

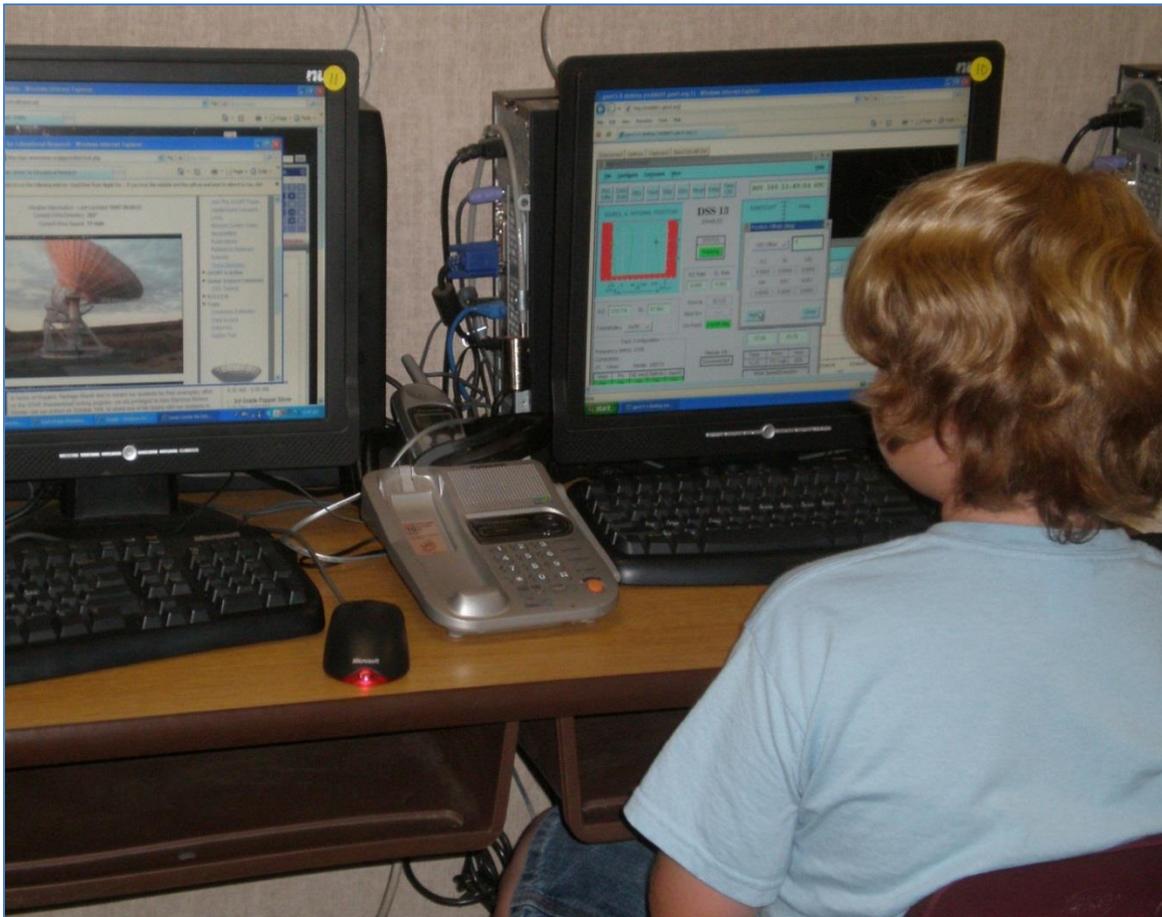


Mars Rover Celebration

Curriculum Module

Week 1: Learning Research Skills

Lesson 3: Research Tools and Skills



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| Educational Product | |
| Educators & Students | Grades 3-5 |

Week 1: Learning Research Skills

LESSON 3: RESEARCH TOOLS AND SKILLS

GRADE LEVEL: 3-5

LENGTH: 2 DAYS

VOCABULARY: plagiarism
research

MATERIALS:

- [Google Earth](#)- Download and install prior to the lesson. See *Introduction to Google Earth* for instructions.
- Computers with internet access
- Informational Text Features Power Point presentation
- Informational Text Features Power Point presentation handouts for students (optional)
- Science Notebooks

ESSENTIAL QUESTION:

Which of the informational text features you learned about today was the most helpful to you in researching information for your Mars Rover project?

LESSON OBJECTIVE(S):

Students will be able to:

- Learn about features of Mars through a demonstration of Google Earth Mars
- Gather, and analyze data from multiple sources on the internet as well as print sources
- Develop and use strategies for reading informational text to systematically find information
- Understand that Earth and Mars have similar geological features

NOTE: Prior to the lesson, visit <http://earth.google.com/mars/> to download and install Google Earth. This software will be used throughout the project.

ENGAGEMENT

1. At the beginning of this lesson, and using the attached documents, present the Essential Question and Key Vocabulary for students to consider during the lesson. In addition, teach the Informational Text Features mini-lesson (view before presenting).

Note: When the presentation is opened, a dialog box may appear. No password is needed to view the PowerPoint. Just click the *Read Only* option. The presentation is organized in such a way that the teacher may choose to use all of it or select only those sections students need. Note that each section of the text features begins with a table. To print out handouts for students, Go to *File>Print*. Under *Settings* and choose *Notes* or *Handouts*. As an additional guide, a suggested teaching guide is also available in the Appendix (Informational_Text_Features_Teacher_Notes.pdf).

