

Dr. You's Blood Lab: Meet the Superheroes in Your Veins!

Materials Needed:

- A clear glass jar or plastic bottle with a lid (a water bottle works great)
- Water
- Vegetable oil or corn syrup (about 1/2 cup)
- Red food coloring
- Small red items (e.g., red craft beads, red lentils, or even red glitter)
- Small white items (e.g., mini marshmallows, white pom-poms, or white beans)
- Small, flat, irregular-shaped items (e.g., small pasta pieces like orzo, or small pieces of torn-up paper)
- Paper, crayons, and markers

Lesson Plan

1. Learning Objectives (The Doctor's Mission)

By the end of this lesson, the student will be able to:

- Identify the four main components of blood: plasma, red blood cells, white blood cells, and platelets.
- Describe the primary job of each blood component using a simple analogy.
- Create a physical model of blood in a jar.
- Apply knowledge of blood cell functions by designing a "Blood Cell Superhero."

Curriculum Alignment: This lesson aligns with elementary life science standards focusing on the structure and function of living organisms (e.g., NGSS 3-LS1-1).

2. The Case File: An Introduction (5 minutes)

Teacher: "Welcome, Doctor! We have a special case today. Our patient feels very tired all the time and gets sick easily. To help them, we first need to understand what makes up healthy blood. Blood is like a team of superheroes flowing through our bodies, each with a very important job. Your mission is to build a model of blood to see this team in action!"

3. The Blood Lab: Hands-On Activity (15 minutes)

In this part, we will build a model of blood. Explain each step as you go.

1. **Create the Plasma:** Pour the vegetable oil or corn syrup into the jar until it's about half full.
 - **Teacher Talk:** "This yellow, thick liquid is our **Plasma**. Plasma is the 'river' that all the blood cells travel in. It carries nutrients and proteins all over the body."
2. **Add the Red Blood Cells:** In a separate cup, mix a few drops of red food coloring into a small amount of water. Pour this red water into the jar. Add the small red beads or lentils.
 - **Teacher Talk:** "These are the **Red Blood Cells**. What do you think they do? Their superpower is carrying oxygen from our lungs to every part of our body, like tiny delivery trucks bringing energy to every house on the street! This is why they are the most common cell in the blood."
3. **Add the White Blood Cells:** Drop a few white marshmallows or pom-poms into the jar. You

need much fewer of these than the red cells.

- **Teacher Talk:** "These are the **White Blood Cells**. They are our body's germ fighters! They act like bodyguards, searching for and destroying nasty germs and viruses that can make us sick."

4. **Add the Platelets:** Sprinkle in the small pasta pieces or torn paper.

- **Teacher Talk:** "These little bits are the **Platelets**. They are the emergency repair crew. If you get a cut, the platelets rush to the spot and stick together to form a clot, like a tiny scab, to stop the bleeding."

5. **Put It All Together:** Screw the lid on tightly and gently shake the jar. Watch how all the different parts mix and float in the plasma. Let it settle and observe the layers.

4. Patient Debrief: Application and Creativity (15 minutes)

Teacher: "Great work, Doctor! Now that you know the team, let's turn them into the superheroes they are. Your task is to choose ONE of the blood components and design its superhero identity."

- **Instructions:** On a piece of paper, ask the student to:
 1. Draw their chosen blood cell as a superhero (e.g., a white blood cell with a shield, a red blood cell with a jetpack).
 2. Give their superhero a cool name (e.g., "General WBC," "Oxygen Flash," "Captain Clot").
 3. Write one sentence describing its superpower, which must be its actual job in the body. (Example: "Oxygen Flash's superpower is delivering oxygen energy at super speed!")

This activity assesses their understanding of function in a fun, creative way, moving beyond simple memorization.

5. Assessment: Closing the Case (5 minutes)

Have the student present their superhero and explain its powers. Then, ask these concluding questions:

- "Looking at our blood model, which part is the 'river' that carries everything?" (*Plasma*)
- "If you get a paper cut, which superhero cell comes to the rescue?" (*Platelets*)
- "Why do you think our original patient was so tired?" (*Guide them to the idea that maybe they didn't have enough Red Blood Cells to carry oxygen/energy*).

6. Differentiation and Extension (Optional)

- **For Extra Support:** Pre-label containers for each blood component. Use a chart with pictures and simple job descriptions that the student can refer to during the activity.
- **For an Extra Challenge:** Ask the student to write a short comic strip about their superhero saving the day. For example, Captain Clot stopping a nosebleed, or General WBC defeating a flu virus. This encourages storytelling and deeper application of the concepts.