

**Instructor:** Pete Guastella

**Dates:** TBA

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**Available hours:**

**Weekdays:** 7-3 (e-mail)

**Weekends and nights:** (home or e-mail)

### **An Introduction to Astronomy through the Eyes of Hubble**

From how we know about the composition of stars to the simple appreciation of the beauty of Hubble pictures this course utilizes the Internet and the amazing photographs of the Hubble Telescope to learn about the basics of Astronomy

The course attempts to teach through motivation and excitement rather than text and notes as participants explore the cosmos. Hubble has taken images of regions as close as the moon and as distant as the edge of the universe. Reviewing just a small portion of these images will allow the student to learn while appreciating the majesty of the night sky. The course is designed to appeal to all teachers but may be most applicable to teachers in the sciences from grades K through 12. The course may also be relevant to art teachers as so much of Hubble's work has been turned into masterpieces through the wonders of multiple filter astrophotography.

#### **Goals**

What's out there on the Internet? Almost as vast as the universe itself the internet has exploded with beautiful and yet scientifically accurate images of the universe. Participants will explore a few choice sites loaded with "motivational tools" from java applets to megapixel jpgs. Participants will be encouraged to search, explore and develop "favorite sites".

How do we know what stars are made of? Participants will learn about the electromagnetic spectrum, emission spectrum and absorption spectrum.

Are we alone? Participants will view images of distant galaxies and develop a sense of just how large the Universe is.

Is our star special – Participants will learn about the HR diagram and the Sun's relative place among the vast number of stellar objects. What will happen to our star? How do we know its fate?

How do they make the beautiful pictures? Participants will view the components of some of the greatest of Hubble's master art works. Participants will explore the story of the Pillars of Creation in the Eagle Nebulae.

Getting Familiar with the night sky. Participants will take the time to view the night sky and try to become familiar with some of the sky's proud inhabitants.

#### **Outcomes**

The participants will distinguish between the goals of each of the Great Observatories in Space

Participants shall create a review plan that can be used by students to aid in the discovery process of the "hubblesite" web site

The participants will determine the sun's position on the HR diagram.

Participants will formulate a thesis to generalize about the lives of stars

Based on Drake's Equation. The participants will formulate an answer to the question: "Is there life in the Universe"?

Participants will explore the Astrophotography techniques used to create Hubble's images

Participants will identify object in the night sky using their naked eye or binoculars.

### **Objectives**

The participants will compare and contrast the 3 space telescopes

The participants will learn about multiwavelength observations

The participants will explore new websites on the topic

Participants will learn about the many objects that have been viewed by Hubble.

Participants will explore the Hubble image gallery and movie theater

The participants will :

Generate approximate numbers for each part of Drakes Equation

Calculate the odds that there is other life in the Universe?

Formulate a theory to the question, "Are we alone out there?".

Participants will find examples of natural, representative and enhanced color.

Participants will explore the use of multiple filters in astrophotography.

Participants will collect sample images from the "Hubblesite" web site

Participants will explore the night sky and identify several of the month's key features.

Participants will keep a log of the images observed and their location and time

### **About the Instructor:**

Pete Guastella is the Research Specialist for Manhasset Public Schools. Mr. Guastella has taught Science as inquiry since 1979. Manhasset's research program (now 18 years old) has been rich with INTEL, Siemens/Westinghouse and ISEF National winners. Mr. Guastella's love for Astronomy has taken him from backyard amateur to being actively involved in several areas of astronomy research and astrophotography. Mr. Guastella was a member of the TLRBSE (Astronomy Based Research Science Education Program) in 2006. As part of the program Mr. Guastella had the opportunity to complete research in Solar Astronomy using the McMath-Pearson Solar Telescope at Kitt Peak in Arizona. Two of his students applied for and won a grant to do their research at Kitt Peak in December of 2007. Mr. Guastella was recently selected as a Spitzer Teacher. He is

presently developing a proposal for research time using the Spitzer Space Telescope. Additionally, Mr. Guastella is a member of the Custer Observatory Research Committee and an avid astrophotographer. Finally, Mr Guastella has received \$16,000 in grants as he develops the Manhasset High School Observatory and it's first Astronomy Club.

### NYS MST Standards

**Standard 1** Students will use mathematical analysis, scientific inquiry, and engineering design, as appropriate, to pose questions, seek answers, and develop solutions.

**Standard 2 - Information Systems** Students will access, generate, process, and transfer information using appropriate technologies

**Standard 4 - Science** Students will understand and apply scientific concepts, principles, and theories pertaining to the physical setting and living environment and recognize the historical development of ideas in science.

**Standard 6 - Interconnectedness: Common Themes** Students will understand the relationships and common themes that connect mathematics, science, and technology and apply the themes to these and other areas of learning.

**Standard 7 - Interdisciplinary Problem Solving** Students will apply the knowledge and thinking skills of mathematics, science, and technology to address real-life problems and make informed decisions

### **Prerequisite Skills:**

- Familiar with Microsoft Word
- Computer literate – email, internet research

**Required software:** completion of the course will require Microsoft Word. Additionally several freeware media program may need to be loaded to view some of the Video clips.

**In-service Recommendations:** Participants will be recommended for in-service hours based on the satisfactory completion of the outcomes of the courses. Participants who do not meet all outcomes will only be recommended for the hours reflected by their satisfactorily completed outcomes.