

## **Bell Ringer #14:**

Socratic Room Name:  
**LEVEL70WARRIOR**

# **Electron Configuration**

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Page 1

# **Agenda**

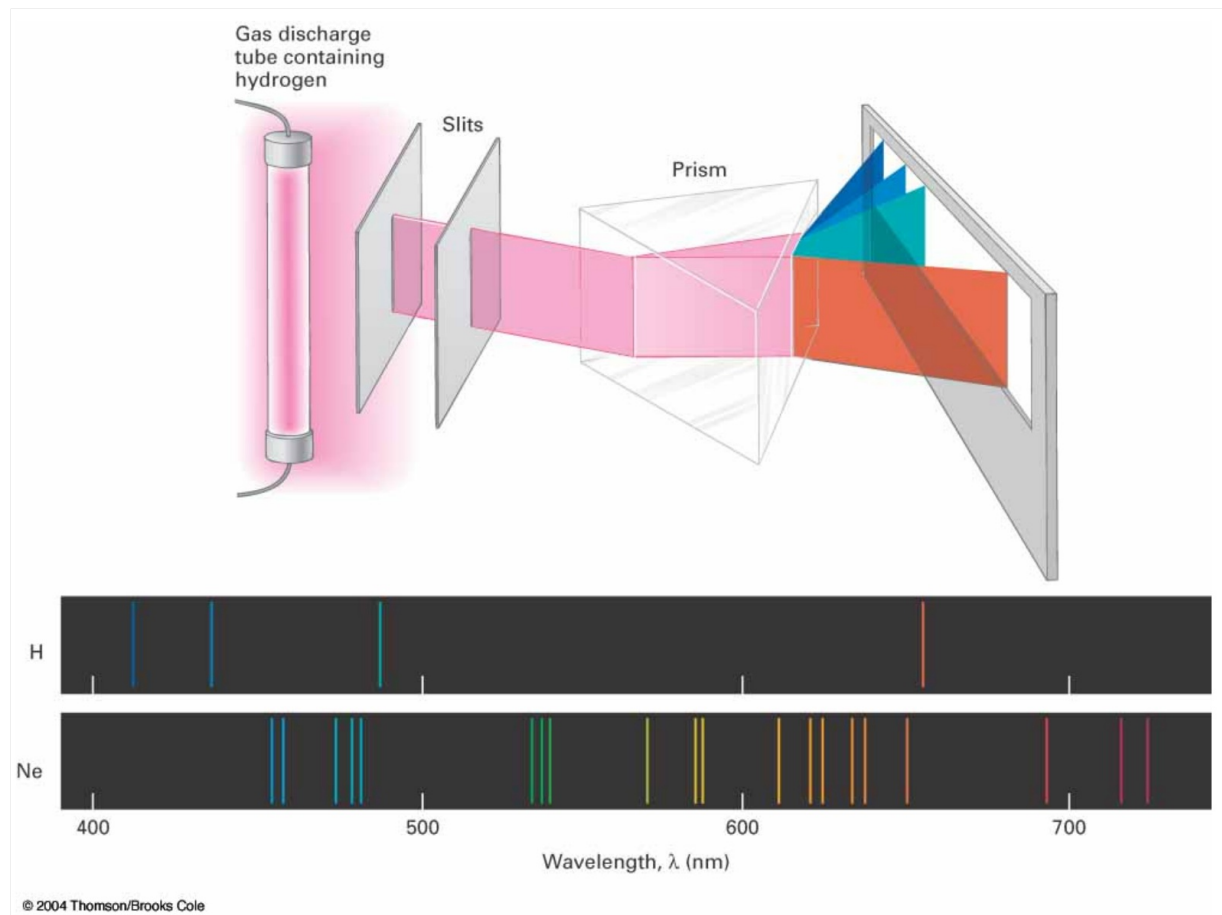
**Bell Ringer**  
**Electron Configuration Notes**  
**Exam 2 (55 minutes)**  
**Electron Configuration Homework**  
**Exit Ticket**

Page 2

## Electron Configuration (Notes)

- Individual atoms give off light when heated or otherwise excited energetically, thereby providing a clue to their atomic structure.

Page 3



Page 4

## Atomic Theory Timeline (Ancient Times)

Moses (**Hebrew**):

Atoms originally known as "dust"

(~3300 years ago)

- And the Lord God formed man *of* the **dust** of the ground, and breathed into his nostrils the breath of life; and man became a living being.

