ECHOS®

Early Childhood
Hands-On Science

Astonishing Air

Acknowledgements

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Overview

Overall Goal: Children engage in trial-and-error investigations that allow them to observe the presence of air and explore its properties.

Lesson	Objectives	Vocabulary	Key Concepts	Tools
#1: Going on an Air Hunt	Children will investigate two attributes of air: it cannot be seen and it is all around us.	air empty/full invisible over/under	• Air cannot be seen because it is invisible. • Air is all around us. • We can observe air by filling an empty bag with air.	plastic bag
#2: Air Takes Up Space	Children will understand that air takes up space.	deflated inflated	• When something is filled with air, it is inflated. • When something is not completely filled with air, it is deflated. • When we breathe, air comes in and out of our body through our mouth or nose. • We can breathe air in (inhale) and blow air out (exhale).	drinking straw
#3: Air Moves Things	Children will understand that air in motion can move objects.	far/near fast/faster slow/slowly wind	• Air in motion is called wind. • Air can move objects. • We can feel air when it moves. • Waving an object back and forth can make air move. • It takes less wind to move an object that is near.	
#4: Air on the Move	Children will understand that wind moves objects in different directions.	direction pinwheel sail sailboat	• Wind moves things. • Wind can move things in many different directions. • We can direct wind.	drinking straw

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Science Process Skills

Science Process Skills	Lesson #1	Lesson #2	Lesson #3	Lesson #4
Observing				
Identifies object properties	●	●	●	●
Uses senses to observe concrete, familiar objects	●	●	●	●
Differentiates between models and the real thing				●
Uses measurement tools to record observations				
Uses tools to observe objects or events	●		●	
Describing				
Describes key attributes of objects	●		●	●
Creates drawings or models depicting objects				●
Describes changes in objects		●	●	●
Discusses changes in variables that affect an investigation				●
Categorizing				
Notices similarities and differences	●	●		
Sorts objects into groups using one attribute at a time		●		
Establishes own sorting criteria				
Sorts objects using multiple attributes				
Provides reasoning for grouping objects		●		
Predicting				
Verbalizes thinking	●	●	●	●
Recognizes and extends patterns		●	●	
Makes simple predictions		●	●	●
Makes predictions based on observations		●	●	●
Uses estimation to make quantitative predictions				
Experimenting				
Investigates models of objects/phenomena				●
Manipulates materials	●	●	●	●
Identifies factors that might affect the outcome of an experiment		●	●	●
Participates in collecting data				
Interprets data using symbols or graphs				
Performs trial-and-error investigations		●	●	●
Drawing Conclusions				
Makes verbal interpretations of observations	●	●	●	●
Finds patterns from data collected				
Connects findings from an investigation		●	●	●

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Key Concepts

Children experience air through the feeling of a gentle breeze, water bubbles in the bathtub, and the simple act of breathing. However, since air is invisible, children need more guided investigations to understand the basic properties of air: air is all around us, air takes up space, and air can move things. Even though children will not fully comprehend air pressure until later years, ***Astonishing Air*** lays the foundation for physical and Earth science concepts using fun activities with materials like balloons, bubbles, pinwheels and toy boats.

- Air is the Earth's **atmosphere**. Wherever we go on the surface of the Earth, there is air. Air is the gas we breathe in and out. Our bodies depend on oxygen from the air to survive.

- Air is a clear, **invisible** gas. It has no odor, color or smell. Since air is invisible, we must use our senses to observe it indirectly. We can see and feel the effect of air on other objects. We can often see water vapor or dust floating in the air, and we can see and smell smog and other forms of air pollution.

- We can observe air when we blow up a balloon, or when we "capture" air in a bag. When a container such as a balloon is filled with air, it is **inflated**, and when it has only a small amount of air inside, it is **deflated**.

- We can observe the effects of air when it moves through water. Children commonly experience this during water play, when they blow bubbles into water or force air under water with a container.

- Wind is moving air. Children can make air move when they blow on their hands or fan a book. They can feel real wind when it is windy outside. We can see the effects of wind when it moves other objects, such as a kite, our hair, trees, or flags.

- Wind can move at different **speeds**. Lower wind speeds have a weaker effect on objects, while higher wind speeds have a stronger effect on objects. Wind can also move in different **directions**. The direction in which wind is blowing changes the direction in which wind moves objects.

- Some forms of transportation, like sailboats or hot air balloons, use the wind's power to move. The force of wind can move a vehicle, and the direction of wind can help steer it.

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Lessons at a Glance

In ***Going on an Air Hunt***, children explore two attributes of air. Air is all around us, but it cannot be seen. Children sing a song as they hunt for air in the classroom using small plastic bags, and find air everywhere they go.

Children explore the concepts of inflated and deflated in ***Air Takes Up Space.*** Children sort inflated and deflated objects based on their observations. A follow-up activity will give the children a chance to create bubbles filled with air by blowing through a straw into milk.

In ***Air Moves Things***, children observe a balloon rocket demonstration and notice that air in motion can move objects. Children discover that they can see and feel the effects of air in motion, or wind. Children conduct an investigation into the impacts of fast and slow-moving air on objects that are near and far.

In ***Air on the Move***, children learn that wind moves objects in different directions. They observe how air makes a pinwheel spin. Children explore by controlling the direction of wind, and apply their knowledge to maneuver small sailboats across a basin filled with water.

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Lesson Guide

TEACHER TALK

Teacher talk is indicated by **bold letters that appear in large print**. When you first start teaching ECHOS, you may need to rely heavily on this text to ensure that you are presenting the science concepts accurately. As you become familiar with the text, use it as a guide or refer to it only as needed. You should always read the entire script prior to delivering the lesson.

TEXT IN ALL CAPS

Text IN ALL CAPS appears throughout the script to emphasize a step or instructions given to children.

VOCABULARY WORDS

Vocabulary words are introduced during the lesson and reinforced in the Outcomes section.
They appear in ***red italic letters*** the first time they are introduced.

MATERIALS IN BLUE LETTERS

Materials listed in blue letters in the *Material Preparation* page, indicate materials that are non-consumable. Once acquired, these materials do not need to be replaced.

SCIENCE AREA

The last page of each lesson contains suggested materials that could be added to your science area. Before adding any materials for children's independent use, evaluate whether the item is safe to be explored with limited supervision. The science area should be a place that children use freely to explore and conduct their own trial and error experiments, rather than a display area.