**🎓 Activity 1: 🧪 Virtual Lab – “Rusting Race”**

**🎙️ Activity Introduction**

"You are now a virtual lab assistant. Your task is to test how iron nails rust under different conditions. Set up each test tube with different combinations of air, water, and salt. Predict, then observe the results. Let the Rusting Race begin!"

**👨‍💻 Developer Guide Instructions**

* **Type**: Virtual Experiment / Simulation
* **Set-Up**:
  + 5 clickable animated test tubes labelled A–E.
  + Learner selects conditions (air, water, salt water, sealed).
  + Prediction step before starting reaction.
* **Interaction**:
* Learner drags and drops the correct materials into the test tube.
* Learner predicts outcome by choosing from prediction icons.
* Learner clicks **“Start Reaction”** to animate rusting process.
* After animation, result appears with facilitative feedback.

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

1. Select a test tube.
2. Drag and drop the correct materials into it.
3. Choose your prediction icon.
4. Click **“Start Reaction”** to see the results.
5. Compare your prediction with what happens in the experiment.

**💡 Hints (On-Screen)**

* “Rust forms when iron reacts with oxygen and water together.”
* “Sealing or removing one ingredient (air or water) stops rust.”
* “Salt speeds up rusting—think about sea water!”

**🧪 Activity Content – Test Tube Conditions & Expected Results**

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| --- | --- | --- | --- |
| **Test Tube** | **Condition** | **Expected Rusting Outcome** | **Icon Summary** |
| **A** | Air only | ❌ No Rust | 🌫️ No moisture present |
| **B** | Water only (sealed, no air) | ❌ No Rust | 💧 No oxygen present |
| **C** | Air + Water | ✅ Rust | 🌫️ + 💧 Rusting occurs |
| **D** | Salt Water + Air | ✅⚡ Fast Rust | 🧂 + 💧 + 🌫️ Salt accelerates rust |
| **E** | Sealed, oil-covered water | ❌ No Rust | 🔒 Air blocked by oil |

**💬 Facilitative Feedback for Each Prediction & Observation**

**Test Tube A – Air only (🌫️)**

* ✅ “Great thinking! Without water, rusting does not happen.”
* ❌ “Not quite. Air alone cannot cause rust—moisture is also needed.”

**Test Tube B – Water only (💧)**

* ✅ “Spot on! Without air (oxygen), the nail stays rust-free.”
* ❌ “Water alone is not enough. Air must be present too.”

**Test Tube C – Air + Water (🌫️ + 💧)**

* ✅ “Correct! Both air and water together cause rust to form.”
* ❌ “Think again. Rusting always needs both moisture and air.”

**Test Tube D – Salt Water + Air (🧂 + 💧 + 🌫️)**

* ✅ “Excellent! Salt speeds up the rusting process greatly.”
* ❌ “Missed it! Salt in water makes iron rust even faster.”

**Test Tube E – Sealed with oil (🔒)**

* ✅ “Yes! Blocking air prevents the rusting reaction.”
* ❌ “Try again. Oil seals off oxygen, so no rust forms.”

**🎙️ Activity Conclusion**

“You completed the rusting race like a true scientist! You now understand that rusting only occurs when both air and water are present—and how salt can make it worse. Great job controlling variables and predicting outcomes!”