Warm Up

A video posted on the internet has gone viral, and the total number of views is increasing by 20% every hour. If the video currently has 52,000 views, how many views will it have in 4 hours?

Factor must be > 1

Rate: +20%

Factor: 1.2

$y = 52{,}000(1.2)^4$

$= 107{,}827.2$

we cannot have a part of a "view"

$\approx 107{,}827$ views

Recap from yesterday

What are your general observations? Is there anything interesting or surprising?

1. What is the independent variable and what is the dependent variable?

I: Drop Height D: Rebound Height

2. Calculate Rebound Ratios by dividing *Rebound Height* by *Drop Height*. Determine a Rebound Ratio that feels like a good representative for your data set. Show the work below.

B-ball: 0.58 Tennis: 0.47
Lacrosse: 0.64 Golf: 0.64

3. Using Desmos, add a table and plot your points. Looking at your graph, would a linear model or exponential model represent the situation best?

4. If you think it is linear you can have Desmos calculate a line of best fit.
In a new line, type $y_1 \sim mx_1 + b$. Look at the calculated values of *m* and *b* and write a linear equation.

$y =$ _____

5. What does your slope mean in the context of the situation?

Slope: $\frac{\Delta \text{ Rebound Height}}{\Delta \text{ Drop Height}}$ = Rebound Ratio

6. Is your y-intercept realistic? Justify your answer in the context of the situation.

7. Compare the *Rebound Ratio* from Question 2 and the *slope* of your line of best fit. What do you notice?

Rebound Ratio =

Slope =

8. If you dropped your ball from a height of 25 feet, what would be the rebound height? **Use your equation to prove your answer.**

Part 2 – Successive Bounces

What if you drop the ball from a height of 200 cm and let it bounce repeatedly?

- Drop the ball from 200 cm and let it bounce 6 times (film from far away to view all bounces).
- Measure and record the height of the ball after the 6 successive bounces.
- Repeat the process two more times to verify data values are accurate.

Bounce Number	Rebound Height Trial 1 (cm.)	Rebound Height Trial 2 (cm.)	Rebound Height Trial 3 (cm.)
0 *(before drop)*	200	200	200
1			
2			
3			
4			
5			
6			

9. Using Desmos, add a table and plot your most accurate Trial. Looking at your graph, would a linear model or exponential model represent the situation best? Explain.

10. Use your data table to write an equation for the height of the ball in inches, *y*, after *x* number of bounces. If you think it could be exponential, in a new line, type $y_1 \sim ab^{x_1}$

11. What do the values of *a* and *b* represent in the context of the problem?

    a represents:

    b represents:

12. Compare the equation you wrote for Part 2 and the equation in Part 1. What do you notice?

Equation from Part 1:

Equation from Part 2:

C-block

Summary:

13. What are the rebound ratios for all the ball types used? Compare your data with other groups and complete the table.

Ball	Rebound Ratio	Bounciness Rank
Lacrosse ball	0.63	1
Tennis ball	0.53	4
Basketball	0.60	3
Ping Pong Ball		
Golf Ball	0.61	2
Playground Ball		

14. Compare your original predictions to the actual "bounciness" of the different ball types.

15. Were there any results that surprised you?

12. Compare the equation you wrote for Part 2 and the equation in Part 1. What do you notice?

Equation from Part 1:

Equation from Part 2:

Summary:

G-block

13. What are the rebound ratios for all the ball types used? Compare your data with other groups and complete the table.

Ball	Rebound Ratio	Bounciness Rank
Lacrosse ball	0.61	2
Tennis ball	0.45	4
Basketball	0.58	3
Ping Pong Ball		
Golf Ball	0.65	1
Playground Ball		

14. Compare your original predictions to the actual "bounciness" of the different ball types.

15. Were there any results that surprised you?

Homework

Complete the packet