**🎯 Activity 3: 🔄 Drag & Drop – “Complete the Diagram”**

**📘 CBC Learning Objective:**  
Construct visual representations of atoms by arranging electrons in the correct energy levels based on given electron configurations.

**🎙️ Activity Introduction 🎤**

**Narration:**  
"Get ready to build atoms! Your mission is to drag electrons into the correct shells based on the atomic configuration provided. Follow the shell filling rules: the first shell holds 2, the second holds 8, and the third also holds up to 8. Let us complete these atoms together!"

**👨‍💻 Developer Guide Instructions**

* **Structure:**
  + Provide a base template of an atom: a nucleus and 3 concentric shell rings.
  + Display draggable electron icons (⚪ or ×).
  + Provide the target electron configuration on-screen (e.g., "2.5").
  + Lock drag zones to shell rings (drop zones).
  + Snap electrons to orbit and count placements.
  + Include **Check My Atom** and **Try Again** buttons.
* **Visuals to Include:**
  + Blank atom shell diagram: centre nucleus + 3 energy levels.
  + Electron tokens with drag-and-drop interactivity.
  + [Optional] SFX: soft drag, click, and “correct” confirmation chime.

**📋 Learner Instructions (On-Screen)**

1. Read the electron arrangement shown.
2. Drag the correct number of electrons onto each shell.
3. Click **Check My Atom** to receive feedback.

**💡 Hint Panel (On-Screen)**

**Electron Shell Rules:**

* Shell 1 → maximum 2 electrons
* Shell 2 → maximum 8 electrons
* Shell 3 → maximum 8 electrons
* Fill shells from the inside out.

**Examples:**

* Oxygen (2.6) → Oxygen has 8 electrons. First shell fills first.
* Nitrogen (2.5) → Nitrogen has 7 electrons. Start with 2 in the first.
* Neon (2.8) → Neon is a stable gas. Fill both shells completely.
* Fluorine (2.7) → Fluorine needs just one to fill the outer shell!

**🧪 Activity Content and Facilitative Feedback**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Element** | **Electron Arrangement** | **Hint (On-Screen Prompt)** | **Correct Feedback** | **Incorrect Feedback Examples** |
| Oxygen | 2.6 | Oxygen has 8 electrons. First shell fills first. | ✅ Great work! You placed each electron where it belongs. | ❌ If 3 in 1st shell: The first shell only holds 2 electrons. Move extras to the next level. ❌ If fewer than 8 total: Recount your total electrons. You may have left some behind. ❌ If 3rd shell used: Shells must be filled from the inside out. |
| Nitrogen | 2.5 | Nitrogen has 7 electrons. Start with 2 in the first. | ✅ Correct! Your placement matches nitrogen’s electron structure. | ❌ If 1st shell incomplete: Always fill the first shell before the second. ❌ If total is not 7: Check the atomic number and count again. ❌ If 3rd shell used: The third shell is not needed for nitrogen. |
| Neon | 2.8 | Neon is a stable gas. Fill both shells completely. | ✅ Perfect! Neon’s configuration is 2.8, making it stable. | ❌ If less than 8 in 2nd shell: A full second shell for neon must have 8 electrons. ❌ If 3rd shell used: Neon does not require a third shell. ❌ If 1st shell not full: Always fill from the first shell outwards. |
| Fluorine | 2.7 | Fluorine needs just one to fill the outer shell! | ✅ Correct! Fluorine has 2 in the first shell and 7 in the second. | ❌ If 2nd shell full at 8: That would make it neon, not fluorine. ❌ If fewer than 7 in 2nd shell: Check the total — fluorine has 9 electrons. ❌ If 3rd shell used: Fluorine only needs two shells. |

**🎙️ Activity Conclusion 🎤**

**Narration:**  
"Well done, atom builder! Your diagram now shows how electrons are arranged in real atoms. Remember: electrons always fill from the lowest energy level up. You are now one step closer to mastering atomic structure!"