

OUTCOMES CHARTS

The two outcomes charts that follow will help you to describe and record your children's progress. You may also find them useful when talking with others about the goals of *Exploring Water with Young Children*. The first chart, "Science Outcomes," is in two parts: science inquiry skills and science concepts. Each skill or concept is defined in the column on the left. On the right are three levels of behaviors, starting with simple and moving to more complex. What your children will achieve will depend on their level of maturity and prior experiences.

The second chart is "Connections between Inquiry Skills and Outcomes in Other Domains." This chart provides a visual presentation of how science inquiry skills relate to outcomes or skills in other areas. The inquiry skills are listed in the left-hand column. Language, literacy, and mathematics skills, as well as social abilities and approach to learning, appear at the top. Checked boxes show where inquiry skills support abilities in other areas. While the outcomes of other subject areas listed are based on the Head Start Child Outcomes Framework, they are also relevant to a range of early childhood programs.

SCIENCE OUTCOMES: SCIENCE INQUIRY SKILLS AND SCIENCE CONCEPTS

Science Inquiry Skills	Water Exploration Behaviors
Engages, notices, wonders, questions: Engages in open-ended explorations of water with different materials; forms questions that guide actions.	<ul style="list-style-type: none"> • Tries to explore water; willingly goes to water table or other water centers. • Persists in exploring water (such as tries to learn more about water by using materials in different ways). • Tries a variety of water play setups with a variety of materials.
Begins to explore, investigate: Engages in simple investigations to extend observations, test predictions, and pursue questions.	<ul style="list-style-type: none"> • Explores water and materials as if asking "What will happen if I try <i>this</i>?" • Tries to find ways to answer specific questions. ("Can I squirt water with the eyedropper like I did with the baster?") • Designs simple investigations. ("I'm going to try to put tubing on the end of the baster to see if I can make a longer baster.")
Collects data: Uses senses, varied tools, and simple measures to gather data.	<ul style="list-style-type: none"> • Uses sight and touch when gathering information about water. • Attempts basic measurement (such as compares how much water is in various containers); uses nonstandard comparison. ("The water is taller so there's more!") • Uses materials and containers based on how they can best be used (such as is comfortable using a baster or funnel properly).
Records and represents experience: Describes and records experiences and information through a variety of means, including two- and three-dimensional representation, charts, and movement.	<ul style="list-style-type: none"> • Attempts simple line drawings of water materials. • Creates two- and three-dimensional representations of water materials that incorporate several characteristics. • Begins to focus on the movement of water in their representations (such as using arrows to indicate direction of flow).
Reflects on experiences: Explores patterns and relationships among experiences; makes reasonable predictions, explanations, and generalizations based on experience.	<ul style="list-style-type: none"> • Draws on prior experiences when describing, comparing, and talking about water. ("I play with water in the bath.") • Bases predictions and explanations on observations and data from past experiences. ("If you squeeze it, the water's gonna squirt!") • Connects observations and data from multiple explorations, identifying patterns and relationships and stating conclusions. (Every time the water gets in, the boat sinks.)
Uses language to communicate findings: Develops increased vocabulary and ability to communicate observations and ideas.	<ul style="list-style-type: none"> • Responds to direct questions about characteristics of water and materials. • Contributes more detailed descriptions and ideas about their water experiences. • Mentions various characteristics of different materials and explains why they were used when they were.
Shares, discusses, and reflects with group: Shares materials, tasks, and ideas; collaborates in joint investigations.	<ul style="list-style-type: none"> • Explores water alone or alongside others. • Explores water with a small group. • Plans, negotiates, and discusses water in a small group.

SCIENCE OUTCOMES: SCIENCE INQUIRY SKILLS AND SCIENCE CONCEPTS (CONT'D)

