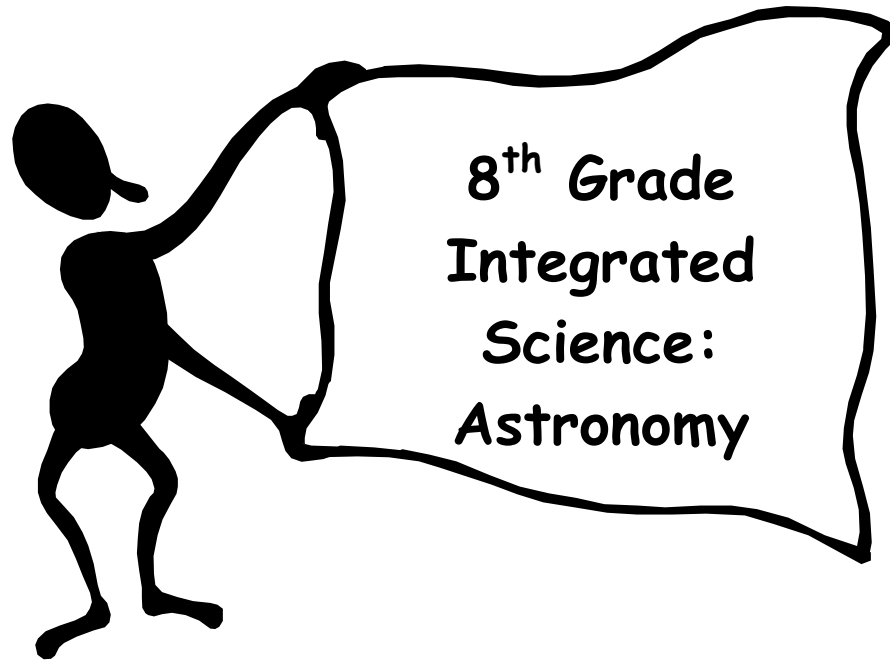


Backwards Design Unit Planning

**New York City Department of Education
Magnet Program District 25 & 28**

School Name
RFK I.S. 250

Backwards Design Unit Planning



Essential Question: What role does structure play on creating harmony in our community - the Universe

Suggested Time Frame: 6 weeks

Theme: Outer Space (Astronomy)

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Graphic Overview of Unit

Suggested Time Frame: 6 Weeks

Essential Question: What role does structure play in creating harmony in our community -the Universe?

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Unit name: The Earth, Sun, and Moon System

Mini-unit name- The Earth-Sun-Moon System

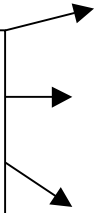
Mini-unit name – Ocean Motion

Mini-unit name – The Solar System

Mini-unit name – Stars and Galaxies

Mini-Units

* It is recommended that each mini-unit end with a standardized test that reflects the state / city assessment



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Unit's Culminating Project: (briefly explain in 2-3 sentences): *Students will work on a WebQuest Project which includes topics which match the unit's mini-units. The WebQuest also involves students creating a Time Capsule project which mirrors the "Golden Record" from NASA's Voyager Mission.*

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Stage 1- Desired Results	
Standards-Based Learning Goals: PS 1.1a, 1.1b, 1.1c, 1.1d, 1.1e, 1.1g, 1.1h, 1.1i, 1.1j, 2.1a, 2.1e, 2.2a, 3.1a, 4.1a, 4.1b, 4.2a, 4.2b, 4.2e, 4.4a, 4.4c, 5.1b, 5.2d	
Concepts	
Big Ideas for this Unit <ul style="list-style-type: none">❖ Structure❖ Function❖ Harmony❖ Interactions❖ Systems	Magnet School Theme: Community How does the Big Idea in your unit connect to your theme? The Big Ideas of the unit on Astronomy connect since the students will be examining the structures, functions, and interactions of the natural surroundings of their community to understand how these things work together to form systems of harmony
Enduring Understandings The structure of the various components of the Universe determines their function. Harmony is created when the various components interact in a manner that allows for a balance between systems.	Overarching Essential Question: (this question should connect to your school theme) What role does structure play on creating harmony in the Universe?

