

Web-Facilitated Science Activity

TLT 426: Science in Elementary Education

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Activity Title: My Weight Around the Worlds

Target Grade Level: 3rd Grade

GREETINGS, SPACE TRAVELER!

Welcome to the Milky Way Galaxy. Due to the recent incident, we have lost data indicating the sizes of planets and other bodies in our solar system. We thank you for your help in regaining this information. Using your vast knowledge about forces, please visit the planets and bodies listed in your **Travel Log** and record your weight on each. We are relying on you and your friends for our success.



Thank you,

The Earthlings

OH NO! WE NEED TO HELP!



The Earthlings have lost their information about which planets and other celestial bodies (*items in outer space that are large, but not planets such as moons and stars*) are bigger and smaller than each other. The Earthlings need to stay on their planet to fix some other things since the incident, so they have asked for your help. Since the planets are too big to measure with rulers and too heavy to move near each other to compare, we need to find another way to learn about the planets' sizes. Luckily, we have e-scales on each planet to weigh ourselves with. Visit the website in the directions that follow to access the e-scales. Use your weight and the information you have learned about **forces** and **gravity** to determine which planets are bigger

and smaller. You can **record your weights** and answer some guiding questions on your Travel Log and then we will come together with the other travelers for a Traveler Conference. During the Traveler Conference, we will **discuss our findings** and order the planets and celestial bodies from smallest to largest. Then we can send our results to the Earthlings and save the day!

Directions



1. Go to <http://www.exploratorium.edu/ronh/weight/>
2. Type your weight in the “Enter Your Weight Here Box.”
Note: If you don't know your weight you may use the class scale near the computers. Only one person may use the scale at a time.



3. Press the “Calculate” button.
4. Scroll down to see your weights on the various planets and celestial bodies.
5. Record your weight in the chart on your Travel Log.
6. Answer the questions on the opposite side of the Travel Log to prepare you for the Traveler Conference.
7. When you are finished answering the question, you may read to yourself until it is time for the Traveler Conference to begin.

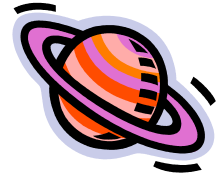
Traveler's Conference Notes:

Biggest: _____

Smallest: _____



MY WEIGHT AROUND THE WORLDS



TRAVEL LOG

TRAVELER NAME: _____

1. Go to <http://www.exploratorium.edu/ronh/weight/>
2. Type your weight in the "Enter Your Weight Here Box."



3. Press the "Calculate" button.
4. Scroll down to see your weights on the worlds below.
5. Record your weight in the chart below.

World		My Weight
Earth		
Venus		
Mercury		
The Moon		
Mars		
Jupiter		
Saturn		
Uranus		
Neptune		
Pluto		
Moons of Jupiter	Io	
	Europa	
	Ganymede	
	Callisto	

The Sun	
A White Dwarf	
A Neutron Star	

Answer the questions below.

Where do you weigh the **most**? _____

Where do you weigh the **least**? _____

Do your classmates weight the most and least on the **same** worlds or **different** worlds? _____

Why do you think you weight is more or less on different worlds? Does **gravity** or the **size** of the planet have anything to do with this?

Think about your weights on different world. How can you tell which planets are bigger or smaller using this information? Can forces predict planet size?



Answer Key

Where do you weigh the **most**? A Neutron Star

Where do you weigh the **least**? Pluto

Do your classmates weigh the most and least on the **same** worlds or **different** worlds? Yes on the same worlds

Why do you think your weight is more or less on different worlds? Does **gravity** or the **size** of the planet have anything to do with this?

Gravity is stronger on bigger planets and weaker on smaller planets. Your weight is how much the force of gravity pulls on you. When gravity is strong you weigh more than when gravity is weak.

Think about your weights on different world. How can you tell which planets are bigger or smaller using this information? Can forces predict planet size?

If I weigh more on a planet it is bigger and if I weigh less on a planet it is smaller. I can use weight to predict planet size by comparing my weights on different worlds to tell which are bigger and smaller. Weight can predict planet size.

TRAVELER'S CONFERENCE: TEACHER'S GUIDE

The Traveler's Conference is a student-led examination of the collected data. As the teacher, it is your job to facilitate the class discussion. Use the guiding questions below to encourage the students to discuss their data with the class. Near the end of the conference, have the students order the worlds from smallest to largest while you write them on the board. If you would like to incorporate writing instruction, have students write letters to the Earthlings after the conference to communicate their findings.

