SCIENCE LAB

BALLOON ROCKET

Amazing Earth 5th Grade

Driving Question: How does changing the amount of air inflated into the balloon affect the speed and distance the rocket travels down the string?

WHAT IS HAPPENING?

Blowing air into the balloon compresses air particles, storing **energy**. When released, that escaping air creates an **unbalanced net force** pushing the rocket forward.

KEY SCIENCE IDEAS

Energy Transformation
Stored potential energy in the balloon becomes motion (kinetic energy) as the air escapes.

Unbalanced Net Force
The escaping air creates a net force that pushes the rocket forward.

Friction
The string creates friction that slows the rocket down.

MAKE A HYPOTHESIS

Write at least 3 hypotheses. Use "If..., then..., because..."

1. If _____
   then _____
   because _____

2. If _____
   then _____
   because _____

3. If _____
   then _____
   because _____



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BALLOON ROCKET RESULTS

Amazing Earth 5th Grade

EXPERIMENT STEPS

- ☐ **1.** Thread the string through the straw.
- ☐ **2.** Blow up the balloon. (That person always blows — no germs!)
- ☐ **3.** Pinch the end.
- ☐ **4.** Hold the balloon under the straw.
- ☐ **5.** Put two pieces of tape across the straw onto the balloon.
- ☐ **6.** Hold the pinched end at the end of the string.
- ☐ **7.** Each person holds one end of the string and stands far apart.
- ☐ **8.** Let go of the balloon and watch it fly!

TEST AND RECORD YOUR RESULTS

Trial (Amount of Air)	Observed Speed	Relative Distance	What did you notice? (Write 1–2 observations)
1 2 puffs	Slow Medium Fast	Short Medium Far	
2 4 puffs	Slow Medium Fast	Short Medium Far	
3 6 puffs	Slow Medium Fast	Short Medium Far	

DRAW YOUR BALLOON ROCKET SETUP

Label arrows for:

1. Escaping Air Push
2. Motion Direction
3. Line Friction

EXTRA THOUGHT QUESTIONS

1. What would happen if we added a lubricant to the string? _____

_____

_____

2. What would happen if we had a larger balloon? _____

_____

_____

SCIENCE LAB

MARSHMALLOW SHOOTER

Amazing Earth 5th Grade

Driving Question: How does changing how far back we pull the balloon launcher affect the speed and kinetic energy of the marshmallow?

WHAT IS HAPPENING?

Stretching the balloon applies a **force** to the **rubber**, **storing energy**. When released, a **contact force** strikes the marshmallow and **transfers** that energy. It transforms into **kinetic energy**, causing the marshmallow to **accelerate** forward.

KEY SCIENCE IDEAS



Kinetic Energy
Moving objects have kinetic energy, the energy of motion.



Energy Transfer & Contact Forces
When the snapping balloon hits the marshmallow, contact forces transfer energy from the launcher to the marshmallow.



Net Force & Mass
An unbalanced force causes the marshmallow to move. Heavier objects need a greater force to move.

MAKE A HYPOTHESIS

Write at least 3 hypotheses. Use "If…, then…, because…"

1. If _____ , _____
   then _____
   because _____

2. If _____ , _____
   then _____
   because _____

3. If _____ , _____
   then _____
   because _____



SCIENCE LAB

MARSHMALLOW SHOOTER RESULTS

Amazing Earth 5th Grade

EXPERIMENT STEPS

- ☐ **1.** Stretch a balloon over a pencil or straw.
- ☐ **2.** Tie the end of the balloon.
- ☐ **3.** Place a marshmallow inside over the knot.
- ☐ **4.** Pull back on the knot (small pull, medium pull, large pull).
- ☐ **5.** Aim safely.
- ☐ **6.** Release and watch it launch!

TEST AND RECORD YOUR RESULTS

Trial (Pull Distance)	**Observed Speed** (circle one)	**Relative Distance** (circle one)	**What did you notice?** (Write 1–2 observations)
1 Small Pull	Slow Medium Fast	Short Medium Far	_____ _____
2 Medium Pull	Slow Medium Fast	Short Medium Far	_____ _____
3 Large Pull	Slow Medium Fast	Short Medium Far	_____ _____

DRAW YOUR MARSHMALLOW SHOOTER SETUP

Label arrows for:

① Pulling Force (Stretch)
② Launch Direction
③ Contact Force / Energy Transfer

EXTRA THOUGHT QUESTIONS

1. What would happen if we used a marshmallow with a greater mass? What about one with a lesser mass?

_____

_____

2. Unlike the balloon rocket, there is no friction causing the marshmallow to slow down. What force is acting on the marshmallow?

_____

_____