



EduTrend Contents

EDUTECH · ENGINEERING · MIDDLE SCHOOL

Balloon-Powered Car

Build, test and iterate a car driven by a balloon jet

Ages 12–14

Level: Intermediate

75 minutes

Pairs · up to 30

Activity 04

Inside: activity at a glance · step-by-step session plan · facilitator notes · 3 student worksheets · assessment checklist

ACTIVITY 04 · AT A GLANCE

Balloon-Powered Car

Pairs build a car from card, straws, skewers and bottle tops, powered by a balloon. They measure how far it travels, then change one variable at a time, such as wheel size or straw length, and record the effect. Pairs explain the motion using the idea that the air pushed backwards pushes the car forwards.

Learning outcomes

By the end of the session students can:

- build a working prototype;
- change one variable at a time;
- measure performance;
- explain motion using forces.

KEY WORDS

thrust · friction · axle · iteration · variable · Newton's third law

CURRICULUM LINKS

Science: forces. Maths: measuring and averages. Design and technology: mechanisms.

1**ASK**

Who needs what?

2**IMAGINE**

Many ideas

3**PLAN**

Sketch and choose

4**BUILD**

Make a prototype

5**TEST**

Measure against criteria

6**IMPROVE**

Redesign and retest

Materials (per pair)

- Card
- Straws
- Wooden skewers (ends blunted)
- Bottle tops
- Balloons
- Tape
- Tape measure
- Worksheets 1, 2 and 3

Before the session

- Blunt skewer ends.
- Pre-cut card bases.
- Mark a test track.
- Print worksheets.

SAFETY

Blunt skewer tips. Check for latex allergies before using balloons. Do not overinflate.

ACTIVITY 04 · SESSION PLAN

Step by step

Axles that rub on the body cause most early failures; check friction first.

Time	What happens	Say or ask
0–10 min Ask	Show a balloon car.	<i>“What pushes it?”</i>
10–30 min Build	Build a first car.	<i>“Do the wheels turn freely?”</i>
30–40 min Test	Measure distance three times.	<i>“Is it consistent?”</i>
40–65 min Iterate	Change one variable, retest.	<i>“What made the difference?”</i>
65–75 min Explain	Forces explanation.	<i>“Why does it move forwards?”</i>

CHALLENGE CARD (print or copy onto the board)

Build a balloon-powered car, improve it by changing one variable at a time, and explain its motion using forces.

ACTIVITY 04 · FACILITATOR NOTES

The engineering know-how in brief

Air rushing backwards out of the balloon pushes back on the car, pushing it forwards. This is an example of Newton's third law: forces come in equal and opposite pairs.

Friction at the axles and air resistance slow the car. Iterating one variable at a time shows which changes really improve performance.

Common ideas to listen for

- "The air pushes on the room." It pushes on the car.
- "Bigger balloons always go further." Friction and mass matter.
- "Change everything at once." Then you cannot tell what helped.

Adapting the activity

Support

Provide a pre-built chassis.

Stretch

Calculate average speed using a timer.

WORKSHEET 1

First test

Name: _____

Class: _____ Date: _____

Three runs.

First test

Run	Distance (cm)
1	
2	
3	
Mean	

WORKSHEET 2

Iterations

Change one thing at a time.

Iterations

Change made	Mean distance (cm)	Better or worse?
1		
2		
3		
4		

WORKSHEET 3

Forces explanation

Explain the motion.

Why the car moves and what slows it

FOR THE TEACHER

Assessment checklist

Use during the session. One sheet covers up to eight students; copy as needed.

Student	Builds a working car	Iterates systematically	Explains with forces

Suggested codes: W = working towards · E = expected · G = greater depth

ABOUT THIS ACTIVITY

Balloon-Powered Car is a sample activity from the EduTrend Contents Edutech Engineering programme (middle school, level: intermediate). Every activity in the programme follows the same format: a practical challenge, a clear session plan, facilitator notes and ready-to-print worksheets, so that teachers, club leaders and parents can run it without extra preparation.

Full 15-, 20- and 32-week programmes are available from EduStore at edutrend.org.

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