The Direction Gravity Pulls

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Overarching Question: What direction does gravity pull objects that are sitting still or in motion?



What direction does gravity pull?

If an object is rolling down a ramp is gravity still pulling on the object? If so in what direction?

 Does gravity effect everything on earth?

Does every object have a gravitational pull?

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If an object is rolling down a ramp is gravity still pulling on the object? If so what direction?

Does gravity effect everything on earth?

Does every object have a gravitational pull?

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| --- |
| Line of Evidence – (Explore) Egg Races |
| When we rolled the eggs down the ramp both eggs eventually reached the ground. This is because gravity was constantly pulling the eggs towards to center of the earth.  |

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| Line of Evidence – (Engage) Predictions  |
| Gravity is pulling all objects to the center of the earth. We know this because no matter the object everything reaches the ground eventually and is being pulled to the center such as a baseball being thrown in the air and returning to the glove.  |

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| Line of Evidence – (Explain)  |
| Anything that has a mass, no matter how big or small, has a gravitational pull. |

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| Line of Evidence – (Elaborate)  |
| Not matter what slope the ramps are at gravity pulls on each egg with the same force.  |

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| Big Aha Thesis Statement  |
|  No matter if the object is sitting still or is in motion gravity is pulling the object straight down on that object causing it to be pulled towards the center of the earth.  |

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**Engage – Egg Race Prediction and Discussion**

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| Eggs Competing  | Ramp Slopes | Prediction  |
| Egg A vs. Egg B  | One sloped ramp A & one low sloped ramp B  |  |
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| Example: Egg A vs. Egg B  | Equal sloped ramps  |  |

**Discussion Topics:**

*Why did your make the predictions you did?*

*How do your predictions vary from others?*

*How will gravity effect the outcome?*

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**Explore- Egg Racing Prediction and Race**

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Answer Key Concepts about the Predictions and First Race

**Claim** (Write a sentence stating what direction gravity is pulling on the eggs.)

*Even though the eggs are both rolling down the ramp until they reach the bottom gravity is consistently pulling them to the center of the earth. That is what keeps the eggs on the ramp and continuing to roll until reaching the bottom.*

**Evidence** (Provide evidence from the first race you observed to support your claim. Describe what caused both eggs to reach the ground.)

*Both eggs reached the ground due to the gravity pulling on them. If the gravity had not been pulling them down they would have not been able to stay on the ramp, instead they would be floating in the air. Gravity was consistently pulling the eggs straight down and towards the center of the earth.*

**Reasoning** (Explain how your evidence supports your claim. Describe how gravity is effecting the direction of the eggs.)

*Because both eggs eventually reached the ground and were not floating we know that gravity was holding them on the ramp as they rolled. Although gravity is pulling on the eggs they are not able to the pulled straight down to the center of the earth due to the ramp being at a sloped angle.*Answer Key Concepts about the Predictions and First Race

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**Explain – Notes / Informational Text**

How Does Gravity Work?

Gravity – The force that pulls people and object towards the center of the earth.



“Gravity is very important to us. We could not live on Earth without it. The sun's gravity keeps Earth in orbit around it, keeping us at a comfortable distance to enjoy the sun's light and warmth. It holds down our atmosphere and the air we need to breath. Gravity is what holds our world together.”

(n.d.). Retrieved April 25, 2017, from https://spaceplace.nasa.gov/what-is-gravity/en/



* Anything with mass has a gravitational full.
* The bigger the object on earth is and more it weighs the stronger the gravitational pull is.
* Gravity hold the planets in orbit.
* Gravity gives people and objects their weight.

