

History and Discovery of Asteroids

Communicating Connections

TEACHER GUIDE

BACKGROUND

In the Exploration section of this module, students designed presentations that chronicled asteroid belt discoveries, trends in science, and the progression of technology as well as historical, social, and political highlights from the 2nd century to the Dawn's launch in 2006.

In this section, students will have the opportunity to communicate and synthesize what they have learned about the interrelatedness of science, technology, and relevant historical/political events. After the reading groups from the Exploration section make their presentations, students will create a visual timeline that spans centuries showing what they feel are the most relevant and significant events leading up to the Dawn mission. By doing so, students will begin to see the Dawn mission as a logical next step in the broader sequence, as part of the progression of science affected by technology, current and past trends in science, and the political/social climate of any given era.

TEACHER GUIDE APPENDICES

At the end of this Teacher Guide, you will find:

- A copy of the assessment rubric for student presentations (**Appendix A**)
- A list of standards addressed in this section of the module (**Appendix B**)

MATERIALS

- Materials as needed for student groups to prepare their presentations; possibly including butcher or poster paper, colored markers, computers with PowerPoint application, and props for skits

PROCEDURE

1. Have groups draw numbers to determine in which order the presentations will be made.
2. During the presentations, use the rubric in Appendix A (or one that has been developed for your school district) to assess their completion of this part of the assignment. Explain to students that they will use the information from the presentations for the assessment activity, "Mystery Asteroid."
3. Following each group's presentation (or during the follow-up class discussion) make sure that any major items omitted in the presentations are discussed so that all class members have access to all pertinent information. You may wish to use copies of the Appendix A materials as checklists during student presentations.
4. Have the groups form a time-line along the wall of the classroom. They will need to look for the group whose presentation preceded and followed the period of time covered in their specific vignette. If any group(s) appears to be "out of order," ask some guiding questions until the chronological timeline is correct.

5. The visuals from the presentations could then be displayed as a timeline along the wall of the classroom and serve as basis for the feedback session in which you ask questions such as:
 - a) What have we learned about the role of scientists and mathematicians in the discovery and characterization of asteroids?
 - b) What have we learned about the role of technology in the discovery and characterization of asteroids?
 - c) What have learned about the role of historical events in the discovery and characterization of asteroids?
 - d) What role will the Dawn mission play in determining the evolutionary history of Vesta and Ceres?

6. Have students refer to the questions that they developed in the Briefing section of this module. Ask them to determine which of the questions they have answered through the readings and flashbacks from this module. Ask them to identify any questions that have not been answered or new questions that have arisen. Students might want to use the resource section or reference materials to explore these unanswered questions.

Teacher Guide Appendices For Interaction/Synthesis Section

APPENDIX A—Rubric for Evaluation of Group Presentations

Rating	Excellent	Satisfactory	Unsatisfactory
Content	Creative, accurate fact-based product; all key points included; no more than one minor error	Factual presentation; most key points included; no more than three minor errors	Two or more key points omitted; key questions not addressed; more than three minor errors or a major error that confuses class
Organization	Focused; clear organization pattern; time period is identified; transition between points; ends with conclusion that recaps the main points	Some organization is apparent; one or more components—identification of time period, transition, or recap of main points—is missing or is unclear	No apparent organization pattern; no clear progression from one point to next
Delivery	Each speaker is prepared, speaks clearly, and slowly without excess pauses	Most speakers are prepared and speak clearly; some excess pauses or repetitions	Speakers are not prepared; do not speak clearly; many pauses and/or repetitions
Group effort	All members of the group were involved in the planning and presentation	Most members of the group were involved in the planning and presentation	One member of the group did most of the planning and presentation
Time limit	The presentation took advantage of the time allotted but was completed within that time.	The presentation was moderately under or over the time limit.	The presentation was significantly under or over the time limit.

Teacher Guide Appendices Interaction/Synthesis Section

APPENDIX B—STANDARDS ADDRESSED

From McREL's *Content Knowledge: A Compendium of Standards for K-12 Education*

Grades 6-8

History

Historical Understanding

Understands and knows how to analyze chronological relationships and patterns

- Understands the historical perspective

Grades 5-6

- Understands that specific individuals had a great impact on history
- Understands that specific ideas had an impact on history
- Understands that specific decisions and events had an impact on history

Grades 7-8

- Understands that specific individuals and the values those individuals held had an impact on history
- Analyzes the influence specific ideas and beliefs had on a period of history
- Analyzes the effects specific decisions had on history

English Language Arts

Uses the general skills and strategies of the writing process

- Prewriting
- Drafting and Revising
- Editing and Publishing
- Evaluates own and other's writing

Uses grammatical and mechanical conventions in written compositions

Gathers and uses information for research purposes

- Uses electronic media to gather information
- Uses strategies to gather and record information for research topics
- Uses strategies to compile information into written reports or summaries

Uses reading skills and strategies to understand and interpret a variety of informational texts

- Summarizes and paraphrases information in texts

Uses listening and speaking strategies for different purposes

- Conveys a clear main point when speaking to others and stays on the topic being discussed
- Makes oral presentations to the class
- Uses appropriate verbal and nonverbal techniques for oral presentations