

LESSON: Mission Directorates

Title: Mission Directorates
Author: Stephanie Stevenson

Submitted: May 12, 2008
School/Org: Fort Caroline Middle School

Lesson Overview:

Students will learn about NASA's overall strategic plan and leadership. Through exploration, class participation, and small group discussions, students will learn about mission directorates and be able to discuss the general strategic plan for NASA.

Suggested Classroom Time: 120 minutes

Grade Levels: 8-10

KLASS Module: 2-Orientation

Topic/Console: NASA Directorates

Materials Needed:

Activity	Documents	Other Materials
Day 1		
1	Background information: http://education.nasa.gov/about/nasaent/ http://www.nasa.gov/missions/current/index.html http://www.nasa.gov/externalflash/nasa101/index.html	Demonstration computer with Internet connection
2	ACT_Directorates-Day1.doc KEY_Directorates-Day1.doc PRES_Mission-Directorates.doc (Optional, text only) PRES_Mission-Directorates.ppt RDG_Org-Chart-Agencywide-05_08.pdf (linked from PPT) RDG_Mission-Directorates.doc	Demonstration or student computers with Internet connection and Microsoft PowerPoint
3	MMAS_Mission-Directorates-Gameshow.htm MMAS_Mission-Directorates-Gameshow.doc KEY_Mission-Directorates-Gameshow.doc	Student computers for multimedia or writing tools for handout
Day 2		
1	PRES_Mission-Directorates.ppt (start with the Day 2 slide) RDG_Mission-Directorates.doc	Demonstration or student computers with Internet connection and Microsoft PowerPoint
2	ACT_Mission-Directorates-Day2.doc	Small groups
3	AS_Mission-Directorates.doc KEY_Mission-Directorates.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	Communication	Students analyze and evaluate the mathematical thinking and strategies of others.

Desired Results:

Students will be able to answer these essential questions

- What kinds of projects does NASA focus on?
- Who determines what NASA's missions are?

Students will know

- That NASA's leadership and strategic plans guide all current and future projects.
- There are 4 mission directorates and acronyms for each.

Students will be able to

- Summarize for what each mission directorate is responsible and name two missions for each directorate.
- Create a faux mission using all four mission directorates.

Learning Plan/Activities (Day 1):**1. Introducing the Lesson.**

Script: "If I say that everyone has a boss, would you agree? Many of you would. It seems that with most organizations, there is a hierarchy, or a list of bosses and/or departments that are in charge. This is called leadership and organizational structure. Today we will learn about NASA leadership and how it works. NASA's mission is to pioneer future space exploration, scientific discovery, and aeronautics research. To do that, thousands of people have been working around the world — and off of it — for almost 50 years, trying to answer some basic questions. What's out there in space? How do we get there? What will we find? What can we learn there, or learn just by trying to get there, that will make life better here on Earth?"

2. Presenting and Exploring Information.

Pass out the *Mission Directorates Day 1* activity (ACT_Mission-Directorates-Day1.doc). Using an overhead projection system, begin the *NASA Mission Directorates* presentation (PRES_Mission-Directorates.ppt).

- Pause on slide 2 so that students can complete the Pre-Instruction Activity portion of the *Mission Directorates Day 1* activity (ACT_Mission-Directorates-Day1.doc). An Anticipation/Reaction Guide is used to assess a class's knowledge before it begins a lesson.
- Continue with the PPT. As you go through these directorates, use the semantic features analysis on the worksheet to keep track of what is the same and what is different about each mission you discuss. You can learn more about this process by visiting <http://www.readingquest.org/strat/sfa.html>.

- Define “organizational chart.” Use the links in the NASA Organizational Chart to go to NASA Headquarters. Explore the first page to the students, describing the function and focus of each position on the org chart.

Next, use the links to go to the home pages of each directorate. Right click to open each directorate in a new tab for easy return to the NASA HQ home page.

Aeronautics. Use the home page and the following links to familiarize students with the ARMD.

- About Us http://www.aeronautics.nasa.gov/about_us.htm
- Multimedia links <http://www.aeronautics.nasa.gov/multimedia.htm>
- Contributions <http://www.aeronautics.nasa.gov/contributions/index.htm>

Exploration. Link to the home page to familiarize students with the ESMD.

- Big Picture http://www.nasa.gov/directorates/esmd/about/esmd_big_picture.html
- Missions <http://www.nasa.gov/missions/index.html>
- Multimedia http://www.nasa.gov/mission_pages/constellation/multimedia/index.html

Science. Use the home page and the following links to familiarize students with the SMD.

- Big Questions <http://nasascience.nasa.gov/big-questions>
Click on the questions to see what missions are answering the big questions.
- Science Programs <http://nasascience.nasa.gov/programs>
- Read selections to see what data is being collected and why.

Office of Space Operations. Use the home page and the following links to familiarize students with the SOMD.

