

Flight and How Things Fly

Middle School 5E Lesson

The 5E model is a scientifically proven method to improve student engagement and learning in your classroom



- ✓ Engagement
- ✓ Exploration
- ✓ Explanation
- ✓ Elaborate
- ✓ Evaluate

Complete Teacher Instructions



Flight 5E Lesson

Grades 6-8	Flight	Ongoing Lesson (8-9 h)
Lesson Objective: Students will learn about the following: - The four forces of flight - How planes get off the ground - Airplanes vs. Helicopters - The types of planes - Why planes travel at such heights - The history of flight - Today's aircrafts - The future of air travel - Thrust propellers and turbo/jet engines - Rocket engines - Taking off and landing - Hot air balloons		
Possible Student Misconceptions: - Plants do not perform cellular respiration. - Oxygen is the main product of photosynthesis. - Plants only need sunlight to grow. - Photosynthesis and cellular respiration are unrelated. - Photosynthesis happens instantly. - Chlorophyll is the only pigment involved in photosynthesis. - Photosynthesis does not occur in cold or cloudy weather.		
Materials: 1 device (smartphone, Chromebook, laptop, tablet, or computer) per 3 students - A means of projecting a presentation - Internet access - General classroom objects		
Teacher Notes: - The presentations as well as the student notes are in Google and Office format which can easily be used in class or online - All videos can be accessed directly from the presentation. To retrieve them, click on the icon while in slideshow mode and it will automatically open for you. If it doesn't for some reason, right-click on the image and click Edit Hyperlink or something similar. - I've created a video walkthrough if needed. It can be accessed here - https://youtu.be/oCIKIP9SaDQ - I don't believe in long lessons. If you feel your students are losing their focus, don't force it. Stop the presentation and give them a 5-minute break. If you'd like to show a quick video, I recommend my video collection here - http://www.teachwithfergy.com/science-videos/. There are tons of brain-break videos to choose from all grouped by category.		

Flight - 5E Lesson

Engagement Phase

Your students will complete 'Engage - Flight'.

Teacher Notes:

- The students will be asked to watch a video and answer questions about it. They will then be asked additional questions which can be answered using information from the video as well as their previous knowledge and each other.

Duration: 20-30 minutes

Teacher Role – Facilitate learning and guide student understanding

Goals

- ☐ Connect student's experiences
- ☐ Create interest
- ☐ Ask questions
- ☐ Understand the objectives of the lesson

Exploration Phase

Exploration – Lab Station Activity

- In groups of 2-3, have your students complete *Exploration – 'How Planes Fly' Lab Station Activity*. Once they're done, they will submit their passport to you.

Teacher Notes:

- The complete instructions for my Lab Station activity can be found in the *START HERE – Instructions* file.

Duration: 1 hour

Teacher Role – Facilitate learning and guide student understanding

Goals

- ☐ Students receive real experience with the topic
- ☐ Students use and develop their critical thinking skills

Elaborate Phase

Your students will complete three digital interactive notebook chapters. These will allow your students to go beyond what they've done in the classroom and demonstrate their understanding in different ways.

- 1) *How Planes and Other Aircraft Fly - Digital Interactive Notebook Pages*
- 2) *The History and Future of Flight - Digital Interactive Notebook Pages*
- 3) *Improving Flight - Digital Interactive Notebook Pages*

Teacher Notes:

- Students will work individually or in small groups
- Students will need one device per group

Duration: 2 hours

Teacher Role – Facilitate learning and keep students focused

Goal

- ☐ Students use their newly obtained knowledge to propose solutions and extend their learning to new situations

Explanation Phase

Lessons

- There are two lessons included.
 1. 'The History and Future of Flight'
 2. 'How Planes and Other Aircraft Fly'
- In both lessons there are multiple embedded opportunities of opportunity to engage, interact and understand throughout the lesson.

Teacher Notes:

- All videos can be accessed directly from the presentation. To retrieve them, click on the video icon and it will automatically open for you. If it doesn't for some reason, right-click on the image and select **Edit Hyperlink** or something similar.
- I've created a video walkthrough if needed. It can be accessed here - <https://youtu.be/oCIKIP9SaDQ>

Evaluate Phase

Have your students complete – *Flight Test*.

The test includes multiple choice, true and false, and short answer questions. Answer key is included.

Duration: 2-3 hours

Teacher Role – Distribute and collect.

