Image credit: NASA
http://www.nasa.gov/worldbook/hubble_telescope_w

Galactic Brain Buster Game
Teacher Information

GENERAL INFORMATION

Subject Areas: Reading, Science, and Technology

Topic of Study: Astronomy

Grade Level: 9th

Time Allotment: 3 class periods, 1.5 hours each

Objective: Students will learn some of the basic vocabulary and history of astronomy.

Summary: *Galactic Brain Buster Game* is a fun interactive activity that will introduce students to astronomy. Students will be able to distinguish between the different kinds of galaxies and star types. They will also learn some astronomical terms and names of scientists who shaped the discipline of astronomy.

Applications: *Galactic Brain Buster Game* as a stand-alone activity can be used to assess the knowledge level of students prior to the study of astronomy. This game can also be utilized for testing purposes after the completion of a unit on astronomy.

IMPLEMENTATION

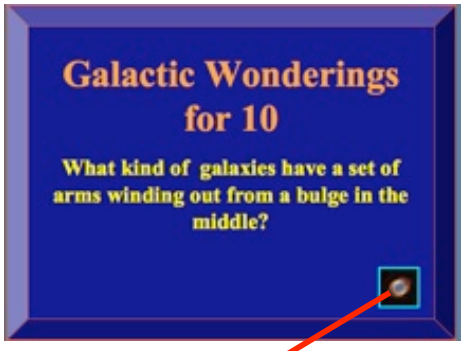
Preparation:

1. Students should visit the Hubble Space Telescope website: http://hubblesite.org in preparation for this activity.
2. Prior to playing *Galactic Brain Buster Game*, the teacher should download the game and be familiar with the operation of the PowerPoint game.

How the PowerPoint Works:
The *Galactic Brain Buster Game* is very user friendly.

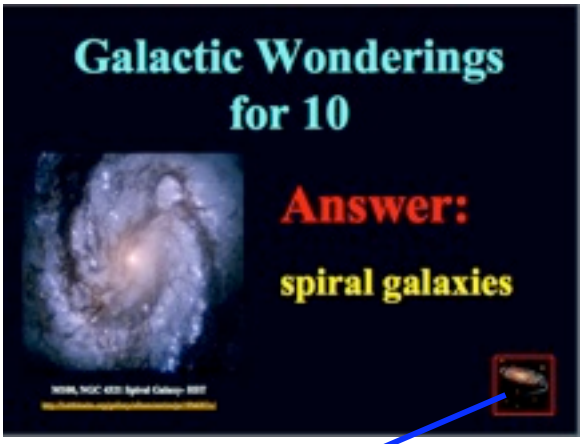
The game board has five categories: Galactic Wonderings, Twinkle, Twinkle Little Star, Eye of the Beholder, Galactic Proportions, and Galacticese.

Beneath each category are boxes with point values on them. When the student selects a category, they must also select a box under the category with a point value.



When the game show host clicks the selected point box, a question will appear. The team or student must give the correct answer.

When the team or student responds with their answer, the correct response can be found by clicking once on this button. Then you will see the answer.



Here is an example of the answer slide.

To return to the main game board, click on this button.

Clicking once on the yellow star can access the Final Galactic Brain Buster question. This star is located on the category header on the main game board.

This button will lead you to the last slide, which includes some of the websites utilized to create the questions and answers for *Galactic Brain Buster Game.*

If you wish to quit the game, click on the ***Escape*** key on your computer keyboard.

Game Procedures:

1. Divide the class into three teams. Each team will need a captain, which the teacher can assign or teams can choose. Each team is given a *Galactic Brain Buster Game Talley Sheet.* One person on each team will keep score on the tally sheet.

2. Team captains will represent their teams when responding to game answers. The captains can consult their team members if they are unsure of the answers. Each captain will be given a buzzer, bell, or flashlight. They will use the device to respond with the correct answers. The first team captain who rings the bell, buzzes the buzzer or flashes the light will have a chance to respond first. The team that responds first will be given 30 seconds to discuss an answer.

3. If the captain gives an incorrect answer, the other two captains will be given a chance to respond. Whoever gives the visible or audible signal first will respond next. If that captain fails to give the correct answer before time is called or gives and incorrect answer then the third captain can buzz in, ring or flash the light to respond. In the event that none of the captains signal to answer, then the game show host will reveal the correct answer.

4. If a captain gives the incorrect response, then the points for that answer is deducted from the teams' score on the *Galactic Brain Buster Game Talley Sheet*. If a team gives the correct response, the team will receive the points for that answer. A team can have a negative score.

5. During the *Final Galactic Brain Buster Question*, the game show host will read the question. Teams will wager all or some of their current points. The teams will be given one minute to decide their response. Each team will then be given a chance to give their answer. Depending on what the team wagered, an incorrect answer would result in points being deducted from their score. If the team has a correct response then the points wagered will be added to their score.

6. The team with the most points will win.

Differentiated Instruction:

The *Galactic Brain Buster Game* template can be modified to fit the knowledge level of students or for special needs students.

Changing the text on question and answer slides: Simply view the PowerPoint as a light board of slides, click on a question slide. Highlight the question and begin to type in your own question. This will delete the previous question. Then click on the corresponding answer slide, which is the slide next to the question slide you just changed. Highlight and type your new answer. This action will delete the previous answer.

Using pictures instead of text answers: You can also remove the answer text and replace with a picture from the Hubble Space Telescope gallery web page. Go to the light board view for the PowerPoint. Click on the answer slide you wish to delete the text and replace with a photo. Go to http://hubblesite.org/gallery/ and find the photo you wish to download. Be sure to save it to the desktop or in a folder in a jpeg format. (Some of the pictures are

large so you may want to adjust the size of the file.) Next, go to *insert* on your menu bar to insert the photo into the PowerPoint answer slide. Insert the photo and add a text box that contains a credit for the source of the photo.