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Content and Skills	
<p>Content Students will know...</p> <p>Sphere, axis, rotation, revolution, ellipse, solstice, equinox, moon phase, waxing, full moon, waning, solar eclipse, lunar eclipse, maria, impact basin, basin, salinity, surface current, wave, crest, trough, breaker, tide, tidal range, solar system, Mercury, Venus, Earth, Mars, Jupiter, Great Red Spot, Saturn, Uranus, Neptune Pluto, comet, meteor, meteorite, asteroid, constellation, constellation, absolute magnitude, apparent magnitude, light-year, photosphere, chromosphere, corona, sunspot, nebula, giant, white dwarf, supergiant, neutron star, black hole, galaxy, big bang theory.</p>	<p>Skills Students will be able to...</p> <ul style="list-style-type: none"> ➤ Examine Earth’s physical characteristics. ➤ Differentiate between rotation and revolution. ➤ Discuss what causes seasons to change. ➤ Identify phases of the Moon and their cause. ➤ Explain why solar and lunar eclipses occur. ➤ Infer what the Moon’s surface features may reveal about its history. ➤ Describe recent discoveries about the Moon. ➤ Examine facts about the Moon that might influence future space travel. ➤ Identify the origin of the water in Earth’s oceans. ➤ Explain how dissolved salts and other substances get into seawater. ➤ Explain how winds and the Coriolis effect influence surface currents. ➤ Discuss the temperature of coastal waters. ➤ Describe density currents. ➤ Describe wave formation. ➤ Distinguish between the movement

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of water particles in a wave and the movement of the wave.

- Explain how ocean tides form.
- Compare the Earth-centered and Sun-centered models of the solar system.
- Explain that gravity holds the planets in their orbits around the Sun.
- List the inner planets in order from the Sun.
- Describe each inner planet.
- Compare and contrast Venus and Earth.
- Describe the characteristics of Jupiter, Saturn, Uranus, and Neptune.
- Explain how Pluto differs from the other outer planets.
- Describe comets and how comets change when they approach the Sun.
- Distinguish among comets, meteoroids, and asteroids.
- Explain that objects from space sometimes impact Earth.
- Explain why some constellations are visible only during certain seasons.
- Distinguish between absolute magnitude and apparent magnitude.
- Explain that the Sun is the closest

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	<p>star to Earth.</p> <ul style="list-style-type: none">➤ Describe the structure of the Sun.➤ Describe sunspots, prominences, and solar flares.➤ Describe how stars are classified.➤ Compare the Sun to other types of stars on the H-R diagram.➤ Describe how stars evolve.➤ Describe the Sun's position in the Milky Way Galaxy.➤ Explain that the same natural laws that apply to our solar system also apply in other galaxies.
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Stage 2- Summative Assessment Evidence

If students understand, know and are able to do the items in Stage 1, they should be able to show their understanding by completing an authentic task found in the world beyond the classroom.

- Design the Culminating/Summative Task:
- Please note: The Essential Question and the Grasp are interconnected. The GRASP is a way for students to demonstrate their knowledge and understanding unit by answer of the Essential Question. Or you can say, they are answering the essential question through their GRASP.

G- (goal): Demonstrate an understanding of the universal idea that structure determines function and how this applies to the entire Universe, including the local community's planet and solar system.

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R- (role): Recorder, Navigator, Skimmer, Second Recorder, and Commander.

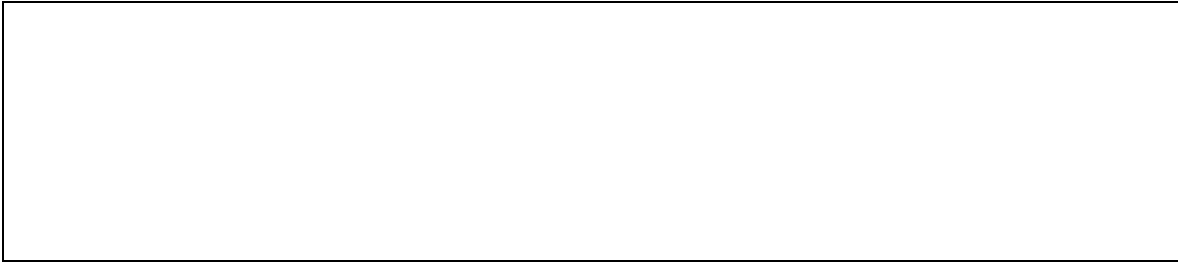
A- (audience): Alien explorers in the future who find the time capsules.

