WONDERY KIDS

THE ULTIMATE HIGH-FLYING AIR ROCKET

NEXT LEVEL CHALLENGES!

THAMES & KOSMOS

WOW IN THE WORLD

NAME:

❶ TARGET PRACTICE

You will need:
Paper
Pens, pencils, markers, or crayons, etc.
Optional: tape to connect multiple pieces of paper together

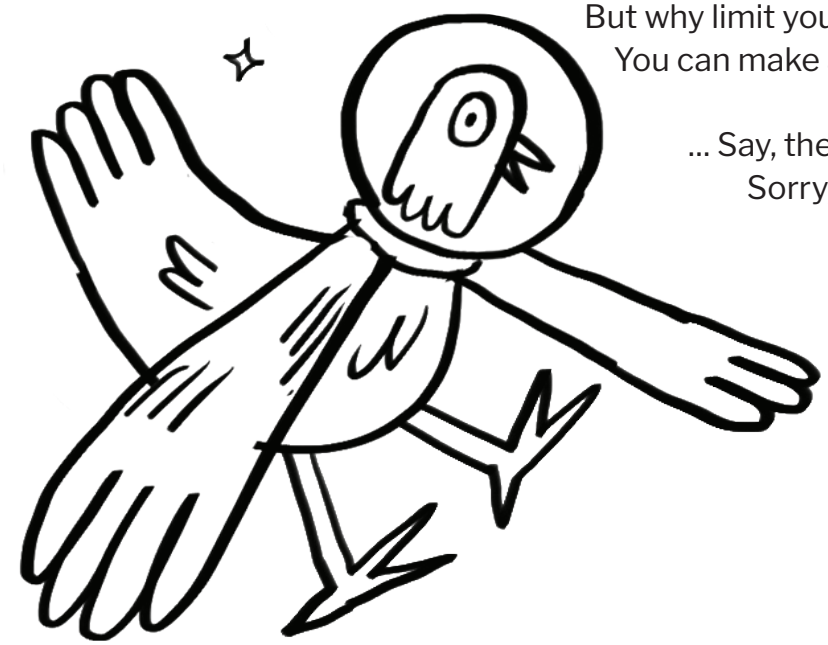
Here's how:

Make a target on a piece of paper, or print the one on the next page. Then set it out in a field, and try to hit the target with the rocket.

There are lots of ways to make a target. If you want to make a circular target with a bullseye, you can find round objects of various sizes around your house, and use them to trace a circular line.

You can also create a compass circle tool by tying a string to a pencil. Have a friend hold one end of the string down, while you pull the pencil out so the string is taught, and trace a circle around the center point. You can change the radius of the circle by making the string longer or shorter. This works with a stick too, if you want to draw circles in the dirt.

For a giant target, a kiddie pool works well!



But why limit yourself to circles?
You can make a target in any shape you want!

... Say, the shape of a pigeon?
Sorry, Reggie!


NAILED
IT!

❷ DIY PAPER ROCKET

You will need:
Paper
Pens or pencils
Tape
Scissor

Here's how:

Make your own rocket out of a rolled-up paper tube and a cardboard nose cone and fins. If you want, you can print the template on the next page.

1. Print out the next page, or start with your own blank sheet of paper. Decorate the paper any way you want with colors, stickers, glitter, etc.

2. Cut out the rocket tube along the dotted lines.

3. Roll the rocket tube around the black launch tube and secure it with a few pieces of tape. You want the paper to be snug, but not too tight. You might need to experiment a bit to get the right fit.

