## The Space-sci Sherlocks Deduce

| *ρ giving-rate =* | $\frac{W}{mass}$ | $\frac{W}{mass}$ | $\frac{W}{mass}$ | $\frac{W}{mass}$ | $\frac{W}{mass}$ | **C4** |
|---|---|---|---|---|---|---|
| **B-10** $kg$ | ***g*** **1.5 Earth** | -15 $\frac{\rho/s}{kg}$ | -15 $\frac{\rho/s}{kg}$ | -15 $\frac{\rho/s}{kg}$ | -15 $\frac{\rho/s}{kg}$ | |
| **Au-200** | ***g*** **1.5 Earth** | -15 $\frac{\rho/s}{kg}$ | -15 $\frac{\rho/s}{kg}$ | -15 $\frac{\rho/s}{kg}$ | -15 $\frac{\rho/s}{kg}$ | |
| **Actual acceleration rate, or "*g*"** | | -15 $\frac{m}{s^2}$ | -15 $\frac{m}{s^2}$ | -15 $\frac{m}{s^2}$ | -15 $\frac{m}{s^2}$ | |
| ***Every second, gravity contributes the same amount of downward momentum! And the unit of subatomic momentum giving (*** $\frac{\rho/s}{kg}$ **or** $\frac{m}{s^2}$ ***) relates to "g"!*** | | | | | | |

# What Causes Gravity?


## Professor Du-Ane Du

www.Wacky1301SCI.com, *"Looking at serious science, sideways!"*


Three sisters, Pico, Hectii, and Tera, the "Space-sci Sherlocks," are traveling through the Asteroid Belt. They stop to explore an asteroid and perform these motion experiments.


—Excerpted from *Murdered Energy Mysteries*, Part 2, Chapter 2, by Du-Ane Du, (Amazon, Kindle, ebook 2018, paperback 2021).


"We're going down," Hectii said, as the elevator-room began to move. "Outward, actually, away from the center of the Gravity Spa's rings. The stars are turning outside the window—that means the ship is slowly rotating around the central hub, like a wheel."

"The gravity will become stronger as the elevator-room gets closer to the asteroid that's attached to the end of the elevator shaft," Tera observed, as she served the first ping-pong ball. "I wonder if stronger gravity means the ping-pong ball will bounce lower or higher?"



"Chip," Pico said eagerly. "Can you activate the computer screen's gravity simulation program?"

"What settings would you like?" Chip said.

"Show a picture of me standing at the top of a very tall cliff, say 500 m tall—make it taller if you need. Set the gravity somewhat lower than Earth's gravity—but don't tell me what it is. Place a motion detector at the bottom of the cliff. And I'll need some metal balls to drop."

Chip chose a picture from the Swiss Alps and placed Pico's avatar image on the edge of the cliff. "Atmosphere? What kind of balls?"

"No atmosphere, I want the balls to fall freely," Pico said. "What's the atomic mass of gold?"

"Gold is Au-197."

"What has an atomic mass of ten?"

"Beryllium or Boron."

"Excellent," Pico said, as she picked up a tennis ball and a basketball. "This tennis ball will represent a 10 kg ball of boron, and this basketball will represent a 200 kg ball of gold. On the computer screen, we'll label the boron ball B-10, and we'll label the gold ball Au-200."

Pico tossed the tennis ball in the air several times, and her avatar mimicked her motions—throwing and catching the boron-10 ball.

"Ok, Chip, I'm ready," Pico declared after bouncing the tennis ball against the wall several times. Her avatar bounced the boron-10 ball against a rock every time Pico's ball hit the wall. "When I drop this tennis ball, let the boron-10 ball fall freely off the cliff. Use the motion detector to record the speed of the ball every second for 5.0 s. Show me the data, and we'll see if I can deduce the strength of the gravity field."

Chip placed a data table near the bottom of the computer screen. "You may drop your ball."

Pico held her ball out, let the ball drop, and she jumped up and down a little as she watched her avatar drop the boron-10 ball off the cliff. Her avatar jumped along with her.

Chip scrolled the screen downward so she could see the ball hit the water below the cliff.

“That was great, Chip,” Pico said excitedly. “I liked watching the water splash. Let’s do the gold ball next.”