Democritus (**Greek**):

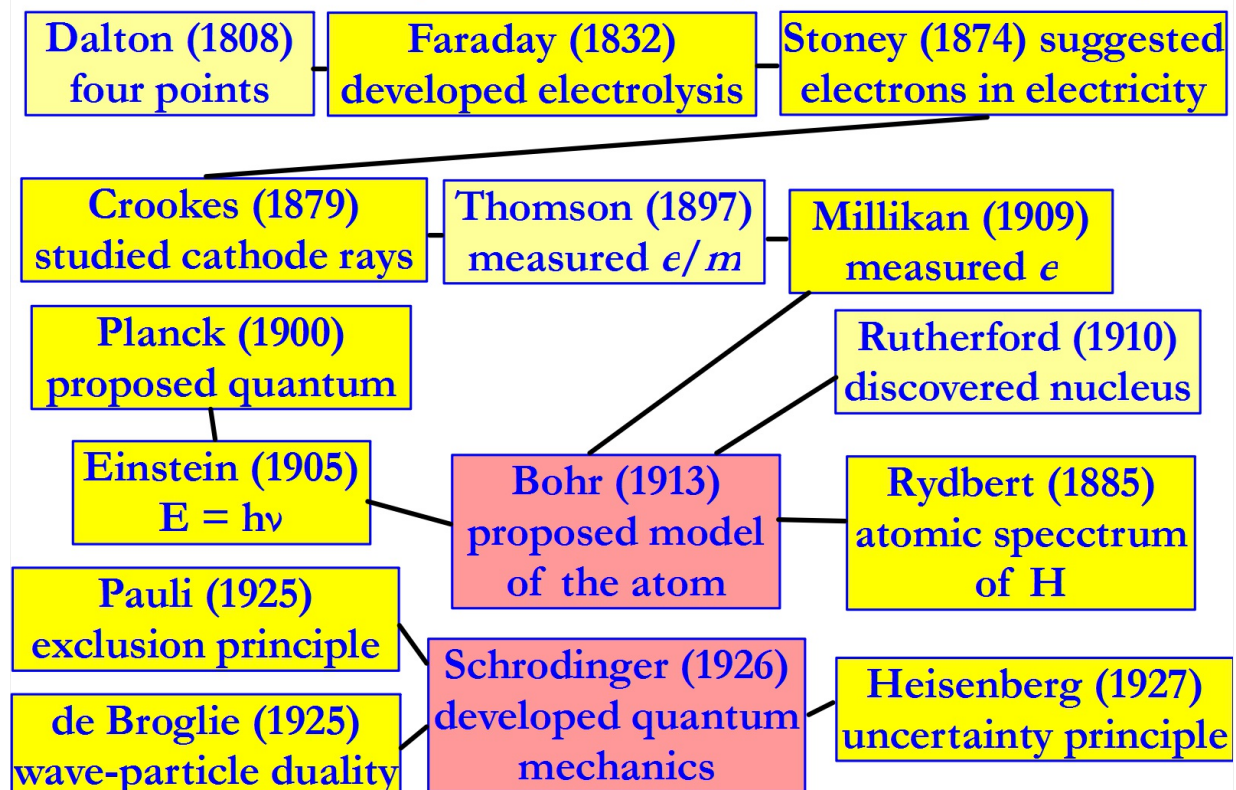
Proposed the "atomos"

(~2450 years ago)

- He proposed that matter could NOT be divided into smaller pieces forever.
- He claimed that matter was made of small, hard particles that he called "atomos"

Page 5

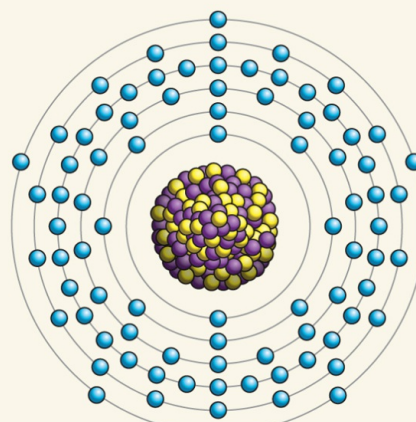
## Atomic Theory Timeline (Modern Times)



Page 6

## Bohr's Model

- Electrons do not randomly orbit the nucleus
- Electron move in specific layers
- Atoms absorb or give off energy when electrons move from one level to another



"Onion Model"

## Quantum Model

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JWW  
11=11

THE spdf ORBITALS (An artistic rendition)			
TYPE	SET	INDIVIDUAL ORBITALS	COLLECTIVE
f	Cubic		
	General		
d	Common		
	"Tri-torus"		
p			
s			



## Electron Configuration

- The distribution of electrons in orbitals around the nucleus.

