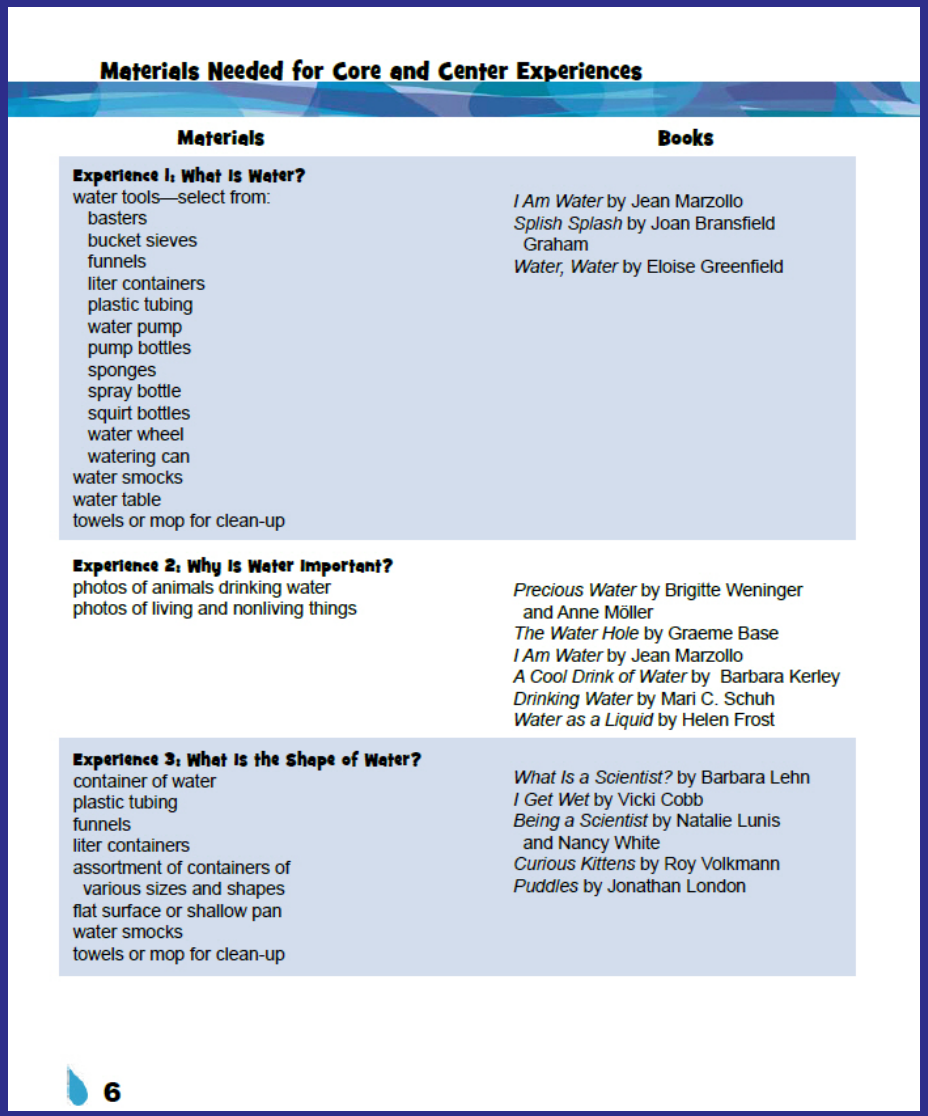
When appropriate, safety concerns are addressed. These recommendations are based on professional practices suggested by the National Association for the Education of Young Children (NAEYC) and other organizations such as the National Science Teachers Association (NSTA).



Definitions are included to help teachers understand our background information, as well as other sources of information such as books or websites. The vocabulary list is not intended to be taught to children, but we did want to help teachers use words correctly when appropriate.

Materials List



Materials Needed for Core and Center Experiences

Materials	Books
Experience 1: What Is Water?	
water tools—select from:	*I Am Water* by Jean Marzollo
basters	*Splish Splash* by Joan Bransfield Graham
bucket sieves	*Water, Water* by Eloise Greenfield
funnels	
liter containers	
plastic tubing	
water pump	
pump bottles	
sponges	
spray bottle	
squirt bottles	
water wheel	
watering can	
water smocks	
water table	
towels or mop for clean-up	
Experience 2: Why Is Water Important?	
photos of animals drinking water	*Precious Water* by Brigitte Weninger and Anne Möller
photos of living and nonliving things	*The Water Hole* by Graeme Base
	I Am Water by Jean Marzollo
	A Cool Drink of Water by Barbara Kerley
	Drinking Water by Mari C. Schuh
	Water as a Liquid by Helen Frost
Experience 3: What Is the Shape of Water?	
container of water	*What Is a Scientist?* by Barbara Lehn
plastic tubing	*I Get Wet* by Vicki Cobb
funnels	*Being a Scientist* by Natalie Lunis and Nancy White
liter containers	*Curious Kittens* by Roy Volkmann
assortment of containers of various sizes and shapes	*Puddles* by Jonathan London
flat surface or shallow pan	
water smocks	
towels or mop for clean-up	

