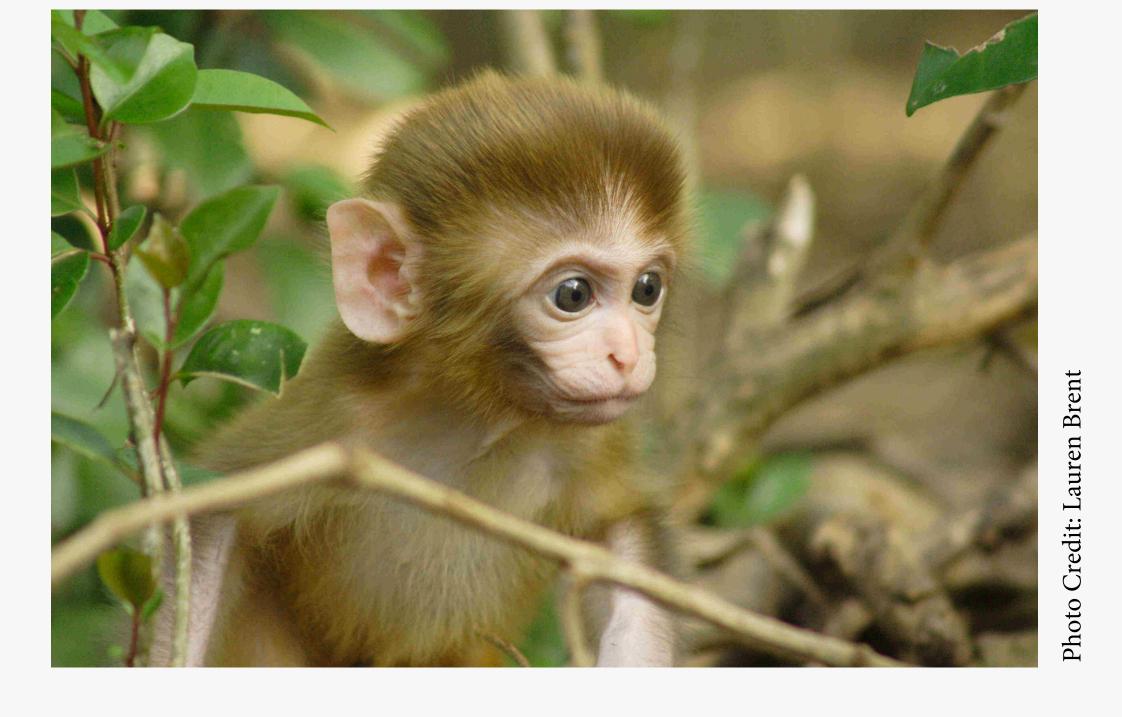
Monkey Health Explorer



INTRODUCTION

Monkey Health Explorer is part of a larger research collaboration investigating how genes and health influence social behavior in rhesus macaque monkeys in Cavo Santiago, an island off the eastern coast of Puerto Rico. Scientists have been conducting research in this free-ranging population of over 1,000 rhesus macaques for many decades. Blood was collected from some of these monkeys to make smears that we can characterize to help us understand monkey health in the population. Images of these blood smears were uploaded to create the Monkey Health Explorer citizen science project on the Zooniverse platform. In this project, users count and identify cell types in a blood sample, similar to what happens when our blood is taken at the doctor.

In this project we need your help to count and identify cell types in a blood sample, similar to what happens when our blood is taken at the doctor. The cell count data are critical to helping us understand which monkeys are healthy and which animals are sick in the population we're studying. We can then compare the health data to the behaviour data to help understand how the health of monkeys impacts how they behave. What we learn by studying the monkeys can be used to help us understand similar processes in humans.

If you would like to involve your students in analyzing real blood smears, you can track their activity in the project on SciStarter.org by adding <u>https://scistarter.org/</u> ealth-explorer to a List on your SciStarter account. Share your List with vour students, so they can each follow the link to create a SciStarter and Zooniverse account (using the **same email** address for both accounts) to start participating. This step is imperative if you'd like to keep track of students' classifications. Once the two accounts are linked with the same email, students can simply log in through either website to start identifying and counting blood cells! The SciStarter page will take them to the Zooniverse project page or they can go directly to <u>https://www.zooniverse.org/projects/mbarrierz/monkey-health-</u> <u>explorer.</u>

Open link []

Vocabulary

Blood Smear

A drop of blood spread thinly onto a glass slide and then stained with a special stain so that the blood cells on the slide can be examined and evaluated.

Plasma

Makes up for 54% of blood. It is mostly composed of water and salt and contains blood proteins. Plasma is the substance that suspends the other components of blood (erythrocytes, leukocytes, and platelets).