S- (situation): Each student is part of a five member space team and will work on a WebQuest project which consists of an individual component and a team assignment.

P- (purpose and product): The culminating task of the WebQuest will be a Time Capsule that the team designs to describe how the structure of the community's planet, Earth, impacts its function in the Universe.

S- (standards for performance): The *Time Capsule* should demonstrate a clear understanding of the relationship between structure and function and how the interactions of various systems create harmony in the communities of the Universe.

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A large, empty rectangular box with a thin black border, intended for planning or writing. It occupies the upper left portion of the page.

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Student Task

In the space below, write the task exactly as students will see it.

You should give this task to them on the first day of the unit. This way they know where they are going.

Overview of the WebQuest

Hello fellow Space Travelers!

You will be part of a five member team. Each team will conduct a *WebQuest* research on five different topics about our community's special place in the Universe.

You and your team will explore one topic each day. Each topic will have five questions for you to answer on your Space Log.

Also, you will describe which objects will be included in the final product of your team's journey through the solar system, which is... a ***Time Capsule!***

The time capsule will be about the size of a backpack and it will be sent into space on a future NASA mission with the hope that somebody, someday will find it.

The time capsule should describe to the aliens that recover it all about life in our solar system. Remember that creatures in space likely won't be able to understand the languages of Earth, so your time capsule should include creative ways of telling

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other aliens about our home planet and our solar system in a way that is easy to understand.

Specifics of the WebQuest

Space Teams!

Each day, you and your team will visit one of the following five topics. You will work together using the internet links provided or the books in our class library to answer the 25 questions in your Space Logs. Each day, you will download your space Log Sheet and answer the five questions for that topic. When you are finished, you will have explored five different topics and answered 25 questions in all. Please note that more detailed information concerning carrying out the tasks of the WebQuest will be found online.

The jobs are:

1. *The Recorder* will take notes for the team from the information found by the Navigator.
2. *The Navigator* will control the mouse and the keyboard.
3. *The Skimmer* will look through the books to find interesting facts in the books and magazines.
4. *The 2nd Recorder* will record on "Post-Its" the title of the book, page number and the facts that the Skimmer finds.
5. The *Commander* will make sure that all jobs are being done. You will also keep an eye on the time. 15 minutes before the period ends, you will call a meeting. During this time, you will all put together the information and the answers that you found. You will also include any interesting facts that were learned. Each day, the Commander will write a summary of the days work.

The Commander will collect the sheets each day and hand them in to the teacher. After you have explored all of the sites and answered the questions, you will work on the Time Capsule. As a team, decide on some things (artifacts) to represent each topic.

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Topics of the WebQuest-

1. The Solar System
2. The Moon
3. The Sun
4. Black Holes
5. Comets, Meteors, and Asteroids

Time Capsule Assignment

Part 1 -

Your team will decide on the objects to be placed into the team's time capsule to be sent on NASA's next journey into outer space.

Each member of the team should choose at least one object per topic. There are five topics, so each member chooses a total of five objects to send into space. The objects should help describe life in our solar system. *Each member of the team will use the **Time Capsule** log that is downloaded and printed from this WebQuest. (Please refer to bottom of the "Task" section for the Space Log worksheets.)*

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Remember that there are millions and millions of solar systems out there, so the things you put into the time capsule will help other civilizations understand more about the human race here on Earth and our special place in the Universe. Good Luck and Bon Voyage!

Part 2 –

You've had the chance to choose five objects that you think should be included in a time capsule. Each of your team members has also written down five objects they think should be included. Therefore your team has a total of 25 objects. Now you will meet with your team and narrow the list down to a total of five objects. Please discuss the reasons why each object was chosen by the team. Your team may also present their findings with the class.