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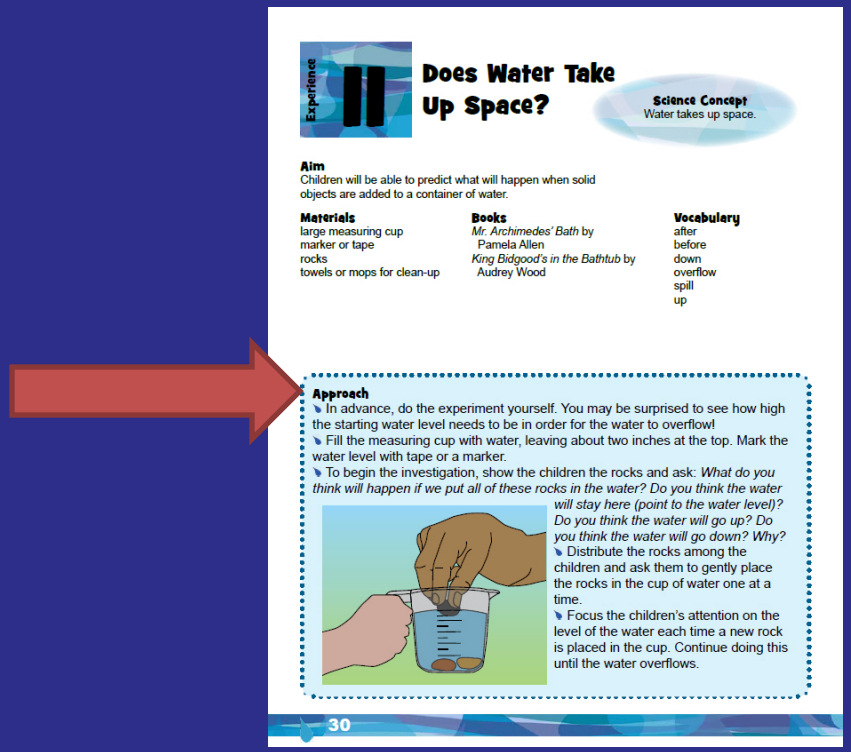
Each Guide includes a Materials List. It names recommended materials and books for each experience.

Teachers report that it is very easy to look at this list, gather what is needed, review or explore the materials on their own, and be ready to implement the experience in the classroom.

Core Experiences:
Aim & Science Concept



Experience 11

Does Water Take Up Space?

Science Concept
Water takes up space.

Aim
Children will be able to predict what will happen when solid objects are added to a container of water.

Materials
large measuring cup
marker or tape
rocks
towels or mops for clean-up

Books
Mr. Archimedes' Bath by Pamela Allen
King Bidgood's in the Bathtub by Audrey Wood

Vocabulary
after
before
down
overflow
spill
up

Approach

- In advance, do the experiment yourself. You may be surprised to see how high the starting water level needs to be in order for the water to overflow!
- Fill the measuring cup with water, leaving about two inches at the top. Mark the water level with tape or a marker.
- To begin the investigation, show the children the rocks and ask: *What do you think will happen if we put all of these rocks in the water? Do you think the water will stay here (point to the water level)? Do you think the water will go up? Do you think the water will go down? Why?*

- Distribute the rocks among the children and ask them to gently place the rocks in the cup of water one at a time.
- Focus the children's attention on the level of the water each time a new rock is placed in the cup. Continue doing this until the water overflows.

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The descriptions of each experience have several important features.
One feature is what we call "Aim." You could also think of this as "Goal" or "Learning Objective." Aim explains the main point of the experience. Sometimes, as in this case, it targets specific behaviors or understanding. So, we hope that children who explore water displacement will, over time, come to understand that whenever solid objects are placed in a container of water, the level of water will rise. We feel that by clearly noting the point of the experience, teachers will more effectively focus children's attention on the key elements, ask more meaningful questions, and offer more helpful explanations. It is entirely possible to have a group of children enjoy the process of dropping rocks into a container of water and leave with no explicit understanding of the science that happened. We want to make teaching more intentional.

Extension

Repeat the procedure using other materials such as pennies or marbles, or even materials that float.

Integrated Experiences

Literacy: Help the children record their observations in their journals using illustrations and words, or create a class log on a large sheet of paper.

Math: During the experiment, have the children count the rocks as they are added or removed from the container.

- Explain that the water overflowed because the rocks took up space where the water once was.
- Now ask: *What will happen to the level of the water if we take the rocks out of the cup?* Have the children remove the rocks one by one, focusing the children's attention on the water level. Explain that the water level goes down because the water is moving in where the rocks were before.

Science concepts are listed and addressed in each experience. These are always related to the "Aim," but are sometimes abstract. And, we don't expect children to come away from the experience saying "Water takes up space."

Core Experiences: Vocabulary

Experience 13

Exploring Floating and Sinking I

Science Concept
Some objects float in water and some objects sink.

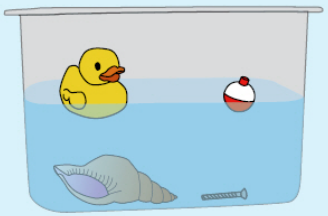
Aim
Children will investigate floating and sinking.

