

## USING *HUBBLE EDUCATION PROGRAM* RESOURCES

Lucy Albert  
Carolyn Slivinski

Space Telescope Science Institute  
3700 San Martin Dr.  
Baltimore, MD 21218  
[lalbert@stsci.edu](mailto:lalbert@stsci.edu)  
[slivinski@stsci.edu](mailto:slivinski@stsci.edu)

### **Abstract:**

*The Space Telescope Science Institute is the home of public outreach activities for the Hubble Space Telescope. Two websites, Amazing Space and HubbleSource, work together to provide the framework for the **Hubble Education Program**, which provides standards-based education tools for formal and informal educators.*

---

The Hubble Space Telescope (HST) recently celebrated the anniversary of its launch into orbit 21 years ago. With five separate trips made by astronauts to the telescope for servicing and repair, the telescope continues to provide new science to the world. The final servicing mission, in 2009, installed new instruments that have made this iconic scientific instrument better than ever.

The Space Telescope Science Institute (STScI) created the *Hubble Education Program* to “bring the universe to the formal and informal education communities, and engage educators and students in the adventure of scientific discovery.” This mission is achieved primarily through two STScI websites, *Amazing Space* and *HubbleSource*.

### *Amazing Space – Formal Education*

*Amazing Space* uses the Hubble Space Telescope's discoveries to inspire and educate about the wonders of our universe, offering standards-based activities for K-12 educators and students. The website has a large collection of science, astronomy, and mathematics Teaching Tools for educators, and suggests ways to use our resources in the classroom and provide links to related materials.

The website contains:

 Graphic Organizers

- ✧ Q&A's
- ✧ Student Misconceptions
- ✧ Science Content Reading Materials
- ✧ Pictures and Facts
- ✧ Classroom Activities
- ✧ Online Explorations

*Hubble Education Program* resources are a valued addition to an educator's "toolbox". For that reason, STScI provides "Teacher Packets" to formal educators, upon request. This packet contains hard-copy versions of a sample of supplemental educational materials that are always available to download for free by the public. Planetariums and science centers may request teacher packets in advance of an in-house educator workshop.

A sample teacher packet may contain items such as:

- ✧ Trading Cards: *Solar System, Jr.* - Early Elementary (K-3); *Galaxies* - Middle Grades (6-8)
- ✧ Graphic Organizer: *Comparing Rocky & Gas Planets* - Upper Elementary (3-5)
- ✧ Star Witness News Article: *Hubble Celebrates a Stellar Anniversary* Upper Elementary or Middle Grades (3-8)
- ✧ Graphic Organizer: *Comparing Spiral, Elliptical, and Irregular Galaxies* - Middle Grades or High School (6-12)
- ✧ Lithograph and Education Sheet: *Mars 2003: Closest Approach* - Middle Grades or High School (6-12)
- ✧ Posters: *The Electromagnetic Spectrum\** - Middle Grades or High School (6-12); *Stellar Evolution\** - High School (9-12)

\* Posters not available online






### *HubbleSource – Informal Education*

*HubbleSource* is a growing collection of resources for formal and informal educators, developers, interpreters, producers, and other professionals in museums, planetaria, nature

centers, observatory & park visitor centers, and other free choice learning venues. It includes professional development for formal and informal educators that enhance science content and pedagogical knowledge.

The Hubble Education Program has a wealth of K-12 resources that can be used as stand-alone activities, or woven together to create a complete unit.

Available through HubbleSource are:

-  ViewSpace, a self-updating multimedia astronomy display
-  Video Documentaries
-  Traveling Exhibits
-  Exhibit Components
-  Source Materials

### *Combining Informal and Formal Education Tools*

Because there is such a wide array of available materials in *Amazing Space* and *HubbleSource*, it is possible to find resources that address different learning styles (such as such as science content reading vs. graphic organizers) and different age ranges from K-12. It is therefore possible to construct a classroom activity, workshop, hands-on demonstration and more for many different astronomy topics, and for many different age groups, using Hubble Education Program resources.

Similarly, these available resources can be made known to teachers who are coming to your institution (with or without students) in order to allow them to perform pre- and post-visit assessments for their students. Figure 1 shows how an informal education resource (a ViewSpace show about galaxies) can be supported through formal education tools addressing the same topic, including science content reading, online explorations, graphic organizers, student misconceptions, lithographs with associated classroom activities, online Q+A, and more.

 <b>Long Ago &amp; Far Away</b> A ViewSpace show about galaxies		Below is a sample of <b>free Curriculum Support Tools</b> from Amazing Space that can be used to support ViewSpace show content.												
<p><b>Online Explorations</b> fun, interactive ways to explore space science topics</p>  <p>Explore the history of telescope development</p>  <p>Use statistics to explore the Hubble Deep Fields</p>  <p>Learn about the three main types of Galaxies</p>  <p>Count and classify the galaxies in the Hubble Deep Field</p>	<p><b>Science Content Reading</b></p>  <p><b>Star Witness News:</b> The Hubble Space Telescope: Time Machine to the Galaxies (upper elementary to middle school)</p> <p><b>Tales of ...</b> Finding one of the brightest and youngest galaxies in the early universe (high school)</p> 	<p><b>Online Questions &amp; Answers</b></p>  <p>Q &amp; A: Galaxies</p>												
	<p><b>Student Misconceptions</b></p>  <p><b>Myths vs realities: Galaxies</b></p>	<p><b>Lithograph:</b></p>  <p>The Hubble Ultra Deep Field <b>And Classroom Activity:</b> In Search of ... Galaxy Evolution</p>												
	<p><b>Graphic Organizer: Comparison of Spiral, Elliptical, &amp; Irregular Galaxies</b></p> <table border="1"> <thead> <tr> <th>Spiral galaxies</th> <th>Elliptical galaxies</th> <th>Irregular galaxies</th> </tr> </thead> <tbody> <tr> <td>             Top view: Spiral 1         </td> <td>  </td> <td>  </td> </tr> <tr> <td>             Side view: Spiral 2         </td> <td>  </td> <td>  </td> </tr> <tr> <td>Pinwheel shape</td> <td>Round-to-oval shape</td> <td>No regular shape</td> </tr> </tbody> </table>	Spiral galaxies	Elliptical galaxies	Irregular galaxies	 Top view: Spiral 1			 Side view: Spiral 2			Pinwheel shape	Round-to-oval shape	No regular shape	<p>These and other</p>  <p>Curriculum Support Tools available at: <a href="http://amazing-space.stsci.edu/">http://amazing-space.stsci.edu/</a></p>
	Spiral galaxies	Elliptical galaxies	Irregular galaxies											
 Top view: Spiral 1														
 Side view: Spiral 2														
Pinwheel shape	Round-to-oval shape	No regular shape												

Figure 1. Connections between Informal and Formal Education Resources

Conclusion

The Space Telescope Science Institute has produced the *Hubble Education Program* as a source of standards-based educational resource tools available freely to the public. Two websites, *Amazing Space* and *HubbleSource*, contain a wide selection of tools and constantly updated content which provide both formal and informal education resources. These resources can be utilized by both informal and formal education venues to improve the shows, classes and demonstrations that they provide to their audiences.

Websites

Amazing Space: <http://amazing-space.stsci.edu/>

HubbleSource: <http://hubblesource.stsci.edu/>