“Calculations?”

“Of course,” Pico said. “Show me the times and velocities first.”

“Here, the velocity of the ball is listed in red, on the bottom line of this table,” Chip said, as he displayed the velocity readings for each of the first five seconds:

| Time | $t_0$ = 0s | $t_1$ = 1s | $t_2$ = 2s | $t_3$ = 3s | $t_4$ = 4s | $t_5$ = 5s | **A1** |
|---|---|---|---|---|---|---|---|
| **Velocity** | $v_0$ | $v_1$ | $v_2$ | $v_3$ | $v_4$ | $v_5$ | |
| **B-10** $kg$ | 0 $\frac{m}{s}$ | -5 $\frac{m}{s}$ | -10 $\frac{m}{s}$ | -15 $\frac{m}{s}$ | -20 $\frac{m}{s}$ | -25 $\frac{m}{s}$ | |

“I see that the time is written across the top,” Pico said. “Oh, if you look at the bottom data-line, every time a second passes, the velocity increases by –5 m/s. Now show me the momentum—that’s velocity times mass, Chip.”

“The momentum is listed in the bottom line of this table:”

| **Momen-tum** | $\rho_0$ | $\rho_1$ | $\rho_2$ | $\rho_3$ | $\rho_4$ | $\rho_5$ | **A2** |
|---|---|---|---|---|---|---|---|
| | $v_0$ X 10*kg* | $v_1$ X 10*kg* | $v_2$ X 10*kg* | $v_3$ X 10*kg* | $v_4$ X 10*kg* | $v_5$ X 10*kg* | |
| **B-10** *kg* | 0 $\rho$ | -50$\rho$ | -100$\rho$ | -150$\rho$ | -200$\rho$ | -250$\rho$ | |

"Looking at the bottom data-line, the momentum also increases the same amount each second," Pico appraised, as she picked up her basketball and started tossing it up in the air. In front of her, Pico's avatar was tossing the 200 kg gold ball.

"Chip, can you calculate the momentum transfer for each second?" Pico said as she keyed numbers into her phone. "You know, like this:"

*momentum-increase "0"* = $t_1 - t_0$
*momentum-increase "1"* = $t_2 - t_1$
*momentum-increase "2"* = $t_3 - t_2$
appeared on her phone.

"That subtraction gives you the gravitational subatomic $\rho$-wreceiving rate [whole-receiving rate, or weight] for each second," Chip said. "Here are the grav- $\rho$-wreceiving rates that your boron-10 ball experiences, each second:"

| **W**hole-receiving rate = | $\frac{\Delta\rho_0}{\Delta t}$ | $\frac{\rho_1-\rho_0}{1\,s}$ | $\frac{\rho_2-\rho_1}{1\,s}$ | $\frac{\rho_3-\rho_2}{1\,s}$ | $\frac{\rho_4-\rho_3}{1\,s}$ | $\frac{\rho_5-\rho_4}{1\,s}$ | **A3** |
|---|---|---|---|---|---|---|---|
| **B-10** $kg$ | **W** = | -50 $\frac{\rho}{s}$ | -50 $\frac{\rho}{s}$ | -50 $\frac{\rho}{s}$ | -50 $\frac{\rho}{s}$ | -50 $\frac{\rho}{s}$ | |

"The unit shown on the bottom data-line is $\rho$/s, and that unit looks similar to a contac- $\rho$-force-rate," Pico noticed. "In this case, the grav- $\rho$-wreceiving rate is always –50 $\rho$/s. But why do they call this a gravitational subatomic momentum ***W***hole-receiving rate?"

"Earlier you learned that a contact force-rate was the rate at which atomic momentum is transferred across an atomic interface from the surface of one object to the surface of another object."

Pico's eyes widened with understanding, "But the ball isn't touching the ground, so this can't involve an atomic interface," she whispered. "I released the ball and it fell freely down the cliff. Now I see what's going on, the unit is still $\rho$ *of momentum-transfer per second*, but now there isn't an atomic interface for the atomic momentum to go through…so this can't involve atoms, can it?"

"Gravity involves the subatomic particles that make up atoms," Chip said.

