📍 **Station 2: What’s It Made Of? – Synthetic vs. Natural**  
**Focus:** Synthetic Materials & Origins  
**NGSS Standard:** MS-PS1-3

Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

### **Investigation Goal:**

Learn to **identify whether materials are natural or synthetic**, and explore **why synthetic materials are useful** in medical care.

### **Background Info:**

* **Natural materials** come directly from nature (plants, animals, minerals).
* **Synthetic materials** are **man-made** from natural resources using **chemical processes** (like plastic or petroleum jelly).
* Many first aid materials are chosen based on their strength, flexibility, absorbency, or ability to protect wounds.

**Materials:**

 Cotton bandage

 Adhesive bandage (Band-Aid)

 Gauze pad

 Petroleum jelly or antibiotic ointment

 Magnifying glass

 Optional: “What’s It Made From?” info sheet or product label

**Student Directions:**

1. **Use the magnifying glass** to look closely at each material.
   * What’s its texture like?
   * Is it stretchy? Soft? Sticky?
   * Does it remind you of something natural or plastic-like?
2. **Use your sense of touch and observation** to make an educated guess:
   * Was this material made directly from plants or animals (**natural**)?
   * Or was it made in a factory from processed chemicals (**synthetic**)?
3. **Look at product labels or the info sheet** (if provided) to check your guess. If no label is available, write your best guess based on texture, look, and feel.
4. **Complete the table below** with your group.

### 📋 Record Your Observations:

| **Item** | **Natural or Synthetic?** | **What’s it made from (or your best guess)?** |
| --- | --- | --- |
| Cotton Bandage | ☐ Natural ☐ Synthetic | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Adhesive Bandage | ☐ Natural ☐ Synthetic | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Gauze Pad | ☐ Natural ☐ Synthetic | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| Ointment | ☐ Natural ☐ Synthetic | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

### 💬 Reflect & Explain:

1. **Why do we use synthetic materials in first aid instead of only natural ones?**  
   → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
   → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. **Which material surprised you the most? Why?**  
   → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  
   → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. **Think like an engineer!** What would be one natural material you could use to replace something synthetic? Would it work just as well?  
   → \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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**NGSS Standard:**

* **MS-PS1-3** – Gather and make sense of information to describe that synthetic materials come from natural resources and impact society.

### ✅ ITEEA STEL Standards – Middle School

**STEL 1F** – New technologies are developed to solve problems and extend human capabilities.  
→ Students explore how synthetic materials were developed to improve first aid performance.

**STEL 2E** – The core concepts of technology include systems, resources, requirements, processes, optimization, and trade-offs.  
→ Students analyze trade-offs between synthetic and natural materials in terms of comfort, flexibility, and functionality in first aid.

**STEL 3F** – Technological products and systems are created to meet human needs and wants.  
→ This activity shows how first aid products are designed from both natural and synthetic materials to meet healthcare needs.

**STEL 4E** – Materials have different properties that make them useful in different situations.  
→ Central to the activity—students compare properties of each material and relate them to practical use.

**STEL 7E** – Design is a creative process used to develop technological products and systems to solve problems.  
→ In the reflection, students brainstorm alternative materials and evaluate whether they could replace synthetic options.

**STEL 11F** – Medical technologies allow for the prevention, early detection, and treatment of diseases and disorders.  
→ The activity highlights how medical products are engineered for treatment based on material science.

### ✅ Common Core Math Standards – Middle School

**CCSS.MATH.CONTENT.6.SP.B.5** – Summarize and describe data sets in relation to the context in which the data were gathered.  
→ Students organize material observations and classify items, supporting skills in categorization and descriptive analysis.

**CCSS.MATH.PRACTICE.MP2** – Reason abstractly and quantitatively.  
→ Learners evaluate observable traits and deduce material origin using logical reasoning.

**CCSS.MATH.PRACTICE.MP5** – Use appropriate tools strategically.  
→ Students use magnifying glasses and labels as investigative tools, justifying conclusions based on evidence.

**CCSS.MATH.PRACTICE.MP6** – Attend to precision.  
→ Students describe material properties using accurate and relevant vocabulary (e.g., flexible, absorbent, sticky).

### ✅ Summary

This activity allows middle school students to blend science, engineering, and analytical thinking by investigating real-world materials. It aligns with **ITEEA standards** on material properties, design, and medical technology, while reinforcing **Common Core Math** through categorization, reasoning, and observational precision. The exercise promotes an understanding of how synthetic and natural materials are evaluated and selected in technological and healthcare design.