4. Cut out the fins along the dotted lines.

5. Fold the fins down the middle, then secure the two sides together with tape.

6. Fold the tabs along the solid lines and secure them to the rocket tube with tape.

7. Choose a nose cone and cut it out along the dotted lines, or design your own.

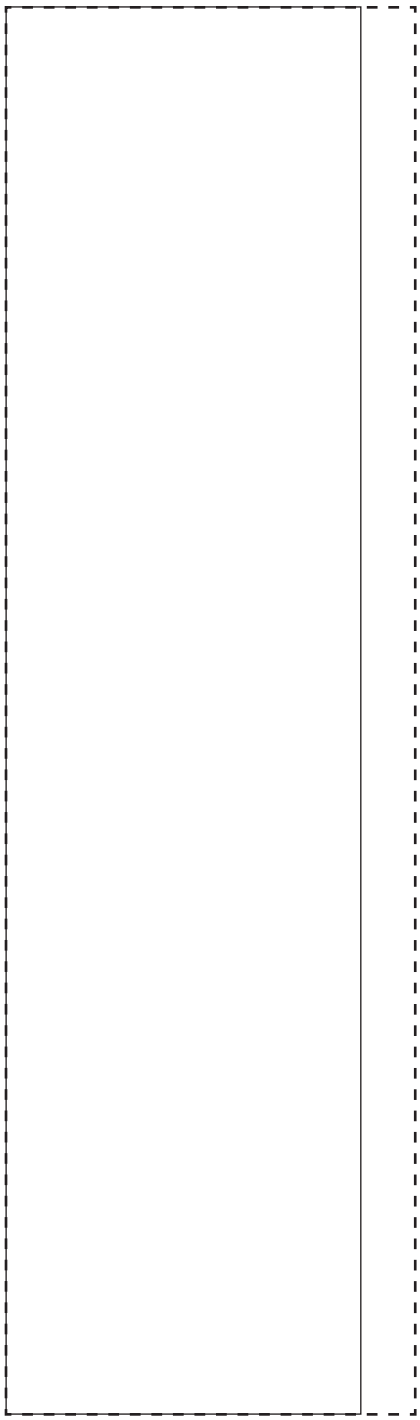
8. Fold the tab along the solid line. Then wrap the two edges together and use tape to secure the tab to the other side of the cone.

9. Tape the nose cone to the top of the rocket tube.

10. Launch your rocket!

11. Set up a little friendly competition with your classmates, friends, or family. Who can make the rocket that flies the highest?

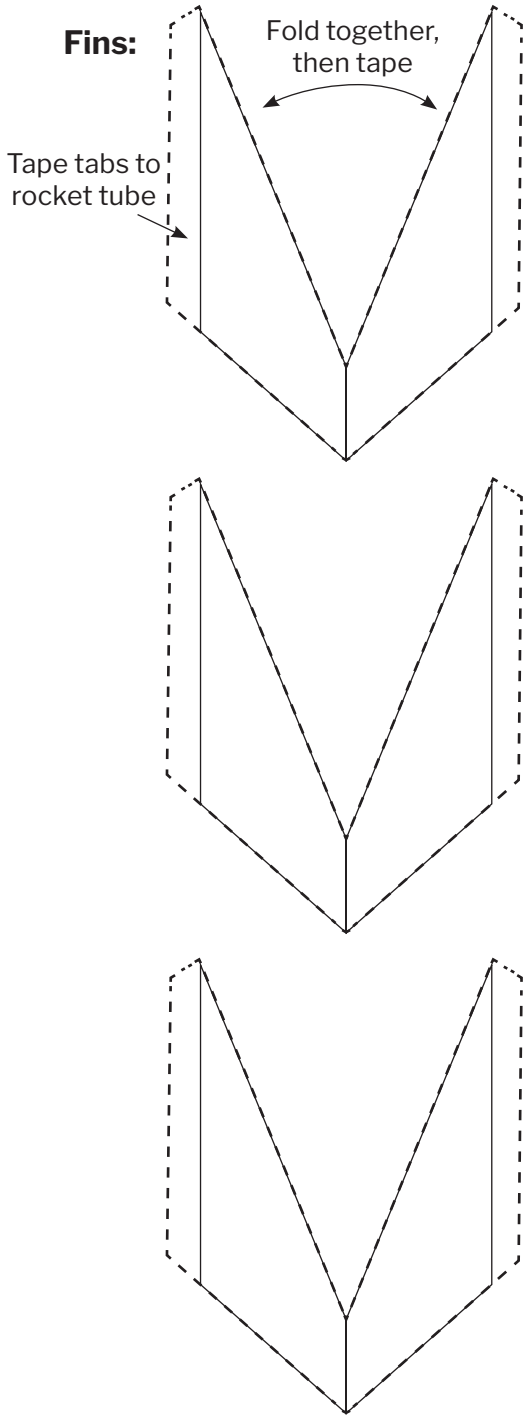
Rocket tube:



