Galaxies Photo Shoot

Linda Holt, WVPT

Overview

Topic: Galaxies, Science. Students will learn about the types of galaxies and their characteristics.

Time Allotment

Three 45-minute class periods

Learning Objectives

On completion of this lesson students will be able to:
- Identify the types of galaxies
- Describe the key features of the each type of galaxy

(This lesson addresses Va. SOL Science 6.1, 6.8)

Media Components

- Video: ***Exploring Space: The Universe: The Vast Reaches of Space.*** Colgren Communications. (2006). Retrieved November 5, 2009, from Discovery Education: www.unitedstreaming.com/
  Segment Used:
  Segment 2: Galaxies (01:53)
- Class PortaPortal: http://guest.portaportal.com/lrholt
- Website: Messier Deep Space Objects — This website lists known galaxies and provides links to information about each. http://www.seds.org/messier/objects.html
- Website: Galaxies Galore, Games and More — This website provides several interactive activities that help to build and reinforce student understanding about the types and features of galaxies. Requires Netscape Navigator 3.0 or Microsoft Internet Explorer 4.0. or later. QuickTime and Macromedia's Shockwave are also required for the interactive features. http://amazing-space.stsci.edu/resources/explorations/galaxies-galore/
- Website: Share the Skies — The website provides information about the Share the Skies telescope, background of the project, and links to resources. http://www.sharetheskies.org/home.cfm
- Website: Google Sky — This website allows students to explore the night sky and celestial objects. http://www.google.com/sky/
- Teacher presentation computer with Internet access.
- Student computers with Internet access — mobile lab or a lab with enough computers for students to work in pairs.
- Microsoft Word or a word processing application that will enable students to use the templates created using Microsoft Word.
- Interactive whiteboard (optional)

Materials and Student Handouts

- Galaxies Graphic Organizer (teacher and student version) downloadable from http://tinyurl.com/yemd4o6
- Features of Galaxies list (attached)
- Step-by-step directions for using the Share the Skies telescope found at http://www.sharetheskies.org/Internet_Telescope_User_Instructions.pdf

- Galaxy trading cards template (attached)
- Glossary found at http://www.sharetheskies.org/glossary.cfm
- Hubble Galaxy Picture Album: http://hubblesite.org/gallery/album/galaxy/
- Scissors and tape for trading card preparation.
- Galaxy Trading Card Checklist (attached)

Teacher Preparations

- Download, save, and preview video segment from DiscoveryEducation streaming.
- Attach multimedia projector to teacher computer.
- Preview websites and bookmark on teacher computer.
- Preview student website resources and place links in the class Portaportal.
- Prepare student handouts.

Videostreaming

In order to use videostreaming interactively with students, teachers should use pre-segmented clips provided by the videostreaming company. If you wish to conduct a discussion before the clip is over and then resume after the discussion, use PAUSE, as this will cause the media player to remain at the current location in the stream. If the remainder of the video clip will not be used and the teacher wants to return to the beginning of the video clip, then use STOP so that the media player will revert to the beginning of the stream.

Introductory Activity

1. Focus: I am going to show you a video clip about galaxies. Listen carefully and see if you can answer the question, "What is a galaxy?" Then listen for the name of our galaxy.

Play: Segment 2: *Galaxies* at the beginning of the clip. (Play in full screen)

Stop: at 00:27 when you see the words "Milky Way and 100,000,000,000 stars" dissolve into the center of the Milky Way and after you hear "a bulge in the center."

Follow-up: "What is a galaxy?" (Students would understand that stars are grouped together in collections called galaxies.) What do we call our galaxy? (Milky Way)

2. Focus: "Do you remember what kind of galaxy the Milky Way is?" Allow students to suggest what type of galaxy the Milky Way is. "Let's listen to the video to see if you are right. Let's also look for the features of the Milky Way that help to determine the type of galaxy it is."