"Protons, neutrons, electrons, and quarks," Pico recited. "Gravity affects the tiny subatomic particles that make up atoms."

"Precisely."

"Interesting… getting back to the last data table," Pico said. "Our calculations show, the ball always receives a total of –50 $\rho$ of subatomic momentum each second.

| **W**hole-receiving rate = | $\frac{\Delta\rho_0}{\Delta t}$ | $\frac{\rho_1-\rho_0}{1\,s}$ | $\frac{\rho_2-\rho_1}{1\,s}$ | $\frac{\rho_3-\rho_2}{1\,s}$ | $\frac{\rho_4-\rho_3}{1\,s}$ | $\frac{\rho_5-\rho_4}{1\,s}$ | **A3** |
|---|---|---|---|---|---|---|---|
| **B-10** $kg$ | **W** = | -50 $\frac{\rho}{s}$ | -50 $\frac{\rho}{s}$ | -50 $\frac{\rho}{s}$ | -50 $\frac{\rho}{s}$ | -50 $\frac{\rho}{s}$ | |

"Exactly," Chip said. "That's the grav- $\rho$-whole-receiving rate for this situation."

"The boron-10 ball has a total subatomic-mass of 10 kg. The data clearly shows the momentum of the ball is increasing. If the momentum is increasing, then the subatomic momentum must be coming from somewhere."

"If we divide each grav- $\rho$-wreceiving rate by the number of kilograms of subatomic-mass," Chip said, "it'll give us a value called the **gravitational subatomic momentum *g*iving rate** for the planet involved. The symbol for the ***g***rav-$\rho$-***g***iving rate is ***g***."

"Subatomic momentum transfer," Pico muttered to herself. "When we measure an object's mass, we're actually measuring the total mass of the subatomic particles present in the object. Right?"

"You're correct," Chip said. "An object's mass is the total mass of all of its subatomic parts."

Pico's lips pursed in concentration, "Subatomic momentum-transfer affects the subatomic particles that make up the atoms and molecules. That means when an object receives gravitational subatomic momentum, the subatomic particles inside the atoms cause the atoms to move downward, and the atoms cause the object to move downward."

"Excellent explanation, Pico," Chip said. "Gravity affects all kinds of subatomic particles, so the momentum-transfer associated with gravity is identified as a downward subatomic momentum."

> **Subatomic momentum is the downward momentum-transfer that affects the subatomic particles that make up an object's mass.**
>
> *Chip Micro*

"I think I understand," Pico said. "Go ahead, Chip, divide the grav- $\rho$-wreceiving rate by the ball's total subatomic mass. It had a mass of 10 kg."

"Dividing the $\rho$-wreceiving rate by kilograms of subatomic-mass produces the following table:"

| $\rho$ **g**iving-rate = | $\frac{W}{mass}$ | $\frac{W}{10\ kg}$ | $\frac{W}{10\ kg}$ | $\frac{W}{10\ kg}$ | $\frac{W}{10\ kg}$ | $\frac{W}{10\ kg}$ | A4 |
|---|---|---|---|---|---|---|---|
| B-10 $kg$ | $\boldsymbol{g}_{0.5}$ Earth = | -5 $\frac{\rho/s}{kg}$ | -5 $\frac{\rho/s}{kg}$ | -5 $\frac{\rho/s}{kg}$ | -5 $\frac{\rho/s}{kg}$ | -5 $\frac{\rho/s}{kg}$ | |
| Actual acceleration | $g$ = | -5 $\frac{m}{s^2}$ | -5 $\frac{m}{s^2}$ | -5 $\frac{m}{s^2}$ | -5 $\frac{m}{s^2}$ | -5 $\frac{m}{s^2}$ | |

"For each second of the fall, the **g**rav- $\rho$-**g**iving rate (**g**) is –5 $\rho$/s/kg, and that's the same value as the acceleration of gravity used in this simulation!" Pico reasoned. "All of the data on this chart matches—this looks important. But is this true in all situations? I think it's time for a gigantic gold splash."

Pico reached high, released her basketball, and on the screen her avatar dropped its gold-200 ball off the cliff. Pico and the avatar jumped up and down excitedly as huge gold ball gained momentum and then struck the water making—

"Yes!" Pico said jubilantly, as water splashed high up on the side of the cliff face.

