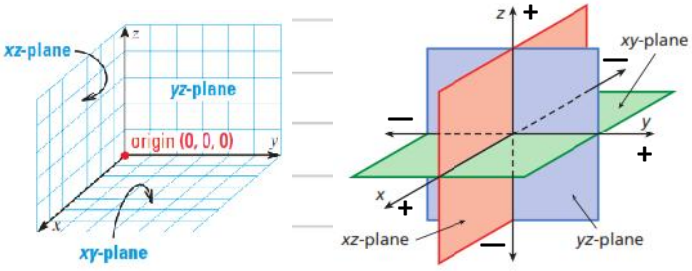
- You can represent any location in three-dimensional space using a **three-dimensional coordinate system**, sometimes called ***coordinate space***.

- Each point in coordinate space can be represented by an **ordered triple** of the form (x, y, z). The system is similar to the coordinate plane but has an additional coordinate based on the ***z*-axis** . Notice that the axes form three planes that intersect at the origin.



Graphing Points in Three Dimensions

Ex) Graph each point in three-dimensional space.

1)
a) A (2, 3, -2)
b) B (-1, 1, 2)
c) C (-3, -3, 0)

2)
a) D (1, 3, -1)
b) E (1, -3, 1)
c) F (0, 0, 3)

Graphing Linear Equations in Three Dimensions

Ex) Graph the given linear equation in three-dimensional space.

1) $3x+4y+2z=12$

2) $x-4y+2z=4$

Real-World Application

Ex) A computer game uses a role-playing scenario in which players build civilizations. Each player begins with 100 gold coins to buy resources. The players then compete for the survival of their civilizations. Each unit of food costs 2 gold coins, wood costs 4 gold coins, and stone costs 5 gold coins.

1) Write a linear equation in three variables to represent this situation.
Let f = units of food, w = units of wood, and s = units of stone

cost of food	cost of wood	cost of stone	100 gold pieces

2) Use the table to find the number of units of stone each player can buy.

Player	Units of Food	Units of Wood	Units of Stone
Bonnie			
Chad			
Federico			
LaToya			

3) Write the conclusion in context.

Bonnie can purchase ___ units of stone, Chad can purchase ___ units, Federico can purchase ___ unit, and LaToya can purchase ___ units.