County Implementation Award Program (CIAP) Math and Science Lesson

Unit Title:
Earth, Space and Stars

Lesson Title:
What goes up must come down.

Author:
Cynthia Sheppard

Grade Level:
5

Time Frame:
1-2 days

Targeted Standard(s):
5.NBT.B.7: Add, subtract, multiply and divide decimals to hundredths, using concrete models or drawings.
5.NBT.A.3: Read, write and compare decimals to thousandths
5-PS2-1: Support an argument that the gravitational force exerted by Earth on objects is directed down.
RI.5.9: Integrate Information from several texts on the same topic in order to write or speak about the subject knowledgeably.

Short Description of Targeted Phenomenon: Share a video of astronauts in space :
https://www.youtube.com/watch?v=3R7iMv2GXHI As students watch the video, have them make note of what they notice and wonder.

Support an argument that the gravitational force exerted by earth on objects is directed down and demonstrate the difference between mass and weight.

Three Dimensions of NGSS

Science & Engineering Practice/s (SEP):
Engaging in Argument from Evidence - Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Support an argument with evidence, data, or a model.

Disciplinary Core Idea/s (DCI):
PS2.B: Types of Interactions -The gravitational force of Earth acting on an object near Earth's surface pulls that object toward the planet's center.

Crosscutting Concept/s (CCC):
Cause and Effect - Cause and effect relationships are routinely identified and used to explain change.

Language Supports:
Clarification Statements:
"Down" - is a local description of the direction that points toward the center of the spherical Earth.
Fee - is money you pay for a service.
Droid - a fictional robot possessing some degree of artificial intelligence in the Star Wars science fiction franchise.
Mass - the mass of an object is a measure of the number of atoms in it
Weight - The weight of an object is the force of gravity on the object

Materials Needed:

1. Device(Chromebook, iPad, smartphone) - Gravity Quizizz
2. YouTube Video - Gravity by Jason Chin
3. Star Tours - Mass, Weight, Gravity
4. email - How to craft an Email
5. small objects to demonstrate gravity
6. google slide presentation

Objective(s): Students will be able to:

1. Support an argument that gravity is a force that is exerted down.

2. Explain the relationship between weight, mass and gravity by completing the Star Tours activity.

3. Demonstrate their understanding by writing an email to your teacher that convinces him/her that they will not fall off the planet if they travel to Antarctica to see the Emperor penguins.

How Math and Science concepts/skills/practices were integrated in this lesson:
Students will calculate different weights for objects on planets with varying degrees of gravity.

Possible Challenges /Misconceptions:
Students need to understand that "down" means towards the center of the planet. Students might confuse weight and mass. An object's mass does not change, but its weight is determined by gravity.

Formative Assessment:
Students complete the Star Tours activity to determine the weight of objects on planets with different gravities.
Students demonstrate their understanding by writing an email to your teacher that convinces him/her that they will not fall off the planet if they travel to Antarctica to see the Emperor penguins.

Lesson Opening

Teacher Actions	Student Actions
Day 1 **Ahead of time set up a free teacher account on Quizizz.** Administer the Quizizz for Gravity and record the percent accuracy for the class. You will give the quiz twice. The first time is at the beginning of the lesson as a pre-test. After the students have	Students go to join.quizizz.com and enter the game code and their name. Students complete the quiz.

finished the quiz, go over the answers to each question with them. **Tell the class not worry everyone will pass!**	
Lesson Introduction	
Teacher Actions Show the video of Gravity by Jason Chin. Think - Pair - Share: Have students discuss what gravity is. Provide sentence frames as needed. Gravity is _____. I think gravity is _____ because _____. Test students understanding with small objects that will not break when they are dropped. Ask students what is larger Earth or _____? So, if I drop _____, it should_____? Repeat with 3-5 objects.	**Student Actions** Students share with a partner what they think gravity is. Students answer with a choral response. Students answer with a choral response.
Body of Lesson	
Teacher Actions Tell students: They have friend visiting Australia who is afraid that he/she will fall off the Earth because of Australia's location what would you say to convince him/her that this will not happen? Think - Pair - Share Tell the students that they are going to write an email to their friend to convince them that they will not fall off the Earth when they visit Australia. Have the students use your email address and send you the email. If your students do not have devices the students can write the email on paper.	**Student Actions** Students discuss with a partner how they would convince their friend that they will not fall off the Earth. Students compose an email to their friend to convince them that they will not fall of the Earth if they visit Australia.

Day 2 **Mass, Weight, and Gravity** Star Tours Tell students that they are going to travel through our solar system on Star Tours. With Star Tours all humans fly free, but your droids don't. Give each student a copy of the Star Tours packet. Have each choose a droid to be their traveling companion. Have each student calculate the new weight for their droid at each destination. Have students consult the fee chart to determine the cost for their droid.	Each student picks the droid they are going to travel with. Students multiply the weight of the droid on Earth (mass) by the gravity of their destination. They then use the fee chart to determine the how much it will cost them to travel with their droid.
Lesson Closure	
Teacher Actions Administer the Quizizz for Gravity a second time as a post- test. Challenge the class to beat their first score. **Tell the class not worry everyone will pass!** You should see the class average go up! Walk around and assist students as needed.	**Student Actions** Students go to join.quizizz.com and enter the game code and their name. Students complete the quiz.
Summative Assessment: Each time the students take a quiz, Quizizz generates a report with each student score.	
Other Teaching Resources:	
Lab Safety: N/A	
Extensions (if any):	