



THE NEW JERSEY ITALIAN HERITAGE COMMISSION



Agenzie Spaziale Italiana Italian Space Agency

Grade Level: 3–5

Subjects: Science / Language Arts

Categories: Modern Italy / Art and Sciences / History and Society

Standards:

Please see page 5 of the lesson plan for complete New Jersey Student Learning Standards alignment.

Objectives:

The students will be able to:

1. research the history of the Italian space program.
2. identify the agencies in which Italy participates for their space exploration projects.
3. develop a time line of major milestones of the Agenzie Spaziale Italiana.

Abstract:

In this lesson, young students will learn about the history of Italy's space program called Agenzie Spaziale Italiana. The students will also explore the important role that Italy has in developing new components that would improve and expand current living and laboratory areas for the International Space Station. The lesson requires the students to research and create a timeline that outlines the evolution of Italy's space programs and contributions. In groups, the students will be given a role to play in order to create a newscast that announces the breakthrough developments of Italy's space projects. The students are encouraged to be as creative as possible and may even want to dress up or use props when they deliver their newscast to the class.

Key Terms:

European Space Agency	n.	An organization of 17 European countries that collaboratively work to explore space.
International Space Station	n.	A space station that can be permanently occupied. This space station is shared by several major countries around the world where astronauts work collaboratively in order to conduct scientific experiments.
NASA	n.	National Aeronautics and Space Administration is a space agency operated by the United States of America.

Background:

In 1964, Italy was one of the first European nations to operate an Earth-orbiting satellite. It was launched from the United States. From 1967 to 1988, Italy organized nine launches with the help of the United States. These launches took place from the San Marco Indian Ocean platform, off the coast of Kenya, which is operated by Aerospace Research Center.

In 1988, the Italian Space Agency, or Agenzie Spaziale Italiana (ASI), was established. This new agency operated under the Ministry of Universities and Scientific and Technological Research and Italy's Undersecretary of Space. ASI is a small organization. Its headquarters are located in Rome, Italy. The Board of Directors is guided by two committees, the Scientific Committee and the Technical Committee. To operate Italy's space program, ASI worked with the University of Rome and the National Research Council (NRC). The NRC aided ASI in mission analysis, design, and data handling. The goal of ASI was to establish a stronger Italian space program that did not rely on the United States for launch technology.

Through the 1990s, the Italian space exploration program became troubled as financial limitations and many administrative changes took place. A five-year plan to strengthen the program was put in place, but Italy was unable to fulfill its goals because of budget problems. Italy is the third largest member of the European Space Agency (ESA), yet its monetary problems left it in need for loans from the ESA. Aside from the budget, the ASI encountered other problems. Many new designs for launch vehicles were attempted, including one designed by an Italian contractor, Difesa E. Spazio from the Italian firm, BPD. This company was in charge of 70 percent of Italy's and Europe's space programs. It focused on spacecraft, ground stations, and computer technology.

The design proposed was called the Ariane 4. This vehicle was launched into Earth orbit from the U.S. space shuttle in 1992. Another, called the Zefiro, was designed by the University of Rome. It was test launched from the new location off the coast of Sardinia, Italy. In 1992, the working relationship between ASI and the University of Rome became extremely tense. They had a difference of opinion concerning the plans to improve Italy's ability to successfully conduct future space launches and vehicle designs. This led to a legal dispute regarding the design of a new launch vehicle, Scout 2. Plans came to a temporary halt and finances were held from the University. In 1993, the University of Rome continued to design the Scout vehicle, but these plans were soon aborted since the

ongoing legal issues on design had not been resolved. The ASI considered funding a different design. Due to the many ongoing problems, there have not been any Italian space launches since 1988.

The focus of the ASI took a turn toward the International Space Station (ISS) in cooperation with the ESA, NASA, Russia, and several other countries. They also experimented and developed many exploration satellites. In 1997, the ESA, with help from the ASI, launched the Cassini-Huygens. This satellite mission took pictures of Jupiter before moving on to Saturn to photograph its rings and moons. This mission was projected to continue into 2008.

