Flying Colors Science

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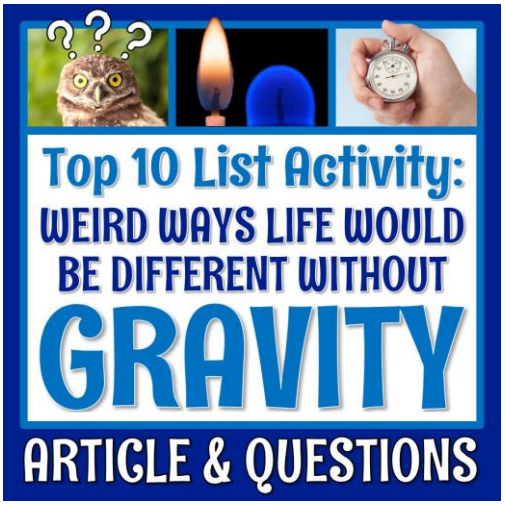
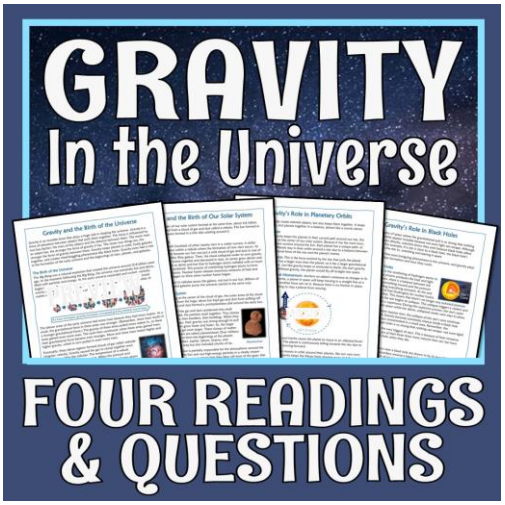
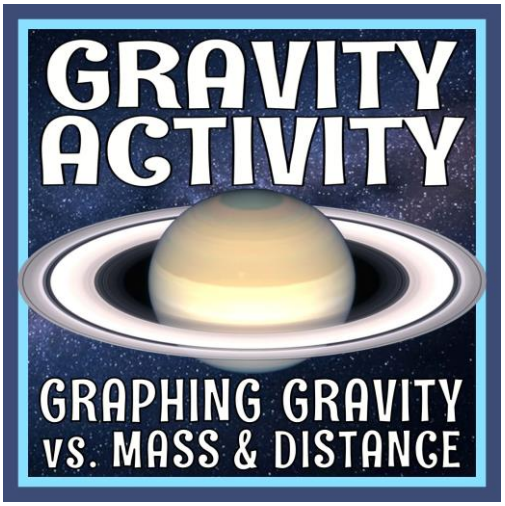
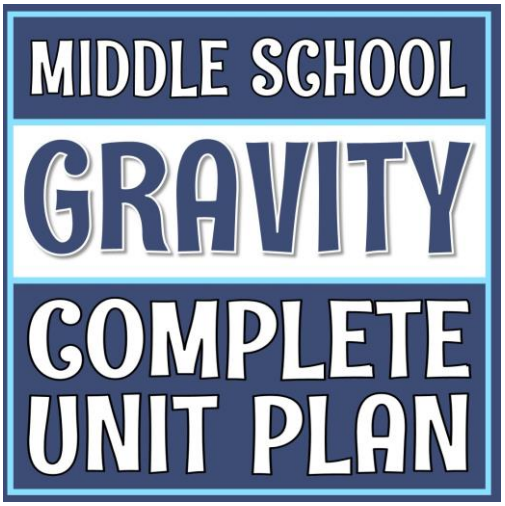




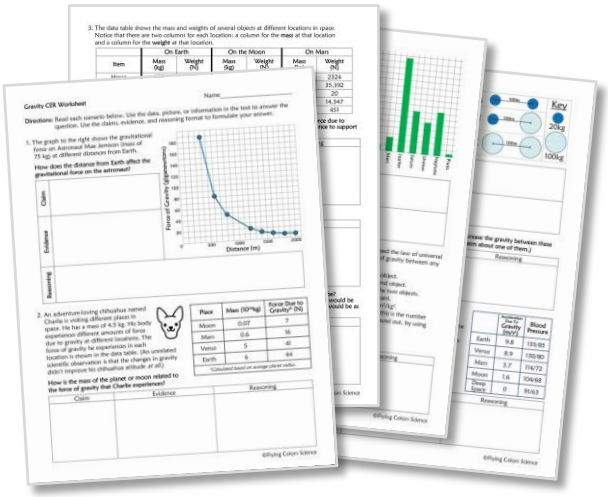




Teacher Notes:

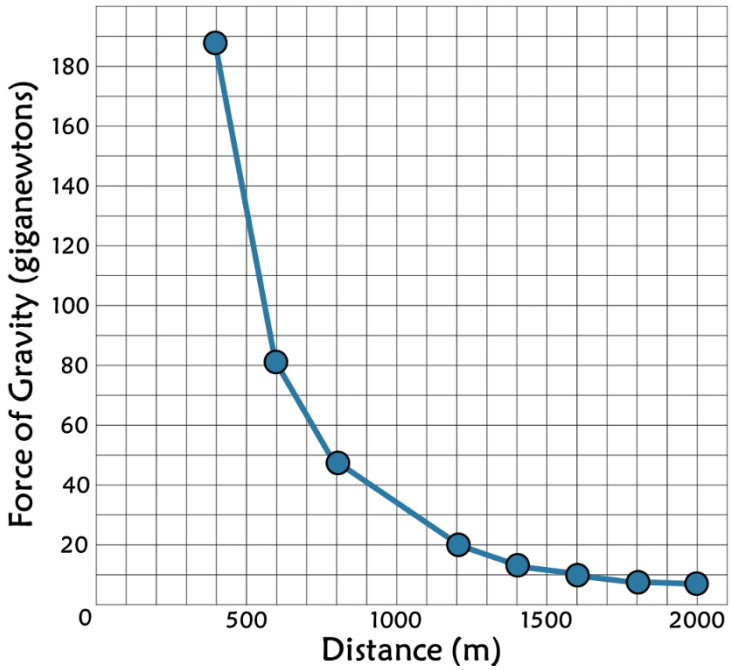
- To make a copy of the **GOOGLE SLIDES VERSION** of this activity, click the icon to the right.