Play: Start the same video at the beginning of the clip. (Play in full screen)

Pause: at 00:27 when you see the words "Milky Way and 100,000,000,000 stars" dissolve into the center of the Milky Way and after you hear "a bulge in the center."

Follow-up: "Were we right about what type of galaxy the Milky Way is?" (Yes if they said it was a spiral galaxy.) What are the features of the Milky Way that make it a spiral galaxy? (giant pinwheel shape with spiral arms and bulge in the middle) Replay the clip if the students did not indicate the correct features.

3. Focus: Now let's watch the rest of this video to find out the names of other types of galaxies. Be listening for the features of these galaxies and how they are different from one another.

Resume: at 00:27.

Stop: at the end of the video clip.

Follow-up: Now, who can tell me one of the names of the other two types of galaxies? (elliptical or irregular) And what is the name of the third type of galaxies? (either elliptical or irregular depending upon the type that was identified in the previous question.) Who can tell me the features of the spiral galaxy? (huge spiral arms; look like pinwheels) What do elliptical galaxies look like? (oval shapes; no spiral arms) What are the features of the irregular galaxies? (no definite shape) (Replay the video clip if students have difficulty distinguishing the different features of the three types of galaxies.

Learning Activities

1. Focus: Now that we know a little more about the three types of galaxies and their features, we are going to practice what we have learned by trying to identify types of galaxies based upon their features.

Activity: This is a whole class activity. Go to the Galaxies Galore: Games and More site by clicking on the link in the class Portaportal (http://guest.portaportal.com/lrholt). Click on the Galaxies Galore

link to start the activity. Go through each of the three activites, Spiral Shapes, Elliptical Slide, and Imagine Irregulars. If you have access to an interactive whiteboard, allow students to come up to the board individually to manipulate the interactives. Discuss with students the features that help to identify the types of galaxies and the different elliptical shapes as revealed by using the Ellipitical Slide. Allow students to watch the animation showing the identification of irregular galaxies.
Follow-up: Okay. Let's review what we have learned about galaxies. Who can tell me how we can tell the difference between a spiral galaxy and an elliptical galaxy? (Spiral galaxies have huge spiral arms; look like pinwheels and Ellipitical galaxies are oval shapes with no spiral arms.) What makes a galaxy “irregular?” (no definite shape)

2. Focus: (This activity would be a good review activity for a subsequent class period.) (This would make a good interactive whiteboard activity if you have access to one in your classroom.)We have been talking about different types of galaxies. We are going to use our Galaxy Graphic Organizer and the list of galaxy features for this activity. Some of the features will apply to one, two, or all three types of galaxies. You will be listing the features that apply to each of the types of galaxies in the column under that galaxies name.
Activity: Give each student a copy of the Galaxy Graphic Organizer and the galaxy feature list. Give the students time to list the galaxy features that pertain to each type of galaxy in the column under the name of each galaxy type. Remind students that some features may be listed in more than one column. When everyone has finished, make this a pair/share activity and have the students compare their lists.
Follow-up: I am projecting on the screen a list of features for each type of galaxy. Do any of you see anything on the screen that is different from what you have on your paper? (Discuss any misconceptions or errors that students have made.)

