ROCKET LAB ACTIVITY PLAN: ROCKETS

45 MINUTES

GOAL

Students learn that rockets burn fuel in one direction to fly in the opposite direction. Students learn the meaning of the word force, action and reaction. Students learn that this phenomenon is known as Newton's Third Law of Motion and apply this to everyday examples of action and reaction forces.

LEARNING OUTCOMES

1. Appreciate that scientists ask questions about our world that lead to investigations and that open-mindedness is important because there may be more than one explanation.
2. Extend their experiences and personal explanations of the natural world through exploration, play, asking questions, and discussing simple models.
3. Explore and act on issues and questions that link their science learning to their daily living.
4. Explore everyday examples of physical phenomena, such as movement, forces, electricity and magnetism, light, sound, waves, and heat.
5. Seek and describe simple patterns in physical phenomena.

VOCABULARY

Force, action, reaction

MATERIALS

- Paper templates
- Paper for nose-cone
- Tape
- Long balloons
- Balloon pump
- String
- Plastic drinking straw

ACCESSING PRIOR KNOWLEDGE (10 MINUTES)

Demonstration 1:
Take one balloon and inflate it using a balloon pump. Ask students to guess what will happen when the balloon is released.

Release the balloon and make students take note of their observations and discuss if their observations were correct.

Demonstration 2:
Select two students to hold each end of a string and walk in opposite directions until the string is stretched tight.

Thread a plastic drinking straw onto the string and move it approximately halfway between the two students. Inflate a balloon using a balloon pump and ask a third student to hold the balloon closed while it is taped to the straw – make sure the balloon is pointed toward either end of the string before taping.

Ask students to guess which direction the balloon will travel along the string 'track'. Count down from 10 and allow the third student to release the balloon.

Students take note of their observations and discuss if their observations were correct.

NEW INFORMATION PRESENTED (5 MINUTES)

When an inflated balloon is released, the air inside is pushed out the end. This creates a force. All forces are either a push or a pull.

When the air inside a balloon pushes one way, the balloon is pushed in the opposite direction. Every push force (or action force) has another force pushing in the exact opposite direction (called the reaction force).

ACTIVITY

MAKING ROCKETS (25 MINUTES)
STUDENT WORKSHEET: WHY DO ROCKETS FLY?

Making a paper Electron rocket:

1. Construct a paper tube using the template provided
2. Take one long balloon and tape the closed end to the inside top of the paper tube.
3. Construct a paper nose-cone for the rocket and tape to the top of the paper tube.
4. Using a balloon pump, inflate the balloon and then pinch it shut with your fingers
5. Countdown from 10, release the balloon and launch your rocket into the sky!

GOAL REVISITED (5 MINUTES)

One student from each group presents their findings to the class, making sure to include the vocabulary learned, and a real world example of Newton's Third Law.rce).

WHY DO ROCKETS FLY?

The Electron rocket burns a fuel called kerosene. It mixes the kerosene with liquid oxygen because all fires need oxygen to burn.

Inside of the Electron rocket, there are two big tanks made from a material called carbon fibre. One tank is for kerosene and one tank is for liquid oxygen, which is very cold! The Electron rocket is the first rocket to go to space using carbon fibre tanks!

When the Electron rocket burns fuel, it creates a force. All forces are either a push or a pull.

CREATE YOUR OWN ROCKET

What fuel did your rocket use?

Circle the correct answers in the sentence below:
When the balloon was let go, the air rushed out the end to create the (Action/Reaction) force. This pushed the rocket in the (opposite/same) direction.

How could you control where your rocket flies?

How could you make the rocket travel even further?

Draw your rocket in flight and include an arrow showing the direction of the action force and the reaction force:

ELECTRON