Stream: Science

Field: Engineering
Career: Aeronautical engineer
Activity: Tour and Info Session with experts from Hindustan Aeronautics Limited (HAL)
Organisation: Hindustan Aeronautics Limited (HAL), Bangalore

About the Organisation: Hindustan Aeronautics Limited (HAL) is an Indian state-owned aerospace and defence company headquartered in Bangalore, India. It is currently involved in the design, fabrication and assembly of aircraft, jet engines, helicopters and their spare parts.

Reason for selecting HAL for the tour: HAL is one of the largest aerospace companies in Asia. They design and manufacture fighter, trainer, reconnaissance, transport aircrafts, aircraft engines, UAV's, spare parts, and other aircraft materials. A Student can do BSc and MSc in physics, or Bachelor's degree electrical or mechanical etc in Engineering followed by Master's in Aero/Aeronautical Engineering to become eligible to the post of engineering at HAL.

Heritage Centre and Aerospace Museum offers guided tour for students from 9 AM to 5 PM on all days throughout the year. This can be followed up with an info session with an engineer from HAL who will explain how the aircrafts can be controlled. The tour can be finished with a Q&A session with the engineer on his job profile and working environments at HAL.

Lesson plan of activity

Learning Objective

Students will be able to identify the various types of engines used in aircrafts and be able identify the controlling elements.

Introduction

Students should have realistic expectations about what they will see at the museum. They should understand the goals and how the tour will help them in getting to know more about the career of an aeronautical engineer. To make the visit effective, activities are to be done before and after the visit also.

Pre-program activities completed before the visit

Strategies	Examples: Students can
Prepare for the experience	Read a book about aircrafts or explore HAL website. Communicative behaviour expectations and consequence.
Prepare for the activities	Review or introduce relevant content and vocabulary related with aircrafts engines design and controlling elements of an aircraft.

Activities at Heritage Centre and Aerospace Museum

1. Tour at Heritage Centre and Aerospace Museum (90 to 120 minutes)

Students should thoughtfully engage with the Museum resources through focused worksheet activities. They should meet the learning objectives and should be able to build on the learning stated during the Pre-program activities.

Strategies	Examples: Students can
Observe	Focused observation on various exhibits nd its description.
Clarify with the museum staffs	Ask questions to the staffs managing the exhibits
Read and record	Write a description of a specific engine. Scientific illustration or careful sketching.
Search and Find	Look for aircrafts with different engines types.

Working with worksheet 1 (20 minutes)

2. Info Session with experts from Hindustan Aeronautics Limited (30 to 40 minutes)
Q & A session (20 minutes)

Strategies	Examples: Students can
Listen	Articulate how engineering is making something in front of them possible.
Describe	Think of other situations were control elements are used.
Compare	Compare the technologies used in different scenarios (aircraft vs. helicopters).
Improve	Discuss with the resources person on improving the current system.

Working with worksheet 2 (20 minutes)

Post-program activities conducted after the visit

Strategies	Examples: Students can
Reflect	Discuss what students like and didn't like about the visit. Share, Compare and contrast observations. Write a journal entry about the experience.
Present	Create a class book that illustrates the visit learning. Create scientific poster to display as evidence gathered.
Investigate	Conduct investigations to learn more

Worksheet 1 (After the tour)

1. I visited the _____museum

2. Record your observation in the box below. Sketch or write what you see.

3. Pick and place the right type of engine in the following aircrafts (Search and Find)

Propeller	Jet	Turbo	Rocket

Worksheet 2 (After the info session)

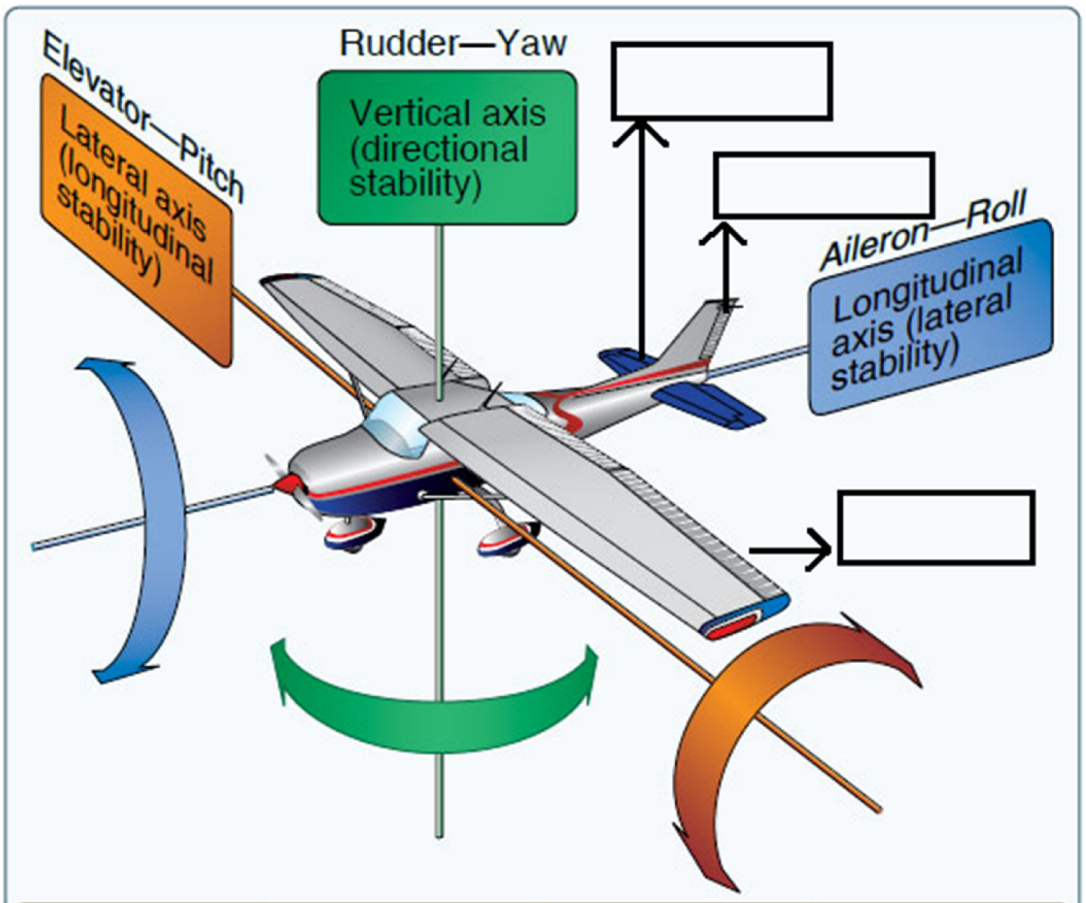
1. I wonder_____

2. I learned_____

3. I have more questions about what I heard during the info session. My questions are

4. Mark the mark the primary control surface of a aircraft in the following figure

Aileron **Elevator** **Rudder**



Primary Control Surface	Airplane Movement	Axes of Rotation	Type of Stability
Aileron	Roll	Longitudinal	Lateral
Elevator/ Stabilator	Pitch	Lateral	Longitudinal
Rudder	Yaw	Vertical	Directional