Materials
materials for charting results
floating and sinking collection
ship photo
clear container of water

Book
10 Little Rubber Ducks by Eric Carle
The Puddle by David McPhail
Ducky by Eve Bunting

Vocabulary
ball, block, bobber, bolt, cork, crayon, egg, float, key ring, rubber duck, shell, sink, washer

Approach
- In advance, prepare a chart to record the results of the investigation.
- Begin this experience by explaining that you are going to spend several days exploring floating and sinking. Select an object to demonstrate what it means to float. Explain that float means that something stays at the top of the water. Then demonstrate what it means to sink. Explain that things that go to the bottom sink.



- Encourage the children to share their ideas about floating and sinking. Ask: *What can you think of that sinks or goes to the bottom in the bathtub? Can you think of anything that floats or stays at the top of the water?*
- Select an object and ask: *Do you think this will float at the top of the water or sink to the bottom?* Encourage the children to explain why.
- Record on the chart whether the

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Extension
Explore floating and sinking with other objects found in the classroom.

Literacy 1: Help the children record their observations in their journals using words and pictures, or create a class log on a large sheet of paper.

Literacy 2: Create a classroom display depicting different types of boats. Label and illustrate with photographs or the children's drawings.

Creative Arts 1 (Dramatic Play): Place cardboard boxes large enough to sit in, tubes to serve as oars, something heavy to be an anchor, and other props in the dramatic play area to encourage pretend play around a "boat" theme.

Creative Arts 2 (Art): Provide an assortment of materials (e.g., styrofoam trays, small pieces of wood) and encourage the children to make and decorate boats.

Creative Arts 3 (Music and Movement): Have the children sing "Row, Row, Row Your Boat."

- Present the remaining objects one by one and ask the children to predict whether the object will sink or float. Encourage them to explain their thinking.
- When you have finished testing all of the items, sort them into groups of things that float and those that sink.
- Talk about the features that things that sink or float have in common. Show the children the photo of the ship and explain that all heavy things do not sink. The ship is heavy, but the weight is spread out over a large space.

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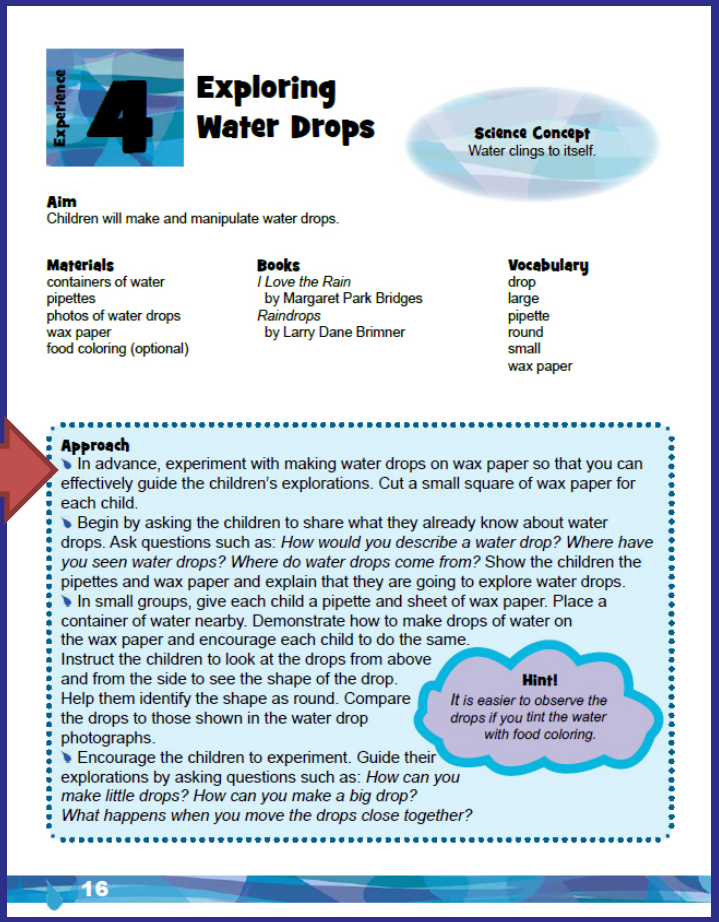
Each experience includes suggested vocabulary, although this always depends on how a teacher approaches the experience and what the children bring to the interaction.

Core Experiences: Approach



Experience 4

Exploring Water Drops

Science Concept
Water clings to itself.

Aim
Children will make and manipulate water drops.

Materials
containers of water
pipettes
photos of water drops
wax paper
food coloring (optional)

Books
I Love the Rain
by Margaret Park Bridges
Raindrops
by Larry Dane Brimner

Vocabulary
drop
large
pipette
round
small
wax paper

Approach

- In advance, experiment with making water drops on wax paper so that you can effectively guide the children's explorations. Cut a small square of wax paper for each child.
- Begin by asking the children to share what they already know about water drops. Ask questions such as: *How would you describe a water drop? Where have you seen water drops? Where do water drops come from?* Show the children the pipettes and wax paper and explain that they are going to explore water drops.
- In small groups, give each child a pipette and sheet of wax paper. Place a container of water nearby. Demonstrate how to make drops of water on the wax paper and encourage each child to do the same. Instruct the children to look at the drops from above and from the side to see the shape of the drop. Help them identify the shape as round. Compare the drops to those shown in the water drop photographs.
- Encourage the children to experiment. Guide their explorations by asking questions such as: *How can you make little drops? How can you make a big drop? What happens when you move the drops close together?*

Hint!
It is easier to observe the drops if you tint the water with food coloring.

