

	Hubble Deep Field Image	Counting objects in space	Hubble Telescope
Objectives	Students in all grades will discover what a Hubble Deep Field image is and why we study it. They will integrate math and science and make estimates of how many objects they see in a Deep Field Image. They will generate questions and describe their ideas about all they have learned.	Students in grades 3-6 will use their mathematical skills to estimate, calculate and quantify large numbers. They will have the opportunity to begin to conceptualize the vastness of our universe.	Students will integrate visual art and science by making a paper model of the Hubble Telescope.
Supplies/Materials	<p>You will need:</p> <ul style="list-style-type: none"> <li>• Copy of Hubble Telescope Deep Field Image found at: <a href="http://amazing-space.stsci.edu/resources/print/posters/hdf-academy.php">http://amazing-space.stsci.edu/resources/print/posters/hdf-academy.php</a> on page 5.</li> <li>• Copy of Hubble Telescope Deep Field worksheets, pages 6-9 found at: <a href="http://amazing-space.stsci.edu/resources/print/posters/documents/hdfacademy_posterback_booklet.pdf">http://amazing-space.stsci.edu/resources/print/posters/documents/hdfacademy_posterback_booklet.pdf</a></li> <li>•Set of Q3 Cards (Question-stem cards) (<a href="http://www.jtayloreducation.com/q3-cards">http://www.jtayloreducation.com/q3-cards</a>)</li> <li>•Internet access</li> </ul>	<p>You will need:</p> <ul style="list-style-type: none"> <li>•Student activity sheets “What does a million look like?” found at: <a href="http://amazing-space.stsci.edu/resources/print/posters/documents/hdfacademy_posterback_booklet.pdf">http://amazing-space.stsci.edu/resources/print/posters/documents/hdfacademy_posterback_booklet.pdf</a> on pages 10 and 11 and HAL log sheet.</li> <li>• Pencils</li> <li>• Scratch paper</li> <li>•Set of Q3 Cards (Question-stem cards) (<a href="http://www.jtayloreducation.com/q3-cards">http://www.jtayloreducation.com/q3-cards</a>)</li> <li>•Internet access</li> </ul>	<p>You will need:</p> <ul style="list-style-type: none"> <li>• Pattern for paper model</li> <li>•Manila folders/construction paper/cardstock</li> <li>•Markers</li> <li>•Color Pencils</li> <li>•Crayons</li> <li>•Clear Tape</li> <li>•Camcorder/digital audio recorder/computer</li> <li>•Black poster paper for background</li> <li>•Chalk (or glow in the dark stars)</li> </ul>
Teacher Instruction	Introduce students to the concept of the vastness of our universe and “hook their interest” with the “Big Idea” Q3 cards by generating a discussion about our universe after viewing the multimedia show about the Hubble Deep Field. Distribute activity sheets and work in teams of 2.	Develop the concept within the lesson by letting the students pick a Q3 card and answer a question about the vastness of our universe and lead the class to discuss their ideas of how big they believe our universe really is. Distribute activity sheets and work in teams of 2.	Students will use a pattern to design and create a paper model of the Hubble Telescope. Students can take the paper model and make a movie or podcast and write a script for their characters in outer space.

<b>Extensions</b>	<p>Engage students by having students view the multimedia show about Hubble Deep Field at: <a href="http://hubblesite.org/hubble_discoveries/hubble_deep_field">http://hubblesite.org/hubble_discoveries/hubble_deep_field</a>. Extend the lesson by having students count how many objects they find in the copy of the Hubble Deep Field image and complete the activity “How many objects are there?” Students will break into teams of 2 and each will receive a copy of the Deep Field Image on page 5 in addition to one camera (A, B or C) image.</p>	<p>Engage students by viewing the worksheet “What does a million look like?” Students work in teams of 2 and answer the questions found on the activity sheets pages 10 &amp; 11. Extend the lesson by having students participate in interactive web-based activity “Stellar Statistician” found at: <a href="http://amazing-space.stsci.edu/resources/explorations/hdf/index.html">http://amazing-space.stsci.edu/resources/explorations/hdf/index.html</a> and compare their answers to astronomers. Students will record their responses on the HAL log sheet.</p>	<p>Engage students by having them make their own paper model of a Hubble Telescope. The pattern can be found at: <a href="http://hubblesite.org/the_telescope/hand-held_hubble/paper-intermediate.php">http://hubblesite.org/the_telescope/hand-held_hubble/paper-intermediate.php</a>. Extend the lesson by having upper grade level students make a podcast of their model in space. For tips on how to make a podcast see: <a href="http://www.nasa.gov/audience/foreducators/diypodcast/index.html">http://www.nasa.gov/audience/foreducators/diypodcast/index.html</a>.</p>
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