

Western Engineering Outreach

Straw Rockets

Grade Sk-2

Meet Today's ENG HERO!



L.Y. Jiang - Professor with Western Engineering

Dr. Jiang is a professor in the Mechanical & Materials Engineering department at Western University. Dr. Jiang received her Ph.D. in Mechanical Engineering from the University of Alberta (Canada) in 2005. Dr. Jiang's research focuses on theoretical modeling and numerical simulation to develop mechanics and physics models for challenging problems related to materials behaviour, ranging from traditional to smart materials, and to nanostructured materials. *To learn more about Dr. Jiang visit:*

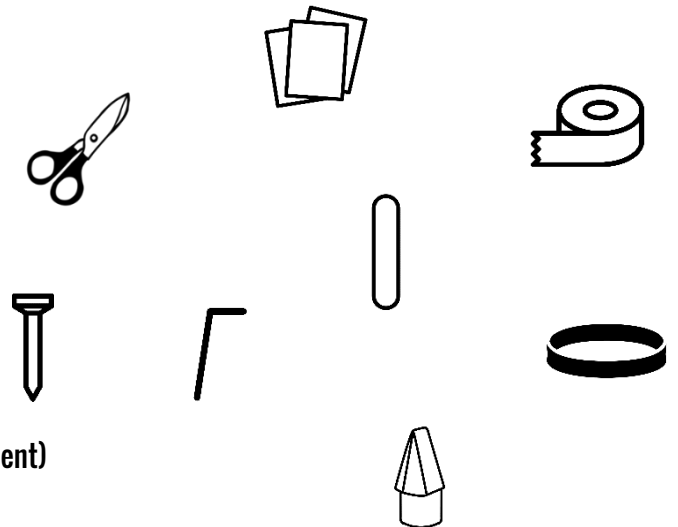
https://www.eng.uwo.ca/mechanical/faculty/jiang_l/index.html

Learning Goal:

- Students will Explore Mechanical Engineering and learn about rockets.
- Curriculum Connections: Grade 1- Materials, Objects, and Everyday Structures, Grade 2- Movement.

Materials Needed:

- Attachable pencil eraser or 1 inch of hot glue stick
- Large (wide) straw
- 1 popsicle stick
- 1 large elastic (thin)
- Brass fastener or a paper clip.
- 3 cardstock triangles (Rocket fins)
- Tape
- Markers
- Small Balloon
- Printed rocket templates (found at the bottom of this document)



Engineering and Science Connections:

Today, we will learn about Mechanical Engineering and rockets.

What do Mechanical Engineers do?

- Mechanical engineers work with moving objects and structures
- A specialization of mechanical engineering offered at some universities is called “aerospace engineering”
- Aerospace Engineers design, build, and test airplanes and rockets.

What is a Rocket?

- A rocket may be a missile, spacecraft, aircraft or other vehicle which is pushed by a rocket engine.
- Some rockets are manned (e.g. Saturn V). “Manned” means that a person is in it.
- Other rockets, for example missiles, are unmanned. “Unmanned” means that the machine can go without a person.

What is an Astronaut?

- An astronaut is a person who is specially trained to travel into outer space.
- Astronauts must undergo extensive training and testing before they can participate in a spaceflight.
- They must show that they can handle the physical rigors from the high gravity of launch to the weightlessness of orbit.
- Astronauts have special gear called a spacesuit that they use when they must leave the safety of their spacecraft. These spacesuits provide them with air, protect them from the extreme temperatures of space, and protect them from the radiation of the Sun.
- The word “astronaut” comes from the Greek words “astron nautes”, which means “star sailor.”



Who is Neil Armstrong?

- Neil Armstrong was the first person to walk on the Moon (1969) .
- When he stepped onto the moon he made the famous statement “That’s one small step for man, one giant leap for mankind.”
- Neil was also part of the Gemini VIII mission which was the first time two vehicles successfully docked in space.



What is NASA?

