girl scouts of manitou

Blood: The Gift of Life

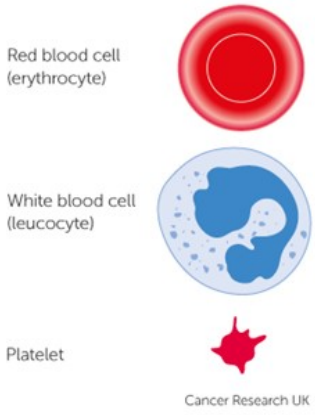
Life Skills

Step 1 BLOOD COMPONENTS

We've all done it—scraped our knees or cut our fingers. When we see blood, we mostly want to clean and cover it up to help our skin heal. But if you look closely enough, that thick red liquid is FAR more than meets the eye!

Blood is made up of four things, each of which has a unique job in helping our wounds heal.

Red blood cells or *erythrocytes* (44% of our blood) give blood its red color. These flat cells look like a donut, except the hole doesn't go all the way through. Red blood cells circulate oxygen to your body and help eliminate waste products. *Plasma* (almost 55%) helps regulate body temperature. *White blood cells* or *leukocytes* (less than 1%) help the body fight infection and other diseases. *Platelets* (1%) help blood to clot by creating a shield that becomes a scab on the wound.



Daisies, Brownies, and Juniors: watch The 4 Components of Blood.

Cadettes, Seniors and Ambassadors: watch Hank Green's videos, Blood, Part 1 - True Blood: Crash Course A&P #29 and Blood, Part 2 - There Will Be Blood: Crash Course A&P #30.

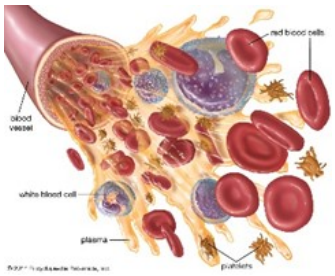
Next, try one or both of these Make-Your-Own-Blood experiments!

1. Tactile Blood Components

You will need:

- Large plastic tub (blood vessel)
- Bag of red water beads (red blood cells)
- 4-6 ping pong balls (white blood cells)
- Red "fun foam" cut into a handful of small (1" x ¼") rectangles (platelets)
- Water (plasma)

Follow directions for "plumping" your red blood cells in your plastic tub. Once they have plumped, add the ping pong balls and the fun foam rectangles. Have fun playing with your "blood"!



2. Blood Components Parfait

You will need:

- Vanilla ice cream (plasma)
- Fresh strawberries or raspberries (red blood cells)
- Large marshmallows or whipped cream (white blood cells)
- Red sprinkles (platelets)

In a tall glass, layer your fruit on the bottom. Add marshmallows or whipped cream and sprinkles to the middle, and top with ice cream. Enjoy!

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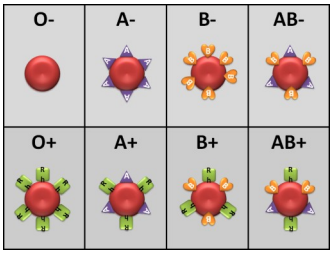
Step 2 BLOOD TYPES

Although there are at least 30 different systems for grouping blood types, most people are familiar with the ABO system. Developed by Austrian physician Karl Landsteiner in 1901, this system groups blood into four general types: A, B, O and AB.

Each blood type is usually further labeled as positive or negative, which is a reference to the blood's *Rhesus factor* (Rh factor). Karl Landsteiner discovered the Rh factor in 1940 while doing blood group research on rhesus monkeys. The Rh factor describes whether or not a specific protein is present on the surface of a person's red blood cells. If it is, as in 85% of people, then they are Rhesus positive (Rh+). If not, as in only 15% of people, they are Rhesus negative (Rh-).



The Rhesus factor is important because, while Rh- people can *donate* blood to Rh+ people, they can't *accept* blood from Rh+ people. There is no naturally occurring Rh antibody, but if by mistake Rh+ blood is transfused into an Rh- person's system, it stimulates the production of an antibody that eventually destroys the donated cells. The reaction is slow in the first transfusion, but becomes fierce in subsequent ones. This reaction is especially important for expecting mothers to consider, since a woman with Rh- blood may have a difficult pregnancy if the baby has Rh+ blood. This can only happen if the father has Rh+ blood though, and can be overcome with a special treatment. *(Source: Science Inspiration.)*

It is important to know your own blood type, as well as that of family members—especially if one of you has a rare blood type. Do you know your blood type? If not, ask your parent/guardian or your doctor.