Facilitating Questions:

1. Where did you weigh the most? (After this question take a class vote to see how many other students weighed the most on this planet. It is likely that all students will raise their hands.)
2. Where did you weigh the least? (After this question take a class vote to see how many other students weighed the least on this planet. It is likely that all students will raise their hands.)
3. Why do we have so many students with the same answers?
4. If a planet is big, did we weight more or less on that planet?
5. What is the relationship between weight and planet size?
6. What does this have to do with gravity?
7. Can you help me make a list of the smallest to largest planets and celestial bodies so we can send that information to the Earthlings?

1. Pluto	7. Mars	13. Neptune
2. Callisto	8. Mercury	14. Jupiter
3. Europa	9. Uranus	15. The Sun
4. Ganymede	10. Venus	16. A White Dwarf
5. The Moon	11. Earth	17. A Neutron Star
6. Io	12. Saturn	

Activity in practice:

I gave a drafted version of the “My Weight Around the Worlds” activity to my host teacher at Paxinosa School in Easton. She gave all the students in the class (23 students total) a copy of the activity and asked students with Internet connections to try the activity at home. The school does not have regular computer or Internet access for students or we would have been able to try this activity in the classroom. Of the 23 students, only 8 parents reported to have Internet access at home and of those students only 1 completed the activity. From this I learned that allowing Internet access time in school is very important due to the lack of exposure to the Internet that many students may experience. Additionally, it seemed that my original activity was not inherently motivating.

With this information, I was able to make the first necessary changes to my activity. I decided to add more clear instructions about how to use the website by adding an image of the actual webpage prompt box and calculate button. This addition would help students with little Internet exposure to easily understand how to work the website. Also, I decided that I needed to make the activity more motivating. To do this, I added the concept of the Earthling’s incident causing missing information. After adding this element, I realized that this helped to drive the inquiry of the project. Instead of simply looking for how his or her weight changed on various worlds, students would be guided by the question of finding the size of each planet using their weights. Students would be intrigued with the fun simulation and want to help the imaginary Earthlings.

Next, I needed to look at how the student who did complete the activity performed and assess his learning. The student recorded his weights with no trouble and used the chart perfectly. The only issue he seemed to encounter was that there wasn’t quite enough room in the chart to record his weight on the neutron star. For this reason, I made the worlds side of the chart thinner and the answer side wider. Next, I looked at his answers and they were excellent. It looked as though he had one of his parents also do that activity and he noticed that his weights on different planets changed in the same way that his parent’s did. He was able to make all the inferences necessary to truly understand the differences in gravity based on the size of the worlds. With the answering of the question, the student again ran into a space issue and I added

more lines to the questions that required more space. It seemed my questions were where they needed to be, so I progressed to assess his learning via an interview.

On my next visit to the school, I had a short interview with the student to get a bit more feedback. I asked the student about gravity on other planets and the forces and the planet sizes and he performed flawlessly. I knew that the activity really hit home for him. I asked him what made him do the activity, and he gave the honest answer: his mom. That was not the motivator I was hoping to find, so I asked him what he thought of the activity. He talked about how it was more fun than he thought it would be. He told me that after he finished the project, he had his mom and brother use the website. He said that they talked about the weights during dessert and that talking about it was the most fun part. From this, I knew that I needed to add a communication element to the activity. Scientists need to report and communicate their results and in the same way my student was driven to discuss his findings. Moreover, a discussion fit perfectly with my new motivating theme for the lesson. With this, I added the Traveler's Conference part of the lesson. My student's verbal feedback was invaluable. The Traveler's Conference seems to be the part of the lesson that would solidify the learning and keep it with students for life.

The "My Weight Around the Worlds" web-facilitated inquiry activity really developed with the input from the students that both did and did not complete the activity. From this, I am tempted to test more—if not all—of my future lessons. The feedback is priceless and almost matures the lesson into something that I can really be proud to teach. I cannot wait to teach this activity again with its new format and driving theme. I know students will find the activity extremely fun and engaging while learning throughout participating.

This is a well-designed Web-facilitated science activity that includes essential features of inquiry. You have done a good job taking advantage of “weight calculator” Web site for students to gather data to understand differences about their weight on different planets and other objects in our galaxy. Your activity is appropriately designed with a good motivating learning context and I believe that third graders will find this activity to be quite interesting when enacted in an actual classroom or school.

The classroom instructions and the assessment materials are appropriately constructed for your target audience. Your pilot-testing feedback is detailed and you have included many very reflective comments. Overall, this is a good Web-facilitated activity for third grade learners to learn about important factors related to differential weight among bodies in our solar system and galaxy.

Assessment mark: A