Collaboration: During the game students will be divided into three teams. Each team will have a captain. Students within each team will work together to generate the correct responses within a 30 second time limit. Only the captains of the teams can give the official answer.

MATERIALS AND RESOURCES

Instructional Materials:
First Class: Explore the photos, news releases, and videos at the Hubble Space Telescope website: http://hubblesite.org

Second Class: Explore as a class the Hubble Telescope website or use the *Hubble Space Telescope Scavenger Hunt* activity as a creative way to explore the Hubble website.

Third Class: Play the *Galactic Brain Buster Game*. Be sure to download the *Galactic Brain Buster Game Tally Sheet,* one for each of the teams and one for the teacher.

Resources Required: Computer with PowerPoint (Office 2000 or higher), LED projector, projection screen, 3 buzzers, bells or flashlights. Access to the Internet is needed since some of the slides have hyperlinks to web pages.

STANDARDS & ASSESSMENT

Standards:

National Sciences Education Standards (Grade Range 9-12)
Area: The Origin and Evolution of the Universe
Content Standard: Earth and Space Science

The origin of the universe remains one of the greatest questions in science. The "Big Bang" theory places the origin between 10 and 20 billion years ago, when the universe began in a hot dense state; according to this theory, the universe has been expanding ever since. [See Content Standard A (grades 9-12)]

Early in the history of the universe, matter, primarily the light atoms hydrogen and helium, clumped together by gravitational attraction to form countless trillions of stars. Billions of galaxies, each of which is a gravitationally bound cluster of billions of stars, now form most of the visible mass in the universe.

Stars produce energy from nuclear reactions, primarily the fusion of hydrogen to form helium. These and other processes in stars have led to the formation of all the other elements.

National Sciences Education Standards (Grade Range 9-12)
Content Standard: Science and Technology
Area: 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 biochemistry 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.

Science and technology are pursued for different purposes. Scientific inquiry is driven by the desire to understand the natural world, and technological design is driven by the need to meet human needs and solve human problems. Technology, by its nature, has a more direct effect on society than science because its purpose is to solve human problems, help humans adapt, and fulfill human aspirations. Technological solutions may create new problems. Science, by its nature, answers questions that may or may not directly influence humans. Sometimes scientific advances challenge people's beliefs and practical explanations concerning various aspects of the world.

National Sciences Education Standards (Grade Range 9-12)
Content: History and Nature of Science
Area: 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.

National Sciences Education Standards (Grade Range 9-12)
Content: History and Nature of Science
Area: Historical Perspective

In history, diverse cultures have contributed scientific knowledge and technologic inventions. Modern science began to evolve rapidly in Europe several hundred years ago. During the past two centuries, it has contributed significantly to the industrialization of Western and non-Western cultures. However, other, non-European cultures have developed scientific ideas and solved human problems through technology.

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

ALA –Information Literacy Competency Standards
Standard: Standard Two
The information literate student accesses needed information effectively and efficiently.

3. The information literate student retrieves information online or in person using a variety of methods.
   c. Uses specialized online or in person services available at the institution to retrieve information needed (e.g., interlibrary loan/document delivery, professional associations, institutional research offices, community resources, experts and practitioners)

Assessment: The game show can be used as a pre- and post- assessment tool. To use as an assessment tool, the *Galactic Brain Buster Game Talley Sheet* should be given to each student.

Pre-test: As a pre-test the teacher can show the *Galactic Brain Buster Game* PowerPoint without teams. Each student will have a *Galactic Brain Buster Game Talley Sheet* and write in their responses when the teacher reads the questions.

Post-test: The *Galactic Brain Buster Game* PowerPoint can be used in three possible post-test situations.

1. Individual students will respond to the questions after spending a classroom period exploring the Hubble Space Telescope website.
2. The game can follow the *Hubble Space Telescope Scavenger Hunt*.
3. Finally the teacher can ask the same questions found on the *Galactic Brain Buster Game* PowerPoint after the class plays the game in the three team format.

Post- Test Rubric: Correct answers are worth 4 points each. A total of 100 points is possible. The final *Galactic Brain Buster Game* question can be used for extra credit. The final question is weighted 4 points as well.

EXTENSIONS

1. Hubble Music Video: Student teams will visit http://hubblesite.org/gallery/album/ select a topic and create a music video using photos and other resources on the site. Music videos should not exceed 3-minutes.
2. "A Day in the Life of ….": Student teams will explore the HST website http://hubblesite.org/explore_astronomy/piercing_the_sky/ and view the "Piercing the Sky" video . Then the teams will write a 5-minute play highlighting their favorite space scientist's most significant life achievement. The play can be live or filmed as a movie.
3. My Favorite Theory Demonstrations: Student teams will explore the HST website http://hubblesite.org/ looking for photos, news releases, and other resources about a law or theory that interests them. Teams will then create a theatrical and scientifically accurate demonstration of the law or theory. Dance, art, theatrics, and PowerPoint presentations can be used.
4. Think Tank Debate: Student teams will use resources from the HST website, http://hubblesite.org/hubble_discoveries/ and other websites to build a case for their

argument. The debate topic is, "Which of the HST's discoveries has affected humankind's perspective of the universe the most?"

5. Build the Hubble: Student teams will explore the *Hubble Essentials* site at http://hubblesite.org/the_telescope/hubble_essentials/ and build a scale model of the HST.