- To assign this activity as a **WORKSHEET**, use the pages that say, "Gravity CER Worksheet."



- To assign this activity as **STATIONS**, use the pages that say, "Gravity CER Stations" and then cut the station cards into the different sections.

Station One



The graph shows the gravitational force on Astronaut Mae Jemison (mass of 75 kg) at different distances from Earth.

How does the distance from Earth affect the gravitational force on the astronaut?

Station Two

An adventure-loving chihuahua named Charlie is visiting different places in space. He has a mass of 4.5 kg. His body experiences different amounts of force due to gravity at different locations. The force of gravity he experiences in each location is shown in the data table. (An unrelated scientific observation is that the changes in gravity didn't improve his chihuahua attitude *at all*.)

Place	Mass (10^{24}kg)	Force Due to Gravity* (N)
Moon	0.07	7
Mars	0.6	16
Venus	5	41
Earth	6	44
*Calculated based on average planet radius.		

How is the mass of the planet or moon related to the force of gravity that Charlie experiences?

Station Three

The data table shows the mass and weights of several objects at different locations in space. Notice that there are two columns for each location: a column for the **mass** at that location and a column for the **weight** at that location.

	On Earth		On the Moon		On Mars	
Item	Mass (kg)	Weight (N)	Mass (kg)	Weight (N)	Mass (kg)	Weight (N)
Horse	625	6129	625	1020	625	2324
School Bus	9500	93,163	9500	15,524	9500	35,392
Gallon of Milk	4	39	4	10	4	20
Elephant	3850	37,756	3850	6296	3850	14,347
Refrigerator	120	1177	120	196	120	451

Which value, the object's MASS or the object's WEIGHT, is an indicator of the force due to gravity on the Earth, Mars, and the moon? Use data from the data table as evidence to support your answer.

Station Four

The data table shows the mass and weights of several objects at different locations in space. Notice that there are two columns for each location: a column for the **mass** at that location and a column for the **weight** at that location.

	On Earth		On the Moon		On Mars	
Item	Mass (kg)	Weight (N)	Mass (kg)	Weight (N)	Mass (kg)	Weight (N)
Horse	625	6129	625	1020	625	2324
School Bus	9500	93,163	9500	15,524	9500	35,392
Gallon of Milk	4	39	4	10	4	20
Elephant	3850	37,756	3850	6296	3850	14,347
Refrigerator	120	1177	120	196	120	451

Which location in space (Earth, Mars, or the moon) has the highest gravity?

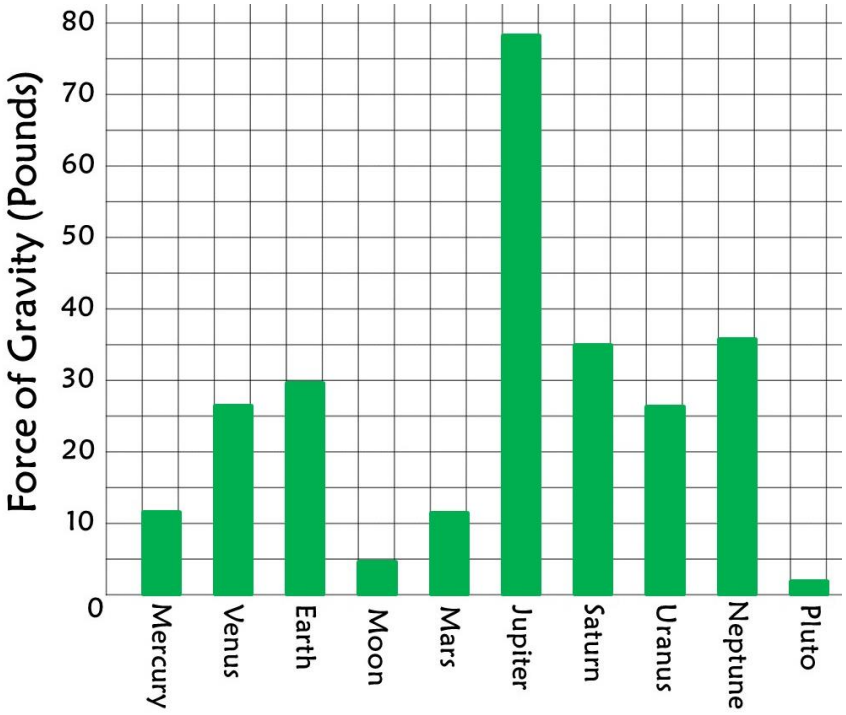
Station Five

The data table shows the mass and weights of several objects at different locations in space. Notice that there are two columns for each location: a column for the **mass** at that location and a column for the **weight** at that location.

	On Earth		On the Moon		On Mars	
Item	Mass (kg)	Weight (N)	Mass (kg)	Weight (N)	Mass (kg)	Weight (N)
Horse	625	6129	625	1020	625	2324
School Bus	9500	93,163	9500	15,524	9500	35,392
Gallon of Milk	4	39	4	10	4	20
Elephant	3850	37,756	3850	6296	3850	14,347
Refrigerator	120	1177	120	196	120	451

Think about what lifting a horse here on Earth would feel like. How heavy would it be? (You can find the exact number in the data table.) Of the objects listed, which object would be as heavy as a horse is on Earth BUT ON THE MOON? In other words, which object would be as heavy on the moon as a horse is on Earth?