Factors that Determines an Objects Gravitational Pull

1. Mass of an object

* How much matter the object is made of
* How easily an object can be moved by a force

2. The distance between two objects

* The closer the objects the bigger the gravitational full will be

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Gold, M. (n.d.). Measurement of Newton's Constant Using a Torsion Balance with Angular Acceleration Feedback  Phys.Rev.Lett. 85 (2000) 2869-2872. Retrieved April 25, 2017, from <http://panda3.phys.unm.edu/nmcpp/gold/phys102/new_and_cool.html>

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Informational Text Questions:

1. The measure of the pull of gravity on an object is called it's\_\_\_\_\_\_\_\_\_\_\_?

Answer: weight / mass

 2. Matter is....?

a. How heavy an object is in space.

b. Invisible.

c. Anything that can be measured.

d. So small you can not see it without a microscope.

e. Anything that has mass and takes up space.

Answer: E

 3. [Define](http://www.helpteaching.com/questions/196936/what-two-properties-keep-earth-in-orbit-around-the-sun) gravity in your own words..

Answer: Answers may vary due to the students way of thinking.

This force that pulls people and object towards the center of the earth.

 4. Gravitational force near the Earth's surface moves towards the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

Answer: center of the earth

 5. Draw a picture to represent an example of the gravitational pull.

Answer: Answers may vary depending on the students thinking and understanding of the gravitational pull.



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**Elaborate – Different Slope Egg Races**

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Answer Key Concepts about the Predictions and The Races

**Claim (**Write a sentence describing how gravity worked with the eggs.)

*Gravity was consistently pulling on the eggs but because it could not pull through the ramp gravity caused both eggs to eventually hit the ground.*

**Evidence** Provide specific data to support your claim. The evidence should include what direction gravity was pulling.)

*In our experiment we did both experiment serval times to insure our data was correct. Every time we rolled the egg down the ramp it hit the ground. This even occurred when the ramps were at different slopes. Because all eggs hit the ground that tells me that gravity is consistently pulling on all of the objects causing them to go toward the center of the earth.*

**Reasoning (**Explain why the evidence supports your claim. Describe how gravity works and what would happen to an object if there was not gravity like on the moon. )

*My evidence supports my claim because gravity is always pulling on everything including the eggs that were rolling down the ramp. If the ramp would not have been in the eggs way it would have went directly down to the center of the earth but instead gravity pulled it down on the ramp until it reached the bottom and then to the center of the earth.*

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**Evaluate***:*

1. Write a sentence stating how gravity effected the eggs when rolled down the ramp.

*Gravity effected the eggs when rolled down the ramp because it was consistently pulling the eggs down to the center of the earth.*

1. What would happen to the eggs if there was not gravity present?

*The eggs would never reach the bottom of the ramp because there would not be gravity holding them down. The eggs would be floating instead of secure on the ramp.*

1. Which of the following is an aspect of gravity?
2. Mass
3. Matter
4. Force
5. All the above

Answer D

1. State other examples of gravity.

*Answers may vary:*

*dropping a pencil
ball rolling downhill
people standing on Earth*

1. Gravitational force near the Earth's surface moves towards the \_\_\_\_\_\_\_\_\_\_\_?

# Center of the earth

1. Write your definition of what gravity is?

*Answers may vary:*

A force of attraction between any two masses that pulls objects down to the center of the earth.

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 The purpose of this unit was to understand what direction gravity pulls objects in. We completed an engagement predictions lab, one sloped egg race multiple times, and a variety of sloped egg race to collect our evidence.

 In our first activity of this unit we predicted what egg will reach the bottom first using the graph that we would be later using in our experiments. This gave us time to discuss what we already know about gravity and how it would affect our eggs.

 The next two activities we did showed us how gravity is consistently pulling down on objects no matter the direction they are going or the slope that they might be rolling down. Because all the eggs eventually reached the ground that tells us that gravity is always pulling straight down on the eggs at all times.

 The overall picture of the unit is that gravity is pulling everything to the center of the earth. If gravity was not pulling on all people and objects then they would be floating in the air like objects and people do when on the moon where there is no gravity. As the eggs rolled down the ramp gravity was consistently pulling straight down on them causing them to reach the ground.

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