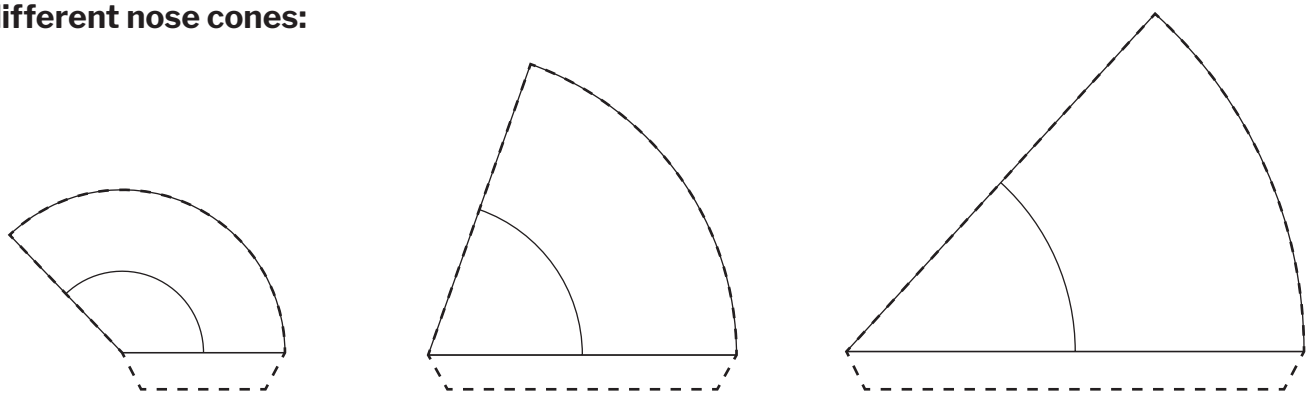
OF COURSE, THESE ARE ONLY SUGGESTIONS TO GET YOU STARTED. YOU CAN MAKE ANY DESIGNS YOU WANT!
THE SKY'S THE LIMIT!*

*WINK WINK NUDGE NUDGE

Fins:



3 different nose cones:



❸ UNDER PRESSURE!

You will need:
Pen or pencil for recording data
Air rocket with pressure gauge

Here's how:

1. Set up your Ultimate High Flying Air Rocket.

2. Place the nozzle cap on the nozzle adapter ring.

3. Watch the air pressure meter closely as you stomp lightly on the stomp pad. How much air pressure did you create?

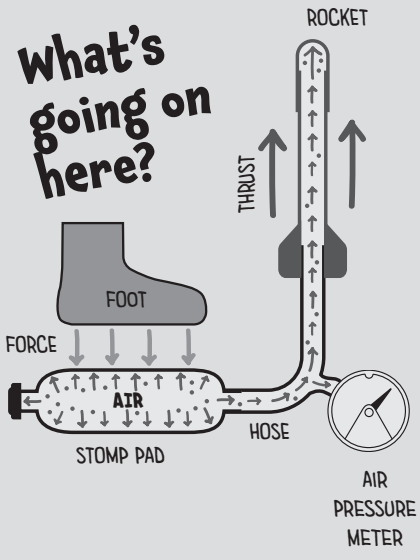
4. Record your results on the following page by making a mark on the illustration, and write a note about the stomp that achieved that result.

5. Reset the needle on the air pressure meter with your finger.

6. Repeat steps 3 – 5 with a harder stomp.

7. What happens if you don't launch a rocket, but rather just stomp on the pad?

8. What happens if you change the nozzle from the nozzle cap to the fart nozzle? What about the whistle nozzle? There are so many combinations to try!