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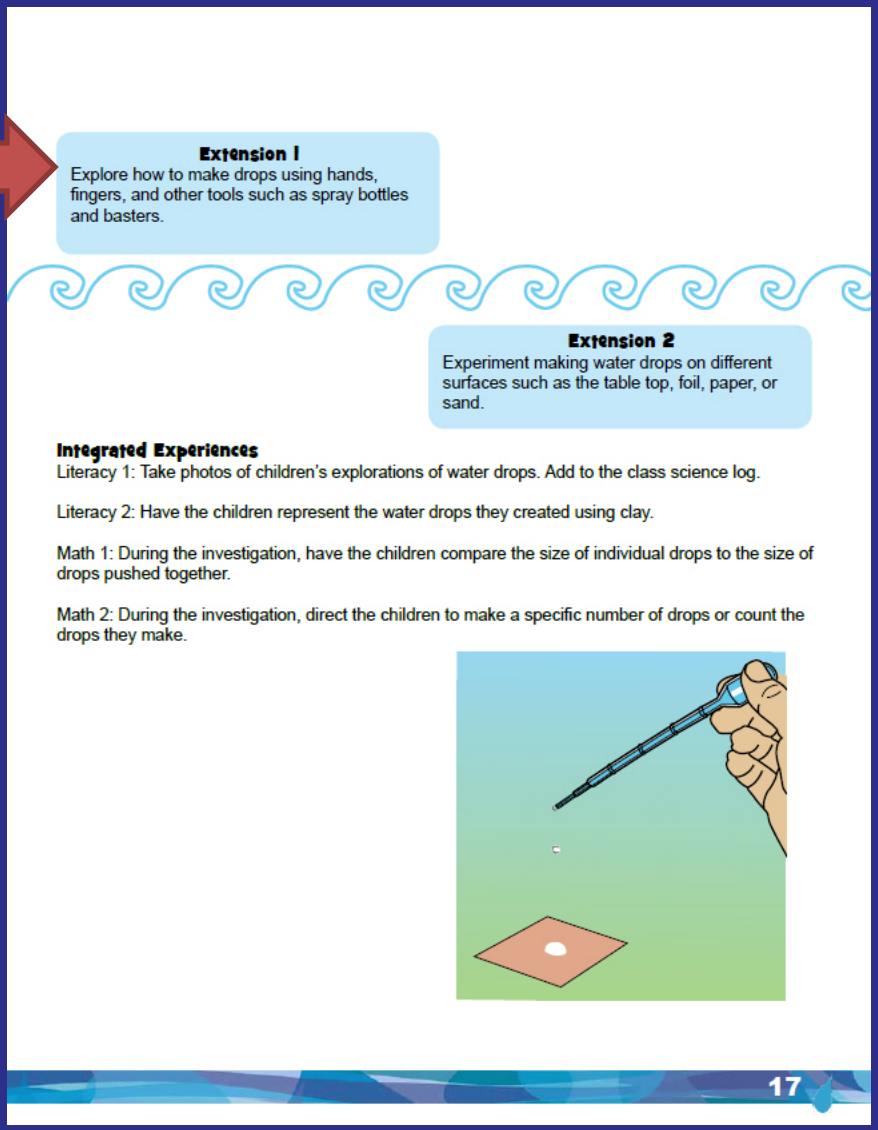
The Approach suggests one way to do the experience. The Approach is based on our field-testing of the experiences, classroom observation of the experiences in action, and teacher feedback.

In each Approach, we remind teachers to review what the children have already learned or to link the experience to children's prior knowledge, ask open-ended questions, and again, do some kind of review at the end.

We do not want teachers to use the Approach as a script! We hope teachers will review the Approach, explore the materials and read the book in advance, and think about how the experience would unfold best in their particular situation.



Extension 1
Explore how to make drops using hands, fingers, and other tools such as spray bottles and basters.

Extension 2
Experiment making water drops on different surfaces such as the table top, foil, paper, or sand.

Integrated Experiences

Literacy 1: Take photos of children's explorations of water drops. Add to the class science log.

