📍 **Station 1: Reaction in Action – Disinfecting Wounds**  
**Focus:** Chemical Reactions  
**NGSS Standard:** MS-PS1-2

Analyze and interpret data on properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

**Investigation Goal:**

Explore how **hydrogen peroxide** reacts with “tissue” to clean a wound, and identify evidence of a **chemical reaction**.

**Background Info:**

Hydrogen peroxide (H₂O₂) is a common first-aid disinfectant. When it touches living tissue, it breaks down and releases oxygen. This bubbling action **helps clean wounds** by removing dirt and killing some germs.

**Materials:**

 1 small cup (plastic or paper)

 Fresh potato slice or a spoonful of yeast solution (your tissue model)

 Hydrogen peroxide

 Water (as a control)

 Dropper or pipette

 Safety goggles and gloves (recommended)

**Student Directions:**

**Step 1: Test the Reaction**

1. **Place the potato slice** (or 1 tsp of yeast solution) into a small cup.
2. **Add 5–10 drops** of **hydrogen peroxide** onto the potato or yeast using a dropper.
3. **Watch carefully for 30–60 seconds.** What do you notice?
   * Do you see **bubbling** or **fizzing**?
   * Does it make a sound or create foam?
4. **Record your observations** in the chart below.

**Step 2: Compare to Water (Control Group)**

1. In a second cup, place another potato slice (or fresh yeast).
2. Add 5–10 drops of **plain water** instead of hydrogen peroxide.
3. Watch for another 30–60 seconds.
4. Record what happens.

### **Record Your Results:**

| **Test Material** | **What Happened? (bubbles, fizz, nothing?)** | **Chemical Reaction? (Yes/No)** |
| --- | --- | --- |
| Hydrogen Peroxide |  |  |
| Water (Control Test) |  |  |

### Reflect & Analyze:

Answer in complete sentences.

1. **What signs showed that a chemical reaction happened with hydrogen peroxide?**  
   → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. **Why didn’t plain water cause the same reaction?**  
   → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. **Why might this bubbling reaction be helpful in real first aid situations?**  
   → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. **Hydrogen peroxide releases oxygen gas when it reacts. What does that tell you about the kind of change it is (physical or chemical)?**  
   → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

## 📍 **Station 1: Reaction in Action – Disinfecting Wounds**

**NGSS Standard:**

* **MS-PS1-2** – Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.

### ✅ ITEEA STEL Standards – Middle School

**STEL 2E** – The core concepts of technology include systems, resources, requirements, processes, optimization, and trade-offs.  
→ Students compare inputs (peroxide vs. water) and outcomes (bubbling or not) to evaluate reaction effectiveness in a medical context.

**STEL 3F** – Technological products and systems are created to meet human needs and wants.  
→ This investigation links chemistry with real-world first aid applications that meet human health needs.

**STEL 4E** – Materials have different properties that make them useful in different situations.  
→ Students explore the reactivity of hydrogen peroxide and learn how its properties support wound care.

**STEL 8E** – The design process involves defining a problem, generating ideas, testing, and evaluating solutions.  
→ Students engage in testing and analysis to determine which substance causes a visible chemical reaction, simulating part of a design inquiry for medical tools.

**STEL 11F** – Medical technologies allow for the prevention, early detection, and treatment of diseases and disorders.  
→ This lesson directly explores a common medical tool (hydrogen peroxide) and how it interacts with biological materials for wound disinfection.

### ✅ Common Core Math Standards – Middle School

**CCSS.MATH.CONTENT.6.SP.B.4** – Display numerical data in plots on a number line, including dot plots, histograms, and box plots.  
→ Students could extend the experiment by graphing the intensity or frequency of bubbling or timing results.

**CCSS.MATH.CONTENT.6.SP.B.5** – Summarize numerical data sets in relation to the context.  
→ Students record, compare, and interpret observations (e.g., bubbling presence/absence, timing), making inferences from qualitative data.

**CCSS.MATH.PRACTICE.MP2** – Reason abstractly and quantitatively.  
→ Learners interpret the meaning of observed data and relate it to scientific reasoning.

**CCSS.MATH.PRACTICE.MP4** – Model with mathematics.  
→ Students use basic data modeling skills (like tables and comparisons) to identify when a chemical reaction occurs.

### ✅ Summary

This activity reinforces core chemical reaction concepts through a medical lens. It encourages students to analyze cause-effect relationships, interpret real-world data, and evaluate the functional properties of materials. The experiment is an excellent fit for **ITEEA standards** on material use, medical technology, and system processes, while also supporting **Common Core math** through simple data analysis, measurement, and reasoning.