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| RESEARCH ARTICLE

Changes in Gravity Value and Anti-Gravity Application

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| ABSTRACT

Gravity is a phenomenon that has been part of the universe since its creation. This phenomenon is when an object pulls everything around it toward the center of the object. Gravity itself was discovered by Sir Isaac Newton in the 17th century. Humans think that there is no such thing as anti-gravity. This research aims to prove that the value of a planet's gravity can change under certain conditions. In addition, this research also aims to prove that humans can create something that causes all objects in a certain area to have a value close to anti-gravity. In short, there are 3 influences that can change the value of a planet's gravity. This research uses two methods, namely the application of the formula that has been applied and data as evidence from the research results. The research was carried out and various analyses were collected which turned out to verify that gravity can change its value due to certain natural conditions. When collecting the analysis, it turned out that there is a concept that can make humans change gravity in an area by using materials that are available directly from the earth itself.

| KEYWORDS

Phenomenon, Thinks, Prove, Research

| ARTICLE INFORMATION

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1. Introduction

One of the problems for humans on this earth is gravity which has a value of 9.80665 m s-2. When lifting an object, it will be heavier compared to other planets which have a lower gravity value. The world has determined that the value of a planet's gravity will always be the same and will never change because the value of the mass and radius of the planet is always the same. Therefore, gravity is a constant velocity. However, is it certain that the value of a planet's gravity, mass, and radius will always remain the same?

Even though the world has determined that a planet's gravity value is always the same, each area on a planet has a different gravity value because the size of the gravitational force value is affected by the location and coordinates where it is located. The general imbalance of gravitational force value from each region has a percentage of 19.28%.

Until now, there is no tool or material that creates a gravity force value in an area that has an anti-gravity value or is close to an anti-gravity value (imbalance value is close to 100%). What if there is a tool or material that can change the gravity value? Is it possible? There is so much information that could be questionable after this question is asked.

Anti-gravity is a condition where an object is free from a gravitational force that pulls it. So it can be concluded that the value of the acceleration due to gravity from the definition of anti-gravity is 0. In short, on this earth, there is still no object that is free from the force of gravity.

Is gravity the will of nature? Does a planet's satellite (e.g., the moon) only have a pulling force on the earth? What if actually the satellite also affects the planet's gravity? Can humans change the gravity of a planet? After gathering all the questions, an idea was

created to carry out the research. This research is divided into 3 areas of research, each describing an effect that can change the value of the gravity number.
In this research, the authors used the method of a general formula applied to the first 2 areas of research. Meanwhile, in the last experiment, the authors used data analysis collection methods. This research is expected to help humans in various aspects of life that are affected by gravity, namely:

1. It has become a theoretical basis for humans to see that gravity can change.
2. Existing calculations of the gravity factor have a more exact value
3. Lighten the load lifted by humans by reducing the value of gravity
4. humans can jump higher according to this theory
5. raising the value of gravity at a point can be done
6. Facilitate the construction of buildings with more gravity etc. (related to gravity)

2. Method Research

2.1 Tools and Materials

In this study, the tools and materials needed were a cup of water and a stopwatch. The stopwatch is used as a time measurement tool for water that will be dropped from a certain height. The amount of water is not important in this research. The time used is only whenthe water falls to the ground. The use of the stopwatch is repeated 5 times, and the time used is the average time of stopping the 5x stopwatch so that the time value taken is more exact.

2.2 Calculation of the value of changes in gravity

Changes in the value of gravity have occurred due to natural factors.
This is the factor of changing the value of gravity which is influenced by nature.

A. Foreign object factor

A foreign object from outside that touches a planet is very influential

1. Increase in the value of gravity

An increase in the gravitational value of a planet influenced by a foreign objectis influenced by a factor which is the addition of mass to the planet.

Look at the picture below.

