Unit 3/Week 1

Title: *Life Without Gravity* by Robert Zimmerman

Suggested Time: 5 days (45 minutes per day)

Common Core ELA Standards: RI.7.1, RI.7.3, RI.7.6; W.7.3, W.7.9; SL.7.1; L.7.1, L.7.2

Teacher Instructions

**Preparing for Teaching**

1. Read the Big Ideas and Key Understandings and the Synopsis. Please do **not** read this to the students. This is a description for teachers about the big ideas and key understanding that students should take away **after** completing this task.

Big Ideas and Key Understandings

Many of life’s adventures include both positive and challenging experiences.

Synopsis

*Life Without Gravity,* a nonfiction selection, is designed to help students become familiar with the characteristics of an expository essay. How does weightlessness affect the body? In “Life Without Gravity,” Robert Zimmerman explains the challenges that living without gravity brings to astronauts. Weightlessness is uncomfortable at first for astronauts. It poses special problems for muscles, bones, blood, and even for eating food. Astronauts get used to living without gravity over time.

1. Read the entire selection, keeping in mind the Big Ideas and Key Understandings.
2. Re-read the text while noting the stopping points for the Text Dependent Questions and teaching Tier II/academic vocabulary.

**During Teaching**

1. Students read the entire selection independently.
2. Teacher reads the text aloud while students follow along or students take turns reading aloud to each other. Depending on the text length and student need, the teacher may choose to read the full text or a passage aloud. For a particularly complex text, the teacher may choose to reverse the order of steps 1 and 2.
3. Students and teacher re-read the text while stopping to respond to and discuss the questions, continually returning to the text. A variety of methods can be used to structure the reading and discussion (i.e., whole class discussion, think-pair-share, independent written response, group work, etc.)

Text Dependent Questions

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| **Text-dependent Questions** | **Evidence-based Answers** |
| Who is Dennis Tito? How does he describe life in space?  | Dennis Tito is a space tourist who visited the international space station. He describes living in space as, “. . . like having a different life, living in a different world.”  |
| What is weightlessness? Using evidence from the text, describe the effect of gravity and weightlessness on blood flow.  | Our hearts pump hard to offset the effects of gravity, sending blood from our legs to our brains. In weightlessness there is no up or down. “Your blood is rerouted, flowing from the legs, which become thin and sticklike, to the head, which swells up.”  |
| How does the author explain the effects of weightlessness on our skeletal system--our bones?  | Lack of gravity causes astronauts to grow one to three inches. It also causes the spine to straighten, and the disks to spread apart and relax. Bones also become thin and spongy due to loss of bone tissue.  |
| How does weightlessness affect the digestive system? Use information from the text to explain.  | During the first few days in space, the inner ear—which gives people their sense of balance—gets confused. Many astronauts become nauseous and lose their appetites. Many throw up. |
| According to the text what must astronauts do to keep their muscles from becoming too weak?  | To prevent their muscles and bones from becoming too weak for life on Earth, astronauts have to follow a boring two-hour exercise routine every single day.  |
| What effect does weightlessness have on liquids? What is a “globule?” How are astronauts able to drink liquids and keep liquids contained in space?  | In zero-gravity, liquid cannot be poured. It simply floats and forms globules, or perfectly round balls. To overcome this affect, “Everyone in space drinks through a straw . . . the straw has to have a clamp at one end, or the liquid will continue to flow out.”  |
| How did Jerry Linenger struggle after returning from four months in space? Use examples from the text in your answer.  | Jerry Linenger struggled to walk, and stated, “My body felt like a 500 pound barbell.” He even had trouble lifting and holding his fifteen-month-old son.  |
| What evidence does Robert Zimmerman provide to support his claim that, “voyages to Mars and beyond are possible”?   | Robert Zimmerman uses the examples of Robert Zimmerman and the almost two dozen more astronauts who lived in space for more than six months—four for over a year—who have since fully recovered from the ill effects of weightlessness to make his claim that long distance space flights are possible. |
| List a few of the advantages you might enjoy in a weightless environment.  | I could “fly like a bird.” “Every inch” of space in a room can be utilized including the ceiling. “You can’t drop anything.”  |

Tier II/Academic Vocabulary

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|  | **These words require less time to learn**(They are concrete or describe an object/event/process/characteristic that is familiar to students) | **These words require more time to learn**(They are abstract, have multiple meanings, are a part of a word family, or are likely to appear again in future texts) |
| **Meaning can be learned from context** | effort feeblegravity manned stuffyweightless  | adaptedair currentsbland downright orbit overcomererouted securely  |
| **Meaning needs to be provided** | disks (as in the spine) globules spine tissue  |  |

Culminating Writing Task

* Prompt
	+ *Life Without Gravity provides several examples of the advantages and disadvantages of weightlessness. Write a five-paragraph narrative, using at least three major aspects of weightlessness from the essay, to describe a day in your life when gravity would be removed for a few hours.*
* Teacher Instructions
1. Students identify their writing task from the prompt provided.
2. Students complete an evidence chart as a pre-writing activity. Teachers should guide students in gathering and using any relevant notes they compiled while reading and answering the text-dependent questions earlier. Some students will need a good deal of help gathering this evidence, especially when this process is new and/or the text is challenging!

