

LESSON: Space Shuttle Information

Title: Space Shuttle Information
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Lesson Overview:

This lesson serves as an intermediate introduction to the Space Shuttle systems. Students will be introduced to key concepts that will be developed further in the KLASS curriculum. The presentation includes deeper explanations in the teacher notes area, and there is a variety of reading documents at basic and advanced levels. Students should enjoy the fun activities offered as part of this lesson set.

Suggested Classroom Time: 120-180 minutes

Grade Levels: 6-10

KLASS Module: 2-Orientation

Topic/Console: Shuttle Information

Materials Needed:

Activity	Documents	Other Materials
1	Background information: http://spaceflight1.nasa.gov/shuttle/reference/basics/index.html http://spaceflight.nasa.gov/shuttle/reference/shutref/	Demonstration computer with Internet connection, Shuttle diagrams, or orbiter model
2	PRES_ Space-Shuttle-Info.doc PRES_ Space-Shuttle-Info.ppt RDG_Space-Shuttle-Info-Additional (Folder of documents)	Demonstration computer or student computers with Internet connection and Microsoft PowerPoint
3	ACT_Orbiter-Labeling.doc ACT_Space-Shuttle-Crossword.doc ACT_Space-Shuttle-Wordsearch.doc KEY_Orbiter-Labeling.doc KEY_Space-Shuttle-Crossword.doc KEY_Space-Shuttle-Wordsearch.doc	Writing tools

National Standards/Objectives:

Discipline	Standard	Objective
Science	E. Science and Technology	Students discover the abilities of technological design.
Science	G. History and Nature of Science	Students explore science as a human endeavor.
Technology	Social, ethical, and human issues	Students understand the ethical, cultural, and societal issues related to technology.
Math	Measurement	Students apply appropriate techniques, tools, and formulas to determine measurements.

Desired Results:

Students will be able to answer these essential questions

- What are the 3 main systems of the Space Shuttle?
- How do the Space Shuttle systems work together to launch the Shuttle?

Students will know

- The Space Shuttle is the world's first reusable spacecraft, and the first spacecraft in history that can carry large satellites both to and from orbit.
- The Space Shuttle is comprised of various systems that make up each of its three main components.

Students will be able to

- Discuss the Space Shuttle and the systems that make up each of its three main components.

Learning Plan/Activities:**1. Introducing the Lesson.**

Show a diagram of the orbiter or pass around a model of the orbiter.

Script: "The Space Shuttle is the world's first reusable spacecraft, and the first spacecraft in history that can carry large satellites both to and from orbit. The Shuttle launches like a rocket, maneuvers in Earth orbit like a spacecraft and lands like an airplane. There are three Space Shuttle orbiters now in operation:

Discovery, Atlantis, and Endeavour. During this set of learning activities that will span over several days, you will learn that the Space Shuttle consists of three major components: the orbiter, which houses the crew; a large external fuel tank that holds fuel for the main engines; and two solid rocket boosters which provide most of the Shuttle's lift during the first two minutes of flight. All of the components are reused except for the external fuel tank, which burns up in the atmosphere after each launch."

2. Presenting and Exploring Information.

To begin the lesson, either use the *Space Shuttle Information* PowerPoint (PRES_Space-Shuttle-Info.ppt) as a presentation or as a student exploratory tool. You also may want to print the slides you plan on covering as notes pages, since there are detailed notes embedded in the presentation.

Go through the various reading documents in the RDG_Space-Shuttle-Info-Additional folder and decide if and how you are going to use them. You could print a copy of each and ask students to study different documents as homework. During a class session this week, you could ask them to report on the details of the particular topic they were asked to study.

3. Evaluating the Lesson.

Have students complete the *Orbiter Labeling* (ACT_Orbiter-Labeling.doc), *Space Shuttle Crossword* (ACT_Space-Shuttle-Crossword.doc), and *Space Shuttle Word Search* (ACT_Space-Shuttle-Wordsearch.doc) activities.

Assessment Evidence:

Performance Tasks

1. Collect and evaluate the student work from the various *Space Shuttle Information* activities.

2. Give feedback regarding how students worked during the class session, and discuss strategies used for finding the answers.

Other Evidence

1. Perform normal classroom observation and assessment of progress and participation.

Extensions and Going Further Resources:

Using the data found in the reading, implement one or more of the following activities based on the subject and grade level.

- Have the students draw and label the 3 parts of the Space Shuttle.
- Have the students each write 3 computation problem sets to exchange with their peers based on the plethora of statistics that are presented in the information. Of course, before they can “quiz” others. Students will have to create answer keys.
- Have a contest to see who can create the longest list of acronyms and/or the longest list of English-to-metric measurements that are presented in the material.
- Have the students analyze trends in the mission data. This is a skill that NASA engineers perform in their quest for process and product improvement. Possible tools could be Excel, charts, and tables or graphs.
- Have students in advanced courses study of the cryogenics and propellants in more depth.
- Be sure to check for student opportunities, additional educational resources and more at: <http://www.nasa.gov/education>