Lesson 1 – History of Drone Aviation

Lesson Focus
This lesson introduces students to Unmanned Aerial Vehicles (UAV’s) and Unmanned Aerial Systems (UAS’). Students will research the history of drone aviation and present their findings to their peers.

Lesson Synopsis
Students learn about the history of drone aviation by researching and constructing a presentation to present to their peers.

Objectives
During this lesson, students will:
- Describe the difference between a UAS and a UAV
- Develop a basic understanding for drones.

Anticipated Learner Outcomes
As a result of this activity, students will have:
- Researched the history of drone aviation.
- Organized their research and construct a presentation to share with their peers.

Lesson Activities
Students will use various resources to research the history of drone aviation. Students will organize their findings and construct a presentation to present to their peers.

Resources / Materials
- Teacher Resource Documents (attached)
- Student Worksheets (attached)
- Student Resource Sheets (attached)

Alignment to Curriculum Frameworks
See attached curriculum alignment sheet.

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Lesson 1 – History of Drone Aviation

For Teachers: Teacher Resources

Lesson Goal:
The goal of this lesson is that students develop an understanding for drone aviation and how it has evolved.

Lesson Objectives
During this lesson, students will:
- Describe the difference between a UAS and a UAV
- Develop a basic understanding for drones.

Materials:
- Computer with Internet access
- Engineering Notebook
- Student worksheets
- Student Resource Sheet

Time Needed: Four – Five, 45 minute sessions
- The lesson can be done in as little as 3 class periods for older students. However, you don’t want students to feel rushed. So, to ensure student success (especially for younger students), split it into four to five periods giving students more time to research and analyze their findings.

Procedure:
1. Break students into groups of 3-4. Have students brainstorm what they know about drones (prior knowledge). Brainstorming can be completed in a variety of styles: having students do a “Graffiti” brainstorm, Pictionary Brainstorm, or Round Robin style.
2. Hand out the History of Drones student worksheet.
3. Discuss the project with students, drawing prior knowledge from groups into the discussion.
4. Provide students with a timeline of the project.
5. Review the Student resources with the class and appropriate use of technology.
6. Allow students to begin working on the project.
7. At the end of the project, provide each student a peer rubric page. Students will present their findings to three of their peers, who will grade their project according to the peer assessment rubric.

Teacher Prep:
- If using postermywall.com, teachers must first create a teacher account and create a class for students to work in.
- Provide students will basic supplies: construction paper, glue, coloring utensils, etc. to make their posters.
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For Teachers: Teacher Resources
Alignment to Curriculum Frameworks

Next Generation Science Standards Grades 6-8 (Ages 11-14)

Engineering Design
Students who demonstrate understanding can:
- MS-ETS1-1 Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

National Science Education Standards Grades 5-8 (ages 10 - 14)

CONTENT STANDARD E: Science and Technology
As a result of activities, all students should develop
- Abilities of technological design
- Understandings about science and technology

Standards for Technological Literacy - All Ages

Technology and Society
- Standard 6: Students will develop an understanding of the role of society in the development and use of technology.
- Standard 7: Students will develop an understanding of the influence of technology on history.

Design
- Standard 10: Students will develop an understanding of the role of troubleshooting, research and development, invention and innovation, and experimentation in problem solving.
Lesson 1: History of Drone Aviation

Student Worksheet

You will investigate the history of Unmanned Aerial Vehicles (UAV’s) and Unmanned Aerial Systems (UAS) and find out their impact on society. You will learn how it may be used differently today than it was 10 years ago, 25 years ago, 100 years ago. You will use various resources to find the information, including print, multi-media, and the web. Be AWARE that every site on the web is not always reliable, so verify your resources. Your presentation will include the minimum requirements below. Answer the questions in your notebook and then prepare a presentation to share what you found with your classmates.

DO NOT SIMPLY ANSWER THESE QUESTIONS IN ORDER ON YOUR POSTER! ANALYZE YOUR RESEARCH AND CREATE A PRESENTATION

You will:

- Gather information about UAV’s and UAS’, taking notes in your engineering notebook. (These notes count towards a notebook grade. Clearly label your notes.)
- Create a presentation from your information to share with your classmates. This presentation can be in two following formats:
  - Traditional Poster – two 8 ½ x 11” sheets of paper (any color) with a piece of construction paper on back of papers to make it sturdy (This also adds a border around you’re the entire poster).
  - Online poster – that will be printed here at school and presented in class
    - www.postermywall.com
    - Click on Login
    - then click on “Student Login”
    - Use the class code: ______________

All presentations must include the minimum of the information shown below:

- the bullets are to help you answer the # question

***Include your name & team name (bottom right corner of poster)

1. All resources used (bottom left of poster)
   - www.google.com is NOT a resource, it is a search engine
   - Wiki – of any type cannot be used
   - Please ask me if you are unsure of any website! See approved websites below.

