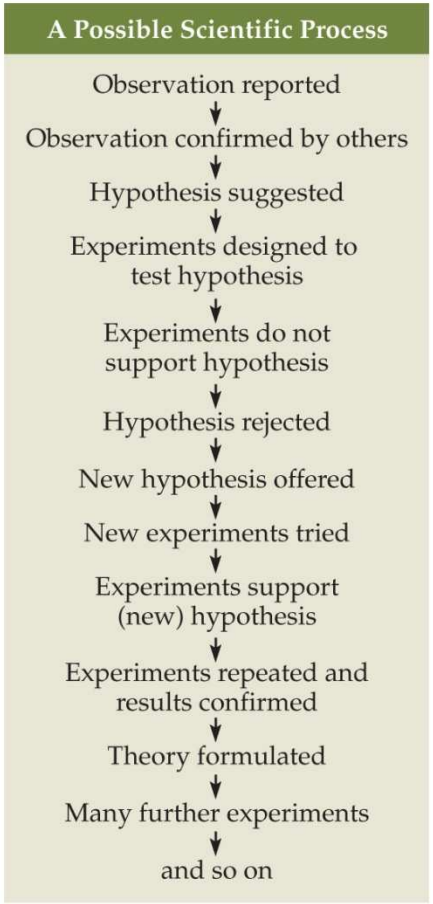
Chapter 1
Chemistry: A Science for All Seasons

A key aspect of a scientific hypothesis is that it must be:



a. Creative
b. Unique
c. Testable
d. Persuasive
e. Understandable

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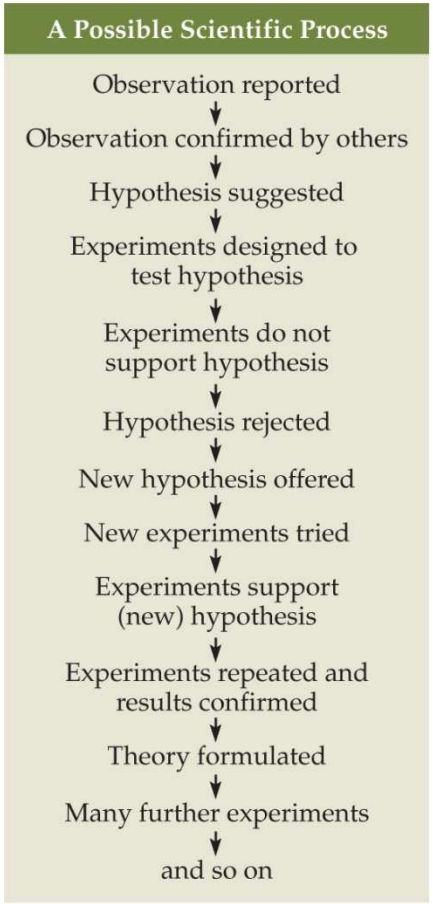

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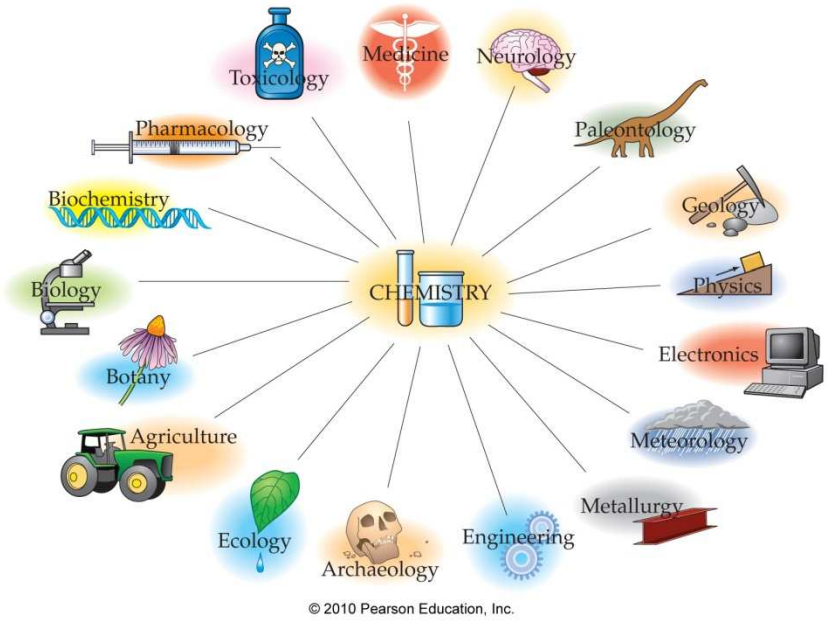
Which of the following processes represents a *chemical* change?



