

A Note to Teachers

Supporting Grade 6 Students in Combined Grade 5/6 STEMterprise Classrooms

Most of the STEMterprise lessons that address science expectations and build STEM skills found in Strand A of the Ontario Science Curriculum can be used as-is in a combined Grade 5/6 classroom. However, in Stage 2, the expectations vary quite a bit between Grade 5 Life Systems: Human Health and Body Systems and Grade 6 Science.

To help make planning easier, we've developed a few optional learning opportunities designed especially for Grade 6 students. These activities connect to the Pizza Project and link directly to the Grade 6 Science expectations on flight and energy.

Teachers know their students best—adapt these ideas or use your own approaches to meet your learners' needs. You'll also find alternate science lesson suggestions at the end if you prefer a different direction.

When teaching combined grades, many educators start with a shared topic and then give each grade a different task or challenge. This is one of the strategies recommended in this [Ontario curriculum resource](#) and works very well in this stage.



A Note to Teachers

The following activities are optional learning opportunities for your Grade 6 students to explore during Stage 2 of the STEMterprise Pizza Shop Project. These activities can be completed independently, with a partner, or in small groups.

This stage includes:

- The Ultimate Pizza Delivery Article – Students make early connections between the topics of *flight* and *pizza delivery*, and [create a KWL chart](#) for this stage.
- Minds On - Students discover drone operators using [Agscope Career Profile: Drone operator](#) from the Stage 3, Lesson 3 [Career Connection slides](#).
- About flight and drones videos



A Note to Teachers

The following activities are optional learning opportunities for your Grade 6 students to explore during Stage 2 of the STEMterprise Pizza Shop Project. These activities can be completed independently, with a partner, or in small groups.

This stage includes:

- Flight Challenge 1: Students need to design a parachute that will delivery pizza
- Flight Challenge 2: Students need to design a plane out of paper that will delivery pizza (*simpler*)
**design templates available in slide speaking notes.*
- Flight Challenge 3: Students will need to design a drone that will deliver pizza
- Flight Challenge 4: Students will need to improve the design of a model rotor system so that it can stay in the air the longest (*simpler*)
- Flight Challenge 5: Students follow the 3 part lesson from TVO Learn on Tech Support.
- Additional Resource Suggestions – Other learning opportunities and extensions

The four Machine STEM Challenges are on [Grade 6 Flight Challenges doc](#) and can be accessed online or printed. These activities were developed and adapted from ideas from Let's Talk Science, SciTech Ontario, Science North, TVO Learn and original content.



Expectations

D. Structures and Mechanism - Flight

D2. Exploring and Understanding Concepts - demonstrate and understanding of the ways in which properties of air can be applied to the principles of flight and flying machines

D2.1 identify flight-related applications of the properties of air

D2.2 describe the relationships between the four forces of flight – lift, weight, thrust, and drag – that make flight possible

D2.3 describe ways in which flying machines and various organisms use balanced and unbalanced forces to control their flight

D2.4 describe ways in which the four forces of flight can be altered

D2.5 describe characteristics and adaptations that enable organisms to fly





Grade 6 - Stage 2: Flight



Learning Goals



We can:

- Understand the forces of flight and explain the effects of the four forces of flight (lift, drag, thrust, and weight) on our airplane or drone
- Apply the engineering design process to design, build, test, and modify a flying machine for pizza delivery
- Communicate our choices, results, and conclusion for our STEM challenge
- Work independently while being productive, responsible, and respectful of our classmates.



The Ultimate Pizza Delivery

Read this [article](#) about a long distance pizza delivery. Answer the key questions about the article.

- Who is the story about?
- What happened?
- When was the pizza delivered?
- Where did this pizza delivery happen?
- Why did this man order the pizza for delivery?
- How did the pizza get to him?



Minds On!



In what ways do you think drones can be helpful to farmers?

Let's Learn About Flight

Force	A push or pull acting on an object.
Weight	The force on an object due to gravity.
Lift	The force that allows an object to overcome its weight.
Thrust	The force that pushes an aircraft forward.
Drag	The force against the forward movement.



Flight Challenge 1: Pizza Delivery Parachute

Scenario: Your pizza business wants to deliver pizzas to remote locations where planes can't land by dropping them with parachutes! They need a new, improved parachute system that ensures the pizza lands safely and accurately in a designated "delivery zone."

Your Challenge: Design, build, and test a parachute system that can safely lower a small "pizza box" (e.g., a small weighted container) from a height, aiming for a specific target landing zone, while controlling its descent rate.

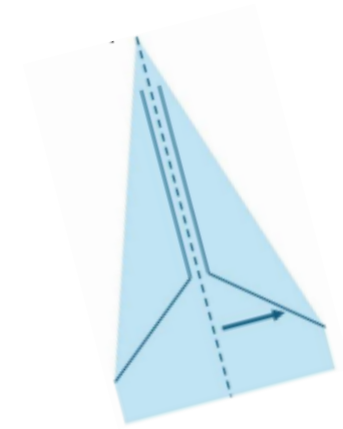


Flight Challenge 2: Pizza Delivery Paper Airplane

Scenario: Your pizza business wants to grow and deliver pizza across Canada. You will need the best airplane, that can fly as far as possible, to make those deliveries.



Your Challenge:
Create a paper airplane to demonstrate the forces of flight.