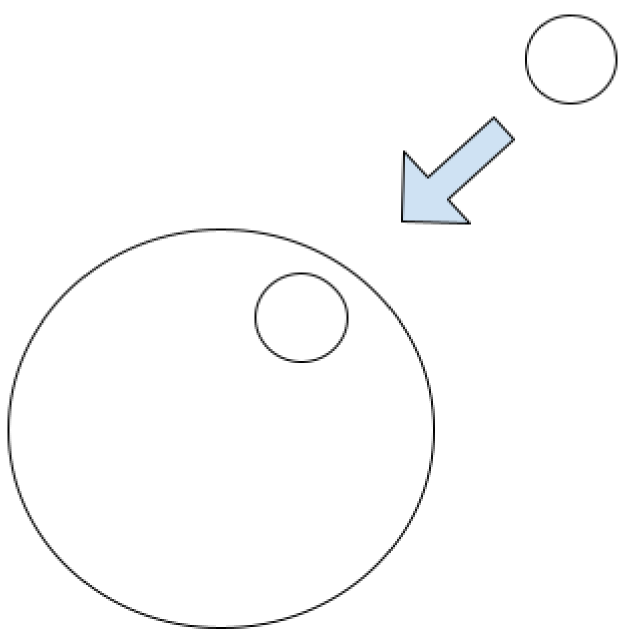

Figure 1
Foreign bodies entering the planet

Figure 1 shows that the planet's mass has increased due to foreign objects entering the planet. The illustration in Figure

1 shows only, the greater the mass of a planet, the greater the gravity. This is proven by the formula of planetary gravity, which is:

$$g = G \frac{M}{R^2}$$

description
g=gravity
G=Gravity constant
M=planetary mass
R=planetary radius

2. Gravity increase/decrease

The increase/decrease of a gravity value which is influenced by foreign objects is caused by 2 factors:

a. A foreign object falling on the surface of the planet

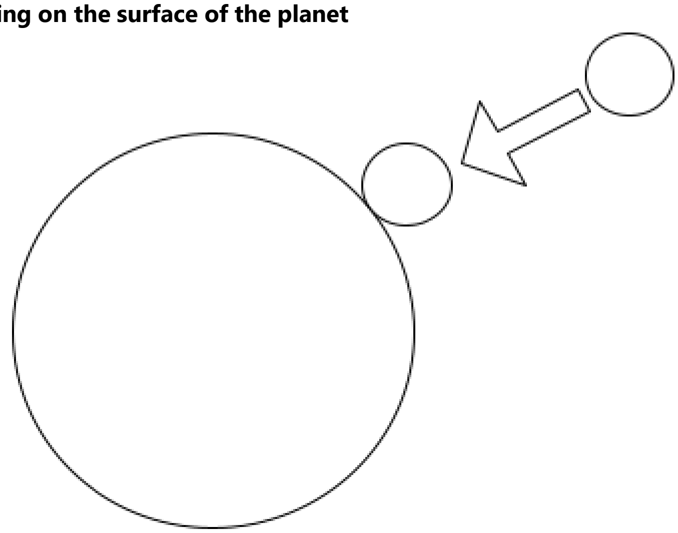

Figure 2
A foreign object was falling on the surface of a planet.

In figure 2, it is known that the mass of the planet and radius of the planet has increased due to foreign objects entering the planet so that the gravitational force can be calculated to be greater or smaller depending on the ratio between the mass and the radius affected by the foreign object.

b. Foreign object that destroys part of the planet

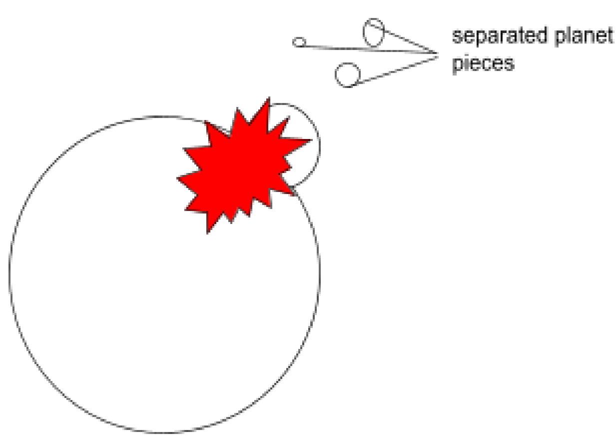

Figure 3
Foreign Object destroying parts of the planet

It can be seen from Figure 3 that there are planetary pieces that are separated, so the planet'smass and radius change. The increase or decrease in the value of gravity, according to the second factor, depends on the value of the change in the mass and radius of the planet, and gravity increases when the mass of a planet increases. In other words, if the mass decreases, the value of gravity decreases. However, if the radius increases, the gravity of an area on the planet will decrease. In addition, if the radius decreases, the gravity of an area on the planet will increase.

