Introduction to Air

Preschool Lesson Plan



Is this glass empty? No. It is filled with air!

Understanding the Science of Air Overview:

Teaching children about air can be a difficult task since air is relatively invisible. In fact, one of the few times that air is truly noticeable is when it is in the form of wind. This, however, does not mean that air should not be a viable topic in your classroom or home; it simply means that you need to be a bit more inventive in the activities that you choose.

Learning about air and its properties is an early lesson on physics. It can lead to many other subjects, including eco-conscious topics or even the topic of gravity and will open up a child's existing vocabulary more than many other topics that we teach children.

Lesson Objective:

Children will begin to understand the world around them and how it is affected by air. It will build skills and processes that are used during physics at a later age and will help with problem solving more abstract questions.

It will help children understand the properties of air and will open up opportunities to learn about other gases, such as carbon dioxide, and scientific topics, such as gravity.

Understanding the Science of Air is an excellent lesson in itself but it can also be used as a lead in to other science, weather and "eco-conscious" topics.

The Lesson

Group discussion:

Did you know that air is all around you and without it there wouldn't be any life on Earth?

Air is the gas that floats all around you and makes up our atmosphere. We can't see it, since it is made up of colorless gases and although we usually can't feel it, air is always touching us.

Some of the gases that make up the air around us are oxygen, nitrogen, carbon dioxide and water vapor. All of these gases combine to give us air and it is what we breathe in to our lungs.

Although we can't see air, it is all around us and it fills up spaces. This is actually called volume, and is similar to liquids. If you have a glass of water, you have a volume of water. Pour out that water and you will be replacing the volume of water with a volume of air. Since air has a volume, it is able to exert pressure on objects, like us.

We constantly have air pushing against us but we cannot feel it because our own body presses back against the air. One of the few times that you can actually feel air pressure is when it is windy. This is when you can actually feel air and see its effects. It is being forced against us and the pressure of the air will cause our hair to move or our clothes to stick to us or the trees to sway.

We can also feel air when it heats up and cools down and it is one of the reasons why we feel different temperatures. During the day, the sun will heat the air, which gives us warmer temperatures and hot days. At night, when the sun has gone down, the air begins to cool down.
Scientists have learned how to use air and its volume and pressure for many different things, including flying planes. Air is also used for many different reasons. It can be used to push objects across a surface, such as a sail on a sail boat, and it can be used to create electricity with a windmill. Astronauts wear special suits that are filled with air when they are in space since there is no air in outer space.

Everything on Earth needs air to live, even plants and animals. In fact, most of our air, and specifically oxygen, comes from plants. So although we are not aware of air all the time, it is always there and all

you need to do is take in a deep breath to see that it is still around you.

Books that encourage learning:

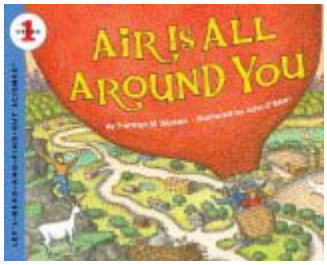
Regardless of the topic, there are always several books that not only encourage learning but also put your lesson into a more manageable context. Air is a hard subject to grasp; it is an invisible presence around us and despite all the best experiments, it has an imaginary quality to it.

When you begin any project with preschoolers, it is better to start with a book or several books to start explaining the concepts. Providing books that give a question and an answer that children can further explore, is an excellent way to promote learning.

With air, there are several books available but I would strongly recommend the following:

Air Is All Around You by Franklyn M. Branley and illustrated by John O'brien. It covers air and how it is around us and also has a few easy activities to do with your children in both the classroom and the home.

If We Could See Air by David T. Suzuki and illustrated by Eugenie Fernandes. This is a book that not only covers air but also how air affects the world around us.



Exploring Air Pressure

This is a simple experiment that you can do with children to explore air pressure and the force of air. It does rely on two instruments but it is an enjoyable activity for children of all ages. This is actually a two part experiment where one day, you use a type of pump that is manipulated by hand and the second day you look at a different type of pump.

Vocabulary:



- Air
- Volume
- Pressure
- Wind
- Force
- Push
- Air Pressure
- Movement
- Air Movement
- Air Flow

Materials:

- AirZooka
- Stomp Rocket (I recommend getting extra rockets. They do soar high and can get stuck on roofs.)
- Paper
- Small objects of different weight

Procedure:

1. Bring out the Airzooka. Talk about it and have the children predict what it does.
2. Show the children what it does by having it blow against their hair or hands.
3. Ask them to predict what would happen if you use it on a small object or paper.
4. Experiment with the paper and different objects to see what it moves.
5. Sort the items into movable and not movable piles.

6. Bring out the stomp rocket. Set up the use much like the Airzooka. Remind the children about the Airzooka and the experiment that you did with it.
7. Discuss the difference between the Airzooka pump and the Stomp Rocket Pump.
8. Ask them what will happen to the rocket if a person jumps on the pump.
9. Have a child stomp on the rocket.
10. Discuss what happens.
11. Using the stomp rocket pump, try to move the items that were too heavy for the Airzooka. Is there any difference in air pressure?

Questions to ask:

What do you think this is and how do we use the Airzooka?
What do you think will happen when I use the Airzooka?
Do you think the Airzooka can move the paper? The small objects?
What do you think the Stomp Rocket is and how would we use it?
What are the differences between the Airzooka and the Stomp Rocket?
Which one do you think will create more air pressure (wind)?
What do you think will happen to the rocket?
Do you think the Stomp Rocket pump could move the objects the Airzooka couldn't?

Things to do:

Document predictions and outcomes of the experiment. Have the children explain what is happening and why they think it is happening.