## Aufbau Principle

- German term for "building up"
- Electrons occupy the orbitals of lowest energy first

Page 9

## Pauli Exclusion Principle

- An atomic orbital may hold no more than two electrons
- To occupy the same orbital, two electrons must have opposite spins; that is, the electron spins must be paired

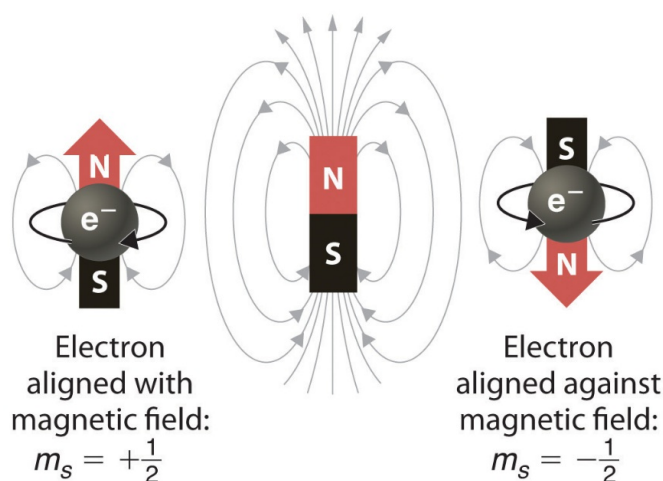
## Hund's Rule

- Electrons are distributed in subshells of orbitals of identical energy in such a way as to give the maximum number of unpaired electrons.

Page 10

## Spin

- Two experiments in the 1920s indicated electrons have an intrinsic angular momentum and a magnetic moment. Classically this could occur if the electron were a spinning ball of charge, and this property was called electron spin.