2. Once Google Earth has been downloaded and installed, open the software to give students a tour of Mars. Depending on the comfort level of the teacher, a self-guided tour may be used. Otherwise, students will view a pre-recorded tour narrated by Bill Nye (Runtime: 08:24). Watch the video tutorial at the download site or refer to the “Introduction to Google Earth Mars” handout for instructions on how to begin the tour.
3. While students are taking their tour of Mars, students should answer the corresponding questions in their Science Notebooks. To assist students in taking notes, point out the first answer during the tour.
4. Once the video concludes, discuss answers as a class:
 - In the 1900’s our ability to explore Mars via telescope from the Earth had reached its limits. Combined with our space-faring abilities, Mars became an excellent candidate for robotic exploration.
 - The first successful landing was NASA’s Viking Lander I in 1976.
 - In 2003, NASA launched the Mars Exploration Rovers (MER), which later came to be called Spirit and Opportunity.
 - Phoenix landed so far north at a position similar to the high arctic on Earth that the team knew the spacecraft wouldn’t last very long. It could only operate until the Martian Autumn or fall because the sun would dip down low on the horizon, the solar panels would not be able to charge the batteries.

EXPLORATION

1. To help students learn how to research Mars, students will be using specific web sites to find facts and features about Mars through an internet scavenger hunt.
2. Begin by directing students to their Science Notebooks. Demonstrate how to answer the first question by pre-reading the questions to determine what kind of information will be needed. Then, select a web site and teach students how to skim for key words.
3. After modeling the first question and answer with students, students may work as a team or in pairs to complete the remainder of the research questions in their Science Notebooks.
4. Circulate as students work assisting when necessary.

Note: Teachers may elect to use a search engine in lieu of the specific web sites provided. To assist students in executing safe searches on the internet, a student-friendly search engine such as Sweet Search (<http://www.sweetsearch.com>) or other district approved search engine is recommended.

EXPLANATION

1. After students have had time to research answers through numerous sources, review the questions and solicit answers from students.
2. Be sure to ask where the information came from and discuss how students chose which sites to use.
3. Send students back to their teams to discuss the answers they found and whether they came from credible sources. Once they have narrowed down their answers to information that came from credible and reliable sources, students should discuss what they learned about Mars through this activity and complete the accompanying Venn Diagram in their Science Notebooks. Venn Diagrams may be completed in teams, partners, or individually.

ELABORATION

1. Students should continue to research Mars for the duration of the lesson. Students may make observations or take measurements to provide evidence of the effects of weathering and/or erosion over time.
2. Students are also encouraged to seek Research Mentors (experts in their fields) who can answer questions and help make connections between their research and STEM Careers.

- One expert who students may be familiar with is Janice VanCleave, author of many children's science experiment books. In collaboration with this project, Ms. VanCleave has generously offered her assistance as a Research Mentor and can be contacted at askjvc@aol.com.
- Another venue for finding Research Mentors is the American Institute of Aeronautics and Astronautics. AIAA professional members often answer questions for K-12 students to support STEM education. AIAA can be contacted at askanengineer@AIAA.org.

Note: It is important that students understand that it is not acceptable to seek a mentor on their own and should always check with their teacher or parent first.

EVALUATION

1. During this two day lesson, the teacher is encouraged to use formative assessments throughout the lesson to determine and deepen student understanding. Teachers may wish to grade team or individual Venn Diagrams and/or review students' science notebooks to establish student understanding.
2. Teachers are encouraged to create their own grade-level and ability-level assessments so as to best meet the needs of their students.

SUPPLEMENTAL RESOURCES

For Students

Kid's Cosmos: Facts about Mars

http://www.kidscosmos.org/solar_system/mars.php

Planets for Kids- Mars

<http://www.planetsforkids.org/planet-mars.html>

The Nine Planets- Mars

<http://kids.nineplanets.org/mars.htm>

Welcome to the Planets

<http://pds.jpl.nasa.gov/planets/choices/mars1.htm>

Mars Rover Celebration Web Site

<http://marsrover.phys.uh.edu/MarsCurriculum.php#MarsResources>

For Teachers

World Wide Telescope

<http://www.worldwidetelescope.org/Home.aspx>

Discover the Red Planet with World Wide Telescope

<http://www.worldwidetelescope.org/whatis/whatIsWWT.aspx?Page=Mars>

NASA Planetary Data System

<http://pds.nasa.gov/>

Books:

Moons and Planets, William K. Hartman, 5th Edition, Brooks Cole, 2004. ISBN-13: 978-0534493936

The New Solar System, J. Kelly Beatty, Carolyn Collins Petersen, Andrew Chaikin, 4th Edition, Cambridge University Press, 1999. ISBN-13: 978-0521645874

Destination Mars: New Explorations of the Red Planet, Rod Pyle, Prometheus Books, 2012. ISBN-13: 978-1616145897

<http://www.uapress.arizona.edu/onlinebks/MARS/CONTENTS.HTM>

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