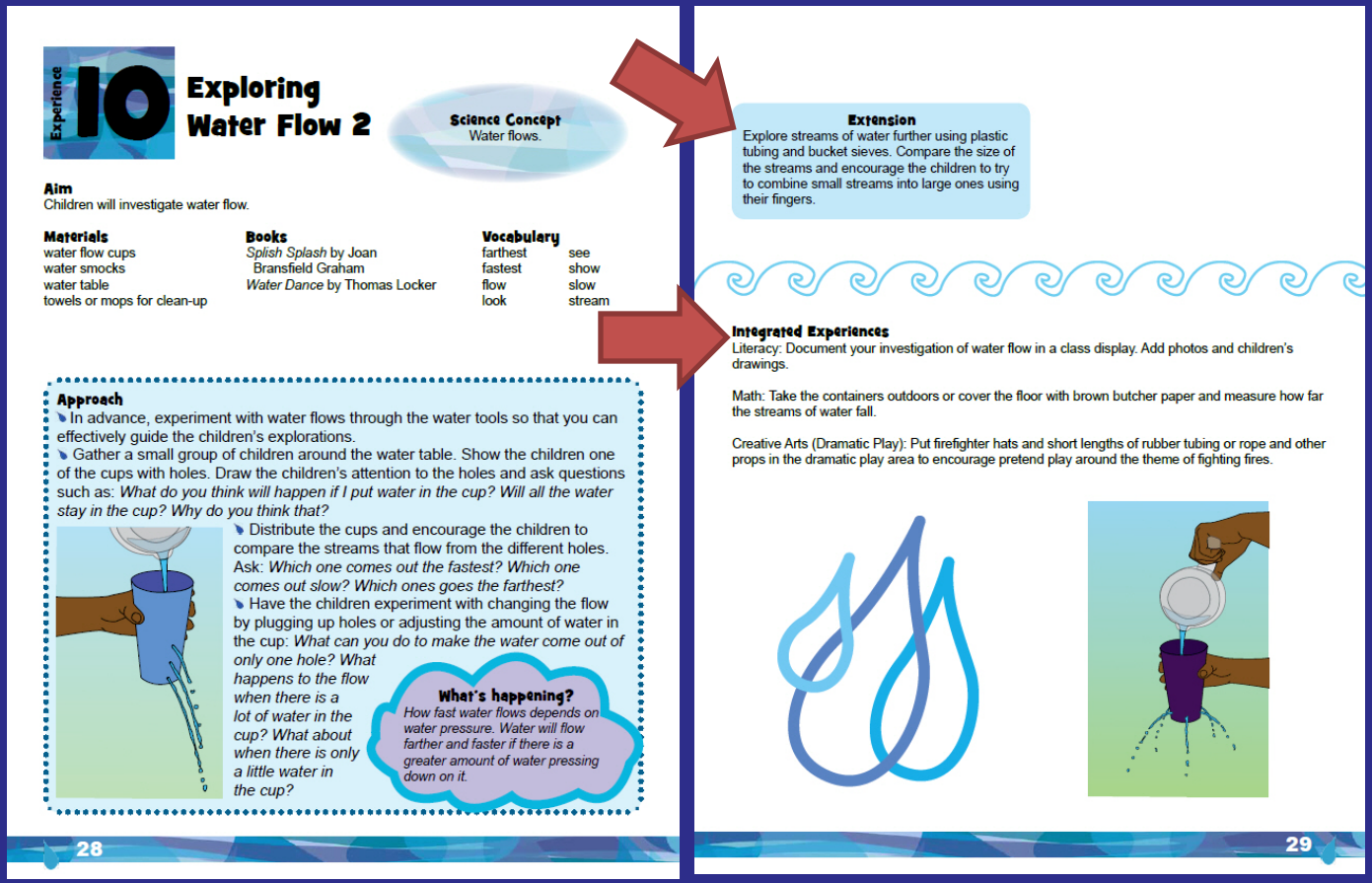
Literacy 2: Have the children represent the water drops they created using clay.

Math 1: During the investigation, have the children compare the size of individual drops to the size of drops pushed together.

Math 2: During the investigation, direct the children to make a specific number of drops or count the drops they make.

We have found teachers can easily generate open-ended questions, but it is much harder for them to ask those questions in the context of an experience. When appropriate, we also provide "hints" to give teachers additional information or suggestions for the experience.

Core Experiences: Extension, Science Center, Integrated Experiences



Experience 10

Exploring Water Flow 2

Science Concept
Water flows.

Aim
Children will investigate water flow.

Materials
water flow cups
water smocks
water table
towels or mops for clean-up

Books
Splish Splash by Joan Bransfield Graham
Water Dance by Thomas Locker

Vocabulary
farthest, fastest, flow, look, see, show, slow, stream

Approach

- In advance, experiment with water flows through the water tools so that you can effectively guide the children's explorations.
- Gather a small group of children around the water table. Show the children one of the cups with holes. Draw the children's attention to the holes and ask questions such as: *What do you think will happen if I put water in the cup? Will all the water stay in the cup? Why do you think that?*
- Distribute the cups and encourage the children to compare the streams that flow from the different holes. Ask: *Which one comes out the fastest? Which one comes out slow? Which ones goes the farthest?*
- Have the children experiment with changing the flow by plugging up holes or adjusting the amount of water in the cup: *What can you do to make the water come out of only one hole? What happens to the flow when there is a lot of water in the cup? What about when there is only a little water in the cup?*

What's happening?
How fast water flows depends on water pressure. Water will flow farther and faster if there is a greater amount of water pressing down on it.

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Extension
Explore streams of water further using plastic tubing and bucket sieves. Compare the size of the streams and encourage the children to try to combine small streams into large ones using their fingers.

Integrated Experiences
Literacy: Document your investigation of water flow in a class display. Add photos and children's drawings.

Math: Take the containers outdoors or cover the floor with brown butcher paper and measure how far the streams of water fall.

Creative Arts (Dramatic Play): Put firefighter hats and short lengths of rubber tubing or rope and other props in the dramatic play area to encourage pretend play around the theme of fighting fires.

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When possible, we suggest ways to extend each experience.