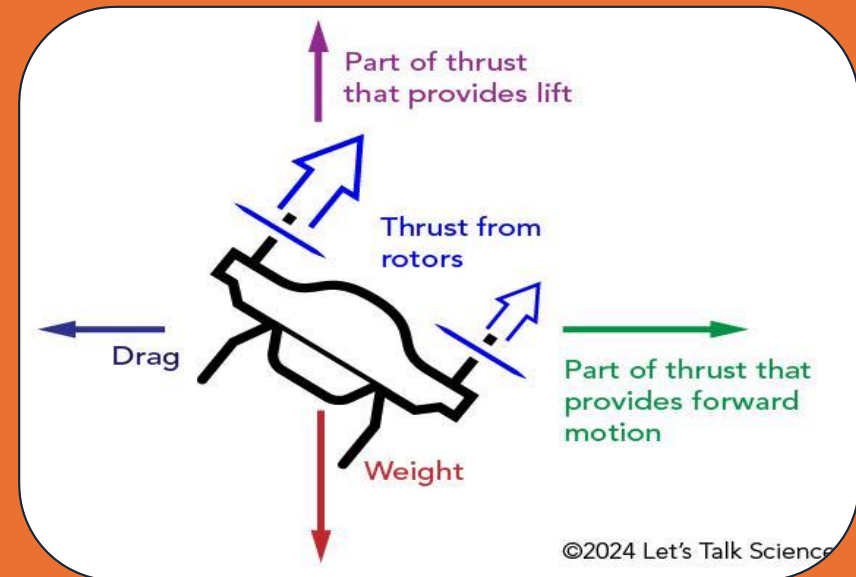


Let's Learn About Drones



How do they fly?

Many drones are quadcopters. A quadcopter does not have wings like an airplane. It uses thrust from the rotors to generate lift.



Flight Challenge 3: Pizza Delivery Drone

Scenario: Your pizza business wants to launch a new, fast, and reliable pizza delivery service using drones! They need your Grade 6 engineering team to design, build, and test a prototype for their new "Pizza Delivery Drone" that can safely transport a mini-pizza to a target.

The Challenge: Design and build a model drone structure (it doesn't need to actually fly with motors; focus on the structural design) that can securely carry a small, weighted "pizza box" (e.g., a small cardboard cube or a block) and is aerodynamic enough to be "flown" (e.g., glided or launched by hand/catapult) while being stable.

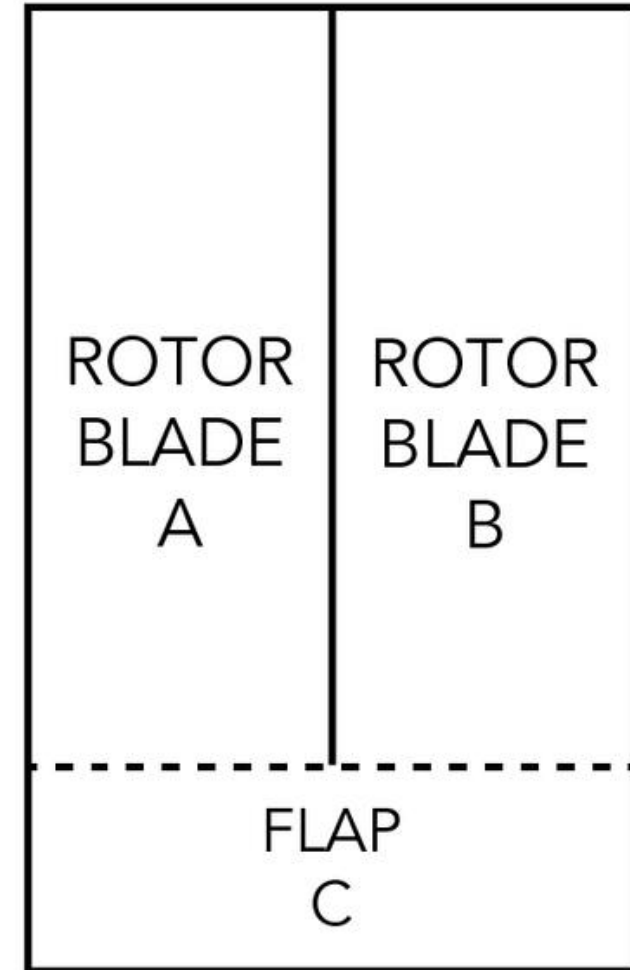


Before you begin, learn more about drones on the next slide.

Flight Challenge 4: Delivery Drone Rotor Improvement

Scenario: Your pizza company wants to start a delivery service. You decide to use quadcopter drones.

Your challenge: Improve the design of a model rotor system so that it can stay in the air the longest.



Flight Challenge 5: TVO Learn - Tech Support

Learn how drones, climate change, and biodiversity intersect with this TVO lesson about [Tech Support for Climate Change & Biodiversity](#)



drone image from TVO Learn



drone planting video WWF

Reflection and Assessment

Grade 6 Rubric and Self Assessment

Name: _____



Single Point Rubric		
Grows How you can strengthen your work.	Learning Goal	Glows Strong aspects to your work.
	I can explain how the four forces of flight (lift, drag, thrust, and weight) work on my airplane or drone.	
	I can effectively use the engineering design process (design, build, test, redesign) to create and improve my device.	
	I can clearly communicate my choices and results.	
	I can be independent, productive, responsible, and respectful during the challenge.	

STEM Reflection
1. What was the greatest success in your final design (for either the drone or the parachute)? Why did it work well?
2. If you had more time and materials , what is the one change you would make to your design to better manage one of the forces of flight (lift, drag, thrust, or weight)?

Additional Resources

The following links provide extensions and additional learning resources.

- [Careers cards](#) related to Flight from Let's Talk Science - LTS teacher [resource](#)
- Coding - [Canada Takes Flight](#) from Canada Learning Code
- [STAO](#) - Science Teachers' Association of Ontario
- TVO Learn - [Gr 6](#) lessons - [TVO Learn - Drone Technology: Help or Hindrance?](#)
- [Science North](#)
- Ontario Curriculum - [Science Long-Range Plans](#)
- [Let's Talk Science](#) - STEM Resources and Lessons



Check In – What's Next?