2. Explanation of UAV’s & UAS’
   - What is a drone & how are drones used?
   - Why does the government use drones?
   - How are drones used for personal/recreational use? Commercial use?
   - What are the benefits of using a drone? What are the drawbacks? (pro’s / con’s)

3. List the discipline(s) of engineering most important to the development of drones
   - What type of engineer(s) makes the drone? Fly’s a drone? Explain why these types are engineers are important to UAS’/UAVs.
4. Provide a timeline drawn to scale showing the history of drone aviation and evolution of drone aviation.
   - Who was the original inventor and when were drones product invented?
   - How was it used when originally invented?
   - How is it used today?
5. Identify major changes that have occurred in the design of UAV’s and UAS’.
   - What are some of the innovations (changes) that this product has undergone since its original invention?
6. Address the global impact on society and the environment.
   - How has this product impacted society in a positive way?
   - How has this product impacted society in a negative way?

Internet Resources: these are not exclusive, but a good starting point

**Remember, if you are unsure of a website. Please ask for assistance.**

**ALL resources must be included on your presentation.**

- The Pro’s & Con’s of Drones
  - [http://drones.procon.org/](http://drones.procon.org/)

- 18 awesome ways drones are being used

- How Drones are being used
  - [http://www.pbs.org/newshour/rundown/how-are-drones-used-in-us/](http://www.pbs.org/newshour/rundown/how-are-drones-used-in-us/)

- History of Drones Timeline
  - [http://www.timetoast.com/timelines/history-of-drones](http://www.timetoast.com/timelines/history-of-drones)

- The history of drones in 9 minutes (Video)

- 10 Ways Drones will impact Society

- Drones: What they are and how do they work?

- The Commercial use of drones

- 5 Benefits of Drones that might surprise you
  - [https://www.sri.com/blog/5-benefits-drones](https://www.sri.com/blog/5-benefits-drones)

- Military Air Robots
  - [https://sites.google.com/a/cortland.edu/tori-military-air-robots/disadvantages](https://sites.google.com/a/cortland.edu/tori-military-air-robots/disadvantages)
# Lesson 1: History of Drones Rubric

<table>
<thead>
<tr>
<th>Elements</th>
<th>4 Points</th>
<th>3 Points</th>
<th>2 Points</th>
<th>1 Points</th>
<th>Total / Comment</th>
</tr>
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| **Science Content** | • Concept fully and properly explained                                   | • Adequate explanation                                                   | • Poor explanation, minimal                                              | • No analysis of science topic                                          | **Name ________________________________**
|                 | • Insight present                                                        | • Some level of understanding shown.                                     | • Misinterprets the science, needs serious refinement                    | • No explanation                                                       | **Total _____ / 12 x 100 = ____________________ %**
|                 | • Understanding present and apparent.                                    | • More than one resource present                                         | • One resource for sure                                                  | • No science specific connection                                        | **Score for project**                                                            |
|                 | • Content is accurate, comprehensive and well supported                  |                                                                          |                                                                          |                                                                          |                                                                                |
|                 | • Excellent use of resources                                             |                                                                          |                                                                          |                                                                          |                                                                                |
| **Organization** | • Defined Sections                                                       | • All section present, but unclear                                       | • No headings, but sectioned                                              | • Clutter, no definitive sections, all over the place                   |                                                                                |
|                 | • Clear headings                                                         | • Clear headings                                                         | • Hard to follow, requires assistance                                   | • Not all sections present                                              |                                                                                |
|                 | • Flows nicely to assist the reader without help                         | • Must re-read for clarity                                               | • Missing parts                                                          | • Boring to look at, does not catch your attention                      |                                                                                |
|                 | • Finished product                                                       | • Some evidence of refinement                                            | • Obvious refinement required                                            | • Interest, motivation, effort and time obviously absent                |                                                                                |
| **Creativity**  | • Interesting, engaging, visually stimulating                             | • Some use of color, diagrams, etc.                                      | • Very little use of color or pictures but enough to engage and hold attention | • Bland, no variability                                                 |                                                                                |
|                 | • Aesthetically appealing use of color, diagrams and text                 | • Will engage but will not stimulate                                     |                                                                          |                                                                          |                                                                                |
|                 | • Interest, motivation, effort and time obviously present                 |                                                                          |                                                                          |                                                                          |                                                                                |

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Name: ___________  
Total: ________/ 12 x 100 = ________%  
Score for project: ________%  
Peer: ___________  
Score for project: ________%