

ROCKETS!

SKILLS/OBJECTIVES

- To learn about pressure
- To learn about the trial and error process

MATERIALS

Balloon rocket:

- String
- Straws
- Balloons
- Tape
- Clothes pin

Alka seltzer rocket:

- Film canister with a snap-on lid. Look for a clear film canister, if possible.
- Alka-Seltzer® tablet
- Safety glasses
- Paper towel for clean-up
- Small pitchers for water

Stomp rocket:

- The stomp rockets - 3
- Paper
- Thick paper note cards
- Scissors
- Tape

Final challenge:

- chalk
- yard sticks/ tape measures
- awards sheets
- pens

NOTES

Note: split the kids into 3 groups and do 10 min rotations at each station. Each station should have one main instructor who step by step demonstrates how to make the rocket. The extra help will work individually with kids. **DO THIS OUTSIDE!**

BACKGROUND

- Recap of prior weeks' activities involving space
- Tell children that after two weeks of astronaut training, they are finally ready to build their very own rockets to launch into space → They're going to become rocket scientists!
- They are going to learn how to make three different kinds of rockets and then pick their favorite one to compete in the science club blast off!
- The person whose rocket goes the farthest wins the science club blastoff competition (which will be split into two categories: older and younger).
- Key word of the week: Pressure

Activity # 1	What is a Rocket and how does it work?
Materials	Balloon
Worksheet	no

Ask Children what a Rocket is. How do they think a rocket works? Rockets work with the use of the physical phenomena pressure!

Quick talk: Ask kids, what is pressure? Explanation: Lets say a door way closed and you really wanted to get through. If you pressed really hard on the door, you would create *pressure* on the door. If you and all your friends pushed on the door, would there be more or less pressure?

→ Balloon demo: blow up a balloon all the way and halfway. Ask the children which balloon they think has more pressure. Then release both balloons at the same time and have the children note which balloon moves more (answer: the large one because there is more pressure in it)

- Explain to the children: You can think of it this way: when you blow air into a balloon, it's like trying to cram a bunch of people into a small room – the more people there are in the room, the more *pressure* there will be on the walls of the room (like the door example before). Each air molecule in the balloon is trying to move around and get out. The more air molecules there are in the balloon, the more pressure there is on the 'walls' of the balloon because there are more air molecules pushing on the balloon.

Activity # 2	Alka-seltzer rocket
Materials	<ul style="list-style-type: none"> • Film canister with a snap-on lid. Look for a clear film canister, if possible. • Alka-Seltzer® tablet • Safety glasses • Paper towel for clean-up • Small pitchers for water
Worksheet	no

Note: only demo this for the youngers

1. Have children cut out the pieces of paper outlined in the handout to make the 'cover' of their rocket. Have them decorate it if they wish
2. Put on your safety glasses. Hand out film canisters and have kids note which symbol is on their canister lid so they remember which rocket is theirs when testing.
3. Divide the Alka-Seltzer tablet into four equal pieces and give each child one piece
4. Fill the film canister 1/2 of the way full with water (mark film canisters half way point ahead of time).
5. Place one of the pieces of Alka-Seltzer tablet in the film canister and quickly put the top on and face it away from you. What happens?
6. If there is time, try it again. This time they can vary the amount of water they put in and see what happens.
7. How does this happen? Have a small discussion (longer for olders).
Explanation: Carbon dioxide gas builds up so much pressure the lid is forcibly launched. With an Alka-Seltzer tablet, the CO₂ is produced as a result of a chemical reaction.

Activity # 3	Stomp rockets
Materials	<ul style="list-style-type: none"> • The stomp rockets • Paper • Thick paper note cards • Scissors • Tape
Worksheet	no

1. Give each child a piece of paper and a piece of tape. Also take a piece of paper for yourself so you can explain lead by example.
2. Have everyone fold their piece of paper in half to make a long sphere and tape it shut (look at the model)
3. Then tape one end (ONLY ONE) of the paper shut. You now have a basic rocket! Write your name on it.
4. Experiment with adding wings onto their rockets. Suggest cutting triangles (out of note cards) and adding them symmetrically to all sides. Ask them why wings might be a good idea (balance). If time, have them look at the trajectory of winged vs. un-winged rockets.
5. Test out rockets. Why does this happen? The air that you 'stomp' into the rocket, causes pressure and forces the rocket into the air. Ask children which direction they think the pressure is acting.

Activity # 4	Balloon rockets
Materials	<ul style="list-style-type: none"> • String • Straws • Balloons • Tape • Clothes pin
Worksheet	no

- Prep: thread straw through string and hang string up around classroom (do this for 5 strings and make sure string is tight)
- Note: carefully lead children through the instructions before they begin
- After demo, ask children why they think the balloon moves the straw? Answer: Newton's third law – for every action there is a reaction. There is a lot of built up *pressure* (who remembers what this means) in the balloon, so when you open the balloon the air molecules come rushing out (show the direction with a balloon). But Newton's third law says that for every action, there is a reaction, thus opposite from the air rushing out of the balloon, there is a *force* (show direction) pushing the balloon.
- Give each child a balloon and blow up the balloon – twist end and seal it with a clothes pin
- Move straw to one end of the string and tape the balloon to the straw (underneath works better)

- Remove the clothespin from the balloon and see how far balloon goes

Activity # 5	Final Challenge!
Materials	<ul style="list-style-type: none"> • chalk • yard sticks/ tape measures • awards sheets • pens
Worksheet	Awards!

Final challenge:

Prep: draw a starting line (in chalk) and then mark long lines for 1 meter, 2 meter, etc

- Ask kids to pick their favorite rocket and then gather all the kids outside for the tournament.
- In two groups (one of olders and one of youngsters if convenient) have kids launch their rocket on 3, 2, 1 blastoff! (make sure that each rocket is labeled before it is launched). Have the next group go just as the first group. Make sure that after the kids send off their rockets they don't immediately go looking for how far theirs went – they will do this after everyone has blasted their rockets.
- Then a science club Wes student, NOT A CHILD, will go out and determine which rocket went the farthest. After that, each child can go and look at how far their individual rocket went. Announce the Blastoff winner and hand out award certificate

CONCLUSIONS

- Which rockets worked the best and why?
- What would they need to make a real rocket that could actually go into space?
- Bring film canister and paper 'stomp' rocket (not the actual launcher) home to keep experimenting with!