

## **What are the objects in the Universe? Activity**

(Supplemental Activity to GEMS Guide, “Invisible Universe: From Radio Waves to Gamma-rays.”)

### **Essential Question:**

What do we know about our Universe?

### **Science Concepts:**

- The scale and structure of the Universe is vast and complex.
- Objects in space are viewed across the whole electromagnetic spectrum.
- The Earth is one of many planets, in one of many solar systems, in one of many galaxies in our Universe.

### **Goals:**

- To give students a better grasp of where objects viewed by scientists in our Universe are located relative to us (Earth).
- To give the students a better understanding of how and why scientists view objects.
- To give students a better understanding of the structure and evolution of our universe and the objects it contains.

**Time:** (Including Tour of the Universe Activity from the GEMS Guide “Invisible Universe: From Radio Waves to Gamma-rays.”) 40minutes (also depends on groups size)

**Recommended group size:** 6 students

### **Materials:**

- Invisible Universe thumbnail size cards (on cardstock) with name and wavelength information on back. (PDF available online)
- National Geographic Poster of the Universe and the Milky Way (one poster)
- Materials from Invisible Universe GEMS guide.

### **Tour of Invisible Universe Procedure:**

1. Explain that Astronomers observe many different objects in the Universe in many different wavelengths. Through these observations scientists have a great understanding of what is in the Universe and where. Because they view these objects in a different light they now have a better understanding of the whole picture or a more thorough picture of our Universe.
2. Ask them to list some astronomical objects and write them down. What do they know about these objects? Size, Distance, Age, and where are they relative to us. Are they inside our Solar System (near by), outside our Solar System but inside the Milky Way (Far), or outside the Milky Way (really far)?





# modeling the universe

3. Give them the small object cards. Place the poster\* either on a table or wall and ask the students to place the objects on the poster, at the locations that they think the cards should be in the Universe. Make sure you point out that there are many images of each object all viewed in a different form of electromagnetic radiation or light.
4. Now give them the description cards. Explain that they will now be reading the Tour of the Invisible Universe cards aloud to their peers and filling in the table (provided in guide) about what they hear and learn. (See procedure in the Invisible Universe GEMS Guide for more detail.)
5. Debrief: What are all of the astronomical objects that you know now? And what are their characteristics? (Revisit your initial questions from part 2.) Did anything surprise them? What did they like the most?
6. Now instruct your students to revise the locations of the objects on the poster knowing what they know now.

**\*Grade Level Adaptations:**

*Grades 9-12:* Use the Universe side of the poster. This will allow for a clearer understanding of the magnitude of the distances involved with these objects.

*Grades 6-8:* Use the Milky Way side of the poster. Middle school student may be too confused if they try to use the size and structure of the entire Universe. The concepts that they can handle are the distances and locations of these objects relative to Earth, so the distances in the entire Universe may be far too vast for their minds to conceptualize.

When you set up the posters you could make little post-its for near, far, and very far and place them on the poster in the regions as defined above so the students do not struggle with the meaning of the very far distances.

**Resources:**

Invisible Universe Gems Guide: <http://www.lhsgems.org/gemspubs.html>

National Geographic Poster: [http://shop.nationalgeographic.com/ search “Universe Map”](http://shop.nationalgeographic.com/search/Universe+Map)

Thumbnail Object Image cards:

<http://swift.sonoma.edu/education/gems/thumbnailimages.pdf>

Swift Mission Resources: <http://swift.sonoma.edu>