The Superhero of Blood Donation: O-

As shown in the graph below, O- (O negative) blood can donate to all other blood types. It is called the "universal donor" for that reason, making it the superhero of blood donation!

blood type	% of population	you can give blood to	you can receive blood from
O+	39%	O+, A+, B+, AB+	O+, O-
O-	9%	all types	O-
A+	30%	A+, AB+	O+, O-, A+, A-
A-	6%	A+, A-, AB+, AB-	O-, A-
B+	9%	B+, AB+	O+, O-, B+, B-
B-	2%	B+, B-, AB+, AB-	O-, B-
AB+	4%	AB+	all types
AB-	1%	AB+, AB-	O-, A-, B-, AB-

What type(s) of blood could you receive, and to which blood type(s) could you donate?

For more information, check out facts about blood and blood types.

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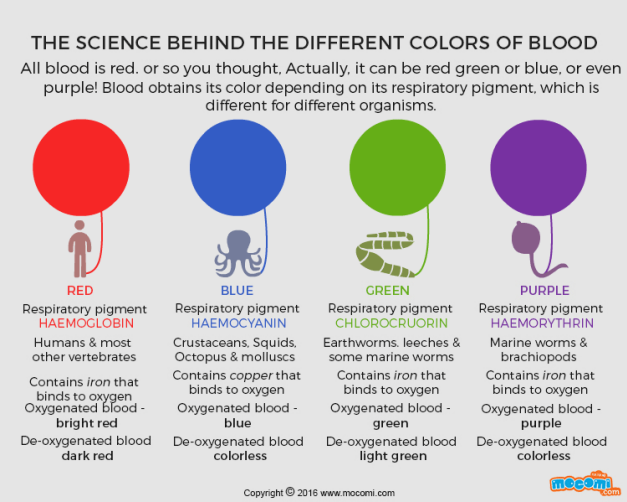
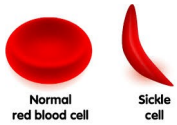
Step 3

BLOOD SCIENCE

All blood is red. Right? Well, all mammalian blood is red—other kinds of creatures have differently colored blood! Look at the chart below to see the different colors blood can be for different animal groups.



A successful blood transfusion relies on sameness. Just as you would not transfuse blue octopus blood to a human, you have to make sure the human blood of the donor matches that of the recipient. If incoming blood has an antigen (a toxin or other foreign substance which induces an immune response in the body, such as the production of antibodies) that you lack, your body can react badly to it. In extremely rare cases, the reaction can be fatal, and even if not, it can tax the immune system in people who are already weakened by their condition. People who need regular blood transfusions—for example, those who have sickle cell disease or leukemia—may face an ever-decreasing pool of suitable blood because they keep creating antibodies.



Bruises

Bruises form when the soft tissues of the body get bumped. When they do, small veins and *capillaries* (the tiniest blood vessels) under the skin sometimes break, causing red blood cells to leak out. The collection of leaked red blood cells under your skin creates that bluish, purplish, reddish, or blackish mark. That's where black-and-blue bruises get their name—from the color under the skin.

Bruises go through colorful changes as the body begins to heal. The color changes mean that your body is metabolizing (say: meh-TAB-oh -lye-zing), or breaking down, the blood cells in the skin. This process is how your body repairs itself.

Daisies: do the American Red Cross Pint-Size Hero coloring pages.

Brownies: do the American Red Cross Pint-Size Hero word search and Maze.

Juniors: do the word search mentioned above and the American Red Cross Pint-Size Hero cross word puzzle.

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Step 4

DIVERSITY, EQUITY, INCLUSION, AND BLOOD

On September 1, 1939, Adolf Hitler invaded Poland from the west, kickstarting the deadliest conflict in human history: World War II. With the war came an intensifying need for blood plasma, as casualties mounted and the wounds and injures seen by physicians became more severe. Dr. Charles Drew, an African-American physician, researcher, and educator, was selected to be the full-time medical director of the Blood for Britain project due to his authority and expertise on blood plasma and preservation. He supervised the successful collection of 14,500 pints of vital plasma for the British.

