Corn Kernel Math with Ear of Corn Dissection

Directions: In this assignment, you will explore multiple ears of corn. From them, you will count the number of rows and kernels found on each ear of corn. You will then use the average mass of a kernel to determine how many kernels are in a container - without having to count every single one! Lastly, you will then find out how many kernels of corn are in a bushel. The weight of a bushel of corn can be found on the internet or somewhere on these pages.

Part 1: Explore an Ear of Corn

1. You have multiple ears of corn at your station.
2. For each ear of corn**, count the number of rows** and record them below:

Ear 1: _____ Ear 3: _____ Ear 5: _____

Ear 2: _____ Ear 4: _____ Ear 6: _____

a. Do they have the same number of rows? _____

b. Is it an even or an odd number of rows? _____

1 lb = 453.592 g

3. Find the **total number of kernels** in each ear of corn by doing the following calculation: **count how many kernels are in one row and then multiply by the number of rows**. Show your work in the spaces provided.

Ear 1:	Ear 4:
Ear 2:	Ear 5:
Ear 3:	Ear 6:

4. Find the **average number of kernels** for an ear of corn – this will be called **Multiplied Kernels**:

$$average\ number\ of\ kernels = \frac{\text{Total \# of Kernels}}{\#\ of\ Ears\ of\ Corn} = \_\_\_\_\_ = \_\_\_\_\_$$

5. Then, actually **count the total number of kernels** on the ear of corn – this will be called **Actual Kernels**:

$$actual\ average\ number\ of\ kernels = \frac{Actual\ \#\ of\ Kernels}{\#\ of\ Ears\ of\ Corn} = \_\_\_\_\_ = \_\_\_\_\_$$

6. Determine the **percent error** between **Multiplied Kernels (from #4) and Actual Kernels (from #5)**.

$$\%\ Error = \frac{(\text{Actual \# of Kernels}) - (\#\ of\ Multiplied\ Kernels)}{(\text{Actual \# of Kernels})}\ x\ 100\% = \_\_\_\_\_ = \_\_\_\_\_$$

Part 2: How Many Kernels are in a Container?

1. Your teacher has a container filled with corn kernels. You and your group are to **determine how many kernels are in the container without counting**. You will be using mass to determine the number of kernels.
2. Your teacher has the **mass of the empty container**. Find the **total mass of the kernels and the container** by placing it on a scale. Use this mass and subtract out the mass of the empty container to find the **mass of the kernels inside the container**. Show your work inside the table.

Mass of Kernels and Container	Mass of Empty Container	Total Mass of Kernels in Container

3. Determine **how many kernels of corn are in the container** by finding the **average mass of a corn kernel** and dividing that average kernel mass into the **total mass of the kernels in the container**.
   a. Find the **total mass of each number of the kernel(s)** – 1, 5, 10, 20 and 50 kernels.
   b. Calculate the **average mass of a kernel for each set** = $\frac{\text{Total mass of Kernels}}{\#\ of\ Kernels}$
   c. Take the **average mass of the kernel found in 10(b)** and divide it into the **Total Mass of the Kernels in the Container** $\frac{\text{Total mass of kernels in container}}{Average\ mass\ of\ a\ kernel}$ this equals the **number of kernels in the container**.
   d. Get the **actual number of kernels in the container** from your teacher.
   e. Calculate the **percent error** for each kernel number $\frac{(\text{Actual \# of Kernels}) - (Exp\ \#\ of\ Kernels)}{(\text{Actual \# of Kernels})}\ x\ 100\%$

56 lbs

# of Kernels	1	5	10	20	50
Total Mass of Kernel(s)					
Average Mass per Kernel					
Total Mass of Kernels in Container					
Number of Kernels in Container					
Actual Number of Kernels in the Container (From Teacher)					
Percent Error					

Part 3: How Many Kernels of Corn are in a Bushel?

1. Using the table above, find the **Average Mass per Kernel that has the <u>smallest</u> Percent Error**.

Place that value in the table below.

12 in. = 1 foot

2. Use the internet to find **how many grams are in a pound**.
3. Multiply the **number of grams in a pound** by the **number of pounds in a bushel**. This is the number of **grams in a bushel**.
4. To find out how many **kernels are in a bushel**, divide the **number of grams in a bushel** by the **average mass per kernel**.

Average Mass per Kernel in grams	Grams in 1 Pound	Grams in a Bushel	Number of Kernels in a Bushel

Part 4: Estimating the Number of Corn Plants per Acre of Land (6-12")

1. You will be estimating the number of corn plants in an acre of land based on the planting of 30-inch rows.
2. The teacher has placed multiple strips of tape down on the ground with spaced-out colored dots. These colored dots represent where a corn seed has been planted.
3. You will be counting the number of seeds for a distance of 17.5 feet. You will not be using a meter or yard stick for this distance. You will be using your feet.
4. Determine the number of inches in 17.5 feet by multiplying it by the number of inches in one foot. This conversion can be found somewhere on this paper or on the internet. Enter that number in the table below.
5. Using a ruler, determine the length of your foot in inches with your shoes on. We don't want smelly feet. Place that number in the table below.
6. Then determine how many of your feet equal 17.5 feet by dividing the Number of Inches in 17.5 Feet (#4) by the Your Foot in Inches (#5).
7. This is how many steps you will take along the taped seed row. Make sure to place one step directly in front of the other as you walk down the length of the seed row.
8. Determine the number of Corn Kernels in 17.5 Feet.
9. Calculate the number of corn seeds per acre by multiplying the Number of Corn Kernels in 17.5 Feet (#8) by 1,000.

Inches in 17.5 Feet	Your Foot in inches	How Many of Your Feet in 17.5 Feet	Number of Corn Kernels in 17.5 Feet	Number of Corn Seeds per Acre (x 1,000)

Questions

1. Which number of kernels (1, 5, 10, 20, 50) came the closest to the Actual Number of Kernels? _____

2. Which number of kernels had the highest percent error? _____
   Explain why that number of kernels would give you the greatest error.

3. Using the internet, what is the average number of kernels for an ear of corn? _____
   How does the average number of kernels you calculated compare to what you found?

4. The average number of bushels per acre of corn in America is 176.4. How many kernels of corn are in the average American acre? Show your work below.

5. Using the number of corn plants you found in Part 4, how many kernels of corn will be in that acre? Show your work below.

6. The average human body contains 18% carbon. From that amount, the average percentage of carbon that comes from corn is 70% due to the many products that are derived from corn in our diet. We will find out how much carbon in your body comes from corn and then determine how many corn kernels you are!

a. How much do you or the average student weigh (in pounds): _____ lbs

b. Convert that into grams (remember 1 lb = 453.592 g): _____ g

c. Multiply your weight in grams by 0.18. This is how much carbon is in your body: _____ g

d. Multiply the carbon in your body by 0.70. The weight of carbon that comes from corn: _____ g

e. Divide the amount of carbon that comes from corn by your most accurate average mass per kernel found in Part 2 from above. This is the number of corn kernels that make up your body!

   You are made up of _____ kernels of corn!

   How many bushels of corn are you? _____ bushels of corn!