In 2001, the ASI entered into a legal contract with NASA to develop a Habitation Module for the ISS. This idea would allow for three to four more people to temporarily reside at the space station while conducting scientific experiments. In 2007, the United States launched Nodes 2 and 3 that the ASI built for the ISS. They were connecting modules for the ISS that proved to be multifunctional. Node 2 served as a connector between the European and U.S. laboratories, a docking station for the U.S. space shuttle and Japanese transport vehicle, and a work station for the ISS' robotic arm. Node 3 will contain life-support equipment for a permanent crew as well as a domed area with several windows that would aid in operating the station's robotic arm. It provides a great view of space. This opportunity also allowed for the ASI to take on a greater role in the ISS. The ASI also developed modifications for the U.S. space shuttle to help carry heavier payloads on trips to the ISS.

In 2003, the ESA, again with great help from the ASI, launched one of two satellites that would orbit Mars. The ESA's satellite was called the Mars Express. NASA was the space agency that developed the other Mars satellite. This mission utilized ground-penetrating radar. While in orbit, the radar component experienced many glitches and did not fully work until the summer of 2005. This proved to be valuable since it was able to map the polar ice caps of Mars. It also was able to begin mapping sedimentary layers and search for answers to the ultimate question: Does Mars have a source of ground water, and if so, how has that affected the evolution of Mars? Roberto Seu, Ph.D., of the University of Rome, La Sapienza, Italy, served as team leader to analyze the information sent back from the Mars Express.

The ASI continues to be an important member of the ESA and continues to send astronauts to the ISS to explore new scientific theories. As technology progresses, so will new and exciting discoveries about space.

Procedures:

- I. The teacher should give a brief overview of the Background material to the class.
- II. Using the Background material the teacher should develop a time line of Italian space achievements.
- III. Assign the students to work in small groups and give each group an accomplishment from the time line for them to research as a group in more detail,

such as their contributions to the ISS, the Mars Express, the beginning of the ASI, or the Cassini-Huygens satellite.

- IV. The students should write down the main points of their research.
- V. From these notes, the group will develop a brief newscast announcing the accomplishment they researched to the people of the world.
- VI. Students should get as creative as possible. Some students can play the role of Italian scientists, newscasters, astronauts, etc. Each student should play a part in the newscast. Students may even want to dress for the part they play.
- VII. Students should present their newscast to the class.

Homework:

Students should complete their newscast and gather any props for their presentation.

Resources:

Suggested websites for students to utilize for their research

http://www.esa.int/esaMI/Mars_Express/SEMSEWEMKBF_0.html

http://www.esa.int/esaMI/Mars_Express/SEMPWD361AF_0.html

http://www.esa.int/esaMI/Mars_Express/SEMKK75V9ED_0.html

<http://www.nasa.gov/centers/marshall/multimedia/photos/2005/photos05-023.html>

http://www.nasa.gov/mission_pages/station/structure/elements/node2.html

<http://www.spaceref.com/iss/elements/node3.html>

<http://mars.jpl.nasa.gov/technology/orbiters/index.html>

<http://www.fas.org/spp/guide/italy/agency/index.html>

<http://saturn.jpl.nasa.gov/home/index.cfm>

<http://www.esa.int/SPECIALS/Cassini-Huygens/index.html>

http://www.nasa.gov/mission_pages/station/main/index.html

New Jersey Student Learning Standards

English Language Arts

RI.3.3 Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.

RI.4.3 Explain events, procedures, ideas, or concepts in a historical, scientific, or technical text, including what happened and why, based on specific information in the text.

RI.5.3 Explain the relationships or interactions between two or more individuals, events, ideas, or concepts in a historical, scientific, or technical text based on specific information in the text.

W.3.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

W.3.7 Conduct short research projects that build knowledge about a topic

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W.5.2 Write informative/explanatory texts to examine a topic and convey ideas and information clearly.

W.5.7 Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic.

W.5.9 Draw evidence from literary or informational texts to support analysis, reflection, and research.

SL.3.4 Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.

SL.3.5 Use media to demonstrate fluid reading at an understandable pace; add visual displays when appropriate to emphasize or enhance certain facts or details.

SL.3.6 Speak in complete sentences when appropriate to task and situation in order to provide requested detail or clarification.

SL.4.4 Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

SL.4.5 Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.

SL.5.4 Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace.

SL.5.5 Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.