"Ok, Chip," Pico said. "Show me the velocity and momentum charts for each of the first five seconds that the gold ball fell.

“Here, I’ll put the momentum data in red—that’s the data you want to focus on,” Chip said, as he displayed the next table:

| Time | $t_0$ = 0s | $t_1$ = 1s | $t_2$ = 2s | $t_3$ = 3s | $t_4$ = 4s | $t_5$ = 5s | **B1** |
|---|---|---|---|---|---|---|---|
| **Velocity** | $v_0$ | $v_1$ | $v_2$ | $v_3$ | $v_4$ | $v_5$ | |
| **Au-200** $kg$ | $0\,\frac{m}{s}$ | $-5\,\frac{m}{s}$ | $-10\,\frac{m}{s}$ | $-15\,\frac{m}{s}$ | $-20\,\frac{m}{s}$ | $-25\,\frac{m}{s}$ | |
| **Momentum** | $\rho_0$ $v_0$ X 200 | $\rho_1$ $v_1$ X 200 | $\rho_2$ $v_2$ X 200 | $\rho_3$ $v_3$ X 200 | $\rho_4$ $v_4$ X 200 | $\rho_5$ $v_5$ X 200 | |
| **Au-200** $kg$ | 0 $D$ | -1000 $\rho$ | -2000 $\rho$ | -3000 $\rho$ | -4000 $\rho$ | -5000 $\rho$ | |

“Looking at the third line of the data table, the gold-200 ball had the same velocities as the boron-10 ball in the previous experiment.” Pico said. “But this time the bottom data-line shows that the values for momentum rage from –1 000 $\rho$ of momentum to –5 000 $\rho$. The gold-200 ball certainly absorbed momentum a lot faster than the boron-10 ball did.”

“Are you having fun, Pico?” Tera inquired.

“I’m dropping huge gold balls off a cliff,” Pico said excitedly.

“Try not to jump too high,” Hectii said. “The gravity in this room is becoming stronger.”

“Much stronger than on Mars,” Tera said. “We don’t want you to fall and hurt yourself.”

“These strength-assist leg braces are adjusting to the gravity changes,” Pico said more confidently. “I feel fine. Say Chip, it looks like the momentum of the gold-200 ball is increasing at a constant rate, like the boron-10 ball did. Did the gold-200 ball receive the same amount of momentum each second? Chip, show me the $\rho$-wreceiving rate table. The formula for that is:”

$$\rho\text{-}\underline{\mathbf{W}}\textit{hole-receiving rate "1"} = \frac{(momentum)_1 - (momentum)_0}{1\ second}$$

$$\rho\text{-}\underline{\mathbf{W}}\textit{hole-receiving rate "2"} = \frac{(momentum)_2 - (momentum)_1}{1\ second}$$

$$\rho\text{-}\underline{\mathbf{W}}\textit{hole-receiving rate "3"} = \frac{(momentum)_3 - (momentum)_2}{1\ second}$$

appeared on Pico’s phone.

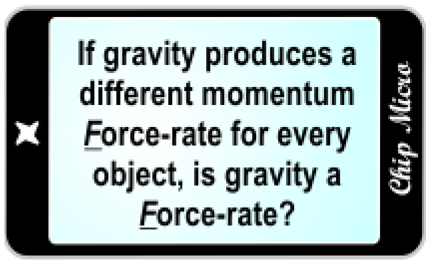
“Here it is:”

| **W**hole-receiving rate = | $\frac{\Delta\rho_0}{\Delta t}$ | $\frac{\rho_1-\rho_0}{1\ s}$ | $\frac{\rho_2-\rho_1}{1\ s}$ | $\frac{\rho_3-\rho_2}{1\ s}$ | $\frac{\rho_4-\rho_3}{1\ s}$ | $\frac{\rho_5-\rho_4}{1\ s}$ | **B2** |
|---|---|---|---|---|---|---|---|
| **Au-200** | **W** = | -1000 $\rho/s$ | -1000 $\rho/s$ | -1000 $\rho/s$ | -1000 $\rho/s$ | -1000 $\rho/s$ | |

“I was right,” Pico said. “The bottom line of this new table shows that the gold-200 ball receives the same amount of momentum every second. But this grav- $\rho$-whole-receiving rate is higher than the $\rho$-whole-receiving rate that the boron-10 ball experienced.”

