Lift off with Our Lady of Loreto

Experiment Express

STEM Field of Study

Technology

Engineering

Specific STEM Area

Aerodynamics

Age Group

All

Cost

Less than (<) $10

Time

1 hour

Materials

2 paper plates; 2 Rubber bands; Scissors; Pencil; Fan (or if it's a windy day…. Go Outside!)

Safety

Adult Supervision Necessary

IEP Goals

Academic

Behavioral

Motor

Question:

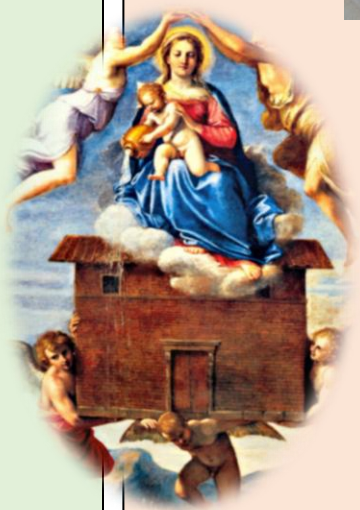
Can you feel air resistance?

Hypothesis:

Before you do this experiment; try to predict the answer to the question above. Write down your Hypothesis in your logbook.

Instructions:

1. Gather all your materials together.
2. Review all Safety Precautions.
3. Flip the paper plate over and using your pencil, on the back side of the paper plate draw on outline of your hand.
4. Now draw a large dot in between the thumb and index finger of the hands as well as near the pinky fingers of the hands.
5. Using your pencil punch a small hole through the dots you just created. Make sure not to make them too large; they need to be just large enough to push the rubber band through the hole.
6. Using your scissors cut each rubber band so you have 2 long rubber strings.
7. Feed each rubber band end through the holes you created.
8. Once you've fed the rubber ends through the holes; tie the ends together as tightly as possible without ripping the paper plate.
9. Next, you're going to use a fan. Turn on the fan and stand back approximately three feet.
10. Place the "Aero Plates" on your hands by feeding your hands through the rubber bands where you drew an outline of your hands.
11. Standing in front of the fan approximately three feet away, hold up your hands with the paper plates attached. Hold your hands so the plate is as if your holding up a "STOP" sign – like the red safety hand shown in this experiment. What do you feel?
12. Next, hold your hands, with the plates still on, flat and parallel to the ground as if you're going to bounce a ball. What do you feel?



Do you know the story of "Our Lady of Loreto" the Patron Saint of Aviators?

This experiment celebrates the truly miraculous events that occurred over 770 years ago when initial Christians saved the home where our Blessed Mother Mary was born. Tradition tells us that Mary's home was revered and honored by the early Saints and to protect it from destruction during waring events, the house was moved – but not by men. Legend states that Our Blessed Mother's home was moved, completely intact, from Nazareth to Croatia and then on to Italy by Angels. However, historians believe a Byzantine family by the name of, "Angeli", paid for shipping Mary's home to Italy. Do you know what "Angeli" means in Italian? Angels.

Lift off with Our Lady of Loreto

Post Experiment Questions for Adults to ask:

1. Did you feel air resistance when you held your hands in the stop sign position?
2. Why?
3. Did you feel air resistance when you held your hands in the flat / bouncing the ball position?
4. Why?
5. Which had position do you feel was more aerodynamic?

Let's Talk!

Discussion of Results / Post Experiment Answers:

1. You should feel some pressure against the plate.
2. There is more surface area when the plate is in the stop sign position. The more surface area there is the more resistance you will feel.
3. You should feel less pressure against the plate and more air movement over the top of your hand.
4. There is less surface area – so there is less resistance do push against.
5. When your hand position is flat and parallel to the ground.

Draw your own conclusion:

Why do you think airplanes are shaped to resemble a bird? Why aren't airplanes shaped to look like a square? Or how about cars… Why do you think engineers design cars a certain way? This is a great time to research the history of flight as well as the history of the automobile. Here are some additional resources for you to review:
https://www.grc.nasa.gov/WWW/K-12/UEET/StudentSite/historyofflight.html

https://www.history.com/topics/inventions/automobiles

https://www.popularmechanics.com/cars/car-technology/a21272157/aerodynamics-car-science/

Expansion Experiments:

One of our favorite scientists is Leonardo da Vinci! He was a remarkable scientist, artist, inventor, genius! We all can benefit from his experiments and thankfully he maintained a log of his work (hint you should too) as well as detailed sketches. If you would like to see more of his work, try this book for more experiments: Leonardo da Vinci's Flying Machines Kit: Paper Airplanes Based on the Great Master's Sketches - That Really Fly! (13 Pop-out models; Easy-to-follow instructions; Slingshot launcher) Paperback – October 15, 2019 by Andrew Dewar

Log your work:

Absolutely!

Channel your inner Leonardo da Vinci and record what you observe by drawing what you see. Who said art and the STEM fields aren't connected? Leonardo certainly proves otherwise.

Real World Application:

Aerodynamics

Aeronautics

Renewable Wind Energy

Pilot / Flying

Additional Resources:

https://www.real-world-physics-problems.com/

https://www.grc.nasa.gov/www/k-12/airplane/bga.html

The Illustrated Guide to Aerodynamics by Hubert C. Smith (Author)