Aerospace: Putting it all together!

Learn how to make a model rocket and to tie everything you have learned together to maximize your design.

Time

2 meetings: 1 hour each
1 meeting: 2 hours
(Dependent upon how many youth are present and difficulty of kits. Numbers above based on 10 members with simple kits)

Materials

- Model rocket kits
- Super glue-if building in one session
- Elmers glue-if building in two sessions
- Scissors
- Model rocket launcher
- Model rocket launch pad
- Correct model rocket engine, igniters and plugs for rockets youth will be building

****Note:** Model rockets can vary in cost. Look for local sponsors, grants or have the youth provide their own rockets. See http://www.estesrockets.com/ for model rocket kits. They can also be found in most craft stores

Space Required

Room with table space for each youth. Space outside for launching rockets.

Before the Meeting

Set out model rocket kits where members will be working with glue. Set up launch pad and launch controller outside.

Background

People have been studying space dating as far back as the era of ancient Greece. Space has been studied across numerous cultures and countries. It wasn't until recent history though, that people finally made a safe trip into space. Yuri Gagarin, a Russian astronaut, was the first human to enter outer space in 1961. Eight years later, Neil Armstrong was the first human to walk on the moon in 1969. This was less than 50 years ago!

Airplanes are also fairly new in history. Today it seems as though they have been around forever however, the Wright brothers (Orville and Wilbur) were credited with creating the first airplane in the early 1900's. They paved the way for modern scientists to create the jets and airplanes that we have come to know today.

These early scientists have made it possible for people in our era to study aerospace and continue to come up with new inventions using the blueprints of the generation before them.

Activity Instructions

1. Have members follow directions included with model rocket kits to properly build their model rockets (if you are all building the same rocket you may want to show them how to build their rocket step by step)
2. Once glue is all the way dry on model rockets they are ready to be launched (if using elmers glue make sure that you let them dry over night or they may fall apart when launching)
3. Bring the engines, igniters, and plugs outside and have members come up one at a time and assemble these outside.
4. Once the rockets have the engines in them attach them to the launch pad by sliding their launch lug over the pole.
5. Attach the launch controller to the igniter
6. Stand back. Insert the key into the controller and have members give a countdown before launching.
7. When members hit the button on the controller the rocket should take off. (If it doesn't tell members to stay back and go up and disconnect the controller from the engine. Sometimes it is challenging to make sure there is a connection, so try a new igniter if the rocket doesn't launch.)
8. When the rocket launches it will go 300-400 feet into the sky depending on the engine used. There will be a constant output from the engine until it is about out of fuel. It should pop after that which will eject the parachute.
9. Have members chase their rockets and recover them.
10. Once everyone has launched their rocket discuss reflect and apply questions.

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Reflect and Apply Questions

1. What made your rocket aerodynamic? What could you do to your rocket to make it more or less aerodynamic? (discuss lift, weight, and drag)
2. What did your rocket use as propulsion? What type of fuel is in the engine?
3. What about the design of the rocket makes it the best design to do its job?
4. What could you do to change the design of the rocket?
5. What did your rocket have equipped with it to make sure it returned safely?
6. What could you do to your rocket to make it go farther into the atmosphere? (discuss two stage rockets)
7. What other ways could you ensure that your rocket return safely to earth? (discuss second parachutes, adding padding to the rocket, or streamer parachutes)

Other Related Resources:

Wyoming 4-H Rocketry competition

References

http://www.estesrockets.com/ https://en.wikipedia.org/wiki/Yuri_Gagarin https://en.wikipedia.org/wiki/Neil_Armstrong

LESSON 6

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REFLECT AND APPLY ANSWER SHEET

Reflect and Apply Questions

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2. **What did your rocket use as propulsion? What type of fuel is in the engine?**
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6. **What could you do to your rocket to make it go farther into the atmosphere? (discuss two stage rockets)**
7. **What other ways could you ensure that your rocket return safely to earth? (discuss second parachutes, adding padding to the rocket, or streamer parachutes)**

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