**🎯 Activity 4: 🦸 Mini-Game – “Soft Water Hero”**

**🎙️ Activity Introduction**

"Hard water problems in the home? 💧 Become a Soft Water Hero! In each situation, choose the correct softening method. Think like a chemist and fix the issue fast!"

**🛠 Developer Guide Instructions**

* Display **3 animated household scenarios** vertically.
* Each scenario should have **three clickable method buttons**: 🔥 Boiling, 🧂 Washing Soda, 💧 Distillation.
* Give **instant correct and incorrect facilitative feedback** when a learner selects an answer.
* Use subtle animations for each scenario outcome (e.g., kettle boiling, soap lathering, distillation in lab).
* Enable a replay button for retrying the activity.
* Unlock a badge if all answers are correct.

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

* "Read each household problem carefully."
* "Click the best method to soften the water in that situation."
* "Pay attention to whether the hardness is temporary or permanent."

**💡 Hints (On-Screen)**

* "Boiling only removes temporary hardness."
* "Washing soda reacts with calcium ions to make water soft."
* "Distillation gives the purest water by removing all dissolved solids."

**📜 Activity Content – Scenarios and Feedbacks**

**🏠 Scenario 1: The kettle has a white chalky coating.**

**Choices:**

* 🔥 Boiling ✅
  + ✅ "Correct! Boiling removes temporary hardness by turning calcium bicarbonate into an insoluble solid."
* 🧂 Washing Soda
  + ❌ "Try again. Washing soda works, but boiling is faster for temporary hardness in kettles."
* 💧 Distillation
  + ❌ "Distillation would work, but is unnecessary for simple kettle scale. Use boiling first."

**🧼 Scenario 2: Soap refuses to lather during laundry.**

**Choices:**

* 🧂 Washing Soda ✅
  + ✅ "Correct! Washing soda reacts with calcium ions and makes the water soft for soap to work."
* 🔥 Boiling
  + ❌ "Boiling only removes temporary hardness. This might be permanent hardness."
* 💧 Distillation
  + ❌ "Too expensive for washing clothes. Try washing soda instead."

**🧪 Scenario 3: The school lab needs completely pure water for an experiment.**

**Choices:**

* 💧 Distillation ✅
  + ✅ "Correct! Distillation removes all dissolved solids and gives pure water."
* 🔥 Boiling
  + ❌ "Boiling does not remove all impurities. Distilled water is required for lab use."
* 🧂 Washing Soda
  + ❌ "Washing soda removes hardness but not all minerals. Not suitable for lab-grade purity."

**🎙️ Activity Conclusion**

"Excellent decisions! You chose the right softening method for each situation. Hard water does not stand a chance when you are around!"

**✅ Key Takeaways:**

* **Temporary hardness removal:** Boiling (breaks hydrogen carbonates) or adding sodium carbonate (precipitates Ca/Mg).
* **Permanent hardness removal:** Sodium carbonate, calcium hydroxide, or distillation.
* **Methods:** Boiling/distillation = physical; chemical softening = reactions.
* **Practical tip:** Washing soda is cheap and widely available (e.g., Lake Magadi).