

Basics of Flight: How Mutlicopters Fly

Lesson Overview

Media: Microsoft® PowerPoint® Presentation (38 slides)

Seat Time: 3 Classes | 150 minutes teaching

Goal:

To analyze how multicopters fly.

Description:

This unit allows students to understand how multicopters fly and achieve different flight maneuvers. The various vectors which are applied to flight characteristics and how they can be calculated, as well as an overview of each step to calculate the values of combined maneuvers is provided.

Objectives:

1. To analyze how multicopters fly.
2. To define how vectors are applied to flight characteristics.
3. To understand how to calculate values of combined maneuvers.

Lesson Plan

Class 1

Class Overview:

- *How Multicopters Fly* Microsoft® PowerPoint® Presentation
- Action Plan
- Vocabulary Handout
- Key Concepts

Essential Questions:

1. How do multicopters fly?
2. How can an individual calculate values of combined maneuvers?

Step 1: Bell Ringer:



- Instruct students to get into groups of two or three to review the **Vocabulary Handout** and quiz each other over the terms.

Step 2: Distribute the Action Plan, Vocabulary Handout and Key Concepts.



- The **Action Plan** lays out a list of tasks for students to complete during the lesson.
- The **Vocabulary Handout** is a list of terms used throughout the lesson.
- The **Key Concepts** is an outline which identifies the main ideas presented in the lesson which students can fill in to aid in note taking during the lesson.

Step 3: Show slides 1 to 18 of *How Multicopters Fly* PowerPoint®.



- This portion of the presentation is 18 slides long.
- Be sure students utilize the **Key Concepts** for this unit of the lesson.

Step 4: Exit Ticket:



- Students should provide one new thing they learned in class.

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Lesson Plan

Class 2

Class Overview:

- *How Multicopters Fly* Microsoft® PowerPoint® Presentation
- Action Plan
- Key Concepts
- Comprehension Questions: How Multicopters Fly
- How Multicopters Fly Check for Understanding

Essential Questions:

1. How do multicopters fly?
2. How can an individual calculate values of combined maneuvers?

Step 1: Bell Ringer:



- Students should answer the **Essential Questions** and keep for future use.

Step 2: Show slides 19 to 38 of *How Multicopters Fly* PowerPoint®.



- This portion of the presentation is 20 slides long.
- Be sure students utilize the **Key Concepts** for this unit of the lesson.

Step 3: Students should complete the **Comprehension Questions: How Multicopters Fly Activity**.



- Students will answer the questions provided and then participate in a class discussion.

Step 4: Administer the **How Multicopters Fly Check for Understanding**.



- The Check for Understanding is a short review of the content presented in the unit.

Step 5: Exit Ticket:



- Students should review their answers to the **Essential Questions** and revise, if necessary, and turn in.

Class 3

Class Overview:

- Action Plan
- Wind Directions in Numerical Representation Student Handout
- Calculating Resulting Magnitude and Direction of Applied Forces Activity

Step 1: Bell Ringer:



- Place an image of a compass rose where students can see it and have them write down everything they know or notice about the compass. Lead a brief class discussion so students can share their knowledge.

Step 2: Distribute the **Wind Direction in Numerical Representation Student Handout**.



- The handout provides necessary additional lesson content.

Step 3: Students should complete the **Calculating Resulting Magnitude & Direction of Applied Forces Activity**.



- Students will solve the calculations in the provided scenarios.

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Lesson Plan

Class 3 (continued)

Step 4: Exit Ticket:



- Students should turn in their activity.

Activities

Comprehension Questions

Students will answer the questions provided and then participate in a class discussion.

Accommodations:

Provide students more time.

Modifications:

Allow students to develop a list to answer the questions instead of requiring paragraphs.

Extension:

Have students conduct research to add content for five paragraphs instead of three.

Calculating Resulting Magnitude & Direction of Applied Forces

Students will solve the calculations in the provided scenarios. Students will need to utilize the **Wind Direction in Numerical Representation Student Handout**.

Accommodations:

Provide students with more time.

Modifications:

Allow students to work in groups of two.

Extension:

Students will create an infographic explaining the mathematical steps in greater detail.