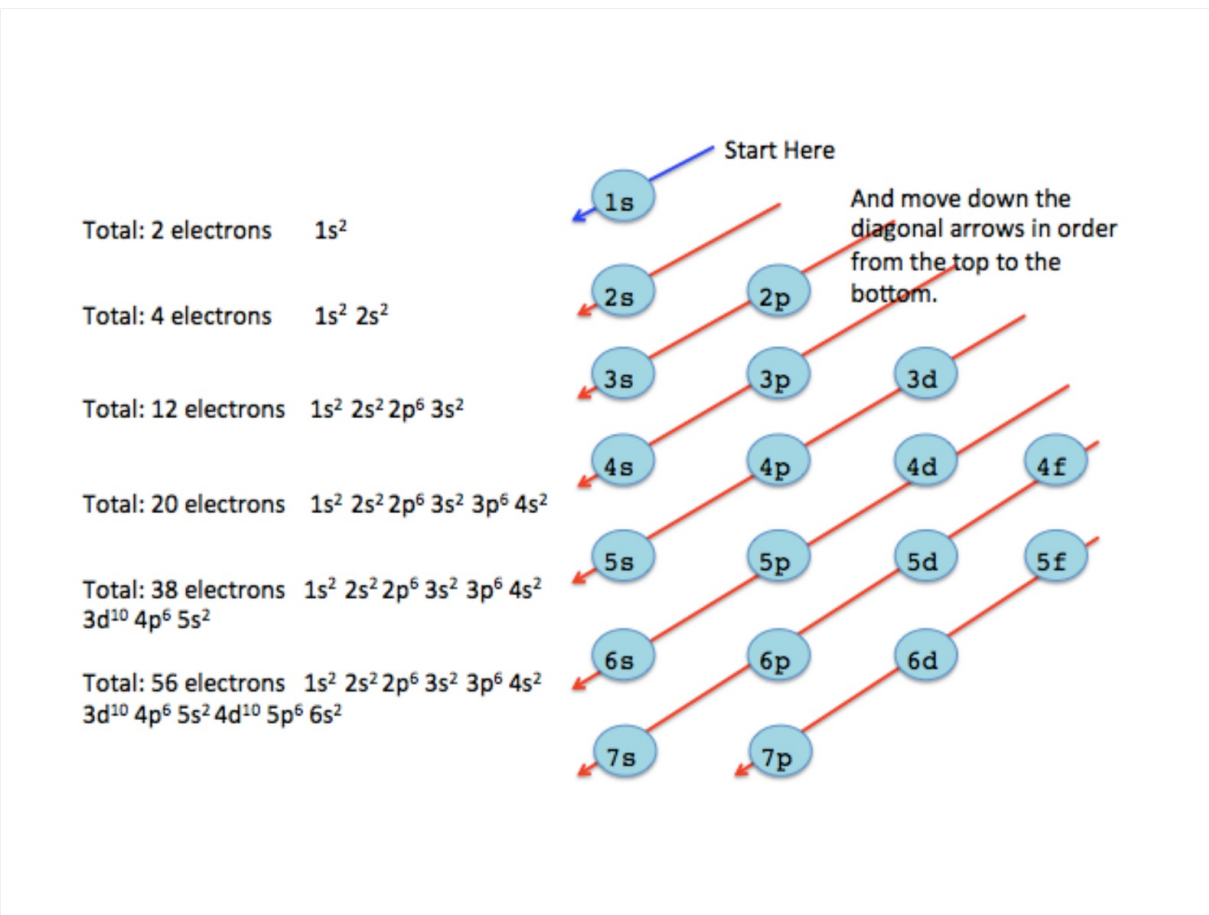
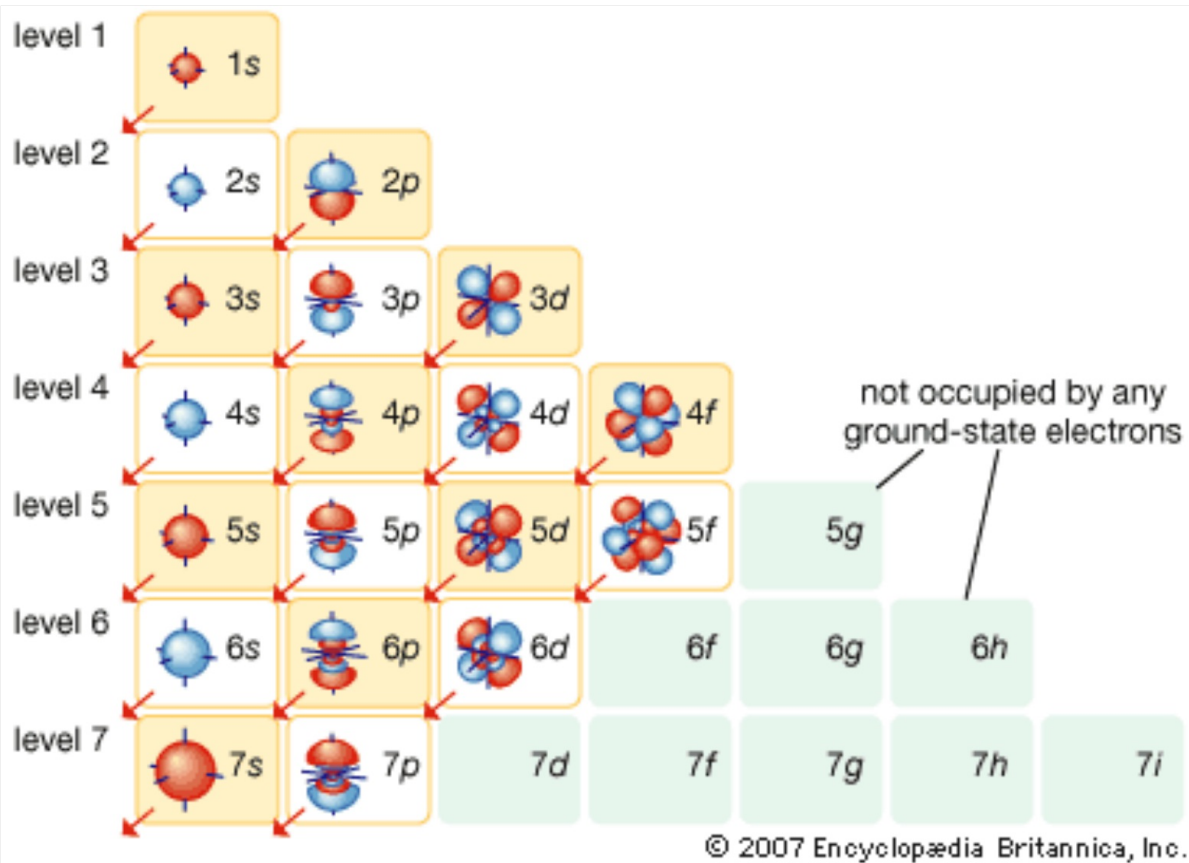