- Transitions Plan http://www.hq.nasa.gov/osf/tran_plan.pdf
Scroll quickly through the document so students can see what kind of planning is done. Focus on the “**Exploration Road Map**” and the “**Multi-Program Integrated Milestones**” charts to get an overview of what it takes to plan the future of human space flight.
- Missions <http://www.hq.nasa.gov/osf/missions.htm>
- FAQ <http://www.hq.nasa.gov/osf/faq.htm>
- Education and Outreach <http://education.nasa.gov/home/index.html>
- Space Flight Awareness <http://sfa.jsc.nasa.gov/index.cfm>

- If you cannot present the PowerPoint to the class, you can load the presentation on student computers and have them explore. In addition, there is a handout that emulates the presentation closely. Also, distribute the *Mission Directorates* handout (RDG_Mission-Directorates.doc) for self-study or for homework and reinforcement.

3. Evaluating the Lesson.

Have students revisit the anticipation activity from the sheet and fill in the “After Lesson” column. Review the semantic features table and discuss the results. If time permits, open the Multimedia gameshow assessment (MMAS_Mission-Directorates-Gameshow.htm) and use it as an informal assessment of today’s lesson and to wrap up the lesson in a fun way.

Learning Plan/Activities (Day 2):

1. Reviewing the Lesson.

Script: “We’re going to begin our challenge. Yesterday, we learned about NASA’s mission directorates. Today, we’re going to learn how they work. We will be divided into four groups, one for each directorate. Let’s revisit the four mission directorates now.”

Open the *NASA Mission Directorates* presentation (PRES_Mission-Directorates.ppt) and start with the Day 2 slide. Review the directorates, and use the Multimedia game show assessment (MMAS_Mission-Directorates-GameShow.htm) if there wasn’t time the day before. Pass out the *Mission Directorates* handout (RDG_Mission-Directorates.doc) if the students don’t already have a copy.

2. Assigning Group Activity.

The last 2 slides of the presentation highlight the steps for completing the group activity. Pass out the *Mission Directorates Day 2* activity (ACT_Mission-Directorates-Day2.doc), and assist the students in separating into groups and beginning their creative discussions regarding a mission that encompasses all four mission directorates.

3. Evaluating the Lesson.

Allow each group to describe its mission briefly to the class. Allow time for students to give feedback to each group as appropriate.

Pass out the 15 question *Mission Directorates* assessment (AS_Mission-Directorates.doc) as a quick quiz or as a homework assignment to further reinforce the roles of NASA leadership and the mission directorates.

Assessment Evidence:

Performance Tasks

1. Collect and evaluate the student work on the Anticipation/Reaction Guide and the Semantic Features Analysis Chart.
2. Help redirect students and note improvements during small group discussions.
3. Give feedback regarding each group’s mission and how they worked together.

Other Evidence

1. Perform daily classroom observation and assessment of progress and participation.
2. Compare the abilities of the individuals to use the technology required to previously submitted samples.
3. Make notes to self on improving the process for the next group project.
4. Grade and give feedback on the 15-question assessment.

Extensions and Going Further Resources:

While there are not many educational resources on the topic of NASA Leadership or Mission Directorates, there are many resources that support the missions that each directorate supports.

- Be sure to check for student opportunities, additional educational resources and more at: <http://www.nasa.gov/education>

Aeronautics

- Paper Glider Kit
<http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/X1.Paper.Glider.Kit.html>
- Smart Skies Fly By Math (Grades 5-9) http://quest.arc.nasa.gov/projects/smart_skies/
To fly smart, professionals need to be able to manage and direct air traffic using distance, rate of speed, and time relationship calculations. Smart Skies Fly By Math curriculum materials were developed by NASA's Airspace Systems Program to engage students in real-life applications of mathematics and science.
- Future Flight Design (Grades 4-7) <http://futureflight.arc.nasa.gov/>
This Web-based, interactive learning experience invites students to address challenges facing the air transportation system or aircraft design.
- And more at http://www.aeronautics.nasa.gov/k_12.htm

Exploration

- Virtual Field Trip <http://quest.nasa.gov/vft/>
The Virtual Field Trip is an immersive multimedia application developed to support student and user exploration of areas on Earth that have been identified as analog sites to regions on Mars. Analog sites are those areas that share some common traits with sites on Mars and have been identified based on their significance and importance to NASA.
- The Lunar Nautics
http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Lunar_Nautics_Designing_a_Mission.html
This educator guide has 40 activities. Students assume roles of workers at Lunar Nautics Space Systems, Inc., a fictional aerospace company specializing in mission management, lunar habitat and exploration design, and scientific research. Educators can use this guide in a variety of settings or formats, such as week-long day camps, after-school programs, a classroom unit, or as supporting curriculum. The Student Employment Handbook supplements the Lunar Nautics Educator Guide. The Handbook contains the student sheets that accompany the lessons and activities.

Science

- SMD Education Resources <http://nasascience.nasa.gov/educators>
There are many resources within the SMD's searchable database.
- NASA Science for Kids <http://nasascience.nasa.gov/kids>
This site has many fun, interactive activities for all ages.

Space Operations

- International Space Station <http://www.nasa.gov/externalflash/ISSRG/>
- Brain Bytes: So You Always Wanted to Ask NASA <http://brainbites.nasa.gov/>