

EARTH SCIENCE Lesson Plan

Quarter 4, Week 10, Day 1



Outcomes for Today

Standard Focus:

PREPARE

1. Background knowledge necessary for today's reading.

Before the term “black hole” was coined in 1967, these objects were referred to as dark or frozen stars. They come in all sizes. Active Galactic Nuclei or AGNs, and quasars are believed to be supermassive black holes. Supermassive black holes have masses comparable to those of a typical galaxy. An AGN emits more energy than would be expected from a typical galactic nucleus. In the last few decades, astronomers have begun looking at the radio, infrared, ultraviolet, x-ray, and gamma-ray regions of the electromagnetic spectrum to get more data on black holes.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

radio galaxies

active galactic nuclei

quasars

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 32.2, pp. 844-846

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- Radio galaxies are extremely bright and emit much or more energy in radio waves than in light waves.
- Most galaxies have energetic objects or activities at their cores called active galactic nuclei.
- Because of the vast distances from Earth, we see quasars as they were millions or even billions of years ago.

7. Post information on the billboard. Add new information to ongoing projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: MiniLab –Measuring Redshifts, text p. 845

Procedure: Students use a model to understand the uniform expansion of the universe

Discussion: Discuss what the results would be if the distance of separation were not equal to begin with

Key question: How does this activity illustrate the uniform expansion of the universe and the redshifts of galaxies?

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world

EARTH SCIENCE Lesson Plan

Quarter 4, Week 10, Day 2



Outcomes for Today

Standard Focus: Earth Sciences 2.e and 2.g

PREPARE

1. Background knowledge necessary for today's reading.

In looking for signals from early communication satellites, scientists detected background radio noise, sometimes called background microwave radiation, which was equally strong in all directions and extremely uniform. This cosmic background radiation was in line with the Big Bang theory. The thought was that immediately following the big Bang, the Universe was extremely hot and the high temperatures created radiation that must still be in the Universe.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

Big Bang theory cosmology steady-state theory
cosmic background radiation

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 31.3, pp. 487-489

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- Not all astronomers agree that the Universe had a beginning.
- Cosmic background radiation matches the predicted properties of leftover radiation from the Universe's early, hot phase of expansion.

7. Post information on the billboard. Add new information to ongoing projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Possibilities for Dark Matter – The Hidden Lives of Galaxies

Procedure: Students complete a graphic organizer

Discussion: Discuss the three main categories of objects considered as possibilities for dark matter

Key question: Could Einstein's Theory of Gravity be somehow wrong?

Source:

<http://imagine.gsfc.nasa.gov/docs/teachers/galaxies/galaxies.html>

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world

EARTH SCIENCE Lesson Plan

Quarter 4, Week 10, Day 3



Outcomes for Today

Standard Focus

PREPARE

1. Background knowledge necessary for today's reading.

The Inflation Theory developed in 1980, is considered an extension of the Big Bang theory. This version maintains that the universe began as a fluctuation in a vacuum that expanded rapidly and then settled into a more gradual expansion. It explains some problems unanswered by the big Bang theory.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

inflationary universe

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch.31.3, pp. 489-451

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- In the Big Bang model, gravity competes with the momentum of expansion to slow expansion, with three possible outcomes.
- Current observations indicate that an unknown force is accelerating the expansion of the Universe.

7. Post information on the billboard. Add new information to ongoing projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: The Universe as Scientists Know It (The Hidden Lives of Galaxies – activity 8)

Procedure: Students complete a concept map graphic organizer

Discussion: Discuss topics covered up to this point

Key question: What is your understanding of the universe

Source:

<http://imagine.gsfc.nasa.gov/doc/teachers/galaxies/galaxies.html>

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world

EARTH SCIENCE Lesson Plan

Quarter 4, Week 10, Day 4



Outcomes for Today

Standard Focus: Earth Sciences 2.e

PREPARE

1. Background knowledge necessary for today's reading.

Experiments with particle accelerators, also called atom smashers, can simulate the conditions of the early universe so that astronomers and physicists can continue to learn details about the origin of the universe. There are two basic types of particle accelerators. Linear accelerators (linacs) are kept underground where the particles move at nearly the speed of light down a long, straight track. The Stanford Linear Accelerator Laboratory is nearly 1.8 miles long. The second type works in a similar fashion except that the particles move along a circular track. The first Cyclotron was invented in 1929.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

particle accelerators

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

page 854

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- Scientists must use other methods to study the Big Bang since it can not be observed or recreated.
- Particle accelerators are tools for scientists to replicate conditions of the early universe.
- Scientists must depend on government funding to build more powerful accelerators.

7. Post information on the billboard. Add new information to ongoing projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Activities with Astrology

Procedure: Students determine the astrological signs of the American presidents

Discussion: Discuss students knowledge about astrology

Key question: How many presidents have the same astrological signs?

Source:

<http://www.astrosociety.org/education/act3/astrologyprint.html>

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world

EARTH SCIENCE Lesson Plan

Quarter 4, Week 10, Day 5



Outcomes for Today

Standard Focus

PREPARE

1. Background knowledge necessary for today's reading.

The Hubble Space Telescope or HST, launched in 1990, was named for American astronomer Edwin Hubble. Hubble developed the modern classification system for galaxies, was instrumental in verifying the existence of galaxies beyond the milky Way, and contributed to the Big Bang theory.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

No new vocabulary

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say, define the word quickly and add to the word wall.

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

pp. 903-907

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 events/concepts to the billboard

Students might mention:

- The idea of a space telescope was conceived in 1923.
- At first the images sent from Hubble were not clear.
- Astronauts are trained to maintain and repair Hubble.

7. Post information on the billboard. Add new information to ongoing projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Activities with Astrology –Mixed-Up Horoscopes (Activity 3)

Procedure: Students match their horoscope for a given day

Discussion: Discuss probability and the need for large samples of data

Key question: Did you match correctly?

Source:

<http://www.astrosociety.org/education/astro/act3/astrologyprint.html>

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world