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? (p. 425) | 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.” (p. 425) |
| What is weightlessness? Using evidence from the text, describe the effect of gravity and weightlessness on blood flow. (p. 425) | 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.” (p. 425) |
| How does the author explain the effects of weightlessness on our skeletal system--our bones? (pp. 425-426) | 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. (p. 425-426) |
| How does weightlessness affect the digestive system? Use information from the text to explain. (p. 426) | 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. (p. 426) |
| According to the text what must astronauts do to keep their muscles from becoming too weak? (p. 427) | 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. (p. 427) |
| What effect does weightlessness have on liquids? What is a “globule?” How are astronauts able to drink liquids and keep liquids contained in space? (p. 427) | 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.” (p. 427) |
| How did Jerry Linenger struggle after returning from four months in space? Use examples from the text in your answer. (pp. 427-428) | 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. (p. 428) |
| What evidence does Robert Zimmerman provide to support his claim that, “voyages to Mars and beyond are possible”? (p. 428) | 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. (p. 428) |
| List a few of the advantages you might enjoy in a weightless environment. (pp. 426- 427) | I could “fly like a bird.” “Every inch” of space in a room can be utilized including the ceiling. “You can’t drop anything.” (p. 427) |

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** | Page 425 – effort  Page 426 – feeble  Page 423 – gravity  Page 425 – manned  Page 425 – stuffy  Page 425 – weightless | Page 425 – adapted  Page 427 – air currents  Page 426 – bland  Page 425 – downright  Page 428 – orbit  Page 425 – overcome  Page 425 – rerouted  Page 427 – securely |
| **Meaning needs to be provided** | Page 426 – disks (as in the spine)  Page 427 – globules  Page 425 – spine  Page 426 – 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*** | ***Page number*** | ***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. | 425 | 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! | 426 | 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. | 426-427 | 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. | 427-428 | I plan to use such details to describe my condition when gravity returns. |
| They all readapted to Earth gravity without problems. | 428 | 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)

Supports for English Language Learners (ELLs) to use with Anthology Alignment Lessons

When teaching any lesson, it is important to make sure you are including supports to help all students. We have prepared some examples of different types of supports that you can use in conjunction with our Anthology Alignment Lessons to ensure ELLs can engage fully with the lesson. While these supports reflect research in how to support ELLs, these activities can help ALL students engage more deeply with these lessons. Note that some strategies should be used at multiple points within a lesson; we’ll point these out. It is also important to understand that these scaffolds represent options for teachers to select based on students’ needs; it is not the intention that teachers should do *all* of these things at every lesson.

**Before reading:**

* Read passages, watch videos, view photographs, discuss topics (e.g., using the [four corners strategy](http://www.theteachertoolkit.com/index.php/tool/four-corners)), or research topics that help provide context for what your students will be reading. This is especially true if the setting (e.g., 18th Century England) or topic (e.g., boats) is one that is unfamiliar to the students.
* Provide explicit instruction, using multiple modalities, on selected vocabulary words that are *central to understanding the text*. When looking at the lesson plan, you should note the Tier 2 words, particularly those words with high conceptual complexity (i.e., they are difficult to visualize, learn from context clues, and are abstract), and consider introducing them ahead of reading. For more information on selecting such words, go [here](https://achievethecore.org/page/3167/selecting-and-using-academic-vocabulary-in-instruction). **You should plan to continue to reinforce these words, and additional vocabulary, in the context of reading and working with the text. (See additional activities in the During Reading and After Reading sections.)**

**Examples of Activities:**

* Provide students with the definition of the words and then have students work together to create [Frayer models](http://www.theteachertoolkit.com/index.php/tool/frayer-model) or other kinds of word maps for the words.
* When a word contains a prefix or suffix that has been introduced before, highlight how the word part can be used to help determine word meaning.
* Keep a word wall or word bank where these new words can be added and that students can access later.
* Have students create visual glossaries for whenever they encounter new words. Then have your students add these words to their visual glossaries.
* Create pictures using the word. These can even be added to your word wall!
* Create lists of synonyms and antonyms for the word.
* Have students practice using the words in conversation. For newcomers, consider providing them with [sentence frames](https://achievethecore.org/page/3159/ell-supports-for-writing-and-discussion) to ensure they can participate in the conversation.
* Use graphic organizers to help introduce content.