Evaluation

This is how your work will be evaluated.

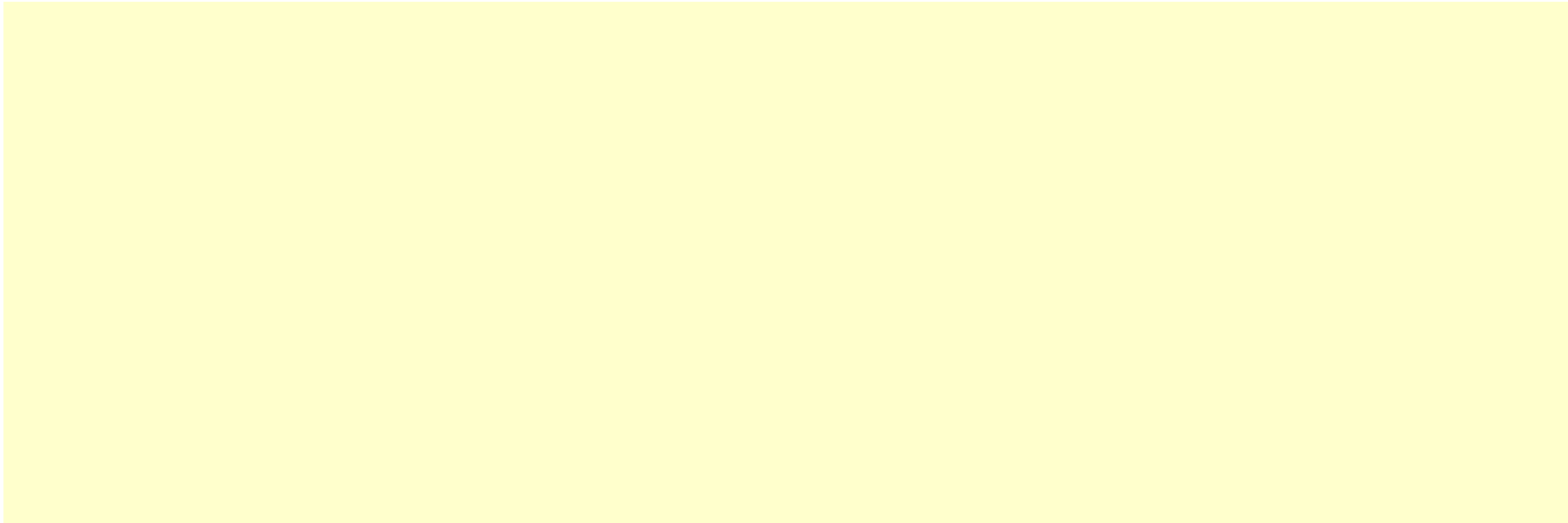
	Unacceptable D	Approaching the standards C	Meets grade level standards B	Exceeds grade level standards A	Score
The Planets 10%	You have many inaccuracies or you answered only 1 question completely.	You answered at least 3 questions accurately. You have at least 2 thoughtful answers.	You answered at least 4 questions with few inaccuracies. At least 3 of your answers are thoughtful.	You answered 5 only minor errors. You may pose interesting questions during the debriefing.	

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Going to the Moon 10%	You have many inaccuracies or you have answered only 1 question completely.	You answered at least 3 questions accurately with at least 2 thorough and thoughtful answers	You answered 4 questions with few errors and at least 3 questions were answered thoroughly and thoughtfully	You answered 5 questions thoughtfully and accurately with only minor errors.		
Our Sun 10%	You have many inaccuracies or you have answered only 1 question completely.	You answered at least 3 questions accurately with at least 2 thorough and thoughtful answers.	You have answered 4 questions with few errors and at least 3 questions were answered thoroughly and thoughtfully	You have answered 5 questions thoughtfully and accurately with only minor errors.		
Black Holes 10%	You have many inaccuracies or you have answered only 1 question completely	You answered at least 3 questions accurately with at least 2 thorough and thoughtful answers.	You have answered 4 questions with few errors and at least 3 questions were answered thoroughly and thoughtfully.	You have answered 5 questions thoughtfully and accurately with only minor errors.		
Asteroids, Comets, and Meteors	You have inaccuracies or the learner has answered only 1 question completely.	You answered at least 3 questions accurately with at least 2 thorough and thoughtful answers.	You have answered 4 questions with few errors and at least 3 questions were answered thoroughly and thoughtfully	You have answered 5 questions thoughtfully and accurately with only minor errors.		

