



Teacher Instructions

Hubble Space Telescope Scavenger Hunt

Subject(s): Science, Technology

Grade Level: 9th grade

Objectives: Students will explore the Hubble Space Telescope website searching for scavenger hunt answers.

By reviewing the website videos and pictures students will gain some basic knowledge on the history of astronomy, identify galaxy and star types, and terminology.

Duration: 1.5 hours but can be shortened to one hour by simply reducing the amount of time given to teams to find the answers. The team with the most correct answers when time is called wins. (The teacher should have a prize for the winning team.)

Procedures:

1. The teacher will give a short introduction to the activity.
2. The teacher will assign students in teams of two and each team will receive a Hubble Space Telescope Student Worksheet.
3. The teacher will set a time limit for the activity.
4. At the end of the activity, time should be allowed to review the answers in the classroom and discuss any findings the teams may have found while exploring the HST web site. Answers can be found on the Answers for the Hubble Space Telescope Scavenger Hunt.

Teacher Introduction: The Hubble Space Telescope, launched in 1990, has opened the door a new frontier of space exploration. Exploration by the Hubble Space Telescope has broaden our understanding of the universe by providing detailed photos and videos of our neighboring galaxies, stars, and planets and of those as distant as 12 billion light years away. Hubble has even helped scientists calculate the age of our universe, which is 13.7 billions years old.

Your job is to help discover some of the mysteries that have been unlocked by Hubble. Each team will be given a Hubble Space Telescope Scavenger Hunt Sheet and must find the missing words. The team that finds the all of the answers wins.

Your answers can be found at these websites:

Hubble Space Telescope website: <http://hubblesite.org/>

Cornell University Welcome to the Galaxy Webpage:

<http://www.astro.cornell.edu/academics/courses/astro201/galaxies/types.htm>

Differentiated Instruction:

Reading Level Adjustments: Lower reading level students should be paired with students with higher reading levels.

Team Composition: Teams can be made of 2 or 3 students. For teams with two students, one student will record information on the worksheet while the other will search the HST web site for the answers. Three member teams can have a web searcher, data collector, and a team leader who will report their answers to the class at the end of the activity.

Two Large Classroom Teams: Split the class in to two large teams and assign them the task of finding the answers faster than the other team. Students will have to agree on the division of work thus creating a cooperative educational activity.

Individual Activity: All students will be assigned a worksheet and will find all the answers individually.

Collaboration:

Students will work collaboratively in groups of two.

Materials and Resources:

Internet access, one computer per group of students, one copy of *the Student Worksheet for the Hubble Space Telescope Scavenger Hunt*, one copy of *the Answers for the Student Worksheet for the Hubble Space Telescope Scavenger Hun.*

Standards and Assessment:

National Science Education Standards

• Chapter 6: Science Content Standards

• **Content Standard D:** Earth and Space Science: As a result of their activities in grades 9-12, all students should develop an understanding of:

• **Ability/ Concept: Origin and evolution of the universe**

⇒Detail: Early in the history of the universe, matter, primarily the light atoms hydrogen and helium, clumped together by gravitational attraction to form countless trillions of stars. Billions of galaxies, each of which is a gravitationally bound cluster of billions of stars, now form most of the visible mass in the universe.

⇒Detail: Stars produce energy from nuclear reactions, primarily the fusion of hydrogen to form helium. These and other processes in stars have led to the formation of all the other elements.

⇒Detail: The origin of the universe remains one of the greatest questions in science. The "big bang" theory places the origin between 10 and 20 billion years ago, when the universe began in a hot dense state; according to this theory, the universe has been expanding ever since.

• **Content Standard E: Science and Technology:** As a result of activities in grades 9-12, all students should develop:

• **Ability/ Concept: Understandings about science and technology**

⇒Detail: Scientists in different disciplines ask different questions, use different methods of investigation, and accept different types of evidence to support their explanations. Many scientific investigations require the contributions of individuals from different disciplines, including engineering. New disciplines of science, such as geophysics and biochemistry often emerge at the interface of two older disciplines.

⇒ Detail: Science often advances with the introduction of new technologies. Solving technological problems often results in new scientific knowledge. New technologies often extend the current levels of scientific understanding and introduce new areas of research.

⇒Detail: Creativity, imagination, and a good knowledge base are all required in the work of science and engineering.

⇒Detail: Science and technology are pursued for different purposes. Scientific inquiry is driven by the desire to understand the natural world, and technological design is driven by the need to meet human needs and solve human problems. Technology, by its nature, has a more direct effect on society than science because its purpose is to solve human problems, help humans adapt, and fulfill human aspirations. Technological solutions may create new problems. Science, by its nature, answers questions that may or may not directly influence humans. Sometimes scientific advances challenge people's beliefs and practical explanations concerning various aspects of the world.

ISTE: National Educational Technology Standards for Students: The Next Generation

• **Standard: 3.** Research and Information Fluency- Students apply digital tools to gather, evaluate, and use information.

⇒Indicator: Students: a. plan strategies to guide inquiry.

• **Standard: 6.** Technology Operations and Concepts- Students demonstrate a sound understanding of technology concepts, systems and operations.

⇒Indicator: Students: b. selects and uses applications effectively and productively.

⇒Indicator: Students: d. transfer current knowledge to learning of new technologies.

Assessment/Rubrics:

Assessment/Rubric: Teams will receive a grade for the most correct answers. There are 14 exploration areas and a total of 28 questions. The questions are weighted 3.5 points each, which is a total of 98 points. The grading scale is based on number of incorrect responses:

All correct: Universe Masters

1 - 2 incorrect: Galactic Voyagers

3-5 incorrect: Milky Way Adventurers

6 or more incorrect: Solar System Explorers