B. Planet Satellite Factor

This research uses water and a stopwatch to fill in data at different times when tested in the presence of the moon's influence (earth satellite).

The location used is in the city of Tangerang, Banten. According to data, Banten hasa gravity value of 9.7810m s-2 - 9.7815m s-2. The place used is in a closed room and an open room. The type of water used is H2O which has a density of 997/ kg /m^3

The experiment was conducted from 10 October to 24 October. The experiment was carried out during the day and night to test the comparison of gravity values.

Table 1

Tests the time the waterfalls to the ground in the presence of the moon

Date and time	**Height (m)**	**Existence of the moon**	**Time for water to fall to the ground (s)**
10 October 2022, 12:00	10	-	1,430
10 October 2022, 20:00	10	✓	1,433
10 October 2022, 21:30	10	✓	1,435

Based on the table, it can be seen that when there is no moon, water will drop faster than when there is a moon. 20:00 and 21:30 have different gravity reduction values because the moon's position is in a different place. Namely, at 21:30, the moon is directly above, while at 20:00, the moon's direction is to the west. Water drops faster due to greater gravity. The existing formula proves this which is $t = \sqrt{\frac{2h}{g}}$. By using this formula, a gravity value can be obtained when there is No moon present (normal) is 9.7804 m s-2 (imbalance of gravity value is 0.0006 m s-2). At 20:00, the gravity value of the area on earth is 9.7395 m s-2 (imbalance of gravity value is 0.0415 m s-2). Meanwhile, at 20:30 it is 9.7123 m s-2(imbalance of gravity value is 0.0687 m s-2).

Table 2

Tests the time of falling water with the influence of moon conditions

Date and time	**Height (m)**	**Moon conditions**	**Time for water tofall to the ground(s)**
10 October 2022, 21:30	10	4/4 (full moon)	1,435
17 October 2022, 21:30	10	¾	1,433

24 October 2022, 21:30	10	2/4	1,432

As seen from table 2, different dates produce different values of reduced gravity caused by the phases of the moon's revolution. Because the cycle time of the 1x revolution of the moon is different from the time of the 1x rotation of the earth, the moon's position is not always the same every day when viewed from one point on the earth's surface. The reduction in the earth's gravity in an area will be more significant if the moon's position is directly above that area. Conversely, suppose the moon's position is farther away. In that case, the reduction in the earth's gravity in an area will be smaller than the reduction in the earth's gravity when the moon's position is directly above the tested area.

Table 3

Testing the time the water falls from the site situation

Date and time	**Height (m)**	**Place conditions**	**When water falls to the ground (s)**
10 October 2022, 21:30	10	open room	1,435
10 October 2022, 21:45	10	closed room	1,435

The third table aims to prove that the time difference in water falling to the ground is affected by the reduction of the earth's gravity by the moon, not by the moon's gravitational pull. Data from an open room and a closed room shows that the time for water to fall to the ground is the same, namely 1.435 seconds. This shows that there is no influence from the moon's gravitational pull. However, there is a decrease in the earth's gravity.

3. Result and Discussion

If there is a foreign object that enters the planet (without destroying a part of theplanet) with the following conditions:

1. A foreign body falls at a height (h) <0
2. All parts of the foreign body must enter the planet
3. There is no damage to the planet when foreign objects enter the planet.then there is a new

formula that is

$$g = G\frac{M+m}{R^2}$$

g=planetary gravity
G=Gravity Constant
M=Planet mass
m=mass of the foreign body that adds to the weight of the planetR=planet radius

When a foreign object lands on a planet, the value of gravity can increase/decrease depending on the ratio of the mass and diameter of the foreign body thataffects the planet. Therefore, one formula is obtained, namely:

$$ga = G\frac{M+m}{(R+d)^2}$$

ga=gravity of a planetary area
G=Gravity constant M=planetary mass
m=mass of foreign object
R=planetary radius

d=foreign body diameter (which is calculated from h=0 to h max foreign body)

The application of this formula can apply conditionally

1. A foreign body falls at the height of h=0
2. When foreign objects enter the planet's surface, there is no damage to the planet.

