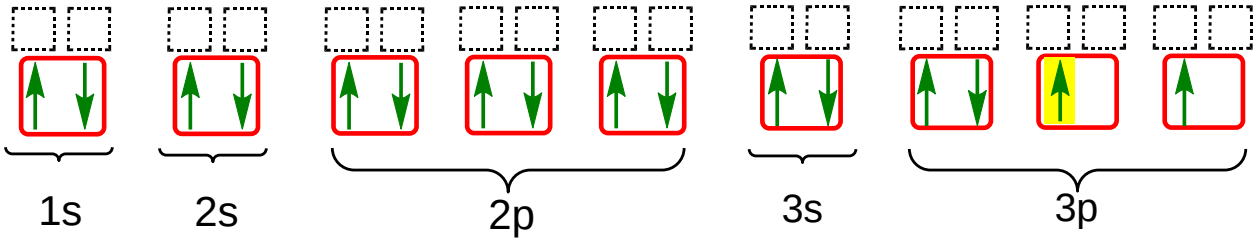
CONCEPT: THE ELECTRON CONFIGURATION: QUANTUM NUMBERS

Counting Electrons

- Electrons within configurations are numbered in the order they are written based on the Auf Bau Principle.

EXAMPLE: Determine the number of the electron highlighted within the electron orbital diagram.



Quantum Numbers

- A set of values that describe the energy levels and ultimately the location of a specific electron.

Quantum Numbers Overview

Quantum Number	Variable	Description	Application
Principal	n	**SIZE** and **ENERGY** of a shell	**7**d orbitals n = ___
Angular Momentum (Azimuthal)	l	**SHAPE** of an orbital within a subshell	**Subshell** s p d f; **l value**
Magnetic	m_l	**LOCATION** of electrons in a set of orbitals	▢ ▢ ▢ ▢ ▢
Spin	m_s	**SPIN** of electron in an orbital	Electron spin ___ m_s = ____ Electron spin ___ m_s = ____

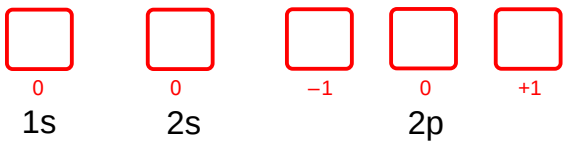
EXAMPLE: Give the set of four quantum numbers for the 6th electron of the oxygen atom.

STEP 1: Provide the electron orbital diagram for the element or ion.

STEP 2: Use the number and letter for the set of orbitals to determine its _____ and _____ values.

STEP 3: Locate the specific orbital for the electron to determine its _____ value.

STEP 4: Determine if the electron spins up or spins down to determine its _____ value.



CONCEPT: THE ELECTRON CONFIGURATION: QUANTUM NUMBERS

PRACTICE: Give the set of four quantum numbers that represent the indicated electron in each of the following elements.

Mg (7^{th} electron)

PRACTICE: Give the set of four quantum numbers that represent the indicated electron in each of the following elements.

Cl^- (18^{th} electron)

PRACTICE: Give the set of four quantum numbers that represent the indicated electron in each of the following elements.

Cr^{3+} (21^{st} electron)