a. Water freezes into ice.
b. Water evaporates.
c. Butter melts in a hot pan.
d. A bicycle left outdoors begins to rust.
e. Sugar dissolves in hot coffee.

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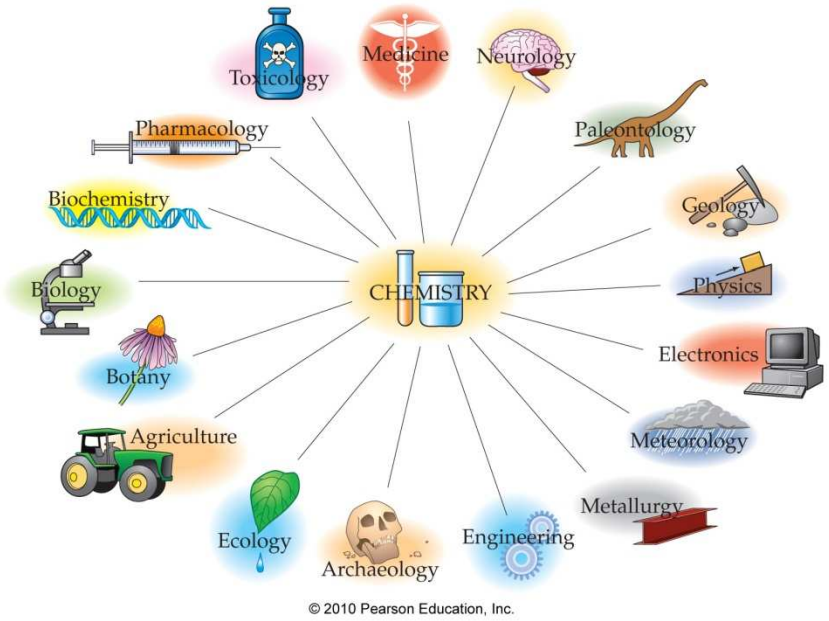

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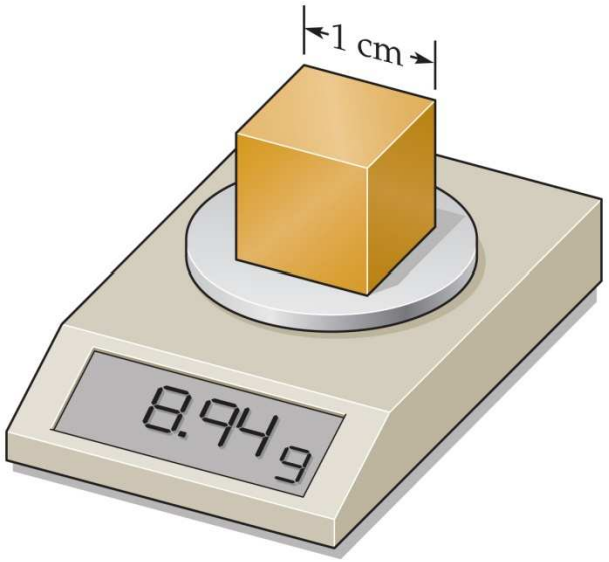
What quantity represents the *smallest* mass?



a. 0.01 kg (10g)
b. 1.0 g
c. 100 mg (0.1g)
d. 1000 μg (10^{-3}g)
e. 100,000 ng (10^{-4}g)