Station Six



A student named Aisha doesn't like to use her locker, so she carries her books and notebooks for every class in her backpack. Her backpack weighs 30 pounds when it's full! The graph shows how much her backpack would weigh on different planets.

Which planet has the highest gravity?

Station Seven

Sir Isaac Newton, a physicist and mathematician of the 17th century, developed the law of universal gravitation. Newton's formula for gravity can be used to calculate the force of gravity between any two objects. Each part of the formula represents a specific value.

Force of Gravity Equation

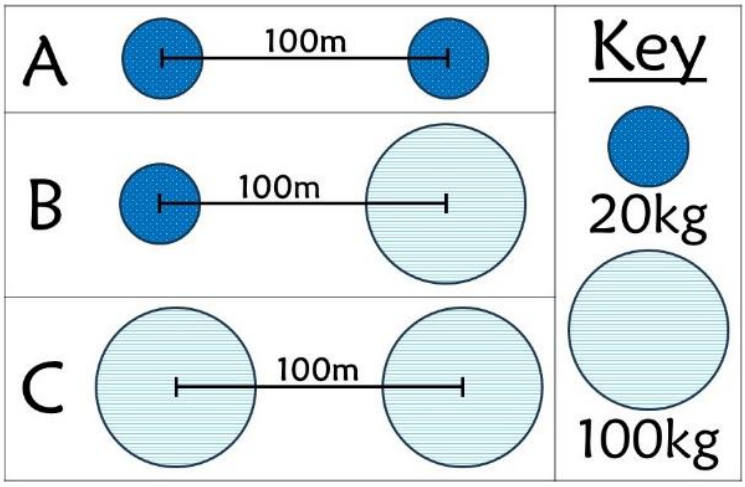
$$F = G\frac{m_1 m_2}{r^2}$$

- m_1 is the mass of the first object.
- m_2 is the mass of the second object.
- r is the distance between the two objects.
- G is the gravitational constant. It is *always* 6.674×10^{-11} $N\cdot m^2/kg^2$.
- F is the force of gravity, so this is the number that will be calculated, or found out, by using the equation.

What two variables are needed to calculate gravity?
(Hint: You don't need to know advanced math to figure this one out!)

Station Eight

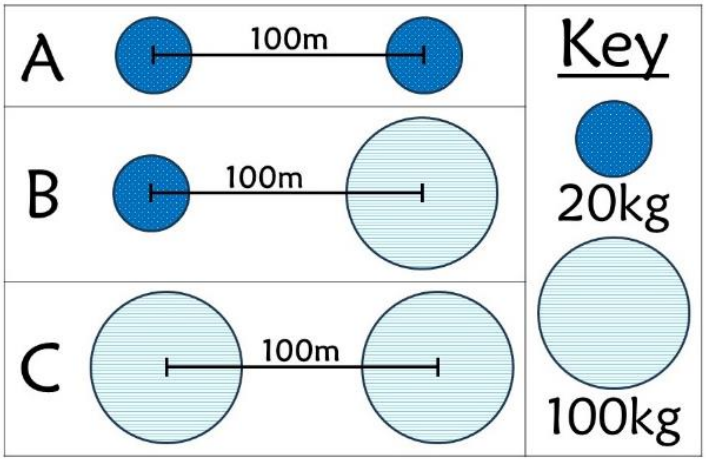
The diagram shows different sets of objects. There are two objects in each row. The objects are the same distance apart in each row. The key shows that the smaller objects have a mass of 20 kg, and the larger objects have a mass of 100kg.



Which row of objects (A, B, or C) would have the largest force of gravity between them?

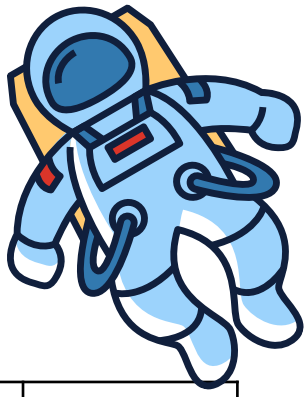
Station Nine

The diagram shows different sets of objects. There are two objects in each row. The objects are the same distance apart in each row. The key shows that the smaller objects have a mass of 20 kg, and the larger objects have a mass of 100kg.



Look at the objects in the row labeled "A". How could you increase the gravity between these two objects? (There are TWO correct answers here. Make a claim about one of them.)

Station Ten



NASA scientists are studying the effects of gravity on astronauts' blood pressure. Blood pressure is the pressure of blood pushing against the walls of the arteries, the tubes that carry blood from the heart to the body. While the heart squeezes and pushes blood, blood pressure goes up. Blood pressure comes down when the heart relaxes. Blood pressure is measured in two numbers:

- The pressure when the heart pumps. (systolic; top number)
- The pressure when the heart rests between beats. (diastolic; bottom number)

Blood pressure is reported as the first number "over" the second number, such as 120 over 80 or 120/80.

	Acceleration Due To Gravity (m/s^2)	Blood Pressure
Earth	9.8	135/85
Venus	8.9	130/80
Mars	3.7	114/72
Moon	1.6	104/68
Deep Space	0	91/63

How does gravity affect an astronaut's blood pressure?

Gravity CER Stations Name_____

1. How does the distance from Earth affect the gravitational force on the astronaut?

Claim	Evidence	Reasoning

2. How is the mass of the planet or moon related to the force of gravity that Charlie experiences?

Claim	Evidence	Reasoning

3. Which value, the object's MASS or the object's WEIGHT, is an indicator of the force due to gravity on the Earth, Mars, and the moon? Use data from the data table as evidence.

