



**Saturday Enrichment Program
Course Syllabus Template**

Session Fall Date 2009

Instructor name: Marcella Linahan

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Course Title: Astronomy & Physics

Course Description:

Where are the stars during the day? Can force overcome gravity? This discovery-based class uses books, materials and a variety of hands-on activities to help young scientists explore a number of the mysteries of the universe. As students conduct experiments and write lab reports, they become acquainted with the scientific method.

Essential Questions:

- 1) Why is science based on experimentation and observation?
- 2) How can physics help us to understand and predict the locations of celestial objects in the night sky?
- 3) How can the location of the Earth, Sun, and Moon affect conditions on our planet?
- 4) Why don't planets and other celestial objects go flying off into space?
- 5) Why isn't Pluto a planet anymore?
- 6) Why do stars come in different colors?
- 7) How can light waves, radio waves, and x-rays (among others) be the same type of wave?
- 8) How can lenses and mirrors provide a variety of images?
- 9) How do we learn about places in the universe, if we can't visit them?
- 10) Will the human race be able to colonize another planet?

Outcomes: Upon successful completion of this course, students will:

- a. Students will be able to use various tools that astronomers use to view the universe
- b. Students will understand how constellations move through the night sky
- c. Students will understand how the universe evolved, especially the formation of our solar system
- d. Students will be able to identify the phases of the Moon, place them in the correct order, and understand the role of the Sun in the Moon phases
- e. Students will be able to identify the 8 planets of the Solar System
- f. Students will be able to distinguish between comets, meteors, asteroids, and dwarf planets
- g. Students will understand how mass and gravity affect crater size.
- h. Student will be able to work with a simple spectroscope to understand the different colors of stars
- i. Students will be able to identify deep space objects such as galaxies and nebulas
- j. Students will become familiar with the difficulties inherent in space travel
- k. Students will become familiar with several Astronomy websites to enhance their current learning and to pursue future research

Resources and Materials:

- a. School supplies to be brought to class each week
- b. Books
 - a. There's No Place Like Space by Tish Rave, 0-679-89115-3
 - b. A Child's Introduction to the Night Sky by Michael Driscoll, 978-159123666
 - c. The Moon Book by Gail Gibbons, 978-0823412976
 - d. The Truth About the Moon by Clayton Bess, 978-0395345511
 - e. The Stars by H.A Rey, 978-0-395-24830-0
 - f. Find the Constellations by H.A. Rey, 978-0-395-24418-0
 - g. Galaxies, Galaxies by Gail Gibbons, 978-0823-420025
 - h. T. rex and the Crater of Doom by Walter Alvarez, 0-375-70210-5
 - i. The Lives of Galileo, a journey through the history of Astronomy, available at the International Year of Astronomy website:
http://www.astronomy2009.org/resources/books/detail/book_fiami/
- c. Websites
 - a. NASA
 - i. <http://www.nasa.gov/audience/forkids/home/index.html>
 - b. Sloan Digital Sky Survey Telescope
 - i. <http://cas.sdss.org/dr6/en/proj/kids/>
 - c. I-CAN constellation camera
 - i. <http://rika.educ.kumamoto-u.ac.jp/i-CAN/eng/index.html>
 - d. Space weather news and information
<http://www.spaceweather.com/>
 - e. Kids Astronomy
 - i. http://www.kidsastronomy.com/solar_system.htm
 - f. Nine (Eight) Planets
 - i. <http://www.nineplanets.org/>
 - g. Tour of the Universe
 - i. <http://sunra.lbl.gov/ISE/new/>
 - h. Lake County Astronomical Society
 - i. <http://www.lcas-astronomy.org/>
 - i. International Year of Astronomy
 - i. <http://www.astronomy2009.org/>
 - j. Adler Planetarium
 - i. <http://www.adlerplanetarium.org/plan/index.shtml>
 - k. Hands on Universe
 - i. <http://www.handsonuniverse.org/>

d. Materials

Please bring all required materials to class each week

In addition, students should bring a lab notebook or spiral notebook to record data

Instructor Biography: Ms. Linahan earned a Bachelor of Science degree from Cornell University in Biology with a minor in Chemistry and a Master's of Science Degree in Education from Northwestern University. Last summer, Ms. Linahan was selected as one of 18 teachers from throughout the United States to study at the National Astronomical Observatory in Arizona for two weeks. Additionally, she was selected into a program through the University of Chicago and Yerkes Observatory in Wisconsin called Astronomy Resources

Connecting Students. This is Ms. Linahan's fourth year teaching at Carmel Catholic High School in Mundelein and her third year teaching for the Saturday Enrichment Program.