Let the children have a hands-on experience with the materials and see if they can find items that can be moved with both the Airzooka and the Stomp Rocket. Have them explore different ways to use both and decide on which way produces the best outcome.

Extension:
Try to find ways to make your own air pump or Airzooka. Use them to push air onto different objects, document what happens.

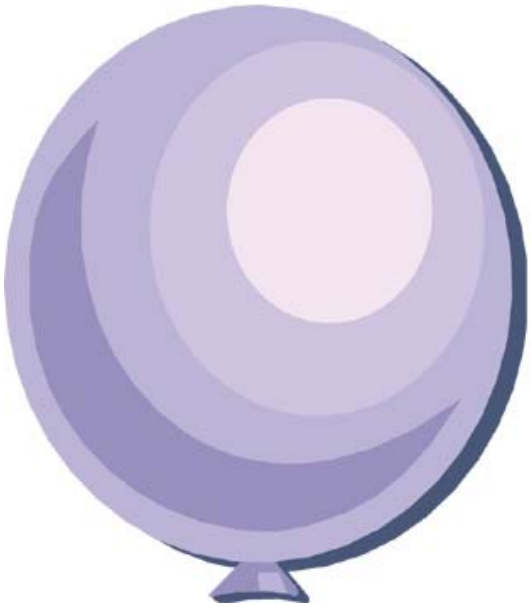
Another great extension is to set up an aquarium with a pump. Much like the stomp rocket, the air is forced through a tube and out into the water. The children can document its course as the bubbles rise to the surface and burst.

Air Engine – Air Races

This is a very fun experiment that teaches children about air; its volume, density and pressure, without them even being aware of it. All you really need is a good set of lungs, some space and a few charts to document the races.

Vocabulary:

- Air
- Volume
- Pressure
- Wind
- Force
- Push
- Pull
- Air Travel
- Movement
- Air Movement
- Air Currents
- Deflate
- Inflate



Materials:

- Drinking Straws
- Round Balloons
- Tape
- String or Cord

Procedure:

1. Bring out the materials for your experiment and talk to the children about what you are going to be doing.

2. Talk about air and air pressure. Before you start the actual experiment, explore the balloons by inflating and deflating them. Allow the children a chance to feel the air moving out of the balloon. Discuss it.

3. Using two straws, slide them onto two separate pieces of string. Make sure they can slide without any difficulty.

4. Attach the ends of the string across an area. The best is between two trees but if you are doing it inside, just secure it to two walls.

5. Blow up a balloon and tape it to the straw, with the opening facing the wall that you are closest too.

6. Ask the children to predict what will happen. Have someone document it.

7. Let go of the balloon. It should move the straw down the string.

8. Set up races. Blow up balloons to different levels and have the children predict which balloon will win.

Questions to ask:

Why do you think the balloon inflates?
Where do you think the air goes when it deflates?
What do you think would happen if we fill up a balloon and let it go?
What do you think will happen if we attach the balloon to the straw?
Why do you think the straw is moving?
Would it move the straw if the straw wasn't on the string?
Which balloon do you think will win?

Things to do:

Document predictions that the children make and the final outcome of the experiment.

Have the children document the experiment themselves with drawings or models. Show them how to use arrows to show air currents.

Keep a chart on what balloon one, if it was inflated a lot or a little.

Extension:

A great way to expand on this experiment is to use different shaped balloons. Does a long and skinny balloon deflate faster than a round balloon? Another way to expand is to tape a weight onto the balloon to see if it slows down the speed of the straw.

Bending Air

Air is a tricky subject to teach to all children regardless of age but this experiment will begin to teach children that air is not only around us but it can also be manipulated depending on the structure.

Vocabulary:

- Air
- Volume
- Pressure
- Wind
- Force
- Curve
- Blocked Air
- Separation
- Air Travel
- Movement
- Air Movement
- Air Currents
- Air Flow

Materials:

- One strip of paper that measures 1in by 3in (2.5cm by 7.6cm)
- Tape
- Small square box
- Large square box
- One 1-liter bottle
- One 2-liter bottle
- One Cylinder (optional)

Procedure:

1. Introduce the materials, preferably after you have read one of the books that we recommended.
2. Discuss the materials and ask them to make predictions on how you will be using the materials and what they feel the outcome of the experiment will be.
3. Set up the strip of paper on a table and tape one end down to the table (the one that is furthest from you.)
4. Ask one child to blow on the paper. What happens? The paper should flutter.

5. Now ask the children to predict what will happen if you place an item in front of the paper.
6. Set up a box or a bottle and have a child blow on the object (not on the paper).
7. Talk about what happens. With the curved objects, the wind will move around the curved surface and the paper will flutter.
8. Repeat with the different objects.

Questions to ask:

What do you think will happen to the paper if we blow on it?
Why do you think the paper moved when we blew on it?
What do you think will happen if we place a box in front of the paper?
What do you think will happen if we place a bottle in front of the paper?
Why do you think the paper fluttered with the bottle but not the box?
Do you think the paper will flutter with a bigger bottle?

Things to do:

Document predictions that the children make and the final outcome of the experiment.

Have the children document the experiment themselves with drawings or models. Show them how to use arrows to show air currents.

Extension:

Although this experiment is fairly straight forward, you can expand on the experiment by having the children place different objects in front of the paper to see if it is just curved objects that separates the air. You could also attach a curved object to a table and place a strong fan in front of it. Have the children place their hands on the sides of the curved object to feel the air currents running along the bottle. Try the same experiment with a large box. Do they feel wind on the sides and back of the box? Lastly, try using the Airzooka, from the first experiment to determine if it changes the air flow.