Claim	Evidence	Reasoning

4. Which location in space (Earth, Mars, or the moon) has the highest gravity?

Claim	Evidence	Reasoning

5. Think about what lifting a horse here on Earth would feel like. How heavy would it be? (You can find the exact number in the data table.) Of the objects listed, which object would be as heavy as a horse is on Earth BUT ON THE MOON? In other words, which object would be as heavy on the moon as a horse is on Earth?

Claim	Evidence	Reasoning

6. Which planet has the highest gravity?

Claim	Evidence	Reasoning

7. What two variables are needed to calculate gravity? (Hint: You don't need to know advanced math to figure this one out!)

Claim	Evidence	Reasoning

8. Which row of objects (A, B, or C) would have the largest force of gravity between them?

Claim	Evidence	Reasoning

9. Look at the objects in the row labeled "A". How could you increase the gravity between these two objects? (There are TWO correct answers here. Make a claim about one of them.)

Claim	Evidence	Reasoning

10. How does gravity affect an astronaut's blood pressure?

Claim	Evidence	Reasoning

Gravity CER Stations ANSWER KEY

1. How does the distance from Earth affect the gravitational force on the astronaut?

Claim	Evidence	Reasoning
The farther away from Earth the astronaut is, the lower the gravity.	When the astronaut is closer to Earth, for example at 500m, the gravity is about 190 giganewtons. But when she is farther away, for example at 2000m away, the gravity is much lower at about 9 giganewtons.	Gravity depends on distance. The closer two objects are, in this case the astronaut and the Earth, the higher the gravitational force between them. The opposite is also true. The further away two objects are from each other, the smaller the gravitational force between them.

2. How is the mass of the planet or moon related to the force of gravity that Charlie experiences?

Claim	Evidence	Reasoning
The higher the mass of the planet or moon, the stronger the force of gravity on Charlie.	Earth has the highest mass (6 10^{24}kg) and also the highest force of gravity (44N). The moon has the lowest mass of the objects in the data table (0.07 10^{24}kg) and also the lowest force of gravity on Charlie (7N). As the mass of the planets go down, so does the force of gravity on Charlie.	Gravity depends on mass. The higher the mass of one or both of the objects (in this case, Earth versus the other locations), the higher the gravitational force between them.

3. Which value, the object's MASS or the object's WEIGHT, is an indicator of the force due to gravity on the Earth, Mars, and the moon? Use data from the data table as evidence.

Claim	Evidence	Reasoning
Weight is an indicator of the force due to gravity.	In the data table, the mass of each object stays the same, but the weight changes.	Weight depends on gravity. Increased gravity will lead to an increased weight of an object, even though its mass stays the same. So, the weight value changing (while the mass stays the same) at each location is an indication/clue that there is a different gravity at each of these locations.

4. Which location in space (Earth, Mars, or the moon) has the highest gravity?

Claim	Evidence	Reasoning
Earth has the highest gravity.	The weight of each object is highest on Earth compared to the other places in the data table. For instance, an elephant weighs 37,756N on Earth, 6296N on the moon, and 14,347N on Mars.	Students should be able to reason that Earth has the largest mass of all the places listed in the table, so that's why it has the largest force of gravity, and, in turn, the highest weights.

5. Think about what lifting a horse here on Earth would feel like. How heavy would it be? (You can find the exact number in the data table.) Of the objects listed, which object would be as heavy as a horse is on Earth BUT ON THE MOON? In other words, which object would be as heavy on the moon as a horse is on Earth?

Claim	Evidence	Reasoning
An elephant on the moon would feel as heavy as a horse on Earth.	A horse weighs 6129N on Earth and an elephant weighs 6296N on the moon.	The gravity is less on the moon so it would make an elephant feel lighter, or easier to lift. It would feel light enough that it would nearly match what it feels like to lift a horse on Earth.

6. Which planet has the highest gravity?

Claim	Evidence	Reasoning
Jupiter has the highest gravity.	The force of gravity on the backpack on Jupiter would be approximately 78 pounds, which is the highest value in the graph.	Students should be able to reason that Jupiter has the largest mass of all the objects listed in the graph, so that's why it has the largest force of gravity on the backpack.

7. What two variables are needed to calculate gravity? (Hint: You don't need to know advanced math to figure this one out!)

Claim	Evidence	Reasoning
The mass of both objects and the distance between them are needed to calculate force.	The required values m1, m2, and r represent the mass of both objects and the distance between them. The other variable in the force equation is the gravitational constant and it does not change.	The force of gravity depends on the objects' masses and the distance between them, so these are the variables that must be in an equation to calculate the force of gravity. [Note: This is challenging for students to come up with a "reasoning" for. I give a little bit of grace in this section!]

8. Which row of objects (A, B, or C) would have the largest force of gravity between them?

Claim	Evidence	Reasoning
Row C would have the highest force of gravity between them.	All of the objects are 100m apart, but the objects in row C both have the largest masses. They are each 100kg.	Because all the sets of objects are the same distance apart, comparing the mass of the objects can determine the relative gravitational force between the three sets of objects.

9. Look at the objects in the row labeled "A". How could you increase the gravity between these two objects? (There are TWO correct answers here. Make a claim about one of them.)

Claim	Evidence	Reasoning
1. Increase the mass of one or both of the objects. 2. Decrease the distance between the objects.	1. The objects are both 20kg, so if you increased their mass the gravity between them would increase. 2. The objects are 100m apart, so they have room to move closer together.	1. Increasing mass of one or both objects increases gravity. 2. Decreasing the distance between objects increases gravity.