In addition, we offer ideas on how to support the experience in other classroom areas or a Science Center.

Take-Home Experience

MESS® Take-Home Kit Information/Experience Card

Investigating Water

Welcome to the Investigating Water *MESS*® Take-Home Kit. This page suggests ways to further explore what your child has been learning at school.

In this Kit you will find:

- *The Water Hole* by Graeme Base

In this counting book, one, then two, and eventually ten animals come to drink at the shrinking water hole.

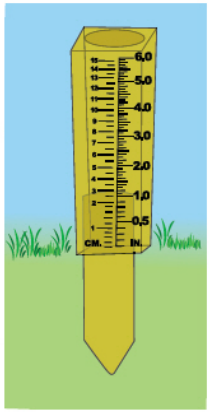
- a rain gauge

This month your child is learning:

- that all living things need water
- about measuring tools

How to use this book:

- Point to the animals as you help your child count them.
- Ask: *What is happening to the water hole? What do you think will happen to the water hole when it rains?* Explain that when it rains the water hole will fill up again.
- Read the book again and look carefully at the illustrations. Count the frogs in each picture. Try to find other animals hiding in the background.



How to use the object:

- Look at the rain gauge with your child. Point to the lines and numbers and explain how we use them to measure rainfall.
- Put the rain gauge outside and see if it collects any rain, use it to collect water from a sprinkler, or try it out in the shower or sink.

To further support your child's learning:

- Talk about the weather. Keep track of how often it rains.
- Visit a lake, river, or other body of water and talk about how important water is to all living things.

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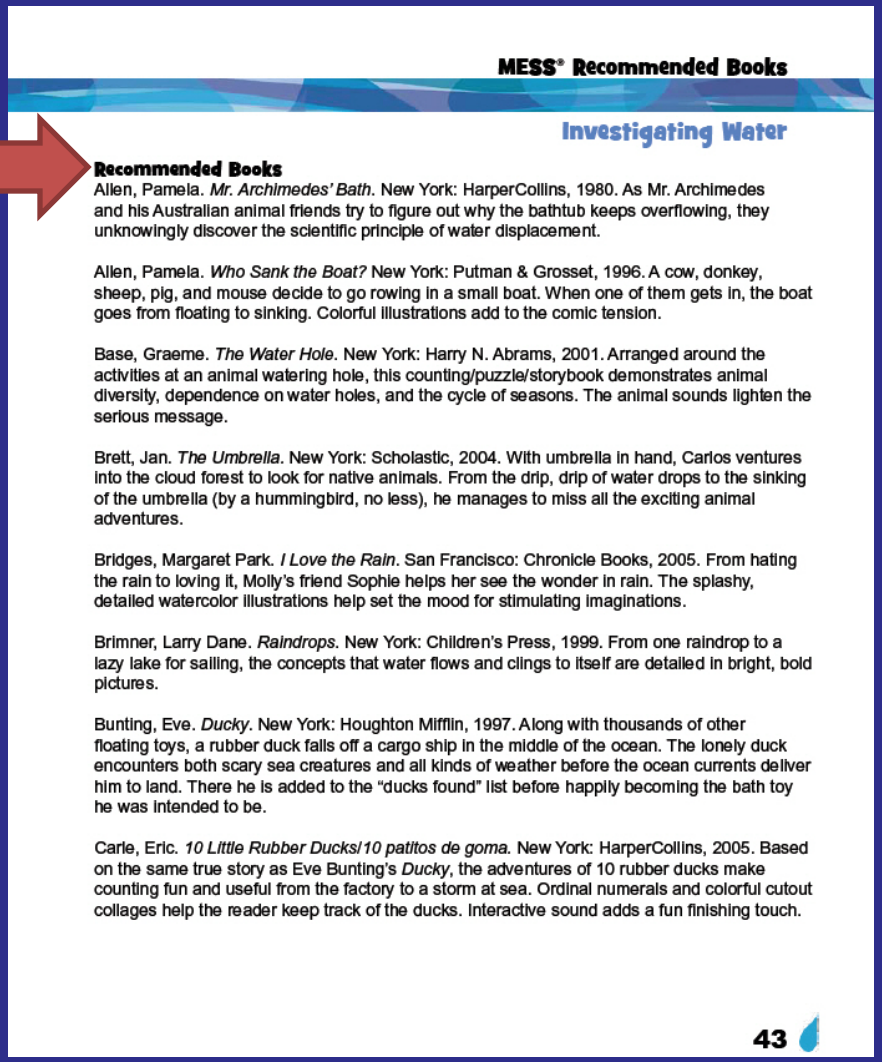
And we suggest ways to integrate the experience across the curriculum.
Each Guide also includes an idea for an experience that children can do at home with their families.

In our program, each take-home kit included an object to explore. A rain gauge was included in this case. Also included in each take-home kit are a book and a card that suggests how to use the book and object, along with other ideas about how to further explore the topic..

Visit ECLKC website to access this video

Terri Harper describes Head Start's success in engaging parents in science.

Recommended Books



MESS® Recommended Books

Investigating Water

Recommended Books

Allen, Pamela. *Mr. Archimedes' Bath*. New York: HarperCollins, 1980. As Mr. Archimedes and his Australian animal friends try to figure out why the bathtub keeps overflowing, they unknowingly discover the scientific principle of water displacement.

