

32.1 Atomic Orbitals

Chemistry

Summarize main points from each video.

Video Title / topic _____

Video Title / topic _____

Video Title / topic _____

Topic Introduction



Summarize your understanding of each paragraph.

s, p, d, f and so on are the names given to the orbitals that hold the electrons in atoms. These orbitals have different shapes and energies.

A block of the periodic table of elements is a set of adjacent groups. The respective highest-energy electrons in each element in a block belong to the same atomic orbital type. Each block is named after its characteristic orbital; thus, the blocks are: s-block

The most common way to describe electron configurations is to write distributions in the spdf notation. Although the distributions of electrons in each orbital are not as apparent as in the diagram.

The s, p, d, and f stand for sharp, principal, diffuse and fundamental, respectively. The letters and words refer to the visual impression left by the fine structure of the spectral lines which occurs due to the first relativistic corrections, especially the spin-orbital interaction.

Read/Summarize Text



1. Read the passage.
2. Underline key expressions in each sentence.
3. Re-write each word (or expression) you underlined.
4. Summarize the passage.

S and P blocks

The s-block elements include hydrogen (H), helium (He), lithium (Li), beryllium (Be), sodium (Na), magnesium (Mg), potassium (K), calcium (Ca), rubidium (Rb), strontium (Sr), cesium (Cs), barium (Ba), francium (Fr) and radium (Ra). The periodic table shows exactly where these elements are within the s-block.

The p-block elements are found on the right side of the periodic table. They include the boron, carbon, nitrogen, oxygen and flourine families in addition to the noble gases. The noble gases have full p-orbital's and are nonreactive. p block orbital.

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Re-write words you underlined

Using a complete sentence, summarize or rephrase the passage

Read Text for Comprehension

Read this article for deeper understanding. No summary is required, although you may want to circle, underline, or mark key ideas and words.

Atomic orbital

In quantum mechanics, an atomic orbital is a mathematical function that describes the wave-like behavior of either one electron or a pair of electrons in an atom. This function can be used to calculate the probability of finding any electron of an atom in any specific region around the atom's nucleus. The term atomic orbital may also refer to the physical region or space where the electron can be calculated to be present, as defined by the particular mathematical form of the orbital.

Each orbital in an atom is characterized by a unique set of values of the three quantum numbers n , ℓ , and m , which respectively correspond to the electron's energy, angular momentum, and an angular momentum vector component (the magnetic quantum number). Each such orbital can be occupied by a maximum of two electrons, each with its own spin quantum number s . The simple names s orbital, p orbital, d orbital and f orbital refer to orbitals with angular momentum quantum number $\ell = 0, 1, 2$ and 3 respectively.

These names, together with the value of n , are used to describe the electron configurations of atoms. They are derived from the description by early spectroscopists of certain series of alkali metal spectroscopic lines as sharp, principal, diffuse, and fundamental.

Orbitals for $\ell > 3$ continue alphabetically, omitting j (g, h, i, k, ...) because some languages do not distinguish between the letters "i" and "j".

