Wonder Project

Rocket Challenge

Mission Brief 12: Final flights

You've made it to the final lift-off!

You've now test-launched your rocket enough times to determine the best water level and rocket design to use. This means your rockets are superpowered and ready to take on their final flights.

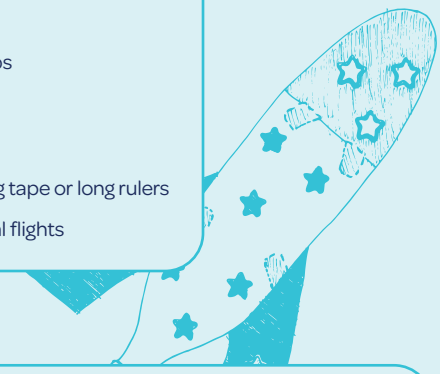
During your final flights, you'll be measuring the distance your rocket travels and timing how long it's in the air. With this data, you'll be able to determine which crew's rocket had the most successful flight and why.

All systems are go!

Set your launch angle to 45° and record your class's best flights.

What you'll need:

- Your improved rocket prototype
- Rocket launcher
- Bike pump – a foot pump is best
- Hi-vis vests and safety glasses
- Bucket of water and measuring cups
- Stopwatch
- Protractor to set launch angle
- Rolling distance counter, measuring tape or long rulers
- Phone or tablet for filming your final flights



Measurements key	
psi	Pound-force per square inch
ml	Millilitres
m	Metres
s	Seconds
°	Degrees

Ask: How will our design improvements impact our rocket's flight?

Our conjecture:

We think our design improvements will impact our rocket's flight by:

We think this because:

Record your data

Flight	Crew name	Angle (°)	Air pressure (psi)	Water level (ml)	Time in air (s)	Distance (m)	Launch rating (1–5)
1		45°	60 psi				
2		45°	60 psi				
3		45°	60 psi				
4		45°	60 psi				
5		45°	60 psi				
6		45°	60 psi				
7		45°	60 psi				
8		45°	60 psi				

Double check your data!

Before you analyse your launch data, check it's accurate by comparing your results with another crew to see if they match up.

Does your data match?

Yes!

No

Figure out what the correct data is. Then, make sure the data in your table is accurate before starting your analysis.

Analysis:

The furthest distance our class achieved was

The longest airtime our class achieved was

's rocket flew the best because:

(insert crew name)

Conjecture comparison:

Did your results match with your crew's conjecture? Why/why not?

Conclusion

Space crews, you've collected heaps of data, learned lots of new things, and launched some out-of-this-world rockets. It's now time to use this information to answer our challenge pātai.

I wonder how rockets fly?

How do your conjectures from Mission Briefs 4, 10 and 12 compare to your final result?

Have you met your challenge goals? Why/why not?

Think about Newton's laws when doing your analysis!

Newton's first law	Newton's second law	Newton's third law
An object will remain at rest (not moving) or keep moving forever at the same speed and in a straight line unless there is another force acting on it	Force = mass x acceleration	For every action there is an equal and opposite reaction