Goal

- ☐ Students are given the opportunity to demonstrate their understanding and evaluate their own progress

Each phase is clearly described

Complete Lessons

TWF

Engines Which Create Thrust - Rocket

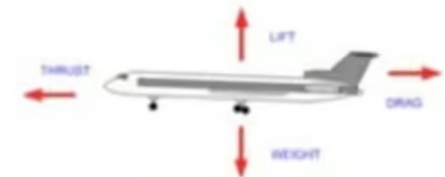
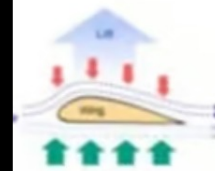
- Thrust is produced by the exit of exhaust downwards
 - Similar to air exiting a balloon
- **The downward exhaust forces the rocket upwards**
- The exhaust is produced by mixing a fuel and oxygen to produce a controlled explosion (combustion)
 - Hydrogen is a



Lift



- Lift is a force that acts perpendicular (right angles) to the movement of the plane
- If lift is greater than weight, the plane goes higher
- _____



Today's Aircrafts – Military

- F-22 Raptor
 - American Fighter Jet
 - Costs 150 million USD
 - Speeds of 1497 m/h (2,410 km/h)
 - Would take just over an hour to fly from New York City to LA
 - **Stealth craft which makes it very difficult to pick up on radar**



Interactive and Engaging Activities



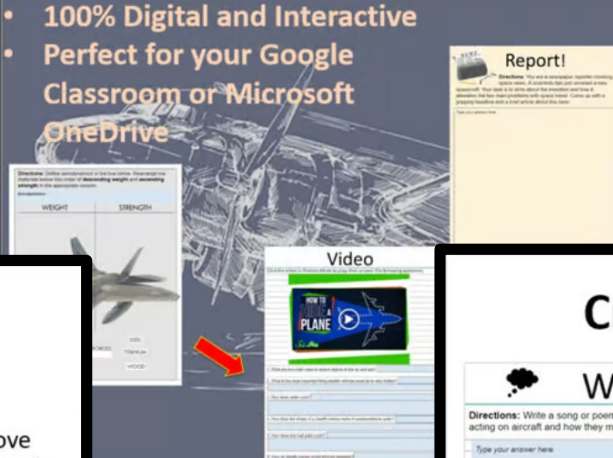
How Planes Fly Lab Station Activity



7 Lab Station Activities
out of their seats and
learn

Chapter 3: Improving Flight Digital Interactive Notebook Pages

- 100% Digital and Interactive
- Perfect for your Google Classroom or Microsoft OneDrive

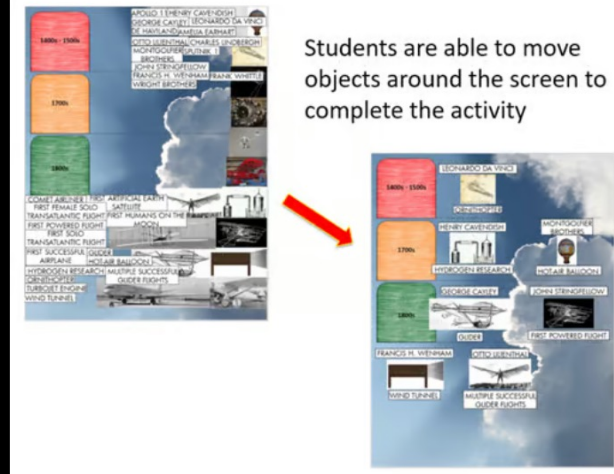


Report!

Video

Interactive Drag and Drop Activities

Students are able to move objects around the screen to complete the activity



Creative Writing

Write!

Directions: Write a song or poem to help you remember the four forces acting on aircraft and how they must relate to one another to enable flight.

Type your answer here

Students are able to express their creativity through writing assignments.

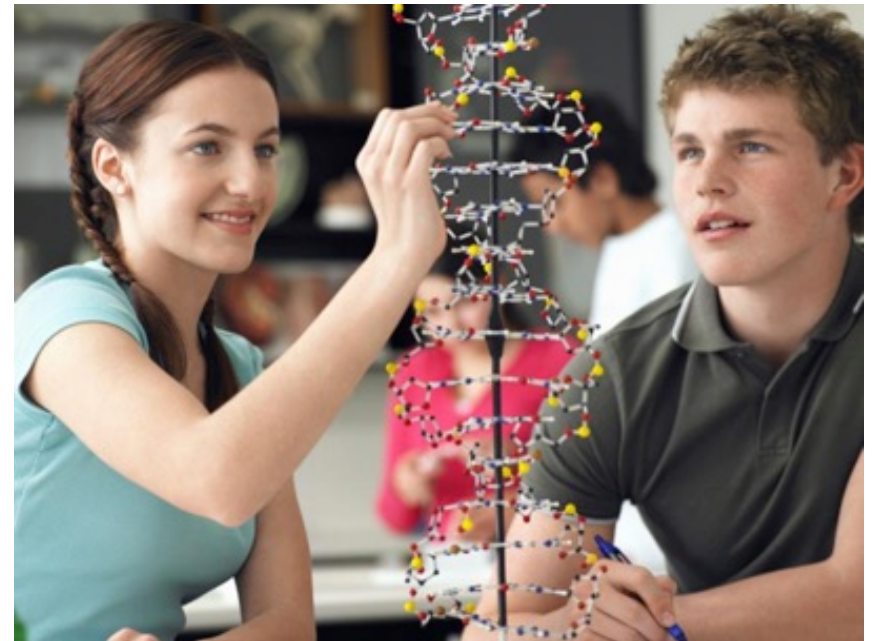
Get away from tired practices and unengaged students



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Provide a Scientifically-Proven means of instruction

TWF



Incorporate Technology and Increase Collaboration



TWF