Draw Illustration



Copy and Label the Illustration in the Space Provided

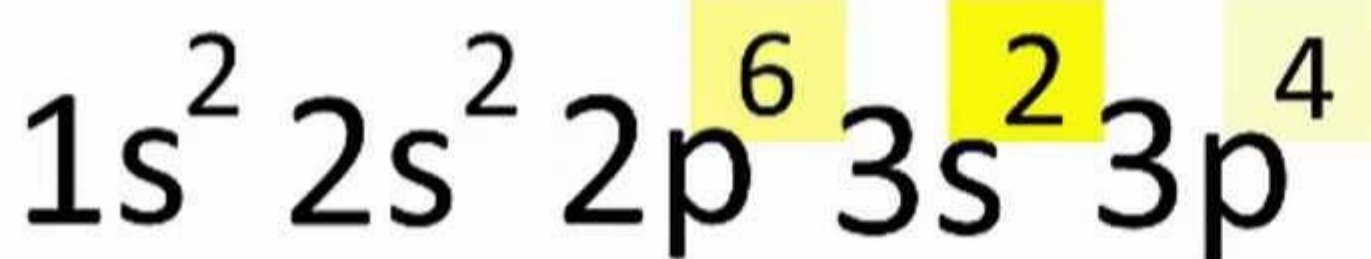
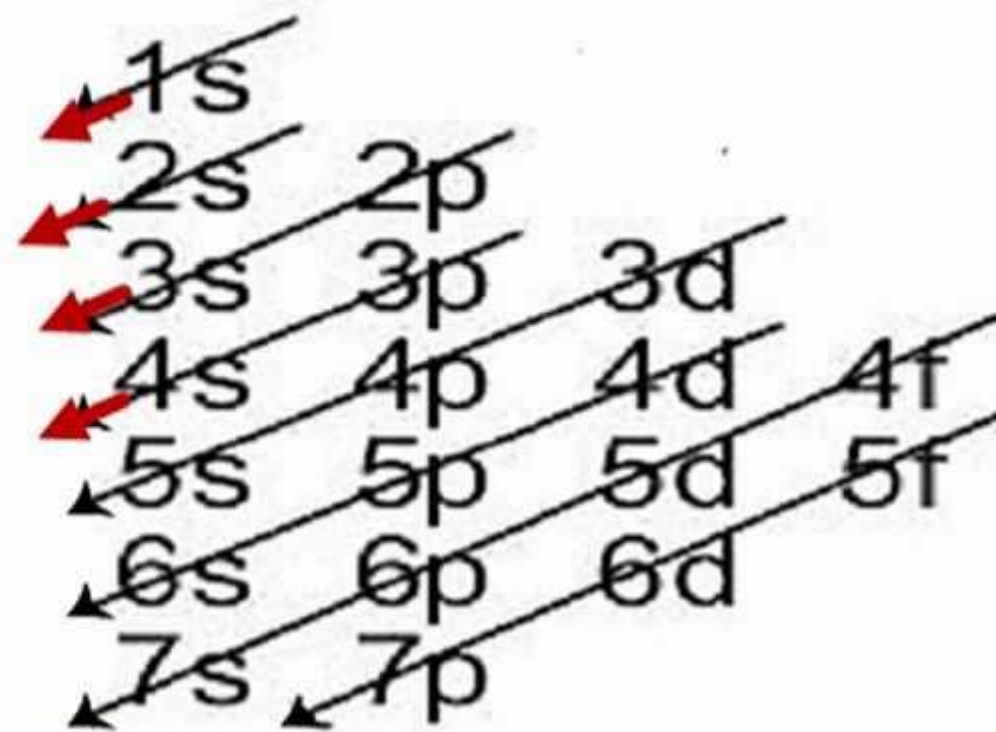
Electron Configuration Chart

s holds up to 2

p holds up to 6

d holds up to 10

16
S
Sulfur
32.07



<https://i.ytimg.com/vi/xJrkyoolgbl/maxresdefault.jpg>

Draw (Copy) the Illustration Here

Interpret a Graph



Write the title of the graph _____

Circle the type of chart this represents

Bar Chart Line Chart Pie Chart Other

If applicable,

What does the X-axis represent _____

What does the Y-axis imply _____

Summarize what this graph represents or conveys

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Quantum Numbers, Atomic Orbitals

	IA								VIII A
1	1s	II A							1s
2	2s							2p	
3	3s							3p	
4	4s			3d				4p	
5	5s			4d				5p	
6	6s			5d				6p	
7	7s			6d					
								4f	
								5f	

Show-Off Your Smarts!



Instructions

- Complete as an individual or small group.
- Discuss your ideas/answers/responses in a small group.
- Select one person to present your responses to the class.

Q1. How can this information be applied to a young-person's life?

Q2. How does this information apply to (or impact) communities?

Q3. When do scientists need to apply this information? How?

Q4. How would a person from 100 years ago view this information?