“How much higher?” Hectii queried.

“Much higher,” Pico said. “In my first experiment, the boron-10 ball experienced a $\rho$-wreceiving rate of 50 $\rho$/s, every second. But the gold-200 ball experienced a $\rho$-wreceiving rate of 1 000 $\rho$/s.”




“What’s a grav- $\rho$-wreceiving rate [whole-receiving rate, or weight]?” Hectii said inquisitively. “You said the units were $\rho$/s. Is it like a contac- $\rho$-force-rate?”

“A contact force-rate involves atomic interfaces,” Pico said. “But when things fall toward Earth, or when they fall toward the planet Mars, there’s no atomic-interface to force the momentum through.”

“That’s true,” Hectii said. “You said subatomic. Which suggests, the momentum is being transferred from the subatomic particles in the planet to the subatomic particles that make up your body—or in this case, the subatomic particles in the gold ball’s atoms.”

“Exactly,” Pico affirmed. “And the puzzle I’m trying to figure out is why my boron-10 ball experienced a grav-

$\rho$-whole-receiving rate of 50 $\rho$/s, but my gold ball experienced a $\rho$-wreceiving rate of 1 000 $\rho$/s."

"If the values are different," Hectii said. "Then gravity cannot be a $\rho$-whole-receiving rate."

"But a $\rho$-wreceiving rate is almost the same thing as a force-rate," Pico said. "And the force-rates were different!"

"If they each experienced a different force-rate, then gravity can't be a force-rate, and gravity can't be a $\rho$-whole-receiving rate," Hectii decisively deduced. "Does your experiment suggest what gravity actually is?"

| ***W***hole-receiving rate = | $\frac{\Delta\rho_0}{\Delta t}$ | $\frac{\rho_1-\rho_0}{1\,s}$ | $\frac{\rho_2-\rho_1}{1\,s}$ | $\frac{\rho_3-\rho_2}{1\,s}$ | $\frac{\rho_4-\rho_3}{1\,s}$ | $\frac{\rho_5-\rho_4}{1\,s}$ | **B2** |
|---|---|---|---|---|---|---|---|
| **Au-200** | ***W*** = | -1000 $\rho/s$ | -1000 $\rho/s$ | -1000 $\rho/s$ | -1000 $\rho/s$ | -1000 $\rho/s$ | |

"There's one more math step we can try," Pico said. "Now we need to divide the $\rho$-wreceiving rate by the total subatomic mass of the gold-200 ball, Chip?"

"The total what?" Hectii said.

"The total subatomic mass," Pico said, as if stating the obvious. "You know, the mass of the protons, electrons, neutrons, and quarks that the atoms of gold are made of."

"Fascinating concept," Hectii said. "How much subatomic mass did the gold ball have?"

"The gold-200 ball has a total subatomic mass of 200 kg," Chip said. "Dividing the wreceiving rate by the total subatomic mass tells us the ***g***rav- $\rho$-***g***iving rate [transmitting rate] for the planet that the ball was falling toward. The new data looks like this:"

| ***ρ-giving rate =*** | $\frac{W}{mass}$ | $\frac{W}{200\ kg}$ | $\frac{W}{200\ kg}$ | $\frac{W}{200\ kg}$ | $\frac{W}{200\ kg}$ | $\frac{W}{200\ kg}$ | **B3** |
|---|---|---|---|---|---|---|---|
| **Au-200** $kg$ | ***g***$_{0.5}$ **Earth** = | -5 $\frac{\rho/s}{kg}$ | -5 $\frac{\rho/s}{kg}$ | -5 $\frac{\rho/s}{kg}$ | -5 $\frac{\rho/s}{kg}$ | -5 $\frac{\rho/s}{kg}$ | |
| **Actual acceleration** | ***g*** = | -5 $\frac{m}{s^2}$ | -5 $\frac{m}{s^2}$ | -5 $\frac{m}{s^2}$ | -5 $\frac{m}{s^2}$ | -5 $\frac{m}{s^2}$ | |

"According to the second line," Hectii summarized, "the $\rho$-***g***iving rate of gravity is –5 $\rho$/s/kg."