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Asteroids, Comets, and Meteoroids	You have inaccuracies or the learner has answered only 1 question completely.	You answered at least 3 questions accurately with at least 2 thorough and thoughtful answers.	You have answered 4 questions with few errors and at least 3 questions were answered thoroughly and thoughtfully	You have answered 5 questions thoughtfully and accurately with only minor errors.		
Time Capsule 40%	You were unable to justify your choice or your justification does not reflect basic understanding.	Your choice is reasonable and you have only a very basic and literal understanding	You explain why your choice is reasonable and representative.	You explain why your choice is reasonable and representative. You are able to explain why other choices were rejected.		



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Unit's Essential Question: What role does structure play in creating harmony in our community - the Universe?

Mini-Unit Title (each mini-unit is approx 1 week long)	Big ideas of the mini-unit / concept statement (macro) What is the big idea of this mini-unit?	Key Content /Knowledge (Important Content to Know about, vocabulary, the specifics) (Micro)	Skills What should the students be able to do? (rule of thumb - skills are verbs – knowledge is a noun)	List of Topical / Content Based Questions (make sure to amend the essential question so that it becomes topical for this mini-unit)	Mini-Unit Assessment (must be aligned to the NYS / NYC exams. It can be a test or a quiz - i.e.: DBQ Essay; 10 multiple choice questions; or 3 constructed response questions)	Scaffolding towards the culminating project (what can be done during this mini-unit to develop the stage 2 culminating assessment (grasp)
The Sun-Earth-Moon System	Life on Earth follows the rhythm of the Earth's movements in the solar system. The Moon can teach you about the Earth. Continuing Moon missions may result in discoveries about Earth's	Sphere, axis, rotation, revolution, ellipse, solstice, equinox, moon phase, new moon, waxing, waning, full moon, solar eclipse, lunar eclipse, maria, impact basin.	Students describe Earth's physical characteristics, differentiate between rotation and revolution, discuss what causes seasons to change. Students will identify phases of the Moon and explain	How does the spherical shape of Earth rotating on its axis cause day and night? Why does the Moon appear to be lighted? What causes the phases of the Moon? Why do scientists continue to study the	Mini Lab, Science Journal, and Intermediate-Level Science Examination Practice.	Students will conduct research on NASA's Golden Record of the Voyager Mission. Complete Task #1 on WebQuest.

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	origin.		their causes, explain why solar and lunar eclipses occur, and infer what the Moon's surface features may reveal about its history.	Moon?		
Ocean Motion	Oceans are considered a valuable reservoir of food, energy, and mineral resources.	Basin, salinity, surface current, Coriolis effect, upwelling, density current, wave, crest, trough, breaker, tide, tidal range.	Students will identify the origin of water in Earth's oceans, explain how dissolved salts and other substances get into seawater, and describe the composition of seawater.	What is the importance of the oceans and their resources? What are four causes of currents in the ocean? How does water in a wave appear to be moving forward?	Concept Map, Applying Skills, Virtual Lab, and <i>Intermediate-Level Science Examination Practice.</i>	Guest speaker from the Queens Borough Department of Environmental Protection (DEP). Complete Task #2 on the WebQuest.

