

A cartoon character of a comet with a blue tail and a white head with eyes.

COMET LINGO BINGO: A GAME SUPPORTED BY THE COMET CHRONICLE

Developed for Stardust-NExT mission by Dr. Martin Horejsi

EDUCATOR GUIDE

ACTIVITY DESCRIPTION:

Comet Lingo is designed to engage students in gathering a thorough and flexible knowledge of comet science, as well as the NASA missions of Discovery that are helping scientists and engineers expand that knowledge.

Students will read *The Comet Chronicle* – a fun comet tabloid written to provide basic understanding of comet science and background of NASA's past and ongoing explorations of comets. Then student teams will participate in a game in where they answer questions of varying complexity highlighting pertinent vocabulary and concepts relating to comets and the missions themselves.

While written for grades 9-12, the humor and format will be compelling for older middle school students as well as high school students. With teacher supplemental support, especially in reading *The Comet Chronicle*, this activity can be relevant and engaging for grades 7-12.

National Science Education Standards:

GRADES 7-8

Earth and Space Science

Earth in the Solar System

- The Earth is the third planet from the sun in a system that includes the moon, the sun, eight other planets and their moons, and smaller objects, such as asteroids and comets. The sun, an average star, is the central and largest body in the solar system.
- Most objects in the solar system are in regular and predictable motion
- Gravity is the force that keeps planets in orbit around the sun and governs the rest of the motion in the solar system.

Physical Science

Motion and Forces

- The motion of an object can be described by its position, direction of motion, and speed.

GRADES 9-12

Physical Science

Motions and forces

- Gravitation is a universal force that each mass exerts on any other mass.

Earth and Space Science

Origin and evolution of the earth system

- The sun, the earth, and the rest of the solar system formed from a nebular cloud of dust and gas 4.6 billion years ago.



Science and Technology

Understandings about Science and Technology

- Scientists in different disciplines ask different questions, use different methods of investigation, and accept different types of evidence to support their explanations. Many scientific investigations require the contributions of individuals from different disciplines, including engineering.
- New disciplines of science, such as geophysics and [astrobiology] often emerge at the interface of two older disciplines.
- Science often advances with the introduction of new technologies. Solving technological problems often results in new scientific knowledge. New technologies often extend the current levels of scientific understanding and introduce new areas of research.
- Creativity, imagination, and a good knowledge base are all required in the work of science and engineering.

History and Nature of Science

Science as a human endeavor

- Individuals and teams have contributed and will continue to contribute to the scientific enterprise. Doing science or engineering can be as simple as an individual conducting field studies or as complex as hundreds of people working on a major scientific question or technological problem. Pursuing science as a career or as a hobby can be both fascinating and intellectually rewarding.

Historical perspectives

- The historical perspective of scientific explanations demonstrates how scientific knowledge changes by evolving over time, almost always building on earlier knowledge.



LESSON:

Objectives:

Students will

learn about

- the anatomy of a comet and its trajectory around the Sun
- be introduced to
- NASA's missions of Discovery to explore cometary science: Stardust, Deep Impact, EPOXI, and most especially Stardust-NExT
- NASA findings regarding comets

Materials:

Student copies of *The Comet Chronicle*

Class set of *Comet Lingo Bingo Boards*, 1 per student or student team

Teacher set of *Comet Lingo Clue Cards*

Advanced Preparation:

Print teacher set of *Comet Clue Cards* front to back on cardstock; cut out

Print Bingo Boards on cardstock and cut out

Print class copies of *Comet Chronicle*

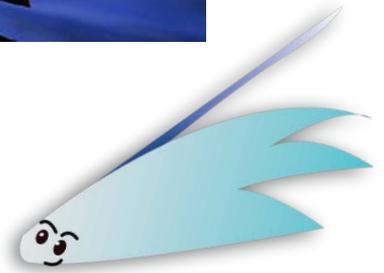
Background Information

Comets are both fascinating and mysterious. Teaching about comets beyond the basics can become difficult because of the depth of science content necessary to understand more sophisticated details. NASA's Stardust and Deep Impact missions recently gathered data from comets revealed interesting facts that, when interpreted through the eyes and methods of science, lead to exciting and sometimes startling conclusions. Two new missions have re-commissioned the spacecraft and will continue expanding on the already collected data set: Stardust-NExT and EPOXI.

The Comet Chronicle is written using a tabloid format and holds a dozen short articles and stories on the missions. The object is to use pop culture and quirky humor to maximize students' staying power with more complex content. *The Comet Chronicle* has been reviewed thoroughly by NASA scientists to ensure its accuracy. Teachers should read it with their students to (re)familiarize themselves with the content covered. More information can be found on the Stardust-NExT website and education pages: <http://stardustnext.jpl.nasa.gov/index.html>

Object of Comet Lingo Bingo Game:

While the true object of Comet Lingo Bingo is to learn about comets, the gaming objective is to be the first to correctly cover a row, column, or diagonal of Lingo Bingo Board squares that match the Comet Lingo Bingo Clues read by the teacher. The Comet Lingo Bingo board contains 25 squares. Unlike regular bingo, there is not a 1 to 1 match between what is announced and what is on the board (unless playing Comet Lingo Bingo in Vocabulary mode). Comet Lingo Bingo requires an interpretation or match between the read-aloud statement and the word on the Comet Lingo Bingo card. Also different from traditional bingo is that all the Comet Lingo Bingo cards have all the same words, just in a different order. Therefore every announced clue has a corresponding square on the board.



RULES OF COMET LINGO BINGO GAME

Game Preparation

- Students read *The Comet Chronicle* individually or in pairs
 - This will take approximately 45 minutes – either in class or for homework
 - Middle school students should participate in guided reading with teacher support;
 - though fun and engaging, the concepts can be complex
 - Pay special attention to bolded words throughout the newspaper
- Each student (or student team) is given one Comet Lingo Bingo board and a set of markers
 - Markers are pennies, poker chips, scraps of paper, or another small flat object
- The Comet Lingo Bingo Clue Cards are shuffled.

Game Play

1. The teacher reads a Comet Lingo Bingo clue
 - a. The Comet Lingo Bingo Clue Cards provide several levels of complexity.
 - i. Level 1 play uses the first level definitions - those that are more basic or direct explanations of the word found on the board, or they contain some hints through word use.
 - ii. Level 2 play requires a more demanding understanding and interpretation between the vocabulary word found on the Comet Lingo Bingo board and the clue.
2. Students interpret the clue deciding on what term, number, or abbreviation on Comet Lingo Bingo square matches the clue.
 - a. Teacher decides whether students may use *The Comet Chronicle* for reference during the game itself.
 - b. If students are working in teams, conferring together without *The Comet Chronicle* can offer a compelling dimension.
3. The students silently mark the corresponding space on their Comet Lingo Bingo board.
4. The team to correctly fill out their board wins.

More Play – More Learning

Other patterns of board coverage can be played. Since all the boards have the same words, a blackout game (total board coverage) will occur at the same time for all the students.

- However the placement of words on the board is different so most other patterns are playable, including one column plus one row, an 'X' pattern, border the board (cover the perimeter), target sight (center row and center column) and bulls eye (target sight plus parameter).