Allen, Pamela. *Who Sank the Boat?* New York: Putman & Grosset, 1996. A cow, donkey, sheep, pig, and mouse decide to go rowing in a small boat. When one of them gets in, the boat goes from floating to sinking. Colorful illustrations add to the comic tension.

Base, Graeme. *The Water Hole*. New York: Harry N. Abrams, 2001. Arranged around the activities at an animal watering hole, this counting/puzzle/storybook demonstrates animal diversity, dependence on water holes, and the cycle of seasons. The animal sounds lighten the serious message.

Brett, Jan. *The Umbrella*. New York: Scholastic, 2004. With umbrella in hand, Carlos ventures into the cloud forest to look for native animals. From the drip, drip of water drops to the sinking of the umbrella (by a hummingbird, no less), he manages to miss all the exciting animal adventures.

Bridges, Margaret Park. *I Love the Rain*. San Francisco: Chronicle Books, 2005. From hating the rain to loving it, Molly's friend Sophie helps her see the wonder in rain. The splashy, detailed watercolor illustrations help set the mood for stimulating imaginations.

Brimner, Larry Dane. *Raindrops*. New York: Children's Press, 1999. From one raindrop to a lazy lake for sailing, the concepts that water flows and clings to itself are detailed in bright, bold pictures.

Bunting, Eve. *Ducky*. New York: Houghton Mifflin, 1997. Along with thousands of other floating toys, a rubber duck falls off a cargo ship in the middle of the ocean. The lonely duck encounters both scary sea creatures and all kinds of weather before the ocean currents deliver him to land. There he is added to the "ducks found" list before happily becoming the bath toy he was intended to be.

Carle, Eric. *10 Little Rubber Ducks/10 patitos de goma*. New York: HarperCollins, 2005. Based on the same true story as Eve Bunting's *Ducky*, the adventures of 10 rubber ducks make counting fun and useful from the factory to a storm at sea. Ordinal numerals and colorful cutout collages help the reader keep track of the ducks. Interactive sound adds a fun finishing touch.

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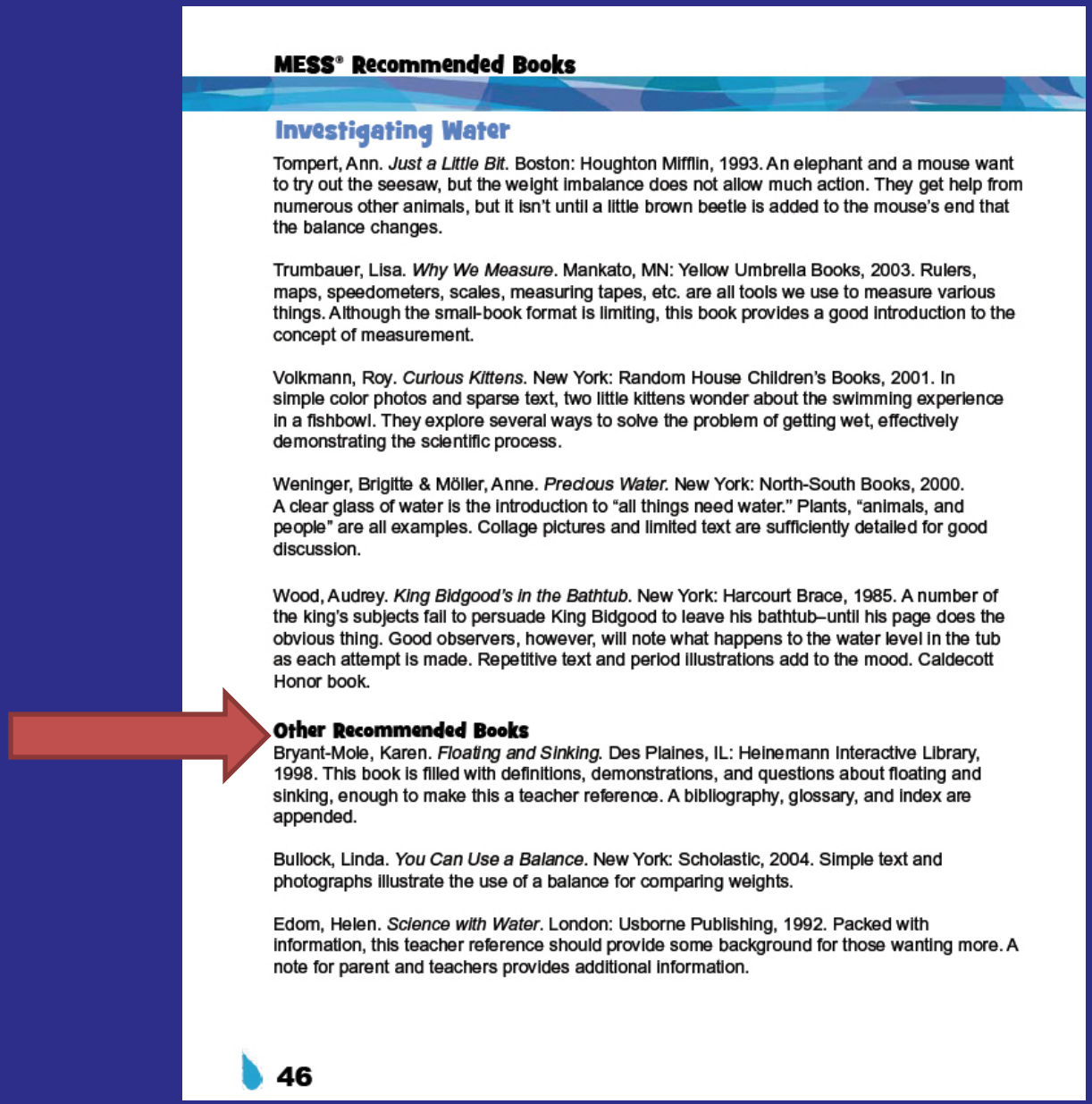
Each Guide includes two lists of recommended books. You may wonder what the difference is between the two lists? The titles listed under *Recommended Books* are those that are directly relevant to experiences described in each Guide. We believe books that are integrated well with children's hands-on experiences best support learning.



