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11. No. Two arrows pointing in the same direction would indicate that two electrons in the same orbital have the same spin quantum number. This violates the Pauli exclusion principle that no two electrons can have the same four quantum numbers.

12. a.

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13. Orbitals fill in order of increasing energy. At energy levels above n = 3, the different sublevels overlap. As a result, the 5s orbital has a lower energy than the 4d orbitals.

14. boron: 1s²2s²2p¹

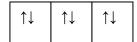
[He] $2s^22p^1$ neon: $1s^22s^22p^6$ [He] $2s^22p^6$

15. $1s^22s^22p^63s^23p^4$

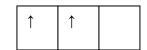
16.











17. a. sodium: 1s²2s²2p⁶3s¹

b. vanadium: 1s²2s²2p⁶3s²3p⁶4s²3d³

18. titanium: [Ar]4s²3d²