- NASA is a US space agency, that stands for ‘National Aeronautics and Space Administration’.
- There have been many missions that NASA have undertaken since the organization was founded, with the most famous mission being the moon landings.

STRAW ROCKETS

Video Recommendation: Falcon Heavy rocket launch

<https://www.youtube.com/watch?v=7JcJcZWke1c>

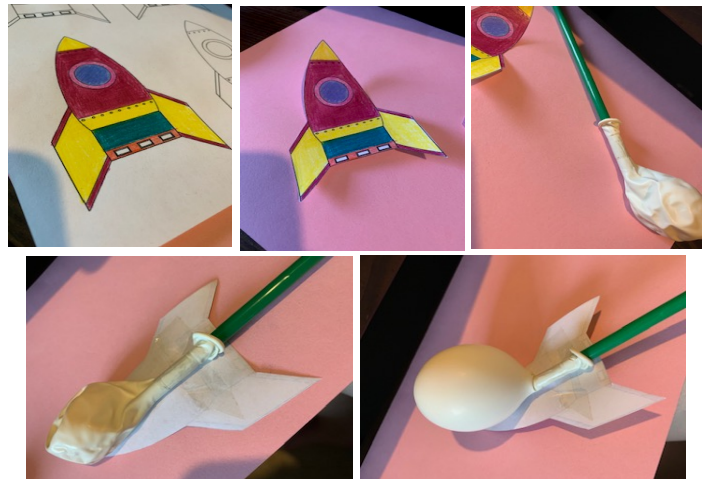
Activity:

Before beginning, think about the following questions:

- Name an airline company.
- What is the name of the famous organization that send astronauts to space?
- What are we building today?

Rocket 1 (Easy)

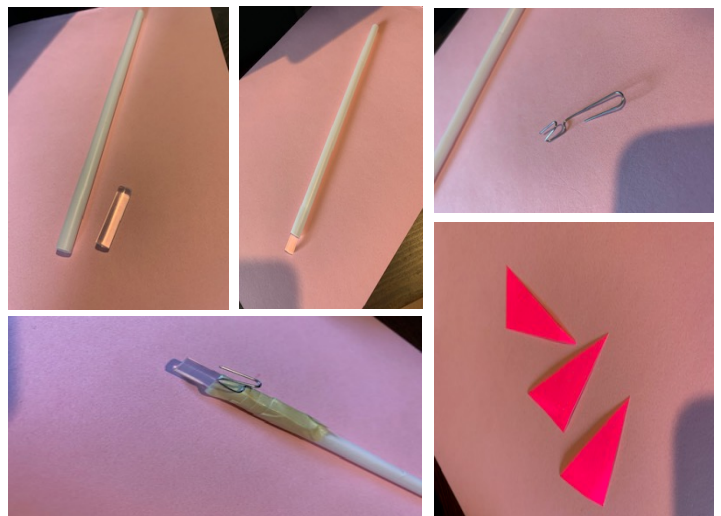
- 1) Using the Rocket templates on the bottom of this document, colour one rocket, and cut it out.
- 2) Tape your small balloon to your straw tightly
- 3) Tape your straw and balloon to the back of your rocket
- 4) Blow your balloon up through your straw. Face it upwards then let the rocket go to launch it.
 - You can cut your straw in half to make it shorter and easier to blow the balloon.



Rocket 2 (Hard)

Part 1: The Rocket

- 1) Attach the eraser (or 1 inch piece of hot glue stick) to one end of the straw.
- 2) Bend the head of the brass fastener, and use masking tape to tape it to the straw (or make a hanging part using a paperclip).
- 3) Cut out 3 paper fins using index cards, thick paper, or cardboard (will not work with normal paper).