MESS® Recommended Books

Investigating Water

Tompert, Ann. *Just a Little Bit*. Boston: Houghton Mifflin, 1993. An elephant and a mouse want to try out the seesaw, but the weight imbalance does not allow much action. They get help from numerous other animals, but it isn't until a little brown beetle is added to the mouse's end that the balance changes.

Trumbauer, Lisa. *Why We Measure*. Mankato, MN: Yellow Umbrella Books, 2003. Rulers, maps, speedometers, scales, measuring tapes, etc. are all tools we use to measure various things. Although the small-book format is limiting, this book provides a good introduction to the concept of measurement.

Volkmann, Roy. *Curious Kittens*. New York: Random House Children's Books, 2001. In simple color photos and sparse text, two little kittens wonder about the swimming experience in a fishbowl. They explore several ways to solve the problem of getting wet, effectively demonstrating the scientific process.

Weninger, Brigitte & Möller, Anne. *Precious Water*. New York: North-South Books, 2000. A clear glass of water is the introduction to "all things need water." Plants, "animals, and people" are all examples. Collage pictures and limited text are sufficiently detailed for good discussion.

Wood, Audrey. *King Bidgood's in the Bathtub*. New York: Harcourt Brace, 1985. A number of the king's subjects fail to persuade King Bidgood to leave his bathtub–until his page does the obvious thing. Good observers, however, will note what happens to the water level in the tub as each attempt is made. Repetitive text and period illustrations add to the mood. Caldecott Honor book.

Other Recommended Books

Bryant-Mole, Karen. *Floating and Sinking*. Des Plaines, IL: Heinemann Interactive Library, 1998. This book is filled with definitions, demonstrations, and questions about floating and sinking, enough to make this a teacher reference. A bibliography, glossary, and index are appended.

Bullock, Linda. *You Can Use a Balance*. New York: Scholastic, 2004. Simple text and photographs illustrate the use of a balance for comparing weights.

Edom, Helen. *Science with Water*. London: Usborne Publishing, 1992. Packed with information, this teacher reference should provide some background for those wanting more. A note for parent and teachers provides additional information.

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Books in the *Other Recommended* list are high-quality books as well, although they made need to be read more selectively.

Domains & Indicators

Head Start Domains and Indicators Associated with Core and Center Experiences

Domain & Indicators	Experience																
MATHEMATICS CONTINUED	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	T-H
Begins to recognize, describe, compare, and name common shapes, their parts and attributes.			•	•													
Progresses in ability to put together and take apart shapes.																	
Begins to be able to determine whether or not two shapes are the same size and shape.				•													
Shows growth in matching, sorting according to 1 or 2 attributes such as color, shape or size.			•														
Builds an increasing understanding of directionality, order and positions of objects, and words such as up, down, over, under, top, bottom, inside, outside, in front, and behind.	•	•	•	•	•	•	•	•	•	•	•	•	•		•	•	•
Enhances abilities to recognize, duplicate and extend simple patterns using a variety of materials.				•					•	•							
Shows increasing abilities to match, sort, put in a series, and regroup objects according to one or two attributes such as shape or size.			•										•				
Begins to make comparisons between several objects based on a single attribute.			•										•				
Shows progress in using standard and no-standard measures for length and area of objects.																	
SCIENCE																	
Begins to use senses and a variety of tools and simple measuring devices to gather information, investigate materials, and observe processes and relationships.	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops increased ability to observe and discuss common properties, differences and comparisons among objects and materials.	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
Begins to participate in simple investigations to test observations, discuss and draw conclusions and form generalizations.	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
Develops growing abilities to collect, describe and record information through a variety of means, including discussion, drawings, maps and charts	•		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

And finally, we link each Experience with the Domains and Indicators in the Head Start Child Outcomes Framework. We do this for the entire set of Domains and Indicators because quality science experiences support development across many domains and domain elements.

Education Coordinators, T/TA Specialists, or other Consultants may find this helpful to use along with the program's curriculum as they work with staff.

Visit ECLKC website to access this video

In this video clip, Ann Crowell describes the importance of science for children.

Science Resources on the ECLKC

http://eclkc.ohs.acf.hhs.gov/hslc

These resources were developed by the
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U.S. Department of Health and Human Services.