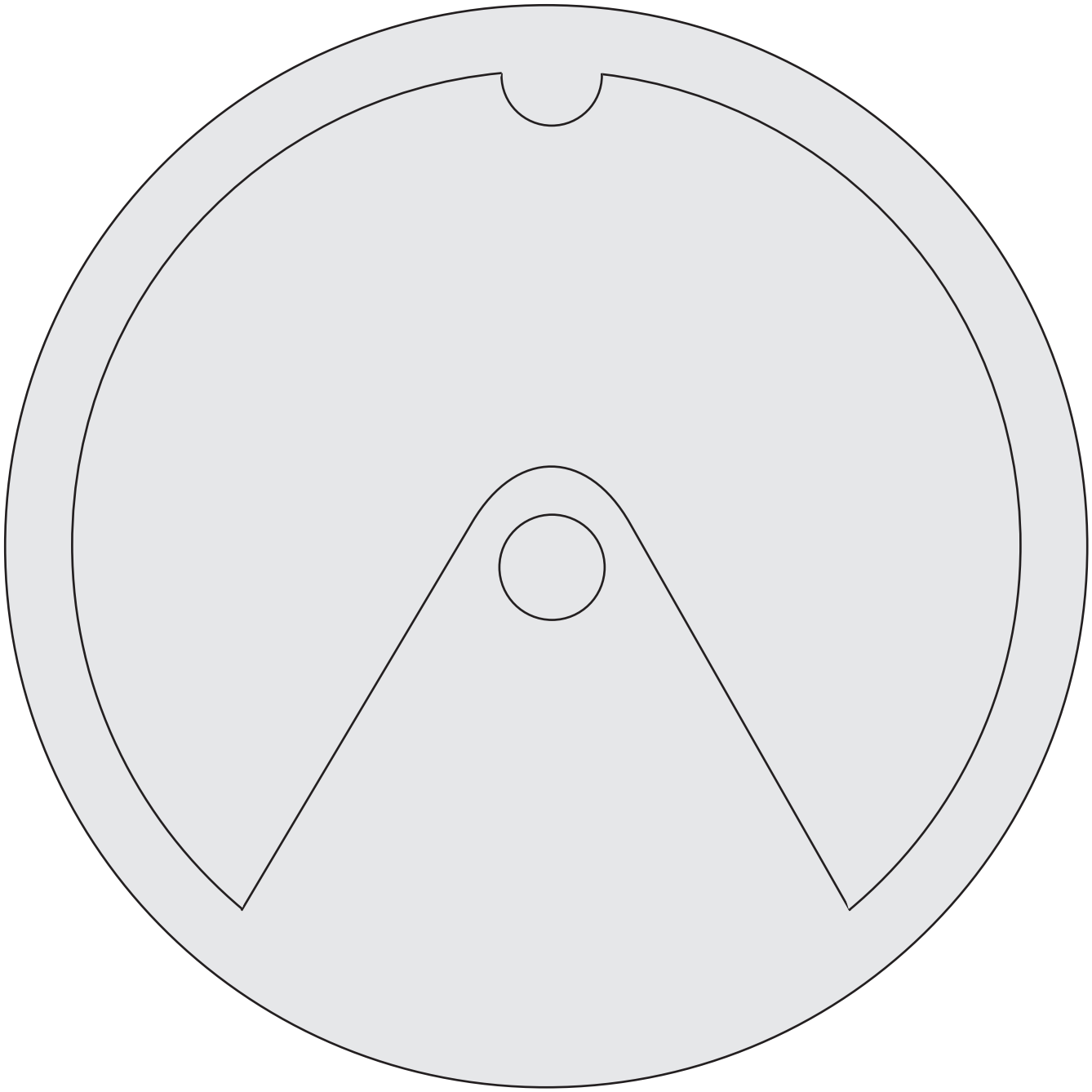


The stomp pad is filled with **AIR.** Air is made of very small particles that we cannot see. When you feel wind, you are feeling countless moving air particles pushing on your skin. This push is called a **FORCE.** The force exerted by air on a surface is called **AIR PRESSURE.**

When you stomp on the stomp pad, the air particles inside it are pushed into a smaller space. They have no where else to go, so they are quickly pushed through the hose and up into the rocket. Some of the air is diverted to the **AIR PRESSURE METER.**

The greater the force from your foot, the greater the air pressure inside the stomp pad. You can increase the force by using more weight or increasing the speed of the stomp. The air pressure inside the pad will be lower if there is more room for it to escape, for example, out the whistle or fart nozzle.

AIR PRESSURE METER



❹ DATA TIME!

You will need:
Stopwatch
Pen or pencil for recording data
Protractor (to measure angle)
Measuring tape

Here's how:

1. Get out a stopwatch, and set up your Ultimate High Flying Air Rocket.

2. Measure the time each rocket is in the air. Repeat four trials for each rocket, then calculate the average.

3. Now choose one rocket to do the launch angle experiment with. (In science, it's best to vary only one variable at a time!)

4. Choose your first launch angle and measure it using a protractor.

5. Launch the rocket and measure the distance from the launch site using the measuring tape. Repeat three more times, then calculate the average of all of the trials.

6. Repeat steps 4 and 5 two more times, choosing new angles each time.

7. Design your own experiment! What other variables could you test?

Keeping the launch angle constant, how long does each rocket stay in the air?
Use a stopwatch to measure the time and record the results in the data table.
Be sure to include units!

Trial	Short Rocket	Medium Rocket	Long Rocket
1			
2			
3			
4			
AVG			

Keeping the rocket type constant, how far does the rocket travel at different launch angles?
Use the measuring tape to measure the distance traveled during each launch.
Be sure to include units!

Trial	Angle 1: ____°	Angle 2: ____°	Angle 3: ____°
1			
2			
3			
4			
AVG			

Design your own experiment! Which variables will you keep constant and which will you vary?

Trial			
1			
2			
3			
4			
AVG			