<u>**CONCEPT:**</u> FACE CENTERED CUBIC UNIT CELL
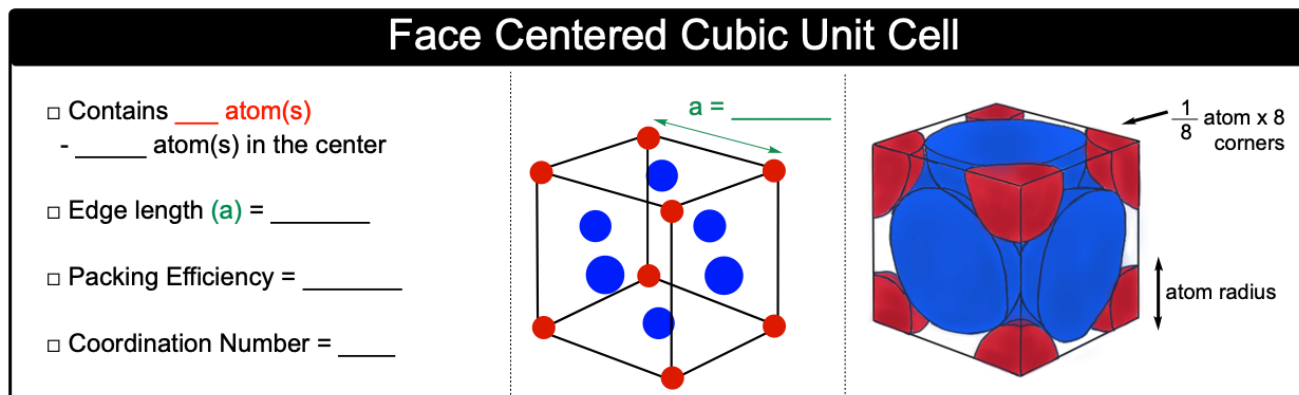
● The **Face-Centered Cubic Unit Cell** is composed of a cube with an atom at each corner and _____ atom(s) on the faces.

Face Centered Cubic Unit Cell

□ Contains ___ **atom(s)**
- _____ atom(s) in the center

□ Edge length (a) = _____

□ Packing Efficiency = _____

□ Coordination Number = _____

a = _____

$\frac{1}{8}$ atom x 8 corners

atom radius

EXAMPLE: Silver adopts a face-centered cubic unit cell structure. Illustrate how the number of atoms per unit cell for the silver atom are obtained.

PRACTICE: Aluminum has a face-centered cubic unit structure and a density of 2.716 g/cm³. Calculate the edge length of the unit cell.

a) 4.041 x 10⁻⁸ cm   b) 3.992 x 10⁻⁸ cm   c) 3.615 x 10⁻⁸ cm   d) 3.247 x 10⁻⁸ cm   e) 2.836 x 10⁻⁸ cm

PRACTICE: An element crystallizes in a face-centered cubic lattice and has a density of 18.44 g/cm³. The edge of its unit cell is 1.05×10⁻⁸ cm. Calculate the atomic mass for the element.

a) 3.21 g•mol⁻¹   b) 15.5 g•mol⁻¹   c) 60.8 g•mol⁻¹   d) 151 g•mol⁻¹