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A Week at a Glance – Copy as Necessary -

WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding		Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement		
Monday	Tuesday	Wednesday	Thursday	Friday
<p>Content Focus: Properties of Earth. Magnetic Field. Changes in Seasons.</p> <p>Hook: Section Focus – <i>A Mysterious Kind of Place.</i></p> <p>Daily Assessment: Section 1 Review, Q#'s 1-5, pg. 319</p>	<p>Content Focus: Solstices and Equinoxes.</p> <p>Hook: Section Focus- <i>A Lovely Gibbous Earth.</i></p> <p>Daily Assessment: Section 1 Review, Q# 6, pg. 319 (Applying Skills Practice)</p>	<p>Content Focus: Motions of the Moon. Phases of the Moon.</p> <p>Hook: <i>National Geographic – Visualizing the Moon's Surface.</i></p> <p>Daily Assessment: Section 2 Review, Q#'s 1-5, pg. 328</p>	<p>Content Focus: Eclipses. Moon's Surface. Inside the Moon. Moon's Origin.</p> <p>Hook: <i>Applying Science – What will you use to survive on the Moon?</i></p> <p>Daily Assessment: Section 2 Review, Q#6, pg. 328 (Applying Math)</p>	<p>Content Focus: Missions to the Moon. Mapping the Moon.</p> <p>Hook: Section Focus - <i>Moon Science.</i></p> <p>Daily Assessment: Section 3 Review, Q#'s 1-5, pg. 333</p>

Weekly Assessment (must be aligned to the NYS / NYC exams): ***Intermediate-Level Science Examination Practice. Chapter 11: Parts 1 and 2, Q#'s 1-20, pp. 340 - 341***

What have the students produced that scaffolds towards the units culminating assessment? Students have completed *Task 1 (The Solar System) of the WebQuest*. And they have started to work on the *Time Capsule* project.
(for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article)

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A Week at a Glance – Copy as Necessary

WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding		Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement		
Monday	Tuesday	Wednesday	Thursday	Friday
Content Focus: Importance of Oceans. Origin of Oceans. Hook: Section Focus- <i>Salt of the Sea</i> Daily Assessment: Section 1 Review, Q#'s 1-5, pg. 347	Content Focus: Composition of Oceans. Surface Currents. Hook: Section Focus – <i>That Could Cool a Lot of Lemonade.</i> Daily Assessment: Section 1 Review, Q#6, pg. 347 (Applying Math)	Content Focus: Upwelling. Density Currents. Hook: Calculating Density Activity – <i>Density of Salt Water.</i> Daily Assessment: Section 2 Review, Q#'s 1-5, pg. 353	Content Focus: Waves. Hook: Section Focus – <i>Run, Grunion, Run.</i> Daily Assessment: Section 2 Review, Q#6, pg. 353 (Applying Skills)	Content Focus: Tides. Hook: <i>National Geographic – Visualizing Wave Movement.</i> Daily Assessment: Section 3 Review, Q#' 1-5, pg. 360

Weekly Assessment (must be aligned to the NYS / NYC exams): ***Intermediate-Level Science Examination Practice. Chapter 12: Parts 1 and 2, Q#'s 1-18, pp. 368 - 369***

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A Week at a Glance – Copy as Necessary

:

WHERE is the student going and what is expected HOOK with needed skills to experience and explore Opportunity to REVISE and RETHINK their understanding		Allow students to EVALUATE work and implications TAILOR work to student needs Be ORGANIZED to maximize engagement		
Monday	Tuesday	Wednesday	Thursday	Friday
Content Focus:	Content Focus:	Content Focus:	Content Focus:	Content Focus:
Hook:	Hook:	Hook:	Hook:	Hook:
Daily Assessment:	Daily Assessment:	Daily Assessment:	Daily Assessment:	Daily Assessment:

Weekly Assessment: (must be aligned to the NYS / NYC exams):

What have the students produced that scaffolds towards the units culminating assessment?
 (for example if the unit's culminating assessment is a newspaper – perhaps the students have written an article)

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Unit Resources

Books: *New York Science – Grade 8, Teacher Wraparound Edition, Glencoe Science, ISBN # 978-0-07-877882-7*

Websites: <http://www.questgarden.com> and www.glencoe.com (refer to *Science Online* section)

Teacher Materials: *Glencoe Science: FAST FILE Chapter Resources, Teacher Works Plus (CD-ROM), Transparencies, ExamView (Assessment CD-ROM), Student Works Plus (CD-ROM), What's Science Got To Do With It? (DVD), Virtual Labs (CD-ROM), Lab Manager (CD-ROM).*

Other: Student Edition of Glencoe Science, Lab Workbook, Reading Workbook.