Culminating Activities

1. Focus: Now we are going to create Galaxy Trading Cards that will feature a specific galaxy on each card. To complete this activity you will need your trading card template. To take pictures of your assigned galaxy, you will be using a special telescope that is located in Western Australia. This telescope is located in a place called Pingelly. Why do you think we would use a telescope in Australia rather than one in the United States? (It is night there during our school day.) We will be working in teams of two to prepare a trading card. Each team will have a chance to use the telescope to take a picture of their galaxy. Before we begin, I am going to demonstrate how to slew (move the telescope to the location of the galaxy) the telescope and take a picture. (If the telescope is not available for this activity, images may be found at the Messier Objects by Type resource links.)
Activity: Have the students follow along as you demonstrate how to select an object, slew the telescope, and take a picture. Divide the students into teams of two. Each team will use the Messier Objects by Type link to find out specific information about their assigned galaxy. Students may also use Google Sky to find information and images. Remind students that there are links in the class Portaportal to additional resources they may want to use. They will insert their information into the Galaxy Trading Card template. The teacher will come to each team to log into the telescope and assist the students as they select their galaxy, slew the telescope, and capture the image. The image will be saved to the student computer and inserted into the Galaxy Trading Card. (If possible, having the ITRT, Computer Lab teacher, or Library Media Specialist available to assist students would be helpful.) When finished inserting information into the trading card template, students will print out, fold, and tape their card and hand it in to the teacher.
Follow-up: Now that we have all completed our trading cards, who would like to show their image and see if the rest of the class can identify the type of galaxy that is pictured? (Students can share the name and information about their galaxy after the type has been identified.)

Assessment

- Trading card checklist.
- Teacher observation of student involvement in discussion during focus and learning activities.

- Teacher observation of student involvement in team assignment.

Community Connections

- Take a field trip to a planetarium in Virginia such as the Abbitt Planetarium at the Virginia Living Museum.
- Take a field trip to an observatory such as Keeble Observatory at Randolph-Macon College or Leander McCormick Observatory at the University of Virginia.

Cross-Curricular Extensions

Language Arts:

- Students are to write about a "new" galaxy they have discovered, detailing interesting facts about it as well as naming the new galaxy.
- Read biographies of astronomers and write a book report.
- Create a classroom library including books such as:
  Hubble: Imaging Space and Time by Robert Smith
  Visions of the Universe by Raman Prina
  Norton's Star Atlas and Reference Handbook by Ian Ridpath
  Chasing Hubble's Shadows: The Search for Galaxies at the Edge of Time by Jeff Kanipe
  Binocular Astronomy by Stephen F. Tonkin
  Astronomy: A Visual Guide by Mark A. Garlick
  Our Place in the Universe by Norman K. Glendenning
  Star Clusters and How to Observe Them by Mark Allison
  The Night Sky Revealed by Martin Ratcliffe and Charles Nix
  Ancient Light: A Portrait of the Universe by David Malin

About the Author

Linda R. Holt
Linda Holt is an Education Services Specialist and the NTTI Manager for WVPT. Prior to coming to the station last April, Linda worked as an Educational Media and Training Special-ist for the Virginia Department of Education. She taught English and Spanish in Caroline County and was a library media specialist in Greene County prior to taking a position at the Virginia Department of Education. She is an NTTI Master Teacher and has earned her NETS*T certification. Linda is also an Intel Master Trainer for Thinking with Technology and a Senior Trainer for Intel Essentials and Intel Leadership. She has also reached Field Trainer 3 status for the Thinkfinity program and is working towards establishing her cre-dentials as a state certified trainer.

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Features of Galaxies

1. Huge; contain stars, gas, and dust
2. Held together by gravity
3. Pinwheel shape
4. Round-to-oval shape
5. No regular shape
6. Bulge and thin disk; halo is present
7. Bulge but no disk; halo is present
8. May show signs of a disk and/or a bulge; halo is present
9. Rich in gas and dust
10. Little cool gas and dust
11. Usually rich in gas and dust
12. Young and old stars are present
13. Mainly old stars are present
14. Young and old stars are present

Team Members: Name of Galaxy: Type of Galaxy: Visual Brightness (Magnitude): Other interesting facts:	INSERT PICTURE

Team Members: Name of Galaxy: Type of Galaxy: Visual Brightness (Magnitude): Other interesting facts:	INSERT PICTURE

Galaxy Trading Card Checklist

_____ The team identified the correct type of galaxy.

_____ The team identified the magnitude (brightness) of the star.

_____ The team identified at least 3 other interesting facts about the galaxy.

_____ The team corrected inserted an image of their galaxy.

_____ The team had no more than 2 grammatical errors.

_____ The team had no spelling errors.