



# Hands-on **STAR**★net

Tested & Approved STEM Activities

# Balloon Rockets

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# Activity Guide



A product of the Science-Technology Activities and Resources for Libraries (*STAR Net*) program. Visit our website at [www.starnetlibraries.org](http://www.starnetlibraries.org) for more information on our educational programs. May 2018

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## Overview

Children are “rocket scientists” as they test their ideas relating to physical forces and launch simple balloon-powered straw “rockets.”

## Activity Time

Under 10 minutes




## Intended Audience

**Families** or other mixed-age groups, including children as young as 3 years old *with assistance from an older child, teen, or adult*  
**School-aged children**

## Type of Program

- Facilitated hands-on experience
- Station, presented in combination with related activities
- Passive program (if instructions are provided)
- Demonstration by facilitator

## What's The Point?

-  When air is allowed to escape from a balloon, the balloon is propelled forward and demonstrates a basic principle in physics (Newton's Third Law of Motion).
-  Rockets are pushed forward by the force of engine exhaust escaping from the opposite end of the rocket.
-  Children – including young children – learn physics concepts by manipulating objects and observing their motions.

# Materials

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- 1 balloon per family
- 2 drinking straws
- 2 (4-10 foot) strings (kite strings work well – discard the kites but keep the handles) or lengths of fishing line
- Masking tape or glue dots
- Optional: 2 inflatable or stuffed “planets” or “moons”
- Optional: Speedometer, purchased from a sporting goods store or [Amazon.com](https://www.amazon.com)
- Optional: Printed copies of the instruction sheet, *Explore on Your Own: Balloon Rockets* (below)

**Tip:** If you use fishing line, clearly mark off the area where the line will be set up so that participants do not accidentally walk into it.

# Preparation

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- Thread the drinking straws onto the strings. Add tape to the ends of the strings to prevent the straws from slipping off.
- Have one volunteer (adult, teen, or older child) hold the kite handle in one hand. **Optional:** have the volunteer also hold an inflatable or stuffed “planet” or “moon” as a target for the rocket.
- Unwind 4-10 feet of kite string. Have a second volunteer hold the other end of the string and the straw.
- If needed, provide copies of the instruction sheet, *Explore on Your Own: Balloon Rockets*.

# Activity

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## 1. Invite children to take turns launching their rockets.

- Blow up a balloon and hold its mouth closed, but do not tie it (adults will need to help small children).
- Attach the balloon to the straw using tape or glue dots, while holding the balloon’s mouth closed.

Allow children to choose how to attach the balloon, even if it’s the “wrong” way.

- Release the air from the balloon and see if the straw reaches the other end of the string.
- **Optional:** Measure the speed at which the balloon rocket travels using a speedometer.

## 2. Try again!

Remove the tape or glue dots from the straws, as needed, and reuse the straws for each launch. If necessary, change the direction that the balloon is attached (so that the mouth points away from the target, propelling the straw toward the target). Or, try blowing the balloon up with more or less air and see how far the straw travels in each case.

# Next Generation Science Standards

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## Disciplinary Core Ideas

### **PS2.A: Forces and Motion**

- Pushes and pulls can have different strengths and directions.
- Pushing or pulling on an object can change the speed or direction of its motion and can start or stop it.

### **PS3.C Relationship Between Energy and Forces**

- A bigger push or pull makes things speed up or slow down more quickly.

## References

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Mazza, D. (2005, September 9). "Activity: Controlled Propulsion Experiment – Balloon," in *Beginner's Guide to Rockets: Newton's Third Law and Rocket Propulsion*.

Retrieved from [https://spaceflight systems.grc.nasa.gov/education/rocket/Lessons/propulsionS\\_act.html](https://spaceflight systems.grc.nasa.gov/education/rocket/Lessons/propulsionS_act.html).

NGSS Lead States (2013). *Next Generation Science Standards: For States, By States*. Washington, DC: The National Academies Press.

