**🎯 Activity 4: 🔍 Outer Shell Detective – “Click the Clue”**

**🎙️ Activity Introduction**   
"Every element hides its identity in its outer shell. In this challenge, put on your detective cap and examine different atomic diagrams. Click the outermost shell to uncover what type of element it is. The number of valence electrons will help you decide—metal, non-metal, noble gas, or metalloid!"

**👨‍💻 Developer Guide Instructions**

* **Type:** Clickable Hotspot / Reveal Interaction.
* **Interface Layout:**
  + Show each atom diagram (dot/cross diagrams) one at a time.
  + Highlight the outermost shell with a subtle glow or ring.
  + Clicking the highlighted shell reveals the explanation.
* **Elements to Include:** Sodium (2.8.1), Chlorine (2.8.7), Silicon (2.8.4), Helium (2), Magnesium (2.8.2), Neon (2.8), Carbon (2.4).
* **Audio:** Click sound + reveal narration.

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

1. Look at the given atomic diagram.
2. Click the **outermost shell** to reveal the classification explanation.
3. Read the explanation to learn how valence electrons determine the element’s type.

**💡 Hint Panel (On-Screen)**

**Classification Reminders:**

* **Metals:** 1–3 valence electrons, tend to lose electrons.
* **Non-metals:** 5–7 valence electrons, tend to gain electrons.
* **Noble gases:** Full outer shells, very stable and unreactive.
* **Metalloids:** Often have 4 valence electrons, showing properties of both metals and non-metals.

**🧪 Clickable Elements & Facilitative Feedbacks**

**🔸 Element: Na (2.8.1)**

**Click Hotspot:** Outermost shell  
**Revealed Feedback:**  
“1 electron in the outer shell. This means sodium is a **metal**. Metals usually have 1 to 3 valence electrons, making them good at losing electrons in reactions.”

**🔸 Element: Cl (2.8.7)**

**Click Hotspot:** Outermost shell  
**Revealed Feedback:**  
“7 valence electrons—almost a full shell! This makes chlorine a **non-metal**. Non-metals typically have 5 to 7 outer electrons and gain electrons easily.”

**🔸 Element: Si (2.8.4)**

**Click Hotspot:** Outermost shell  
**Revealed Feedback:**  
“4 electrons in the outer shell. That is right in the middle! This makes silicon a **metalloid**, showing both metal and non-metal properties.”

**🔸 Element: He (2)**

**Click Hotspot:** Outer shell (only one shell)  
**Revealed Feedback:**  
“2 electrons, which completely fills the first shell. Helium is a **noble gas**, very stable and non-reactive.”

**🔸 Element: Mg (2.8.2)**

**Click Hotspot:** Outer shell  
**Revealed Feedback:**  
“2 electrons in the outer shell. That classifies magnesium as a **metal**. It easily loses electrons to form positive ions.”

**🔸 Element: Ne (2.8)**

**Click Hotspot:** Outer shell  
**Revealed Feedback:**  
“A full outer shell with 8 electrons. Neon is a **noble non-metal**—it does not react easily due to its stability.”

**🔸 Element: C (2.4)**

**Click Hotspot:** Outer shell  
**Revealed Feedback:**  
“4 valence electrons. Carbon is a **non-metal**, but with its 4 outer electrons, it can form many types of bonds.”

**🎙️ Activity Conclusion**   
"Fantastic detective work! You examined outer shells and used valence electrons to unlock each element’s identity. This skill helps scientists predict element behaviour and how they interact with others in chemical reactions."