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| ***Evidence******Quote or paraphrase*** | ***Elaboration / explanation of how this evidence supports ideas or argument*** |
| Weightlessness can be downright unpleasant. Your body gets upset and confused. Your face puffs up, your nose gets stuffy, your back hurts, your stomach gets upset and you throw up. | These are some of the details in the essay that I plan to include in my own story. The main character in my story will be confronted with some of these ailments. |
| Flying around like a bird becomes fun!  | In the story, I will certainly take advantage of the opportunity, but be wary of the possibility that the weightlessness could come to an abrupt end. |
| Any surface in a room can be considered a “floor” where furniture, machinery, or any standing object could be attached.  | Perhaps I’ll use this opportunity to repair the chandelier or simply take a stroll on what is normally the ceiling. |
| Astronauts struggle to walk after returning to Earth’s gravity, and they often feel very heavy, as if being pulled down. | I plan to use such details to describe my condition when gravity returns. |
| They all readapted to Earth gravity without problems. | I’ll rely on this fact to safely survive my weightless ordeal. |

1. Once students have completed the evidence chart, they should look back at the writing prompt in order to remind themselves what kind of response they are writing (i.e. expository, analytical, argumentative) and think about the evidence they found. (Depending on the grade level, teachers may want to review students’ evidence charts in some way to ensure accuracy.) From here, students should develop a specific thesis statement. This could be done independently, with a partner, small group, or the entire class. Consider directing students to the following sites to learn more about thesis statements: http://owl.english.purdue.edu/owl/resource/545/01/

OR http://www.indiana.edu/~wts/pamphlets/thesis\_statement.shtml.

1. Students compose a rough draft. With regard to grade level and student ability, teachers should decide how much scaffolding they will provide during this process (i.e. modeling, showing example pieces, sharing work as students go).
2. Students complete final draft.
* Sample Answer

One summer day, as I was getting ready to meet a friend at the pool, a very strange set of events was put in motion. When I say, “motion,” I mean as in everywhere—up, down, and around—high, low, and everything in between. One minute I was standing on the ground, and the next, I was floating in the air along with every other thing (or person) that wasn’t tied down or attached in some way to the floor. This was a day I’ll never, ever forget, but it wasn’t all fun. There were several very troubling issues I had to deal with, as well.

The prospect of flying to meet my friend and how thrilling it would be was soon spoiled by the prospect of losing my lunch. I began to feel unbalanced, a bit dizzy, and my stomach was very upset, much as you would be if you were sea sick. Zero gravity was playing games with my inner ear which keeps me upright and maintains my equilibrium. Not only that, when I floated past the mirror, I could barely recognize myself. My face was terribly swollen!! I won’t even try to describe my newfound hairdo. Wait, was I floating past the mirror, or was the mirror floating past me? You can understand how confusing things could become in a weightless world.

Things weren’t all bad though. Once I became adjusted to my new world with no up and no down, I began to appreciate the many advantages that weightlessness provided. Before I left the house, I took the opportunity to retrieve several small toys I had lost under the refrigerator. There was also the matter of my brand new soccer ball which had been stuck on the roof since my birthday when I got the darn thing. “Hey this really isn’t bad at all,” I thought to myself. “Maybe I’ll float on down to the pool and see if Joey is there. I’d sure like to hear what he has to say about all this.”

Dodging cars, trucks, dogs, cats, shopping carts, baby buggies, and anything else you could imagine that might be floating around, I made my way to the pool. As I flew closer, getting to within eye-shot, the most amazing spectacle befell my eyes. I stared in wonder, “Oh no! Could that be what I think it is? Are those people doing what I think they’re doing?” Floating in the air in front of me was a giant silvery blue globule—presumably what used to be the swimming pool Joey and I had frequented for the last several summers. It was right there—suspended in mid-air—swaying back and forth in the wind like a watery kite. There were people all around, staring at this flying pond—some on the ground, some standing on the sides of buildings, and some people floating directly above. Like I said—there was no up or down.

The most amazing thing about what was going on, believe it or not, was not that the pool had risen into the sky or that people could sit, stand, or float anywhere they chose. It was where and how I found my friend, Joey. I suppose, now, I should call him my hero, Joey. What all these folks and I were looking at so gloriously unbound by gravity suddenly transformed into “who” we were observing. It was Joey! And where was Joey? And what exactly was Joey doing? That’s the amazing part of this story. Now, picture this: Several thousands of gallons of ice-blue water forming a perfect liquid ball are suspended in mid-air. With the bright sun shining down on it, it appears as a spectacular jewel in the sky. Does this keep your attention? Did it keep mine? No, because Joey had beat me to the pool. He wanted to get there as early as possible. Today was Joey’s birthday, and he had just gotten the gift he had been wishing for forever. What was this gift you might ask? Well, it was Scuba equipment—yup, the tank, the fins, the mask, the whole shebang! So, do the math—connect the dots. What was everyone staring at? Why were they so mesmerized? You’ve got it. There within the great silver-blue ball was my friend Joey trying out his new diving gear, and showing off just a little bit, too!

Additional Tasks

* In pairs or small groups, students will create either a graphic organizer or an illustrated poster depicting the advantages and disadvantages of living in a weightless environment.
	+ Student answers could include some of the following information:
		- Advantages:
			* Taller, ability to float around, easily move things
		- Disadvantages:
			* Food and liquids float around, hard on the body (bones, digestion)