Wild Weather-Pre Visit Activities

RIDE THE WIND

OBJECTIVE:

- Students will design aircraft that they will test fly on updraft winds at COSI
- Students will be able to describe the effects that updrafts of wind have on aircraft.

MATERIALS:

- Scissors
- Tape
- Glue and glue sticks
- Variety of light weight material. Common materials used in wind tubes include cardboard, paper towel rolls, paper or plastic cups, paper, straws, cotton balls, foam, ping-pong balls, and anything else you can find in your classroom. Please keep in mind that these materials will be cut, glued, taped, and otherwise manipulated.

PROCEDURE:

- Engage students in discussion on air. Remind students that air takes up space and influences objects around them. Introduce students to the concepts of updrafts. Updrafts are pockets of rising warm air surrounded by cooler air. Updrafts can affect the flight of planes and cause ice crystals to accumulate into hail.
- Inform the students that during their trip to COSI they will have an opportunity to experiment with updrafts during the weather workshop at the station called Wind Tubes by creating their own aircraft to fly in the tubes.
- Students will create an aircraft out of the available materials. The aircraft can take on any form they want. It does not have to look like a traditional aircraft. The challenge for the students will be to design a craft that flies in the Wind Tube the longest

without flying out the top of the tube or falling back to the ground at the bottom of the tube.

- Don't forget to bring your aircraft when you come to COSI

ACADEMIC STANDARDS:

Earth and Space Science 4.1
Physical Sciences K.1, K.2, K.4, 1.6, 3.4
Science and Technology 1.1, 3.4, 3.5, 5.2

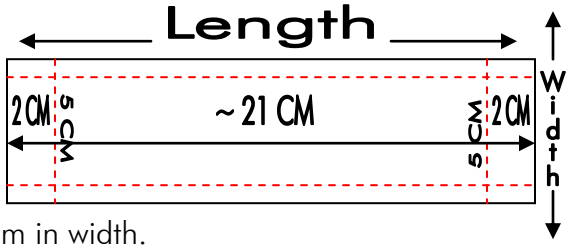
TUMBLE WING WALKALONG GLIDER

OBJECTIVE:

- Students will be able to describe that air, though invisible, surrounds and affects other objects.
- Through hands-on learning and observation students will be able to identify how air affects objects.
- Students will be able to explain that air is made up of molecules that exert pressure on objects.
- Students will use directions provided to construct their own walkalong glider.

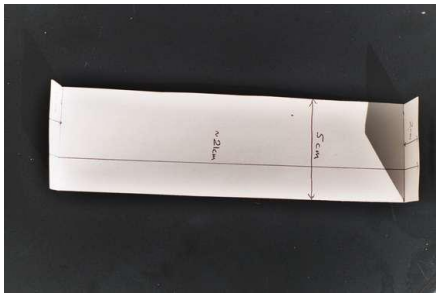
MATERIALS:

- Phone book paper (or any light weight paper) - 1 Sheet should accommodate 2-3 students.
- 3-4 pieces of large cardboard or Plexiglas material. Approximately 4-6' in surface area.
- Scissors
- Rulers
- Pencils

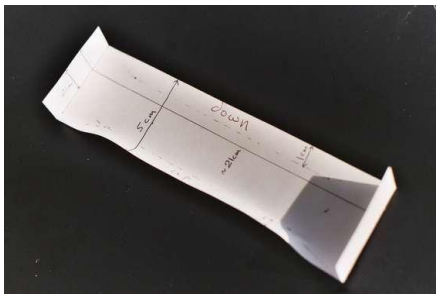


PROCEDURE:

1. Cut phone book sheet into a strip of 5 cm in width.
2. Cut strip so the overall length is approximately 21 cm.
3. Measure and draw two dotted lines across the width of the strip. These lines should each be 2 cm from the end of the strip.
4. Fold across the dotted line to form two small tabs. These folds should form two 90° angles that face the same direction. These are the wings of the glider.



5. Fold the length edges over slightly as shown in the picture below. These folds should face in the opposite direction. The fold that goes down is the leading edge and the other fold that goes up is the trailing edge.



6. Your glider is now complete and ready to fly. To launch the glider, hold the glider so that the leading edge is facing out and the wings are facing up. Once the glider is in position you can let go and it will tumble to the ground. If the glider falls to one side or the other, the wing folds are not symmetrical and will need to be adjusted.

7. Once your glider is functioning properly it is time to guide your glider. As the glider falls hold the piece of cardboard or Plexiglas directly under the glider. As your glider moves forward, continue to walk forward with the cardboard or Plexiglas under the glider. The glider will stay in the air and you will be able to guide it around the room.

WHAT HAPPENED:

What is keeping the glider from falling to the ground? How does the board keep the glider in the air without touching it? How does the glider's design keep it flying? Even though you cannot see air, can you still feel or even see the effects of air?

EXTENSIONS: Try different kinds of glider designs and see if they work. Also explore paper airplane designs and examine how the design of the plane interacts with the air around it.

DID YOU KNOW? A "glider" is defined as an aircraft that is not powered. The design of gliders help the aircraft use rising air to fly. Gliders can use pockets of rising air to travel long distances before finding the next source of lift. The sport of gliding became popularized in post World War I Germany. Restrictions in the Treaty of Versailles placed strict restrictions on powered aircraft. Germans turned to designing and developing more effective and efficient gliders. One of the first gliding competitions, the Wasserkuppe, was held in Germany in 1920.

ACADEMIC STANDARDS:

Earth and Space Sciences 4.1, 4.4
Physical Sciences K.1, K.5, 1.5, 1.6,
Science and Technology 1.1

COHESION COIN

OBJECTIVE:

- To demonstrate the property of cohesion between water molecules.

MATERIALS:

- A few coins
- A water dropper
- Water

PROCEDURE:

Lay a penny on the table. Have students form a hypothesis about how many water drops can fit on a penny, without spilling onto the table.
Use the water dropper to begin to put drops of water on the coin, counting as you go. Continue to add drops until the water domes up, eventually spilling over onto the table.

WHAT HAPPENED:

Cohesion can be defined as an 'intermolecular force that holds together molecules in a solid or liquid'. Due to the polarity of individual water molecules (all of the electrons are gathered on the Oxygen side of the molecule), the negative side of one water molecule is attracted to the positive side of another water molecule. The force which draws the molecules to one another is called **hydrogen bonding**, which is an attractive force between a hydrogen atom in one molecule and a strongly electronegative atom (such as Oxygen) in another molecule. Cohesion between water molecules is what allows them to 'bead' up without spilling over onto the table.

ACADEMIC STANDARDS:

Science: Scientific Inquiry: 1.6, 2.6, 5.1
Science: Ways of Knowing: 3.1