



PLTW Flight and Space Virtual Learning

# 8th Grade/Propulsion

May 18, 2020



8th Grade/Flight and Space  
Lesson: May 18, 2020

**Objective/Learning Target:**  
**Students will learn about the 4 main propulsion systems  
used for today's aircraft.**

## Warm-Ups:

Review the factors that affect lift of an airplane with this [Quizlet](#).

# Lesson Introduction/Background Information:

There are 4 main types of propulsion used on aerospace vehicles today: propeller, turbine (jet) engine, ramjet or scramjet, and rocket. Each engine creates thrust in a different manner. Propeller propulsion is commonly used on smaller aircraft that flies slower and at lower altitudes. Airliners, cargo planes, and planes that fly at higher speeds and higher altitudes use turbine or jet engines that create thrust by pushing a jet of air out the back of the engine. Ramjets and scramjets are specialised jet engines designed for hypersonic speeds only. Rocket propulsion has super high speeds for short time periods for specialized rocket planes and space rockets. Read more here: [Beginner's Guide to Propulsion](#)  
[Propeller Propulsion](#) and [Gas Turbine Propulsion](#)  
[Ramjet Propulsion](#) and [Scramjet Propulsion](#)  
[Rocket Propulsion](#)

# Practice:

Using the knowledge gained from the websites in this lesson answer the following questions on [Cornell Notes](#) or notebook paper.

1. What is a propulsion system?
2. Why do we have different types of engines?
3. What type of planes use propellers?
4. What are the different numbers of propeller blades an airplane can have?
5. What types of planes use turboprops and turbo fans?
6. Briefly explain how a jet moves. Use your knowledge of Newton's Third Law to explain.

## Practice:

7. What type of engines do high speed airplanes use?
8. What is the difference between scramjet and ramjet engines?
9. What is the main advantage of scramjet or ramjet engines?
10. What is the main disadvantage of scramjet or ramjet engines?
11. What is the downside of a rocket-powered airplane?
12. List the four types of rocket propulsion systems.

## **Self-Assessment:**

In your notes reflect on when or if you have seen airplanes with the different types of propulsion. If you wanted to see airplanes with these types of propulsion systems where might you go to see them?

# Extend Your Learning/Continued Practice:

Learn more about jet engines and [scramjets](#).

See a [scramjet hitch a ride for takeoff](#).