

INSPIRE GK12 Lesson Plan



Lesson Title	Exploring the Universe
Length of Lesson	One (50 minute) class period
Created By	Calista Guthrie
Subject	Earth Science
Grade Level	8 th grade
State Standards	8 th : 1d, 1h (Inquiry); 2e (Physical Science); 4f (Earth Science)
DOK Level	DOK2, DOK3
DOK Application	Categorize, Organize, Construct, Modify, Interpret, Make Observations, Show, Classify, Compare, Explain Phenomena in Terms of Concepts
National Standards	5-8: A (Inquiry); B (Physical Science); D (Earth/Space)
Graduate Research Element	Sulfur is one element created as a result of fusion reactions in a star.

Student Learning Goal:

MS 8th Grade:

1(d) The lecture will reveal different components of the universe and the way that their existence was determined. 1(h) Holes in the Big Bang Theory logic may be pointed out. 2(e) Students will observe the light spectrum and how we interpret outer space using it. 4(f) Students will learn the hierarchical structure of the universe.

National Science Education Standards of Content 5-8:

A: Inquiry: Students will describe, explain, interpret and build models using evidence of the structure of the universe.

B: Physical Science: The sun's energy arrives to Earth with light of different wavelengths

D: Earth and Space Science: Earth in the Solar System; Earth's position in the solar system and the solar system's place in the hierarchical structure of the universe.

Materials Needed (supplies, hand-outs, resources):

Handout (INSPIRE_Guthrie_03.01.12_ExploringtheUniverseHandout)

PowerPoint (INSPIRE_Guthrie_03.01.12_ExploringtheUniverse)

Materials to build a model such as: fishing line, tape, scissors, beads, play dough, pom pom balls, skewers, straws, construction paper, etc.

Lesson Performance Task/Assessment:

The PowerPoint (INSPIRE_Guthrie_03.01.12_ExploringtheUniverse) will be presented first, explaining different things that exist in the universe. As the PowerPoint is presented, students should listen to fill in the blanks on their handout

(INSPIRE_Guthrie_03.01.12_ExploringtheUniverseHandout). Students will make models of the universe or some part of the universe. Each student or student group will



present their model to the class. The class will observe and point out if there is foundational problem with the model. After all students have presented, the teacher will lead a discussion on the misrepresentations of a model and what cannot be demonstrated in the model.

Lesson Relevance to Performance Task and Students:

The capture activity for this lesson is making models of the universe. Through the lecture students will learn about things in the universe and where they are found in the universe. The structure of the universe and scale at which these things occur should be emphasized. Students will then make models to reflect something they have learned about the universe.

Anticipatory Set/Capture Interest:

The initial capture of this lesson will be the theme song to the Big Bang Theory (see Teacher Notes). The students can then guess what the topic of the day is. The teacher can demonstrate Hubble's Law using a balloon with things taped on it showing the expanding universe as seen in Hubble's Law Balloon (see Teacher Notes).

Guided Practice:

Students will listen and interact throughout the lecture. The instructor should check regularly for understanding by involving the students as much as possible in explaining different parts of the universe. The lecture should be completed within 15 minutes, materials to build the model then passed out and students should have 12 to 15 minutes to make the model. Models will then be presented and discussed. Misrepresentations should be discussed with the students concerning scale and quantity particularly.

Independent Practice:

Students have 12 to 15 minutes to make a model of something they learned about the universe. During this time and the discussion following, they should fill in the chart at the bottom of their handout.

Remediation and/or Enrichment:

Remediation – Have students make a flow chart showing the relationship between different components of the universe.

Enrichment- If the teacher would like to expand this into two class periods, they can use this lesson as an introduction to the universe and next period discuss ways things in the universe are observed through x-ray, red-shift, radio, etc.

Check(s) for Understanding:

Allow students to interject during lectures with questions and comments. The instructor should present questions throughout the lecture to check for understanding. The teacher

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will lead discussion about the models at the end of class by giving clues that will lead the students to recognizing misrepresentations and difficulties in modeling the universe.

Closure:

Following the discussion and clean-up, if time allows show the video from NASA (see Teacher Notes) which zooms out from the Earth's surface to the view of the universe keeping everything to scale.

Possible Alternate Subject Integrations:

Math (Hubble's Constant), Social Studies (Astronomy as the oldest natural science)

Teacher Notes

.gif file sources:

RaisinBread.gif- http://map.gsfc.nasa.gov/universe/bb_tests_exp.html

Relationship.gif- http://astro.wku.edu/astr106/Hubble_intro.html

Opening Big Bang Theory- <http://www.youtube.com/watch?v=X41bA4l-h0w>

Hubble's Law Balloon- <http://www.youtube.com/watch?v=IwMFBqzpxDU>

Closing NASA Video- <http://apod.nasa.gov/apod/ap100120.html>

Other good videos:

History Channel-

<http://www.youtube.com/watch?v=zDQzKTedGNE>

Edwin Hubble- <http://www.youtube.com/watch?v=ppE5sR36kBg>

Understanding Hubble's Law Further:

<http://www.youtube.com/watch?v=Ppa1et7Loxs>

<http://www.youtube.com/watch?v=RplP3iARsB4>