

Bean Mass Units and the Vole

Measure out the relative mass of each type of grain in grams. Count the number of kernels in each relative mass.

Gram-relative mass	number of kernels / <i>3 grains</i>
1.0 grams of rice	
6.9 grams of popcorn	
12.4 grams of black-eyed peas	
17.4 grams of pinto beans	
46.5 grams of lima beans	

1. Is the number of kernels in the relative mass of each type approximately the same? _____

Call that amount the vole.

A vole is than a certain number of particles and is equal to the relative mass of the substance in grams.

2. Take the average of all the grains to determine the average number of particles in one vole. Assume that all the types of grains now have this number of kernels per one vole. _____

3. What is the mass of 1 vole of pinto beans? _____

4. What is the mass of 0.5 vole of pinto beans? _____

5. If you were to measure this many grains on the balance, how many grains would you measure? (go ahead and do this if you need to). _____

6. What is the mass of 0.5 vole of popcorn? _____

7. How many kernels of popcorn does this represent? _____

8. How does the number of pinto beans in 0.5 vole compare to the number of popcorn kernels in 0.5 vole? _____

9. How does the number of grains in 2.0 vole of rice compare to the number of beans in 2.0 vole of lima beans? _____

10. How does the number of peas in 0.45 vole of black-eyed peas compare to the number of beans in 0.45 vole of pinto beans? _____

11. Do equal numbers of voles of any substance have equal number of particles? _____

12. What is the easiest way of obtaining approximately 675 grains of rice? _____

Show your work for each of the following including the units and how they cancel.
Watch for significant figures!

13. What is the mass of 3.0 voles of rice?

14. What is the mass of 1.5 voles of popcorn?

15. What is the mass of 7.2 voles of black-eyed peas?

16. What is the mass of 0.25 vole of pinto beans?

17. What is the mass of 0.067 vole of lima beans?

18. How many voles are in 8.7 grams of rice?

19. How many voles are in 32.9 grams of black-eyed peas?

20. How many voles are in 2.6 grams of pinto beans?

21. How many voles are in 125.0 grams of lima beans?

22. How many voles are in 67.2 grams of popcorn?

23. If you had 125.6 grams of black-eyed peas and were going to have a pea shooting contest with a friend, how many grams of pinto beans would your friend need for you each to have the same number of particles?