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2018 Technology Integration Workshop

Unit Title: Stars and Beyond

Grade Level: ***(example: 9, 10, 11, 12 or 7-8)*** 8th Grade

Subject Area: ***(example: Science, Physics; English, Short Stories)*** Earth Science-Astronomy

Duration/Length/Number of class periods: ***(example: 5 class periods)*** 8 class periods

Description:
In this unit, students will investigate stars and galaxies, both within and beyond the Milky Way. Students will compare other stars to the sun in composition, absolute magnitude, relative magnitude, and life stage. They will investigate the fuel source of the sun and compare the elements fused within it to the elements fused in older and younger stars. The unit culminates with students investigating constellations and identifying the many contributions of world cultures to the narratives that surround star pictures worldwide.

Established Goals (National, State, Local):
8.3.3.1.1 Recognize that the sun is a medium-sized star, one of billions of stars in the Milky Way galaxy, and the closest star to Earth.

8.1.3.2.1 Contributions of Cultures

8.3.2.1The sun is the principal external energy source for the Earth.

What Enduring Understandings are desired?
The Sun is the principal external energy source for the Earth and Solar System.

Stars are independent celestial bodies that are enormous and immensely far away.

The sun is one of billions of stars in the Milky Way Galaxy, the Milky Way is one of billions of galaxies in the universe.

What Essential Questions will be considered?
How does the sun and other stars produce energy?

What is the Sun's place in the universe?

How does the sun compare to other stars?

Students will know / be able to:

Students will be able to use proper units and measurement to relate the distance and brightness of stars.

Students will be able to explain how stars produce energy and how it relates to E=mc2.

Students will be able to sequence and compare the life cycle stages of stars.

Students will be able to interpret the analysis of the color of light from stars.

Students will be able to describe the sun's place in the galaxy and the universe.

Students will be able to design a visual project assessing the stars that make up a selected constellation.

Description *Units must include at least one of each formative, summative, introductory activity and learning activity. Check the appropriate box; one per row.*	Formative	Summative	Introductory Activity	Learning Activity	Student Technology Used	Teacher Technology Used	ISTE Standards
What are Constellations? Students will access the activity at this link: https://docs.google.com/document/d/1v5VZ-jmh7-Dp4frMP0tDWyvdsNH_w6pgYVBUpwoZy5g/edit?usp=sharing They will use an image representation of an actual portion of the night sky to create their own constellation and a story to go along with it. At this point, the class will discuss that there are 88 recognized constellations internationally, but that many different cultures have their own unique stories about the shapes in the stars. Students will be introduced to the Sky Map: https://in-the-sky.org/skymap.php and given the opportunity to explore different locations/times of day/year to emphasize the fact that stars are always there, but what we can see changes based on our location around the sun. If students have extra time, they can access the Enrichment Constellation Hunt to quiz themselves on a few basic constellations: https://kidsastronomy.com/the-universe/constellation-hunt/			**x**		Computers G-suite	SMART board G-suite	**I.**C II.C

Stellar Distances Activity Students will calculate a "Me year" and doing the following activity: https://drive.google.com/file/d/1sBgACp5b-sQdN70TYJp4BHQEIYNt0BfU/view?usp=sharing They then will use the same method to calculate the actual distance of a lightyear. This will introduce the idea of a lightyear as a unit of distance, not time. Students will then complete the calculating Brightness From Stellar Distances Activity: https://docs.google.com/document/d/1FtE_7mqowvvCiNu9iwrLy-Cz6E_T4PoqAIGoouNyz6w/edit?usp=sharing using google draw in order to visualize the impact of distance on apparent magnitude of stars.				**x**	Stopwatch Google Drawings	SMART board	I.D
Energy from Stars Students will view the following video on the energy source and life cycle of stars. They will then post to a class Padlet, where they will share what they have learned about the actual fuel source for stars and how star compositions change as they proceed through their life. https://www.youtube.com/watch?v=PM9CQDlQI0A				**X**	Padlet	Padlet SMART board	II.A
H-R Diagram, Life Cycle of Stars Students will complete the following activity on paper to investigate how the temperature and colors of stars are related and can be represented visually with an H-R diagram. It allows them to discover the relationship by plotting a data set. https://drive.google.com/file/d/1-Ghzt7GteJ6VCqCkp9tHM3J2eLV5xhyD/view?usp=sharing Students will then work through an online module where they can interact with a digital H-R diagram that explains where main sequence stars fall as well as stars that are later in their life cycle. http://cse.ssl.berkeley.edu/segwayed/lessons/startemp/student.htm				**X**	Computers		I.D
Kahoot on Star Life Cycles Students will play the following kahoot and self-assess using the quizlet https://play.kahoot.it/#/k/ac5ad70b-a761-43e0-b5c8-40feff0c1ed4 Quizlet	**X**				Kahoot Quizlet		

https://quizlet.com/_3hoo6q					Personal phone Computers		
Galaxies, size and scale of universe Students will watch this video that visualizes the size of and space between objects in the universe: https://www.youtube.com/watch?v=HEheh1BH34Q The teacher will then lead students through this activity to help them further investigate the size and scale of the universe itself: http://wise.ssl.berkeley.edu/documents/ScaleRealmsUniverse.pdf The end of the above activity is a question posed to students about how their view of the immensity of the universe has changed after completing this activity. They will record their responses in a short 1 minute video on flipgrid.	**X**			**X**	Flipgrid	SMARTboard	I.C
Star spectral analysis Students will complete this online activity that will introduce them to star color and spectral analysis: http://www.learner.org/teacherslab/science/light/color/spectra/ Students will then watch the two videos below to investigate ways that the spectral signature of a star can be changed based on the direction it is moving: Red Shift/Blue Shift https://www.youtube.com/watch?v=Kg9F5pN5tlI&edufilter=Me0Y8oEc4HkxgjmJaR_JWQ Big Bang Theory https://www.youtube.com/watch?v=z0EaoilzgGE Finally, students will complete this activity: Star Radiation and Stage http://cse.ssl.berkeley.edu/lessons/indiv/timothyk/skymap.html. This activity allows students to actually look at a random star's spectral signature in order to investigate the life stage of the star in question.				**X**	Computers Youtube Online modules		I.C,DI.D

Culmination project: Constellations Students will report on a selected constellation incorporating graphics with proper terminology to detail properties of stars. Students should include details on the majors stars including magnitudes, distance, color, and life stage. Students should also include art, literature and cultural references. **Museum Tour:** **https://docs.google.com/presentation/u/1/d/1iqn7YVK0BpgwDSnegBhA8OY-VgnPC6sgIbPfjYo9Vpc/template/preview** **Or** **National Geographic Report** **https://docs.google.com/presentation/d/1xsDVmFNdrOk9V-5KK7491FLks26nffKs0Sq18CK4bf0/template/preview**		**X**			COmputers G-suite Google Drawings		I.C II.AI.A III.B VI.B

Materials, tools and resources: Google Suite, Computers, SMARTboard, Kahoot, Quizlet
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