3.2 Activity: A Mole of Pennies

Question

How long and massive would a stack of 1 mol of pennies be?

Background

The mole is a convenient and useful term for counting very large quantities of things. You know that 1 mol of pennies is approximately 6.02×10^{23} pennies but can you picture just how many that really is? Suppose you stacked 1 mol of pennies. How tall do you think that stack would be? How much would it weigh? Just for fun, try guessing by completing the tables below in pencil before you do the necessary calculations.

Procedure

1. Make a stack of 10 pennies.
2. Measure and record the stack's height in centimetres. _____
3. Measure and record the stack's mass in grams. _____

Results and Discussion

1. Calculate the height in kilometres of a stack of 1 mol of pennies.

2.

Would the stack reach…	Distance (km)	✔ or ✗
our Moon?	3.9×10^{5}	
Pluto?	5.9×10^{9}	
Proxima Centauri (the nearest star)?	4.1×10^{13}	
Andromeda (the nearest galaxy)?	1.9×10^{19}	

3. Calculate the mass in kilograms of 1 mol of pennies.

4.

Would the stack weigh as much as…	Mass (kg)	✔ or ✗
the U.S.S. *Ronald Reagan* (the world's heaviest aircraft carrier)?	2.1×10^{7}	
the total of all living things on Earth?	2×10^{15}	
our Moon?	7.4×10^{22}	
Earth?	6.0×10^{24}	