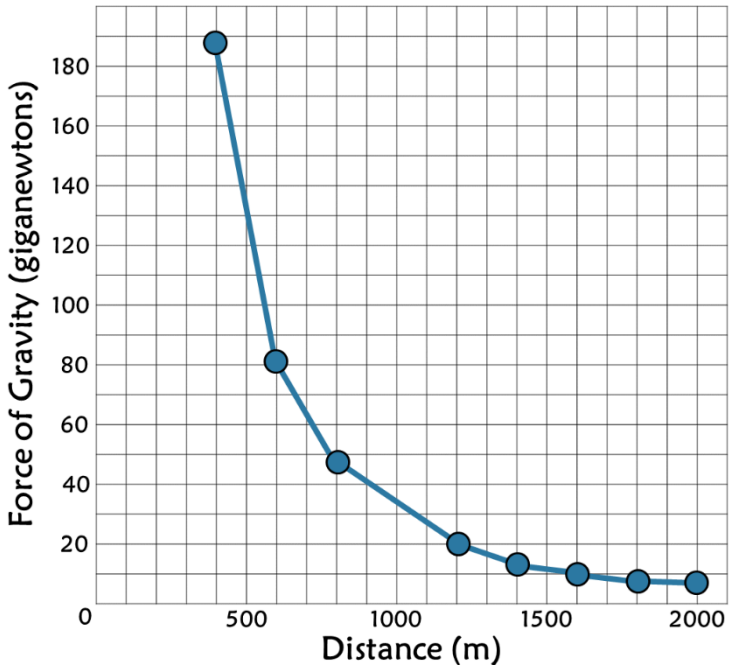
10. How does gravity affect an astronaut's blood pressure?

Claim	Evidence	Reasoning
Decreasing gravity decreases an astronaut's blood pressure.	Earth has the highest gravity (9.8 m/s^2) and this is where the astronaut's blood pressure is the highest (135/85). Where the gravity is the lowest (deep space, 0 m/s^2), the astronaut's blood pressure is the lowest.	When there is lower or no gravity, the heart doesn't have to pump as hard to get blood around the body, so there is less pressure in the arteries.

Gravity CER Worksheet Name_____

Directions: Read each scenario below. Use the data, picture, or information in the text to answer the question. Use the claims, evidence, and reasoning format to formulate your answer.

1. The graph to the right shows the gravitational force on Astronaut Mae Jemison (mass of 75 kg) at different distances from Earth.



How does the distance from Earth affect the gravitational force on the astronaut?

Claim	
Evidence	
Reasoning	

2. An adventure-loving chihuahua named Charlie is visiting different places in space. He has a mass of 4.5 kg. His body experiences different amounts of force due to gravity at different locations. The force of gravity he experiences in each location is shown in the data table. (An unrelated scientific observation is that the changes in gravity didn't improve his chihuahua attitude *at all*.)

Place	Mass (10^{24}kg)	Force Due to Gravity* (N)
Moon	0.07	7
Mars	0.6	16
Venus	5	41
Earth	6	44

**Calculated based on average planet radius.*

How is the mass of the planet or moon related to the force of gravity that Charlie experiences?

Claim	Evidence	Reasoning

3. The data table shows the mass and weights of several objects at different locations in space. Notice that there are two columns for each location: a column for the **mass** at that location and a column for the **weight** at that location.

	On Earth		On the Moon		On Mars	
Item	Mass (kg)	Weight (N)	Mass (kg)	Weight (N)	Mass (kg)	Weight (N)
Horse	625	6129	625	1020	625	2324
School Bus	9500	93,163	9500	15,524	9500	35,392
Gallon of Milk	4	39	4	10	4	20
Elephant	3850	37,756	3850	6296	3850	14,347
Refrigerator	120	1177	120	196	120	451

3a. Which value, the object's MASS or the object's WEIGHT, is an indicator of the force due to gravity on the Earth, Mars, and the moon? Use data from the data table as evidence to support your answer.

Claim	Evidence	Reasoning

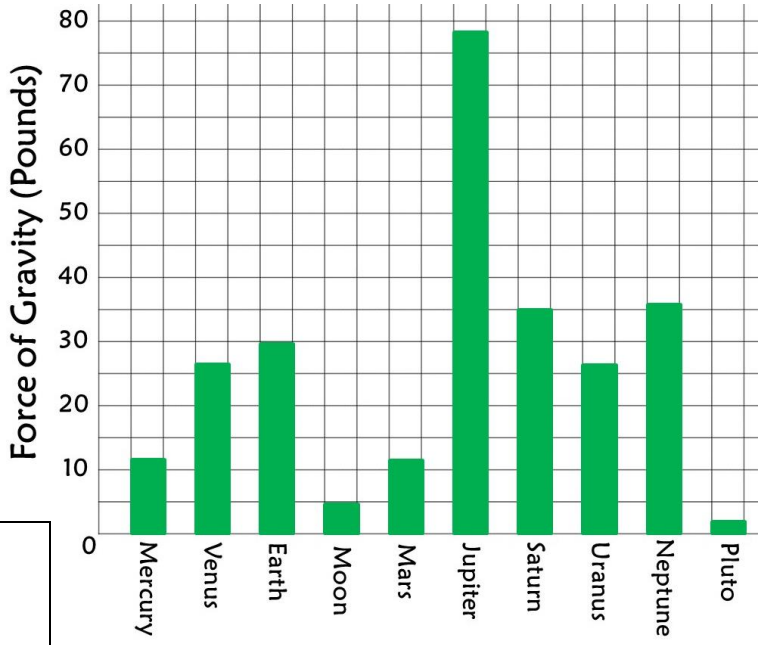
3b. Which location in space (Earth, Mars, or the moon) has the highest gravity?

Claim	Evidence	Reasoning

3c. Think about what lifting a horse here on Earth would feel like. How heavy would it be? (You can find the exact number in the data table.) Of the objects listed, which object would be as heavy as a horse is on Earth BUT ON THE MOON? In other words, which object would be as heavy on the moon as a horse is on Earth?