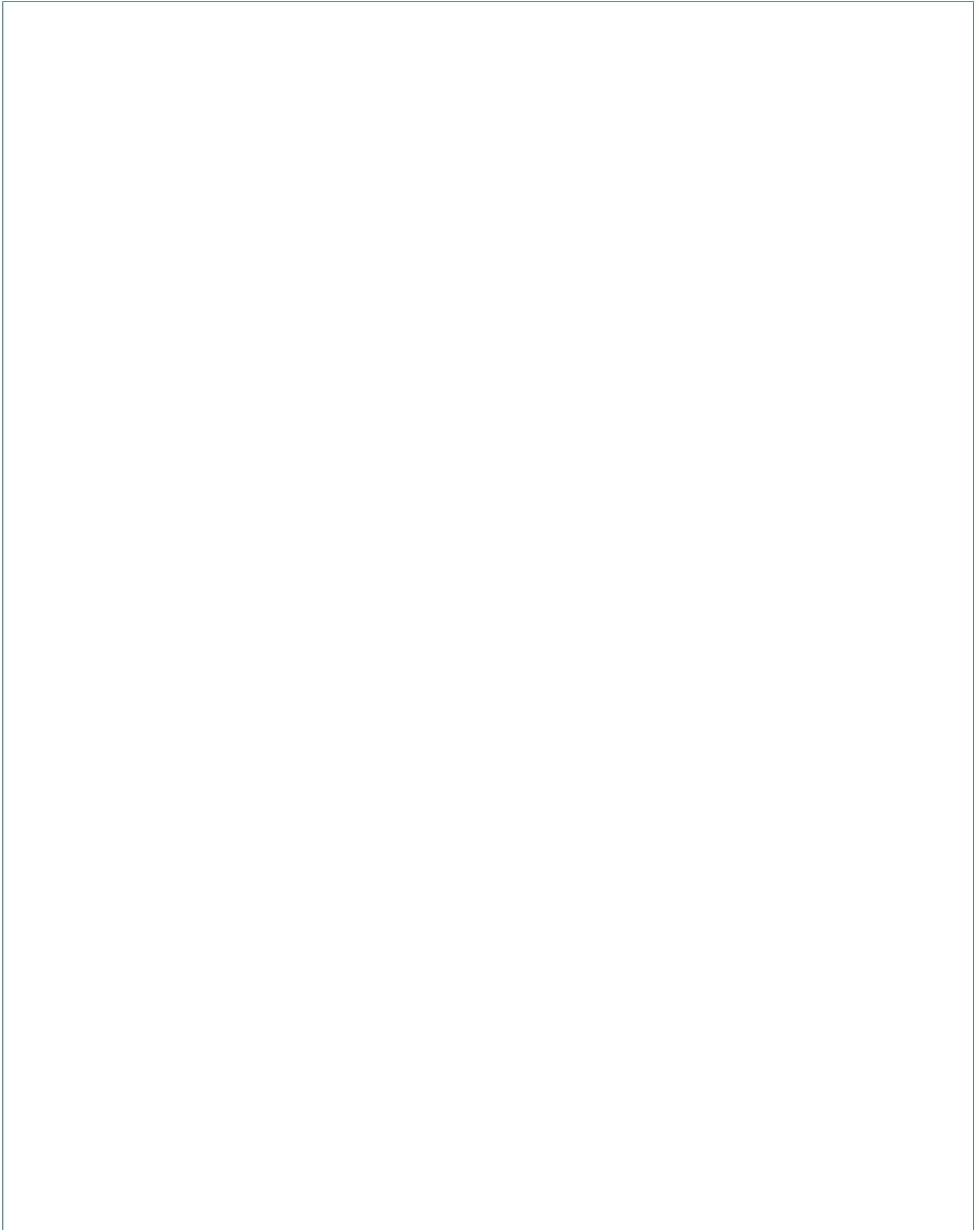
Q5. How does this topic connect to other science topics or math?

Write down at least three words introduced or covered by this topic.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.

Make a Poster

In the space provided here, create/draw a poster which conveys the concepts you have learned on this topic.

A large, empty rectangular box with a thin blue border, intended for the student to create a poster. The box occupies the majority of the page below the instructions.