If a foreign object damages a part of a planet, it can be summed up in a formula, namely:

$$ga = G\frac{M+m-M'}{(R+d-d')^2}$$

ga=gravity of a planetary area

G=gravity constant
M=planet mass
M'=mass of separate planet pieces m=mass of foreign object R=planet radius
d'=diameter of discrete areas of the planet
d=foreign body diameter (which is calculated from h=0 to h max of a foreign object)

The conditions for using this formula are:

There are pieces of a planet that are separated from that planet
*planet pieces will not be attracted to the surface of the planet again

In research on factors that are influenced by a satellite, a new formula can be created basedon the data that has been collected.

$$ga = Gap\,(1 - \frac{Gs}{GsW})$$

$$GsW = Gs\ x\ \frac{R+h}{R}$$

ga=the gravity of the area affected by the satellite
GsW= gravitational drop affected by satellites
Gap=planetary area gravity
Gs = satellite gravity
R=planetary radius
h=distance of the planet to the satellite (the surface of the planet being tested to the core ofthe satellite)
note:*imbalance of finding (ga) is 0% - 0.5%

The application of this formula can apply conditionally

1. The satellite is at an altitude of (h)> 0
2. The planet's gravity does not attract a satellite.
3. Calculations are made only in an area (not the average value of a planet's gravity)
4. The satellite is right above the tested area

*The value of Gs is always more significant than the value of GsW

If the satellite is not directly above the tested area (e.g., half-moon), there will be a newformula.

$$ga = Gap\left(1 - \frac{Gs}{GsW}\right)$$

$$GsW = Gs\, x \frac{R+h}{R} \cos\theta$$

ga=the gravity of the area affected by the satellite
GsW= gravitational drop affected by satellites
Gap=planetary area gravity
Gs = satellite gravity
R=planetary radius
h=distance of the planet to the satellite (the surface of the planet being tested to the core ofthe satellite)
cosθ= angle between the perpendicular line of the tested area and the satellite

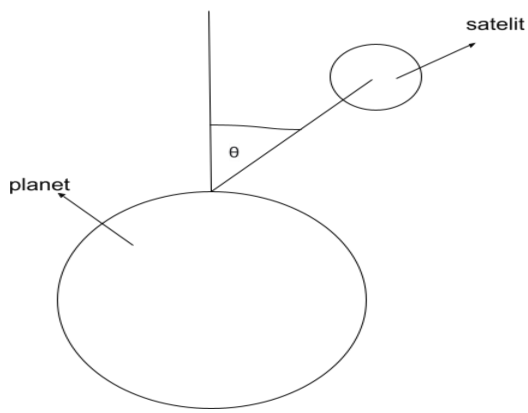

Figure 4
Satellite at an angle with the perpendicular line of the tested area

Gravity values can be lowered and increased by natural factors. However, humans can undoubtedly create a new creation to reduce the value of the gravity of an area by making artificial satellites that have a very large mass and the smallest possible radius and evolve on earth with the condition that the speed of revolution of the satellite once around is equal tothe time the speed of rotation of the earth one revolution so that the decrease in gravity is constant.

4. Conclusion

This research aims to prove that the value of a planet's gravity can change under certain conditions. In addition, this research also aims to prove that humans can create something that causes all objects in a particular area to have a value close to anti-gravity. Based on the results of the research that has been done, the enlargement of a planet's mass and the planet's radius can happen, which means gravity can change its value. In addition, satellites can reduce the value of a planet's gravity. The farther the satellite is, the smaller the decrease in the gravity value affected by the satellite. The higher the gravity of the satellite, the more significant the decrease in theplanetary gravitational force value affected by the satellite.

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