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Middle/High School STEM Field Trip Worksheet – Free Fall

Math Exploration

1. What is the area, in candies, of a square with the following lengths?

   a. A square with a length of 3 has an area of _____.

   b. A square with a length of 4 has an area of _____.

   c. A square with a length of 5 has an area of _____.

2. List the first 12 square numbers:

3. Find the missing number in the following pattern: 0, 5, 20, 45, _____

   What's the pattern? _____

4. If something has been falling, the following table shows the height of the fall given how many seconds it's been falling. Complete the table.

Time	Height
0 seconds	0 meters
1 second	5 meters
2 seconds	20 meters
3 seconds	45 meters
4 seconds	
5 seconds	

5. What can you do with the "seconds" number to get the "height" number? Write this as an equation:

H =

6. The acceleration due to gravity rounds to 10 meters per second per second. Rewrite the equation above so that it has the number 10 in it.

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Engineering Challenge

Build a tower on a table or counter. Create a device on the tower that conveys (moves) a foam golf ball to the top of the tower and drops it all the way to the floor, not just to the table.

1. Design
   Draw a picture of your tower and of the device.

2. Build
   Create both the tower and the device.

3. Test
   Test the device. Is the tower stable? Does the golf ball make it all the way to the top? Does he ball fall from the top all the way to the floor?

4. Redesign
   Redesign and rebuild as needed to maximize the efficiency and effectiveness.

Science Experiment

Test Galileo's equation for an object in free fall. Drop an object from the top of your tower and time how long it falls. Calculate the height and then measure the height. How well did the equation predict the height of the fall? What could contribute to any discrepancies?

Time: _____
(number of seconds the ball fell… this will be a decimal)

Equation: _____

Calculated Height: _____

Measure Height: _____

Reasons for discrepancy: _____