Science Concepts	Water Exploration Behaviors
<p>Water moves in particular ways: Shows increasing awareness of how water moves or flows. Shows increasing awareness that water usually flows down, but that in certain circumstances it can be made to move up or sideways (such as when using basters or pumps).</p>	<ul style="list-style-type: none"> • Anticipates water will usually move down and is easy to spill. • Shows awareness that water can move through a number of materials, including thin and thick tubing and funnels. • Recognizes that water can be made to move up or sideways when force is exerted on it (such as by squeezing or with a pump). Recognizes that drops have some of the same characteristics as larger amounts of water (such as usually moves down unless squirted from an eyedropper).
<p>Water takes the shape of its container: Shows increasing awareness that water will look different in different containers.</p>	<ul style="list-style-type: none"> • Notices that water must be contained (such as child pours water repeatedly from one container to another). • Begins to notice that all kinds of containers can be used with water (such as bottles, caps, and tubing). • Begins to show awareness that containers with holes can hold water for a short while, depending on the size and location of the holes.
<p>Properties of water—adhesion and cohesion: Shows increasing awareness that water can appear in small quantities such as small streams and drops (cohesion) and appears different on different surfaces (adhesion).</p>	<ul style="list-style-type: none"> • Begins to show awareness that water has a number of different properties (such as that it overflows containers, spills, drips, and splashes). • Begins to notice that drops of water of any size seem to keep a rounded shape, and that they usually return to this shape as they are pushed and dragged along certain surfaces. • Becomes more careful in making drops of varying sizes and in observing how drops appear in different circumstances (such as tries to make very small drops, notices different shapes on different surfaces).
<p>Objects can sink, float, or stay suspended in water: Becomes aware that when placed in water, some things remain on the surface (float), and others go under the surface to either sink to the bottom or to stay suspended. Aware that floating and sinking objects have certain characteristics. (Note: The goal is to make predictions, not for children to understand density, which is a more difficult concept.)</p>	<ul style="list-style-type: none"> • Begins to notice that some of the objects played with in the water table float and others sink. • Begins to notice that materials that sink or float usually remain sinking or floating even if left in water. • Shows awareness that objects that sink or float will usually do the same thing every time they are placed in water.
<p>Air takes up space and floats to the top of water: Shows increasing awareness that bubbles can be seen in certain circumstances, and that air can move water.</p>	<ul style="list-style-type: none"> • Begins to notice bubbles in water when pouring, or using a baster or pump. • Begins to notice that bubbles seem to appear consistently and can often be predicted. • Shows awareness that water can often fill “empty” spaces, but in some situations it cannot.

Figure 8.7

CONNECTIONS BETWEEN INQUIRY SKILLS AND OUTCOMES IN OTHER DOMAINS

<div style="text-align: center;"> LANGUAGE → <i>and</i> SCIENCE ↓ </div>	Shows progress in understanding and following simple and multistep directions.	Shows increasing abilities to understand and use language to communicate information, experience, ideas, feelings, opinions, questions, and so on.	Progresses in abilities to initiate and respond appropriately in conversation and discussions with peers and adults.	Links new learning experiences and vocabulary to what is already known about a topic.
Explores/questions —Engages in open-ended explorations; forms questions that guide actions.		✓	✓	
Begins to investigate —Engages in simple investigations to extend observations, test predictions, and pursue questions.	✓	✓	✓	✓
Collects data —Uses senses, varied tools, and simple measures to gather data.	✓	✓		
Records and represents experience —Describes and records experiences and information through a variety of means, including two- and three-dimensional representation, charts, and movement.		✓		✓
Synthesizes and analyzes data from experiences —Sees patterns in data and relationships among experiences; makes reasonable predictions, explanations, and generalizations based on experience.		✓	✓	✓
Uses language to communicate findings —Develops increased vocabulary and ability to communicate observations and ideas.		✓	✓	✓
Collaborates —Shares materials, tasks, and ideas; collaborates in joint investigations.		✓	✓	

CONNECTIONS BETWEEN INQUIRY SKILLS AND OUTCOMES IN OTHER DOMAINS (CONT'D)

<div style="text-align: center;"> LITERACY  <i>and</i> SCIENCE  </div>	Progresses in abilities to retell and dictate stories from books or experiences, act out stories in dramatic play, and predict what will happen next in a story.	Develops an understanding that writing is a way of communicating for a variety of purposes.	Begins to represent stories and experiences through pictures, dictation, and play.	Experiments with a growing variety of writing tools, such as pencils, crayons, and computers.
Explores/questions —Engages in open-ended explorations; forms questions that guide actions.				
Begins to investigate —Engages in simple investigations to extend observations, test predictions, and pursue questions.	✓			
Collects data —Uses senses, varied tools, and simple measures to gather data.		✓		✓
Records and represents experience —Describes and records experiences and information through a variety of means, including two- and three-dimensional representation, charts, and movement.	✓	✓	✓	✓
Synthesizes and analyzes data from experiences —Sees patterns in data and relationships among experiences; makes reasonable predictions, explanations, and generalizations based on experience.	✓	✓	✓	✓
Uses language to communicate findings —Develops increased vocabulary and ability to communicate observations and ideas.	✓	✓	✓	✓
Collaborates —Shares materials, tasks, and ideas; collaborates in joint investigations.				

