

## Answer to iClicker Question #8A (Themes 2)

Increasing the size of anything by 1000x increases its volume by  $(1000)^3x$  - this is because the length increases by 1000x, the width increases by 1000x, and the height increases by 1000x. So the approximate expected increase in volume is  $1000 \times 1000 \times 1000$  or 1,000,000,000-fold. Since ants are made of roughly homogeneous material, if you increase their volume by 1,000,000,000-fold, their weight will increase by 1,000,000,000-fold. So (D) is the correct answer.

## Answer to iClicker Question #8B (Themes 2)

When each of the linear dimensions (length, width, and height) increase by X-fold - this is called “scaling up X-fold proportionally” - any area measurement increases by  $X^2$ -fold and any volume (or weight) increases  $X^3$ -fold. Therefore, since the diameter (a linear dimension; you know it is a “linear dimension” because it is measured in inches, not square or cubic inches) increases 3-fold (since 2ft x 3 = 6ft it is a 3-fold increase):

- any area will increase  $3^2$ -fold = 9x increase.
- any volume (or weight) will increase  $3^3$ -fold = 27x increase

Therefore, the only correct answer is (2).