**Examples of Activities:**

* Complete a [Know, Want to Learn, Learned (KWL) graphic organizer](http://www.nea.org/tools/k-w-l-know-want-to-know-learned.html) about the text.
* Have students research the setting or topic and fill in a chart about it. You could even have students work in groups where each group is assigned part of the topic.
* Fill in a bubble map where they write down anything that they find interesting about the topic while watching a video or reading a passage about the topic. Then students can discuss why they picked the information.

**During reading:**

* Allow ELLs to collaborate in their home languages to process content before participating in whole class discussions in English. Consider giving them the discussion questions to look over in advance (perhaps during the first read) and having them work with a partner to prepare.
* Allow ELLs to use English language that is still under development. Students should not be scored lower because of incorrect spelling or grammar (unless the goal of the assignment is to assess spelling or grammar skills specifically). When grading, be sure to focus on scoring your students only for that objective.
* Scaffold questions for discussions so that questioning sequences include a mix of factual and inferential questions and a mix of shorter and more extended responses. Questions should build on each other and toward inferential and higher order thinking questions. There are not many factual questions already listed in the lesson instructions, so you will need to build some in as you see fit. More information on this strategy can be found [here](https://achievethecore.org/aligned/creating-sequencing-text-dependent-questions-support-english-language-learners/).
* Provide explicit instruction, using multiple modalities, on selected vocabulary words (e.g., 5–8 for a given text) that are central to understanding the text. During reading, you should continue to draw attention to and discuss the words that you taught before the reading.

**Examples of Activities:**

* Have students include the example from the text in a student-created glossary.
* Create pictures that represent how the word was used in the passage.
* Create sentences using the word in the way it was used in the passage.
* Have students discuss the author’s word choice.
* Examine important sentences in the text that contribute to the overall meaning of the text.
* Examine sentence structure of a particular sentence. Break down the sentence to determine its meaning. Then determine how this sentence contributes to the overall meaning of the passage. Determine if there is any figurative language in the sentence and have students use context clues to determine the meaning of the figurative language.
* Use graphic organizers to help organize content and thinking.

**Examples of Activities:**

* While reading the text, have students fill in a story map to help summarize what has happened.
* Have students fill in an evidence chart while they read to use with the culminating writing activity. Make sure to model with the students how to fill in the evidence chart by filling in the first couple of rows together as a class. Go over the prompt that the evidence should support, making sure to break down what the prompt means before having the students get to work. If some of your students frequently struggle to understand directions, have the students explain the directions back to you.
* Provide somewhere for students to store new words that they encounter. Students could use a chart to keep track of these new words and their meanings as they read.
* If you had students start a KWL before reading, have them fill in the “L” section as they read the passage.

**After reading:**

* Reinforce new vocabulary using multiple modalities.

**Examples of activities:**

* Using the words that you had students work with before the reading, require students to include the words in the culminating writing task.
* Create Frayer models with the words. Then cut up the Frayer models and have the students put the Frayer models back together by matching the pieces for each word.
* After reading the passage, continue to examine important sentences (1–2) in the text that contribute to the overall meaning of the text. Guide students to break apart these sentences, analyze different elements, and determine meaning. More information on how to do this, including models of sentence deconstruction, can be found [here](https://achievethecore.org/page/3160/juicy-sentence-protocol).
* When completing the writing assignments after reading, consider using these scaffolds to support students depending on their English proficiency.

**Examples of Activities:**

* For all students, go over the prompt in detail making sure to break down what the prompt means before having the students get to work. Then have the students explain the directions back to you.
* Have students create an evidence tracking chart during reading, then direct them to look back over their evidence chart and work with a group to see if their evidence matches what the rest of the class wrote down. If some of the chart does not match, students should have a discussion about why.
* For students who need more support, model the proper writing format for your students and provide them with a properly formatted example for reference.
* For newcomers, you may consider creating sentence or paragraph frames to help them to write out their ideas.