Claim	Evidence	Reasoning

4. A student named Aisha doesn't like to use her locker, so she carries her books and notebooks for every class in her backpack. Her backpack weighs 30 pounds when it's full! The graph shows how much her backpack would weigh on different planets. (Note that scientists use the unit *Newtons* when they discuss gravity. However, this graph uses pounds so that people who use pounds as a unit in everyday life can better understand how the weight of the backpack changes on each planet.)



Which planet has the highest gravity?

Claim	
Evidence	
Reasoning	

5. Sir Isaac Newton, a physicist and mathematician of the 17th century, developed the law of universal gravitation. Newton's formula for gravity can be used to calculate the force of gravity between any two objects. Each part of the formula represents a specific value.

Force of Gravity Equation

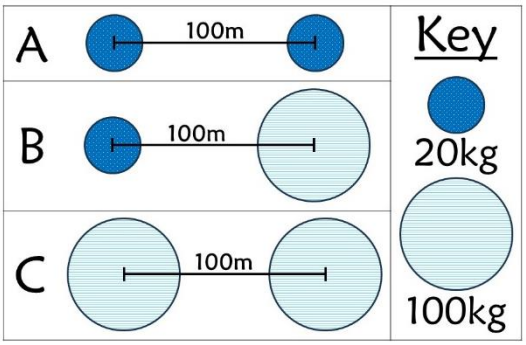
$$F = G\frac{m_1 m_2}{r^2}$$

- m_1 is the mass of the first object.
- m_2 is the mass of the second object.
- r is the distance between the two objects.
- G is the gravitational constant. It is *always* 6.674×10^{-11} $N\cdot m^2/kg^2$.
- F is the force of gravity, so this is the number that will be calculated, or found out, by using the equation.

What two variables are needed to calculate gravity?
(Hint: You don't need to know advanced math to figure this one out!)

Claim	Evidence	Reasoning

6. The diagram shows different sets of objects. There are two objects in each row. The objects are the same distance apart in each row. The key shows that the smaller objects have a mass of 20 kg, and the larger objects have a mass of 100kg.



6a. Which row of objects (A, B, or C) would have the largest force of gravity between them?

Claim	
Evidence	
Reasoning	

6b. Look at the objects in the row labeled "A". How could you increase the gravity between these two objects? (There are TWO correct answers here. Make a claim about one of them.)

Claim	Evidence	Reasoning

7. NASA scientists are studying the effects of gravity on astronauts' blood pressure. Blood pressure is the pressure of blood pushing against the walls of the arteries, the tubes that carry blood from the heart to parts of the body. While the heart squeezes and pushes blood, blood pressure goes up. Blood pressure comes down when the heart relaxes. Blood pressure is measured in two numbers:
   - The pressure when the heart pumps. (systolic)
   - The pressure when the heart rests between beats. (diastolic)

   Blood pressure is reported as the first number "over" the second number, such as 120 over 80 or 120/80.

	Acceleration Due To Gravity (m/s^2)	Blood Pressure
Earth	9.8	135/85
Venus	8.9	130/80
Mars	3.7	114/72
Moon	1.6	104/68
Deep Space	0	91/63

How does gravity affect an astronaut's blood pressure?

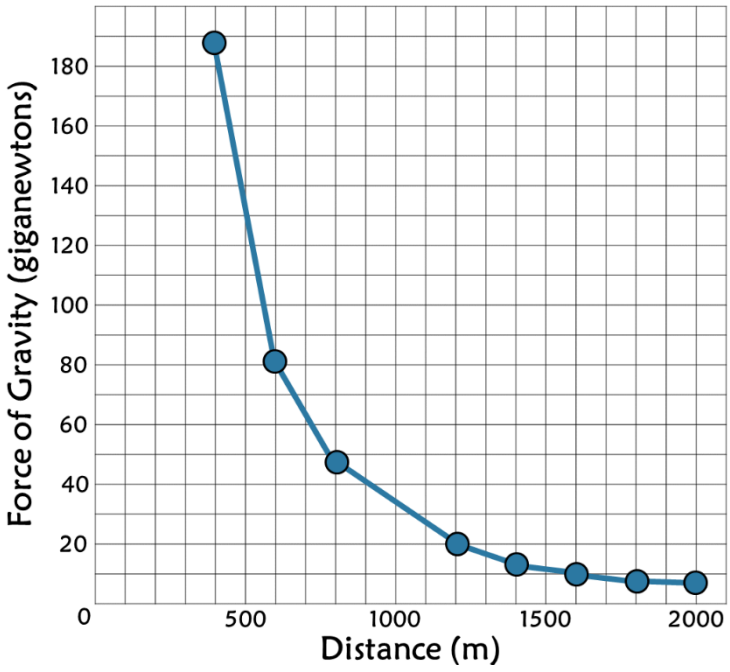
Claim	Evidence	Reasoning

Gravity CER Worksheet ANSWER KEY

Directions: Read each scenario below. Use the data, picture, or information in the text to answer the question. Use the claims, evidence, and reasoning format to formulate your answer.

1. The graph to the right shows the gravitational force on Astronaut Mae Jemison (mass of 75 kg) at different distances from Earth.

How does the distance from Earth affect the gravitational force on the astronaut?



Claim	The farther away from Earth the astronaut is, the lower the gravity.
Evidence	When the astronaut is closer to Earth, for example at 500m, the gravity is about 190 giganewtons. But when she is farther away, for example at 2000m away, the gravity is much lower at about 9 giganewtons.
Reasoning	Gravity depends on distance. The closer two objects are, in this case the astronaut and the Earth, the higher the gravitational force between them. The opposite is also true. The further away two objects are from each other, the smaller the gravitational force between them.

