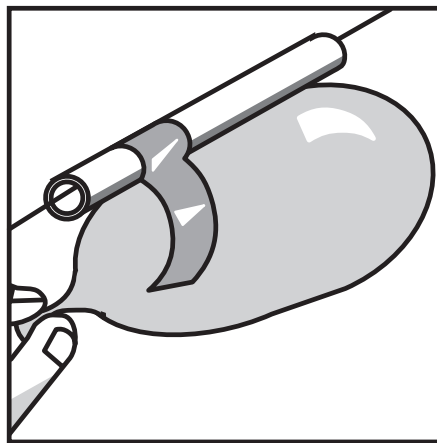


Team games: Making a balloon rocket



60 mins

Students are introduced to the concept and skills of co-operative learning. They work in teams of three to make a balloon rocket.



At a glance

Student book pages 1–2

- Introduce and explain team skills and team jobs.
- Introduce the team investigation.
- Form teams and allocate jobs.
- Students carry out the team investigation.
- Discuss the results.



Lesson outcomes

1 Students are aware of the skills that will help them to work in teams.

They show their awareness by:

- moving into their teams quickly and quietly;
- speaking softly;
- staying with their teams;
- taking turns; and
- doing their jobs.

2 Students are aware of the process of continual improvement.

They show this by modifying their balloon rocket so that it travels a specified distance.



Equipment and preparation

- For the class**
- team skills chart (BLM 5.1)
 - team jobs chart (BLM 5.2)

Team investigation

- For each team**
- fishing line (or thin string), about 6 metres long
 - 1 plastic straw
 - sticky tape
 - 1 balloon
 - 1 tape measure
 - job badges for director, manager and speaker

Managers will find it easier to collect the equipment if you put the items for each team into a separate container.

Spare balloons may be useful.

Preparation

Although fishing line tangles easily (and is difficult to see when stretched taut) it will give better results than string—there is less friction with the straw. Cut the fishing line into 6-metre lengths and wind each length around a piece of cardboard (or similar material). Tape down the loose end to prevent tangling.

Arrange to work outside in a space large enough for teams to extend their lengths of fishing line. If this isn't possible, students can shorten the line and work inside.

Keep the fishing line for use in Lesson 6 and keep two sets of the team equipment for demonstration in Lesson 2.

BLMs Make one copy of 5.1 and 5.2.

**Teaching strategies**

- 1 Introduce and explain the team skills chart and team jobs chart.

If students are using Primary Investigations for the first time, provide them with a full explanation of team skills and team jobs. Emphasise that each team member will contribute to the team investigations and that the team jobs will be rotated during the year.

- 2 Show students the equipment table and discuss its use. Explain that this is where team managers will collect and return the equipment.

Make sure students understand that only the manager of each team collects or returns equipment from the equipment table.

Remind students to wear their job badges. This makes it easier for you to identify which job each student should be doing—and easier for the students to remember what they and their team members should be doing.

- 3 Outline the team investigation: *How can we make a balloon rocket and adjust it so that it travels 5 metres?*

Don't be concerned if teams cannot achieve an exact result. The importance of this lesson is to introduce students to the team skills and team jobs.

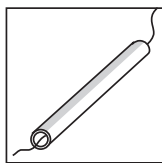


- Form teams and allocate jobs.
Ask managers to collect team equipment.

- 4 Ask students to carry out steps 1 to 7 in the student book. (You may wish to demonstrate these steps to the class.)

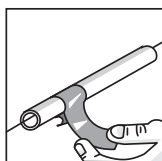
All the variables that make up the rocket system (the amount of air in the balloon, the size and shape of the balloon, the size and length of the straw, the amount of sticky tape, and the angle and tension of the line) cause changes in the distance travelled and the speed of the rocket. Suggest that teams change some of these to try to make the balloon rocket travel the required distance.

- Step 1** Thread the straw onto the fishing line or string. (Unwind the fishing line carefully as it tangles easily.)

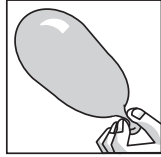


- Step 2** Tie each end of the line to something stable, such as a chair, desk or post.

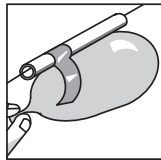
- Step 3** Put a piece of sticky tape over the straw.



Step 4 Blow up the balloon—hold the mouth part closed so air doesn't escape.



Step 5 Stick the balloon to the tape.



Step 6 Let the balloon go! Measure how far it travelled.

Step 7 Make adjustments to the balloon, the straw or the line so that the rocket will travel 5 metres.

Remember that this is a team effort.

5 After the teams have completed the investigation or have had some measure of success, students can dismantle their rockets. Ask managers to return equipment to the equipment table.

6 Conclude the lesson with a discussion. Randomly choose students to report on their team's findings, asking questions such as:

How did your team's rocket perform?

What are the parts of the rocket?

What parts could be changed and how?

What difference did it make when you changed

- the balloon?
- the line?
- the straw?

- 7 Help students to evaluate the way in which they carried out their team skills.

Encourage teams to suggest ways in which they could improve their skills and incorporate them into the next team investigation.



Background information

A balloon rocket works in much the same way as a fireworks skyrocket or a space rocket, except that its energy is stored in the stretched rubber and compressed air in the balloon instead of as chemical fuel.

The rocket gains its propulsive force from the rush of compressed air out of the neck of the balloon. The force that is expelling the air causes an equal and opposite force on the balloon. ☺