LESSON 1

It's a Bird, No it's a Plane, No It's a Rocket

Learn about the study of aerospace and what is included in the field. Learn the difference between aeronautics and astronautics.

Time

45 minutes total

Activity 1 Materials

- 8 ½ X 11 inch printer paper (enough for each person to have two)
- Masking tape
- Measuring tape

Activity 2 Materials

- Rocket launcher from the National 4-H Science day experiment 2014 (see local extension office, if they don't have it reference instructions at bottom on how to build one)
- 8 ½ X 11 inch card stock (enough for 2 sheets per person)
- Scotch Tape
- Multiple 2 liter bottles (they are good for 4-6 stomps)

Space Required

Room big enough to spread out. Space to make a "runway" for a paper airplane and space to launch a stomp rocket (approximately 20 feet long and at least 10 feet tall ceiling).

Before the Meeting

Set up a runway for your paper airplane (a line of masking tape so that everyone starts from the same spot. Set up launch pad for rocket. Spread out paper where youth will be sitting

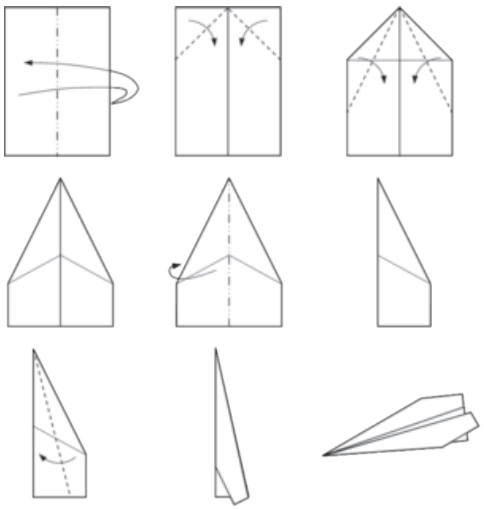
Background

Aerospace is the study of flying objects. This could mean many things such as watching how birds take flight, how an airplane can remain airborne, or how a rocket launches and moves in outer space.

Aerospace is often broken down into two categories: aeronautics which is the study of flight inside the atmosphere, and astronautics which is the study of flight outside of the atmosphere. Within each of these disciplines there are people who study the design and flight patterns of each of the objects. Multiple factors influence these studies such as aerodynamics, propulsion, and environment where the air or space craft will be. Aerodynamics is the study of the way that an object moves through the air. Propulsion is the amount of energy needed to move an object forward. People who study environments determine what kind of material is needed to make the aircraft or spacecraft so that it will be safe and effective in whatever environment that it ends up in. People also study the safety of air crafts and how they return to the ground without damaging the aircraft or the passengers that it may be carrying.

Activity 1 Instructions (25 mins)

1. Give members step by step instructions on how to build an airplane. Demonstrate so they can see how to do it:
   a. Fold Paper in half long ways.
   b. Fold in Corners of paper airplane so that they form 90 degree angles with the midline.
   c. Fold each side in so that the outside of the 90 degree triangles is even with the midline.
   d. Fold in half so that your paper air plane makes a triangle and a square
   e. Fold in half again so that your paper airplane has wings. Set aside



2. Instruct member to build an paper airplane of their own design.
3. When everyone has completed both paper airplanes launch them at the runway. Record how far each airplane goes for later comparison.
5. Discuss the reflect and apply questions.

Reflect and Apply Questions

1. Which airplane went farther?
2. Why do you think that one went farther than the other?
3. What was your propulsion device? What is the difference in how far it went depending on how hard you threw your plane?

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Activity 2 Instructions (20 mins)

1. Direct members on how to build a stomp rocket:
    a. Roll paper up so that it will fit around your launch tube.
    b. Completely close off one end of your tube so that no air can escape
    c. Roll paper to a point and attach to top of the tube where the tape is for a nose cone
    d. Cut 3, 90 degree triangles and attach to the fins to the opposite end as your nose cone.
2. Once they have their rocket built direct them to the launch pad
3. Give each member a 5 second countdown and have them stomp on the bottle to launch their rocket.
4. Discuss questions below after everyone has launched their rocket.

Reflect and Apply Questions

1. What was the difference in flight patterns between the rocket and the airplane? Does the design of each affect how they fly? What about how they take off?
2. Was there a difference in how far they went when your compare your design to a friends? Where there differences based on how hard you stomped on the bottle?

How to build rocket launcher:

Materials:

- 1-2inch PVC pipe (All pipe is 3/4inch in diameter can be different so long as all the same size)
- 2-5inch PVC pipe
- 3-12inch PVC Pipe
- 2- Tee PVC Pipe pieces
- One connection piece
- 2 caps

Instructions:

1. Attach two 12inch pieces together using the connector
2. Attach a tee piece on one end of the 12 inch pieces
3. Attach the last 12inch piece on the top of the tee piece
4. Attach the 2inch piece on the last open hole of the tee piece
5. Attach the second tee piece to the other side of the 2inch piece
6. On the two open holes attach the 5 inch pieces
7. Put the caps on each end of the 5 inch pieces
8. Attach a 2 liter bottle to the first 12inch piece using duct tape
9. Put rocket on the piece that is sticking up.

Other Related Resources:

National 4-H Science day experiment 2014 Rockets to the Rescue

References:

Adapted from: National 4-H Science day experiment 2014

LESSON 1

Aerospace: It's a Bird, No it's a Plane, No It's a Rocket

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REFLECT AND APPLY ANSWER SHEET

Activiy 1 Reflect and Apply Questions

1. **Which airplane went farther?**
2. **Why do you think that one went farther than the other?**
3. **What was your propulsion device? What is the difference in how far it went depending on how hard you threw your plane?**

Activity 2 Reflect and Apply Questions

1. **What was the difference in flight patterns between the rocket and the airplane? Does the design of each affect how they fly? What about how they take off?**
2. **Was there a difference in how far they went when your compare your design to a friends? Where there differences based on how hard you stomped on the bottle?**

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