In February 1941, he was appointed director of the first American Red Cross Blood Bank. This put him in charge of the blood used by the U.S. Army and Navy. During this time, African-Americans were not allowed to donate blood, even though it was in high demand. Drew opposed this, arguing that authorities should stop excluding the blood of African-Americans from plasma-supply networks. In 1942, the armed forces ruled that the blood of African-Americans would be accepted, but had to be stored separately from that of whites. Drew resigned his official post in protest of the senseless racial discrimination.

It would be almost another decade before the Red Cross stopped requiring donated blood to be segregated by the race of the donor, and it wasn't until the late 1960s and early 1970s that southern states such as Arkansas and Louisiana overturned similar requirements.

Daisies, Brownies, and Juniors: watch this 2-minute video on Dr. Charles Drew.

Cadettes, Seniors, and Ambassadors: watch this CBS This Morning segment.

A New Disease and Its Lasting Effects on Blood Donation

In the early 1980s, a mysterious illness appeared from nowhere and quickly reached epidemic levels across the world. Those most impacted were gay men, intravenous drug users, and blood transfusion patients. The disease became known as acquired immunodeficiency syndrome, or AIDS. Scientists now understand a lot more about AIDS, what causes it, and have effective testing methods, yet fear of getting the virus from a blood transfusion and discrimination persist.

One lasting consequence, though, was that gay men and many others in the LGBTQ+ community could no longer donate blood—ever. In 2015, the lifetime ban was modified to a 12-month deferral period. Then, during the COVID-19 pandemic, the deferral was temporarily shortened to just 3 months in response to incredibly high demands on the blood supply.

Take time to imagine how you would feel if you wanted to help and donate, but were not allowed.

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Step 5

LOCAL BLOOD NEEDS

Every 2 seconds, someone in the United States needs blood! In order to provide a safe and reliable blood supply in the Midwest, 1,000 donors are needed every day. When someone donates blood, they are donating whole blood. Their blood can then be separated into three of its four components and used to treat different patients in need. Red blood cells, platelets, and plasma are used variously for patients who have suffered trauma or burns; need surgery or an organ transplant; are undergoing cancer treatments; or have bleeding disorders or blood diseases.

More blood facts:

- 35,000 blood donations are needed in the US everyday
- The average adult has 10-12 pints of blood and one donation is one pint
- One donation can save up to three lives
- Red blood cells have a shelf life of 42 days, platelets only five days, and plasma one year

Blood and Platelet Use

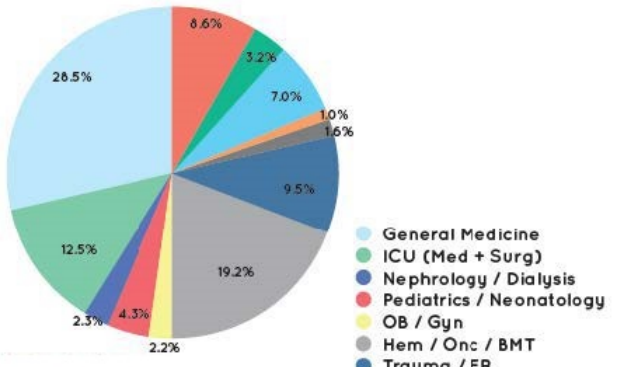
Blood transfused directly to a patient can only come from a volunteer donor. This is one of the reasons donating blood is so special. Here's a national overview showing how blood and platelets are used.

The fact is, 1 in 7 people will need a blood transfusion at some point during their lifetime. But only 1 in 10 people nationally donate blood! **Why do you think that is?**

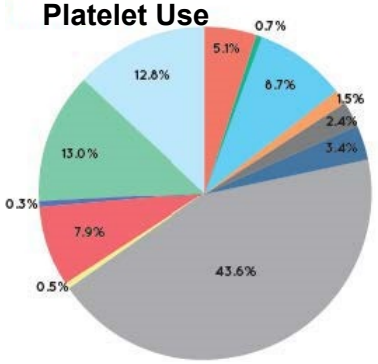
Who can donate? Anyone who is in good health, at least 18 years old, and weighs at least 110 pounds may donate whole blood every 56 days. There are some restrictions though. But, in some states like Wisconsin, teenagers between 16-17 can donate with 16 year olds needing parental permission.

Find out if you meet the criteria for being a blood donor by looking at the restrictions linked above. If you do, consider donating! If you don't, what can you do instead to support blood donation?

Blood Use



Platelet Use



National blood use, 2013