CONNECTIONS BETWEEN INQUIRY SKILLS AND OUTCOMES IN OTHER DOMAINS (CONT'D)

<div style="text-align: center;"> MATHEMATICS → <i>and</i> SCIENCE ↓ </div>	Begins to recognize, describe, compare, and name common shapes and their parts and attributes.	Increases understanding of directionality, order, positions of objects, and words (<i>up, down, over, under, top, bottom, and so on</i>).	Enhances abilities to recognize, duplicate, and extend simple patterns using a variety of materials.	Increases abilities to match, sort, put in a series, regroup, and compare objects according to one or two attributes (such as shape or size).	Shows progress in using standard and nonstandard measures for length and area of objects.	Participates in creating and using real and pictorial graphs.
Explores/questions —Engages in open-ended explorations; forms questions that guide actions.						
Begins to investigate —Engages in simple investigations to extend observations, test predictions, and pursue questions.				✓	✓	✓
Collects data —Uses senses, varied tools, and simple measures to gather data.	✓	✓		✓	✓	✓
Records and represents experience —Describes and records experiences and information through a variety of means, including two- and three-dimensional representation, charts, and movement.	✓	✓		✓	✓	✓
Synthesizes and analyzes data from experiences —Sees patterns in data and relationships among experiences; makes reasonable predictions, explanations, and generalizations based on experience.	✓	✓	✓	✓		✓
Uses language to communicate findings —Develops increased vocabulary and ability to communicate observations and ideas.	✓	✓				
Collaborates —Shares materials, tasks, and ideas; collaborates in joint investigations.						

CONNECTIONS BETWEEN INQUIRY SKILLS AND OUTCOMES IN OTHER DOMAINS (CONT'D)

<div style="text-align: center;"> SOCIAL  and SCIENCE  </div>	Demonstrates increasing capacity to follow rules and routines; uses materials purposefully, safely, and respectfully.	Increases abilities to compromise in interactions, take turns, and sustain interactions with peers by helping, sharing, and discussing.	Progresses in understanding similarities and respecting differences among people (such as gender, race, special needs, culture, and so on).	Develops growing awareness of jobs and what is required to perform them.
Explores/questions —Engages in open-ended explorations; forms questions that guide actions.	✓	✓	✓	✓
Begins to investigate —Engages in simple investigations to extend observations, test predictions, and pursue questions.	✓	✓	✓	✓
Collects data —Uses senses, varied tools, and simple measures to gather data.	✓	✓	✓	✓
Records and represents experience —Describes and records experiences and information through a variety of means, including two- and three-dimensional representation, charts, and movement.	✓	✓	✓	✓
Synthesizes and analyzes data from experiences —Sees patterns in data and relationships among experiences; makes reasonable predictions, explanations, and generalizations based on experience.	✓	✓	✓	✓
Uses language to communicate findings —Develops increased vocabulary and ability to communicate observations and ideas.	✓	✓	✓	✓
Collaborates —Shares materials, tasks, and ideas; collaborates in joint investigations.	✓	✓	✓	✓

CONNECTIONS BETWEEN INQUIRY SKILLS AND OUTCOMES IN OTHER DOMAINS (CONT'D)

<div style="text-align: center;"> APPROACHES TO LEARNING <i>and</i> SCIENCE </div>	Chooses to participate in an increasing variety of tasks and activities, developing the ability to make independent choices.	Approaches tasks and activities with increased flexibility, imagination, and inventiveness.	Grows in eagerness to learn about and discuss a growing range of topics, ideas, and tasks.	Grows in abilities to set goals and persist in and complete a variety of tasks, activities, and projects, despite distractions or interruptions.	Develops increasing ability to find more than one solution to a question, task, or problem.	Grows in recognizing and solving problems through active exploration, interactions, and discussions with peers and adults.
Explores/questions —Engages in open-ended explorations; forms questions that guide actions.	✓	✓	✓	✓		✓
Begins to investigate —Engages in simple investigations to extend observations, test predictions, and pursue questions.	✓	✓	✓	✓	✓	✓
Collects data —Uses senses, varied tools, and simple measures to gather data.		✓	✓		✓	✓
Records and represents experience —Describes and records experiences and information through a variety of means, including two- and three-dimensional representation, charts, and movement.	✓	✓	✓	✓	✓	
Synthesizes and analyzes data from experiences —Sees patterns in data and relationships among experiences; makes reasonable predictions, explanations, and generalizations based on experience.			✓	✓	✓	✓
Uses language to communicate findings —Develops increased vocabulary and ability to communicate observations and ideas.			✓	✓		✓
Collaborates —Shares materials, tasks, and ideas; collaborates in joint investigations.		✓			✓	✓

Figure 8.8