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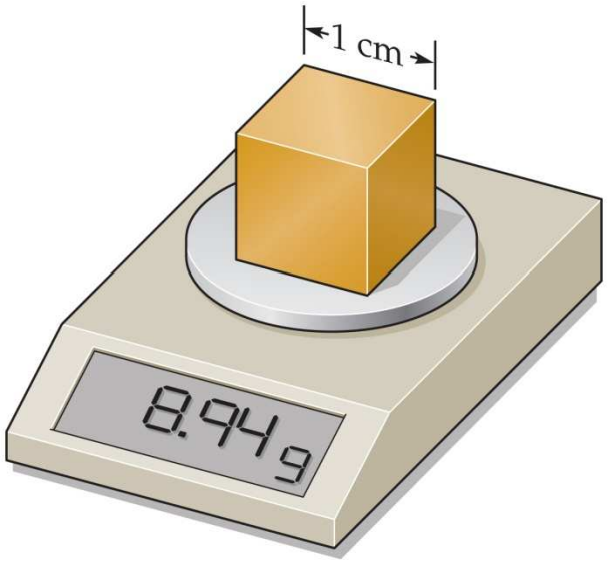

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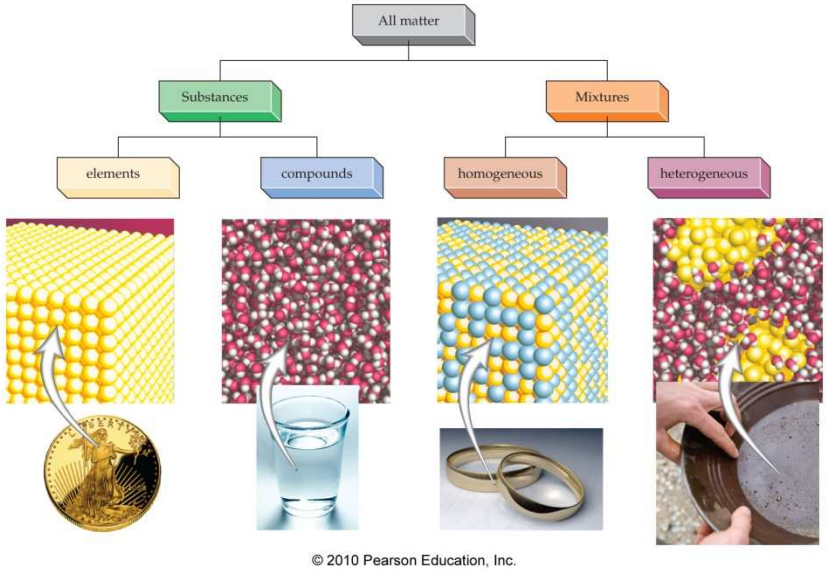

a. Hexane (0.660 g/mL)
b. Ethyl alcohol (0.789 g/mL)
c. Water (1.00 g/mL)
d. Magnesium (1.738 g/cm^3)
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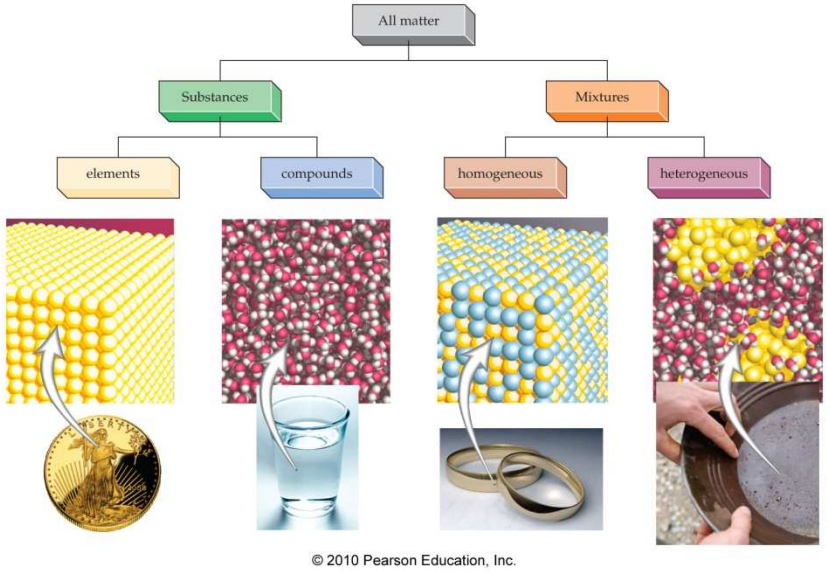