Schedule:

Date(s)	Topic(s)	Activities	Assignments and/or Assessment	Instructional Strategies
Session 1 October 3 Pre-Assessment	Tools of the Astronomer	<ul style="list-style-type: none"> • Introductions • What is gravity and Emmy's stars pre-assessment worksheets • Telescopes • Astrolabe • Star Chart • Sloan Digital Sky Survey (SDSS) Telescope 	Week 1 Astrolabe Activity Star Chart	Individual and small group activities designed to foster logical-mathematical, visual-spatial, linguistic, and interpersonal intelligences
Session 2 October 10	Constellations, the Moon, and Gravity	<ul style="list-style-type: none"> • Continue Star Chart • Read the Truth about the Moon Book • Moon Formation • Moon Phases • Gravity and Crater Formation 	<ul style="list-style-type: none"> • Week 2 Astrolabe Activity • Lunar Observing Record Chart • Oreo Moon Phases 	Individual, small group, and large group activities designed to foster logical-mathematical, visual-spatial, and interpersonal intelligences
Session 3 October 17	Terrestrial Planets, Dwarf Planets, Comets, Meteors, and Asteroids	<ul style="list-style-type: none"> • Formation of the Solar System • Mapping a Volcano • Make your own comet • SDSS Asteroid Lab 	<ul style="list-style-type: none"> • Lunar Observing Record Chart • Mars Rover 	Individual and small group activities designed to foster kinesthetic, logical-mathematical, visual-spatial, and interpersonal intelligences
Session 4 October 24	Jovian Planets, Density, and Circular Motion	<ul style="list-style-type: none"> • Online exploration of planets • Jupiter's Moons Flip Book • Density Lab • Motion Lab 	• Lunar Observing Record Chart	Individual, small group, and large group activities designed to foster kinesthetic, logical-mathematical, visual-spatial, and interpersonal intelligences

Date(s)	Topic(s)	Activities	Assignments and/or Assessment	Instructional Strategies
Session 5 October 31	The Sun and Light	<ul style="list-style-type: none"> • Plot Sun’s position • Spectroscope Lab • Solar Telescopes (weather permitting) • Sun’s Layers • Sun Song 	<ul style="list-style-type: none"> • Lunar Observing Record Chart 	Individual, small group, and large group activities designed to foster logical-mathematical, visual-spatial, linguistic, musical, and interpersonal intelligences
Session 6 Nov. 7	The Stars and Light	<ul style="list-style-type: none"> • Colors of Stars SDSS Lab • Light, mirrors, and lenses lab • Assign roles for Expo! 	<ul style="list-style-type: none"> • Lunar Record Chart • Complete Spectroscope Lab • Research for Expo! 	Individual and small group activities designed to foster logical-mathematical, visual-spatial, linguistic, and interpersonal intelligences
Session 7 Nov. 14	Galaxies and other Deep Space Objects	<ul style="list-style-type: none"> • Practice for EXPO • SDSS & Hubble Tuning Fork • Deep Space Art Painting 	<ul style="list-style-type: none"> • Lunar Observing Record Chart—Finish and bring to class next week • Prepare EXPO costume • Practice for Expo! 	Activities designed to foster logical-mathematical, visual-spatial, linguistic, and interpersonal intelligences
Session 8 Planet Palooza Expo! Nov. 21	Black Holes, Space Travel, and EXPO	<ul style="list-style-type: none"> • Lunar Chart • Practice Expo • Black Holes • Space Travel • Planet Palooza Expo! Join students on a guided tour of our Universe 	Keep looking up at the sky!	Activities designed to foster logical-mathematical, kinesthetic, visual-spatial, linguistic, and intrapersonal intelligences

CTD Statement on Third-Party Web Sites

Instructors are required to thoroughly review any third-party web sites they intend to use in their courses for inappropriate content. However, because web content continuously changes, CTD disclaims any responsibility for any of the content contained on third-party web sites used in course materials. If you become aware of anything that may be inappropriate, please notify CTD staff immediately.