Page 11

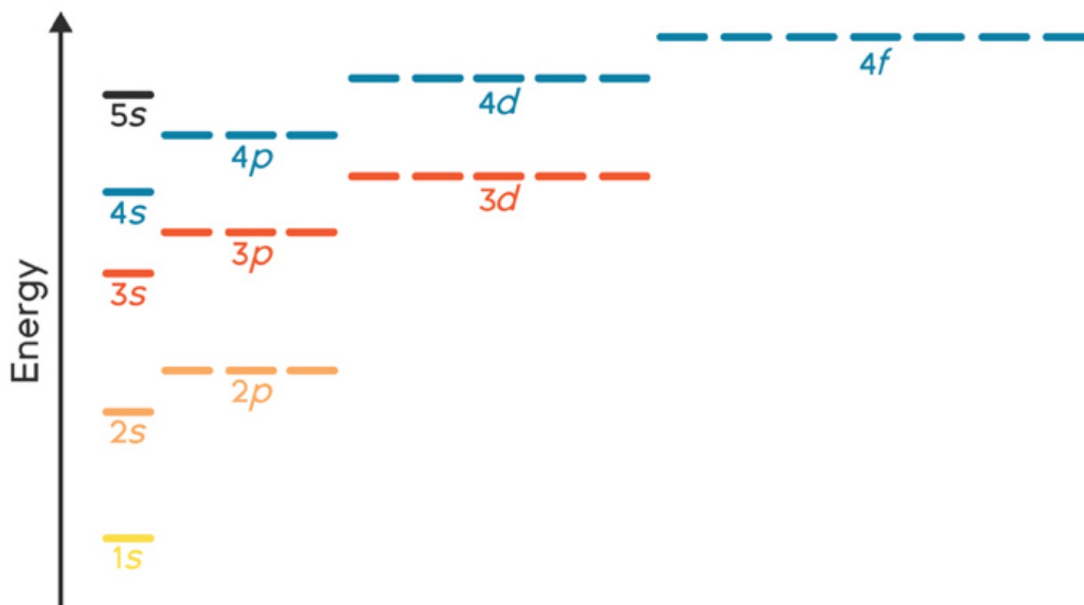
## Electron Configuration and Orbital Diagrams

Element	Total Electrons	Orbital Diagram				Electron Configuration
		1s	2s	2p	3s	
H	1	↑				1s <sup>1</sup>
He	2	↑↓				1s <sup>2</sup>
Li	3	↑↓	↑			1s <sup>2</sup> 2s <sup>1</sup>
Be	4	↑↓	↑↓			1s <sup>2</sup> 2s <sup>2</sup>
B	5	↑↓	↑↓	↑		1s <sup>2</sup> 2s <sup>2</sup> 2p <sup>1</sup>

Page 12



			1s	2s	2p
Lithium	Li	$1s^2 2s^1$	$\uparrow\downarrow$	$\uparrow$	$\square \square \square$
Beryllium	Be	$1s^2 2s^2$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\square \square \square$
Boron	B	$1s^2 2s^2 2p^1$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow \square \square$
Carbon	C	$1s^2 2s^2 2p^2$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow \uparrow \square$
Nitrogen	N	$1s^2 2s^2 2p^3$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow \uparrow \uparrow$
Oxygen	O	$1s^2 2s^2 2p^4$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow \uparrow \uparrow$
Fluorine	F	$1s^2 2s^2 2p^5$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow \uparrow\downarrow \uparrow$
Neon	Ne	$1s^2 2s^2 2p^6$	$\uparrow\downarrow$	$\uparrow\downarrow$	$\uparrow\downarrow \uparrow\downarrow \uparrow\downarrow$





# Electron Configuration Homework

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Page 17

**Exit Ticket #14:**

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## Electron Configuration

Page 18