"Hectii," Pico said triumphantly, "We think I found our first fact about gravity. It looks like gravity is the continuous ***g***iving/transmitting of downward subatomic momentum. A planet has gravity because the subatomic particles inside the planet continually give-out the same amount of negative [downward] subatomic momentum to all nearby objects. A receiving object's gravitational $\rho$-wreceiving rate is determined by how many kilograms of subatomic mass it has."

"Seriously?"

"From what I've seen so far," Pico said. "Receipt of downward gravitational subatomic momentum causes an object's subatomic particles to move downward at a faster and faster rate."

"Back up," Hectii said. "You're saying a planet's gravity gives the same amount of downward momentum to all nearby objects?"

"Based on the amount of subatomic mass in the receiving object," Pico said.

"Amazing," Hectii interpreted. "It's a lot like the fuel in our rocket engines! The fuel always gave the same amount of momentum to whatever rocket it was attached to."

Pico shrugged her shoulders, "Sort of the same, only this is a type of $\rho$-***g***iving rate that doesn't require surface contact like an atomic interface. Which means, every kilogram of subatomic mass around the planet receives the same amount of downward momentum each second."

"That's amazing," Hectii said with a touch of awe. "Pico, I believe you have discovered what gravity is! This should be our kinetic fact #4 of gravitational momentum transmission."

"Gravity is the ***g***iving of downward subatomic momentum," Pico said, eagerly nodding her head. "The $\rho$-***g***iving rate is a constant for each planet—"

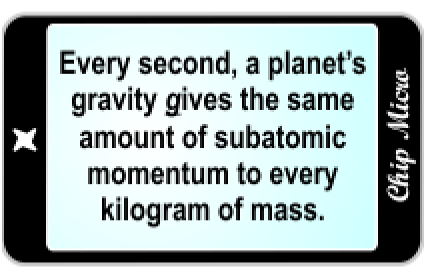
"—based on how far you are from the planet, of course—"

"—and the $\rho$-wreceiving rate of momentum absorption is related to the total amount of subatomic mass in a given object," Pico finished.

"We'll call this our **kinetic fact #4 of gravitational momentum transmission**," Hectii said. "It'll say, gravity is the continuous ***g***iving/transmitting of downward subatomic momentum. A planet has gravity because the subatomic particles inside the planet continually give off the same amount of negative (downward) subatomic momentum to every object around it, based on the distance from the center of the planet."

"And," Pico said, "a receiving object's grav- $\rho$-wreceiving rate [whole-receiving rate] is determined by how many kilograms of subatomic mass it has."

"Of course! And receipt of downward gravitational subatomic momentum causes an object's subatomic particles to move downward at a faster and faster rate," Hectii added. "This produces gravitational acceleration and gravitational attraction."




"But what if we dropped the balls at different times?" Hectii said.

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CONCLUSION: More research needs to be done into the relationship between mechanical energy and other theoretical forms of energy. Many common beliefs may actually be philosophical myths.

*Murdered Energy Mysteries* seeks to increase understanding of the various forms of momentum and momentum transfer, as well as the various forms of energy and energy transfer. The lack of understanding on the part of the scientific community is substantial, and more research needs to be done.

—Du-Ane Du, author of the edu-novel *Murdered Energy Mysteries* (Amazon, Kindle, e-book 2018, paperback 2021.)

More information, see:
*Murdered Energy Mysteries*,
an edu-novel

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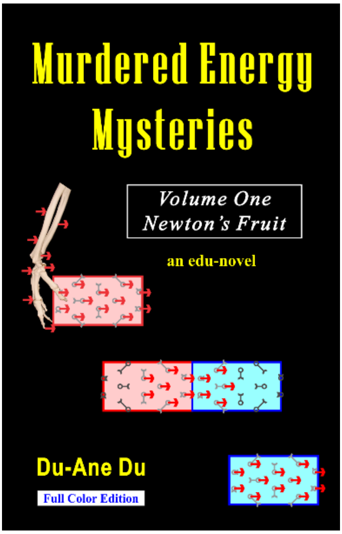


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