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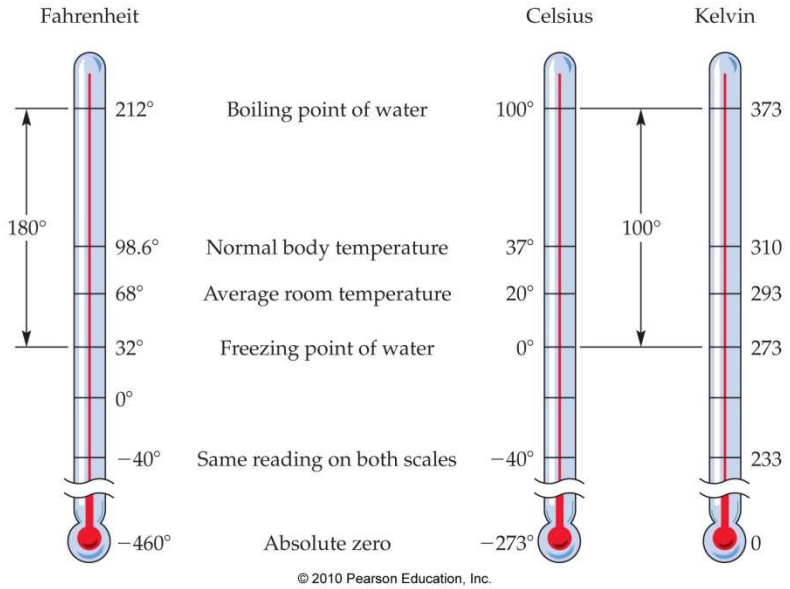
The energy required to heat 1.0 L of water from room temperature (20 ºC) to boiling is:



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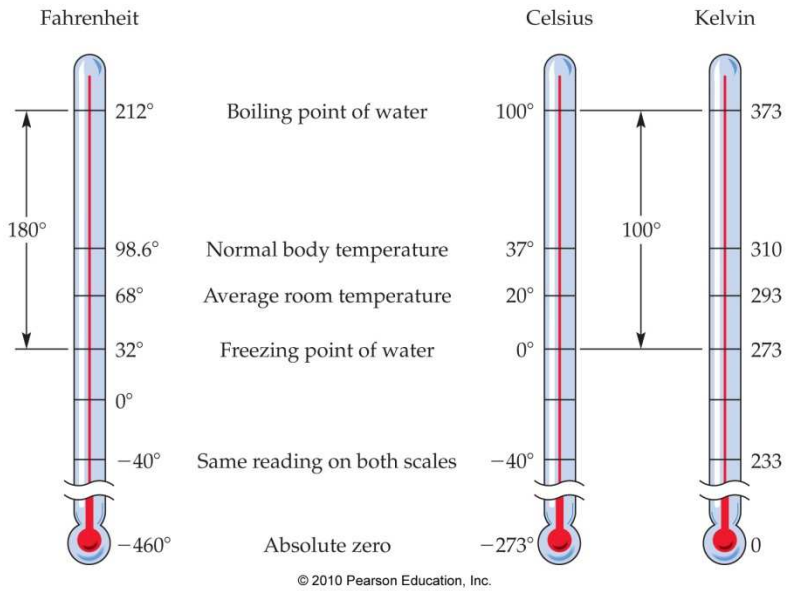

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Why? 1.0 L =1000 mL = 1000 g H_2O

Boiling water is 100 ºC, so temp increase is 80 ºC x 1000 g = 80,000 cal or 80 kcal.

Which of the following claims are falsifiable?

a. A classmate claims that carrying an amethyst will increase your mental alertness if you are open to its positive energy.
b. Your fellow student claims to have memorized all of the elemental names and symbols on the periodic table.
c. A self-help guru claims that if your desire for success is strong enough, you will receive it.
d. An alternative health practitioner claims that drinking “energized water” will promote cell health and increase moisture absorption by your body, resulting in increased vitality and overall energy.

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