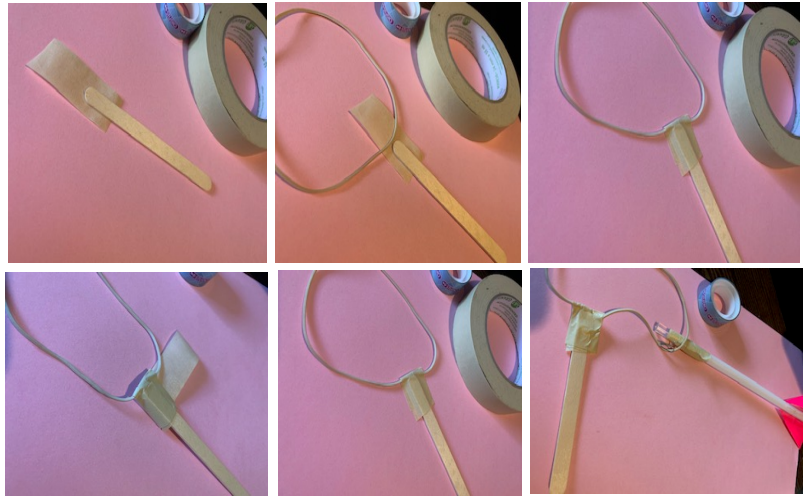
STRAW ROCKETS

4) Tape them to the bottom of the straw as shown in the pictures below:



Part 2: The Slingshot

- 5) Grab one popsicle stick, and a small piece of masking tape.
- 6) Tape half of the piece to the popsicle stick, and add the rubber band on the tape
- 7) Close the tape on the other side of the popsicle stick, and add another layer of masking tape to keep it in place
- 8) Hold the slingshot with one hand and the rocket with the other.
- 9) Hook the fastener on to the rubber band (or your paperclip), pull back and launch.



What Did You Learn?



- Who was the first man to walk on the moon?
- What type of engineering was explored today?
- What is a rocket?

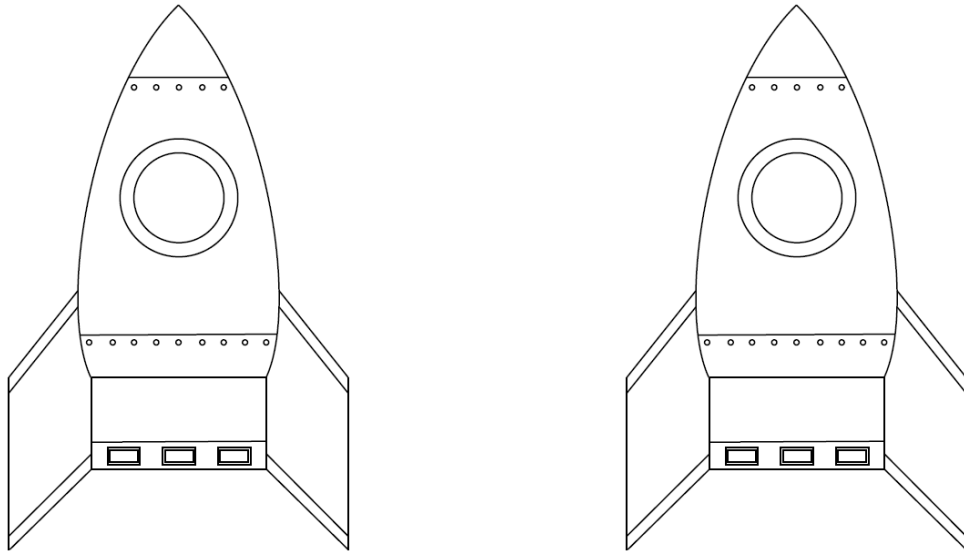
Future Learning



- Look around your house for new material, and use them to make your rocket go farther than it does.
- What made your rocket travel farther? Why do you think it did?

STRAW ROCKETS

Rocket Templates: Print and customize, or draw your own rocket.



Share your creations!

We would love to see what you made. Email us at discover@uwo.ca or tag us on social media.

Instagram: @westernueng

Twitter: @westernueng

Facebook: @westernueng

Thanks for discovering with us!