2. An adventure-loving chihuahua named Charlie is visiting different places in space. He has a mass of 4.5 kg. His body experiences different amounts of force due to gravity at different locations. The force of gravity he experiences in each location is shown in the data table. (An unrelated scientific observation is that the changes in gravity didn't improve his chihuahua attitude *at all*.)

Place	Mass (10^{24}kg)	Force Due to Gravity* (N)
Moon	0.07	7
Mars	0.6	16
Venus	5	41
Earth	6	44

**Calculated based on average planet radius.*

How is the mass of the planet or moon related to the force of gravity that Charlie experiences?

Claim	Evidence	Reasoning
The higher the mass of the planet or moon, the stronger the force of gravity on Charlie.	Earth has the highest mass (6 10^{24}kg) and also the highest force of gravity (44N). The moon has the lowest mass of the objects in the data table (0.07 10^{24}kg) and also the lowest force of gravity on Charlie (7N). As the mass of the planets go down, so does the force of gravity on Charlie.	Gravity depends on mass. The higher the mass of one or both of the objects (in this case, Earth versus the other locations), the higher the gravitational force between them.

3. The data table shows the mass and weights of several objects at different locations in space. Notice that there are two columns for each location: a column for the **mass** at that location and a column for the **weight** at that location.

	On Earth		On the Moon		On Mars	
Item	Mass (kg)	Weight (N)	Mass (kg)	Weight (N)	Mass (kg)	Weight (N)
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School Bus	9500	93,163	9500	15,524	9500	35,392
Gallon of Milk	4	39	4	10	4	20
Elephant	3850	37,756	3850	6296	3850	14,347
Refrigerator	120	1177	120	196	120	451

3a. Which value, the object's MASS or the object's WEIGHT, is an indicator of the force due to gravity on the Earth, Mars, and the moon? Use data from the data table as evidence to support your answer.

Claim	Evidence	Reasoning
Weight is an indicator of the force due to gravity.	In the data table, the mass of each object stays the same, but the weight changes.	Weight depends on gravity. Increased gravity will lead to an increased weight of an object, even though its mass stays the same. So, the weight value changing (while the mass stays the same) at each location is an indication/clue that there is a different gravity at each of these locations.

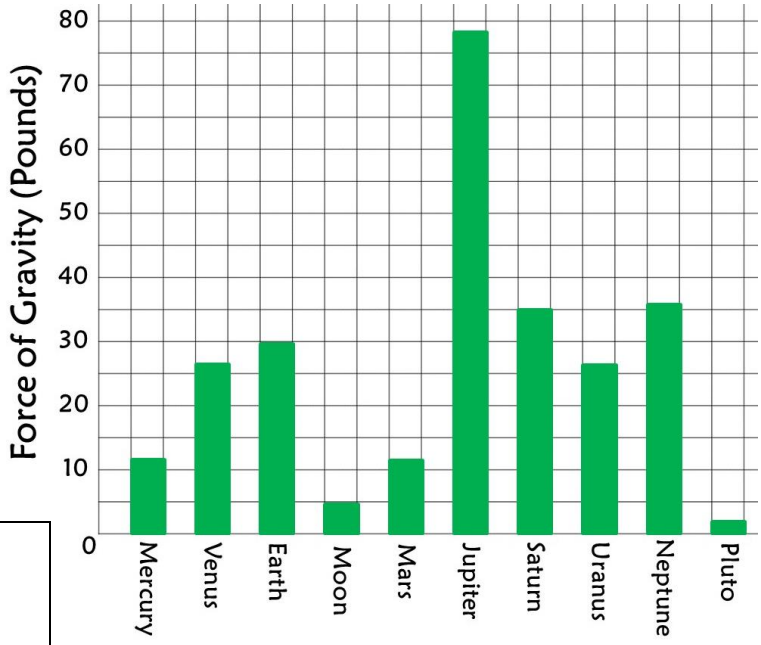
3b. Which location in space (Earth, Mars, or the moon) has the highest gravity?

Claim	Evidence	Reasoning
Earth has the highest gravity.	The weight of each object is highest on Earth compared to the other places in the data table. For instance, an elephant weighs 37,756N on Earth, 6296N on the moon, and 14,347N on Mars.	Students should be able to reason that Earth has the largest mass of all the places listed in the table, so that's why it has the largest force of gravity, and, in turn, the highest weights.

3c. Think about what lifting a horse here on Earth would feel like. How heavy would it be? (You can find the exact number in the data table.) Of the objects listed, which object would be as heavy as a horse is on Earth BUT ON THE MOON? In other words, which object would be as heavy on the moon as a horse is on Earth?

Claim	Evidence	Reasoning
An elephant on the moon would feel as heavy as a horse on Earth.	A horse weighs 6129N on Earth and an elephant weighs 6296N on the moon.	The gravity is less on the moon so it would make an elephant feel lighter, or easier to lift. It would feel light enough that it would nearly match what it feels like to lift a horse on Earth.

4. A student named Aisha doesn't like to use her locker, so she carries her books and notebooks for every class in her backpack. Her backpack weighs 30 pounds when it's full! The graph shows how much her backpack would weigh on different planets. (Note that scientists use the unit *Newtons* when they discuss gravity. However, this graph uses pounds so that people who use pounds as a unit in everyday life can better understand how the weight of the backpack changes on each planet.)



Which planet has the highest gravity?

Claim	Jupiter has the highest gravity.
Evidence	The force of gravity on the backpack on Jupiter would be approximately 78 pounds, which is the highest value in the graph.
Reasoning	Students should be able to reason that Jupiter has the largest mass of all the objects listed in the graph, so that's why it has the largest force of gravity on the backpack.

5. Sir Isaac Newton, a physicist and mathematician of the 17th century, developed the law of universal gravitation. Newton's formula for gravity can be used to calculate the force of gravity between any two objects. Each part of the formula represents a specific value.