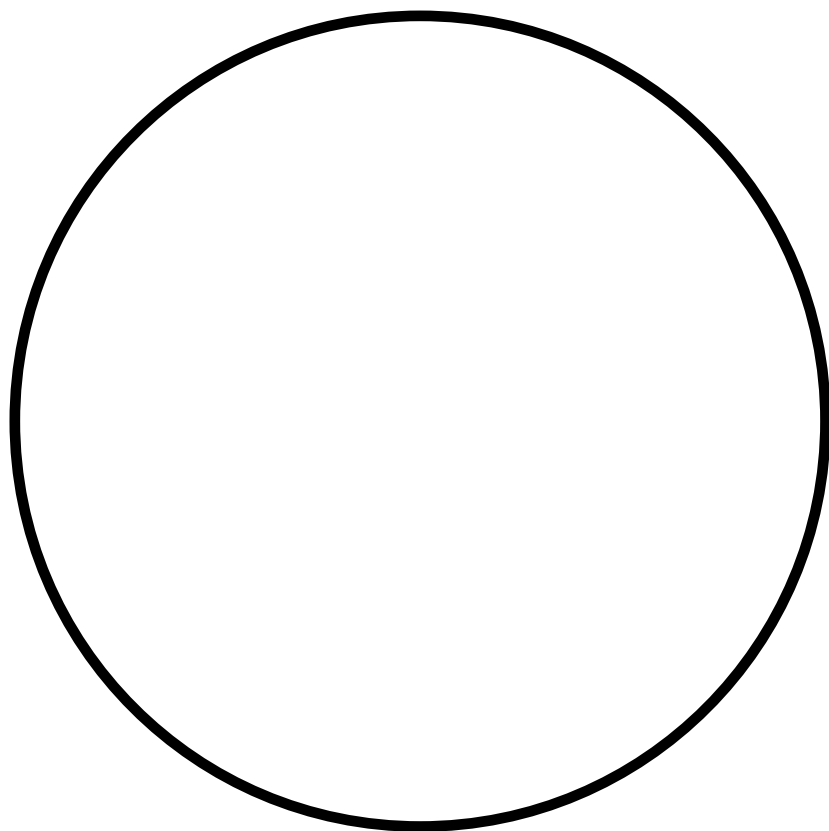
Gur, C. (2011). "Physics in preschool." *International Journal of the Physical Sciences* 6(4), 939-943.

# Activity Materials to Print

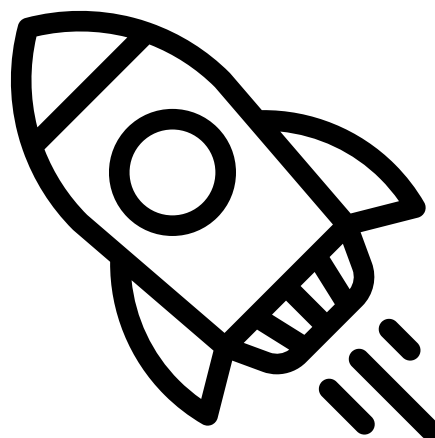
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# Explore on Your Own:

## Rocket Coloring Page and Hands-on Activity



**What planet would you like your rocket to visit?**  
**<----- Draw it here.**



## Activity

**Be a rocket scientist!** Use a balloon to launch a straw “rocket.”

### What You’ll Need

- A balloon
- A drinking straw
- A long piece of string (4-10 feet)
- Tape or glue dots
- Art supplies to draw a planet you’d like your rocket to visit

### What to Do

- 1) Straight drinking straws work best. If you have a bendy straw, cut off the part that bends and keep the straight part.
- 2) Tie one end of the string to a chair or railing. This is where your balloon rocket will fly to. If you want, draw a picture of a planet you’d like your rocket to visit on this sheet and tape your picture in the same place.
- 3) Have a friend or family member hold the other end of the string. Thread the straw onto the string. Add tape to the end of the string to prevent the straw from slipping off.
- 4) Blow up a balloon and hold its mouth closed. Don’t tie the balloon! Get help from a grown-up if needed.
- 5) Your balloon is the engine for your straw “rocket.” Which way should you point the balloon’s mouth? You decide!
- 6) Attach the balloon to the straw using tape or glue dots.
- 7) Let go of the balloon’s mouth and see how far your rocket flies!
- 8) Launch your balloon again. Try something different this time!

Adapted from the NASA “Beginner’s Guide to Rockets: Rocket Propulsion Activity,” <https://goo.gl/JCC7gM>