Force of Gravity Equation

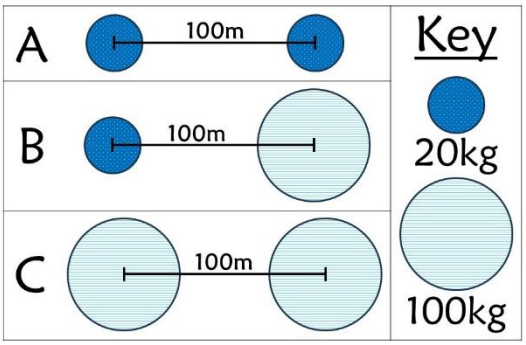
$$F = G\frac{m_1 m_2}{r^2}$$

- m_1 is the mass of the first object.
- m_2 is the mass of the second object.
- r is the distance between the two objects.
- G is the gravitational constant. It is *always* 6.674×10^{-11} $N\cdot m^2/kg^2$.
- F is the force of gravity, so this is the number that will be calculated, or found out, by using the equation.

What two variables are needed to calculate gravity?
(Hint: You don't need to know advanced math to figure this one out!)

Claim	Evidence	Reasoning
The mass of both objects and the distance between them are needed to calculate force.	The required values m1, m2, and r represent the mass of both objects and the distance between them. The other variable in the force equation is the gravitational constant and it does not change.	The force of gravity depends on the objects' masses and the distance between them, so these are the variables that must be in an equation to calculate the force of gravity. [Note: This is challenging for students to come up with a "reasoning" for. I give a little bit of grace in this section!]

6. The diagram shows different sets of objects. There are two objects in each row. The objects are the same distance apart in each row. The key shows that the smaller objects have a mass of 20 kg, and the larger objects have a mass of 100kg.



6a. Which row of objects (A, B, or C) would have the largest force of gravity between them?

Claim	Row C would have the highest force of gravity between them.
Evidence	All of the objects are 100m apart, but the objects in row C both have the largest masses. They are each 100kg.
Reasoning	Because all the sets of objects are the same distance apart, comparing the mass of the objects can determine the relative gravitational force between the three sets of objects.

6b. Look at the objects in the row labeled "A". How could you increase the gravity between these two objects? (There are TWO correct answers here. Make a claim about one of them.)

Claim	Evidence	Reasoning
1. Increase the mass of one or both of the objects. 2. Decrease the distance between the objects.	1. The objects are both 20kg, so if you increased their mass the gravity between them would increase. 2. The objects are 100m apart, so they have room to move closer together.	1. Increasing mass of one or both objects increases gravity. 2. Decreasing the distance between objects increases gravity.

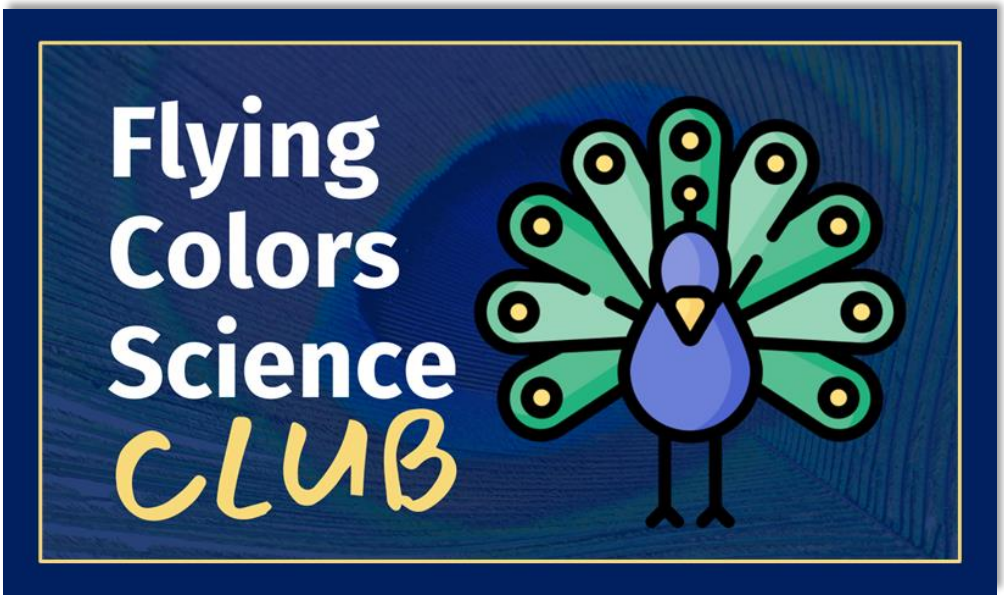
7. NASA scientists are studying the effects of gravity on astronauts' blood pressure. Blood pressure is the pressure of blood pushing against the walls of the arteries, the tubes that carry blood from the heart to parts of the body. While the heart squeezes and pushes blood, blood pressure goes up. Blood pressure comes down when the heart relaxes. Blood pressure is measured in two numbers:
   - The pressure when the heart pumps. (systolic)
   - The pressure when the heart rests between beats. (diastolic)

   Blood pressure is reported as the first number "over" the second number, such as 120 over 80 or 120/80.

	Acceleration Due To Gravity (m/s^2)	Blood Pressure
Earth	9.8	135/85
Venus	8.9	130/80
Mars	3.7	114/72
Moon	1.6	104/68
Deep Space	0	91/63

How does gravity affect an astronaut's blood pressure?

Claim	Evidence	Reasoning
Decreasing gravity decreases an astronaut's blood pressure.	Earth has the highest gravity (9.8 m/s^2) and this is where the astronaut's blood pressure is the highest (135/85). Where the gravity is the lowest (deep space, 0 m/s^2), the astronaut's blood pressure is the lowest.	When there is lower or no gravity, the heart doesn't have to pump as hard to get blood around the body, so there is less pressure in the arteries.



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