Erythrocytes

Also known as "red blood cells", erythrocytes make up 42% of blood. They contain hemoglobin which is responsible for carrying oxygen to your body.

Platelets

The smallest cells in blood and account for 3% of blood composition. Platelets form clots to stop the flow of blood when you have a cut or other injury.

Leukocytes

Also known as "white blood cells", leukocytes make up about 1% of blood. They are the defense cells of the body, and there are five major types of leukocytes: neutrophils, eosinophils, basophils, monocytes, lymphocytes.

Granulocytes

A term used to classify white blood cells by their visible granules in their cytoplasm.

Neutrophils

These are the first responder white blood cells that attack bacteria invaders that enter the body. Neutrophils are distinguished by their 3-5 lobed, thin, horseshoe-shaped nucleus.

Eosinophils

White blood cells that attack parasites that enter the body (example: worms) and are distinguished by their bi-lobed nucleus.

Basophils

White blood cells that store the chemicals heparin and histamine and are used to promote inflammation (example: allergies). Basophils are distinguished by their s-shaped nucleus and large granules.

Monocytes

These are the largest leukocytes and are considered circulating phagocytes. When debris, microbes, or parasites invade the tissues, monocytes attempt to engulf and devour the invaders.

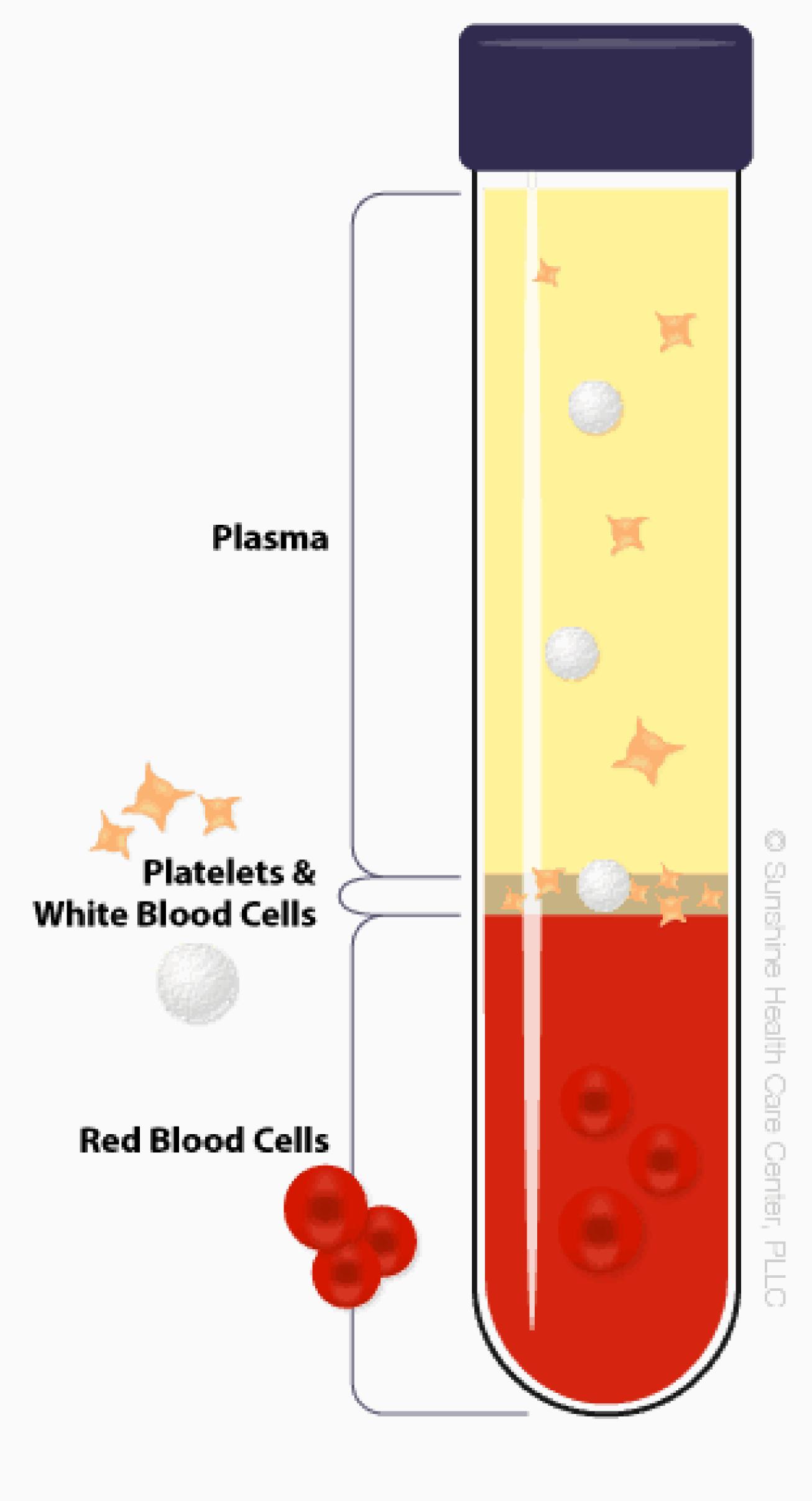
INSTRUCTIONS

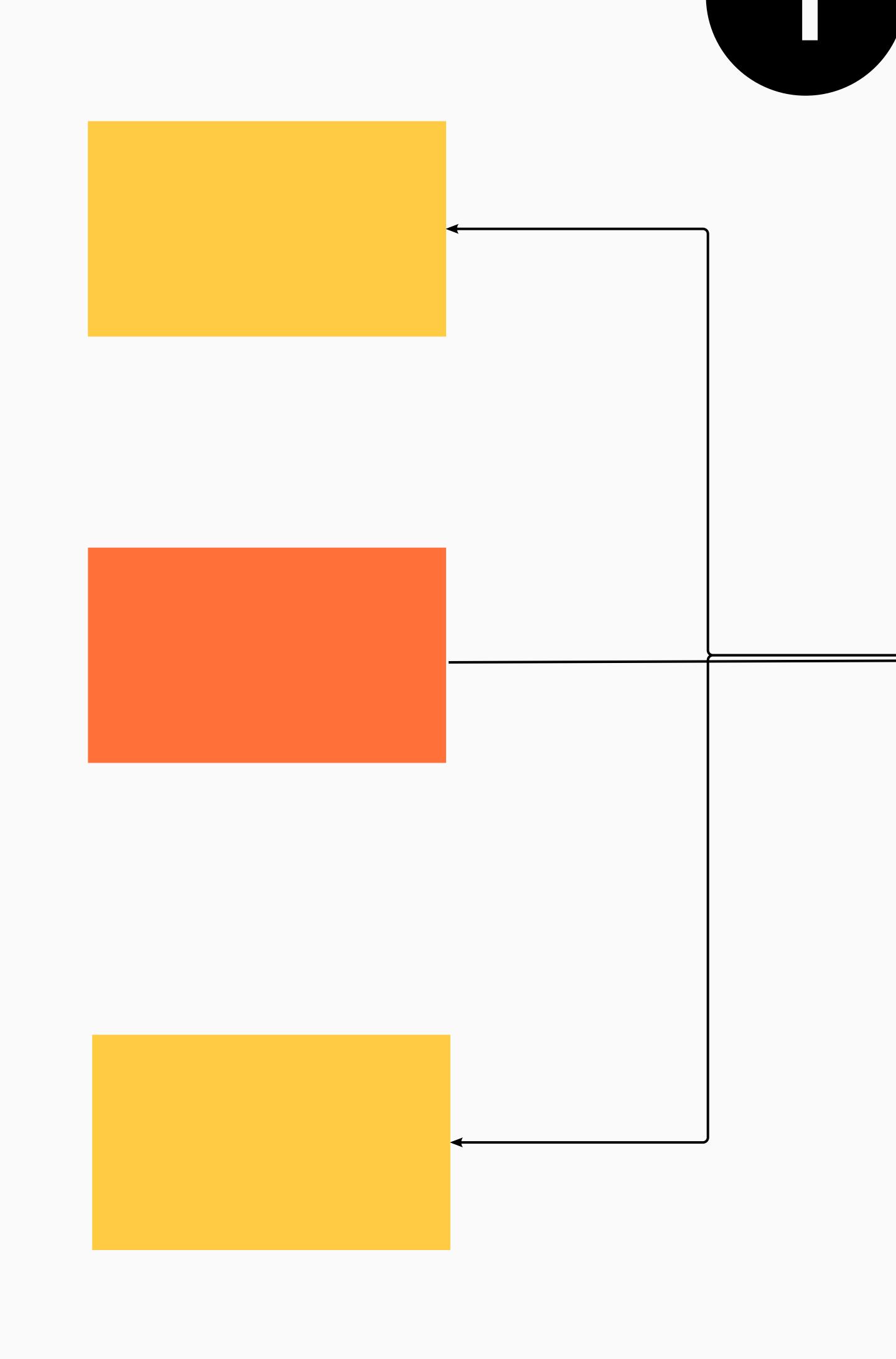


1 Complete the diagram below

2 Make your own model of a blood smear using a resealable zip lock bag and proportional materials to represent each component of blood.

3 Let's help the Monkey Health Explorer Project scientists analyze their blood smears.







Spot that White Blood Cell Exercise



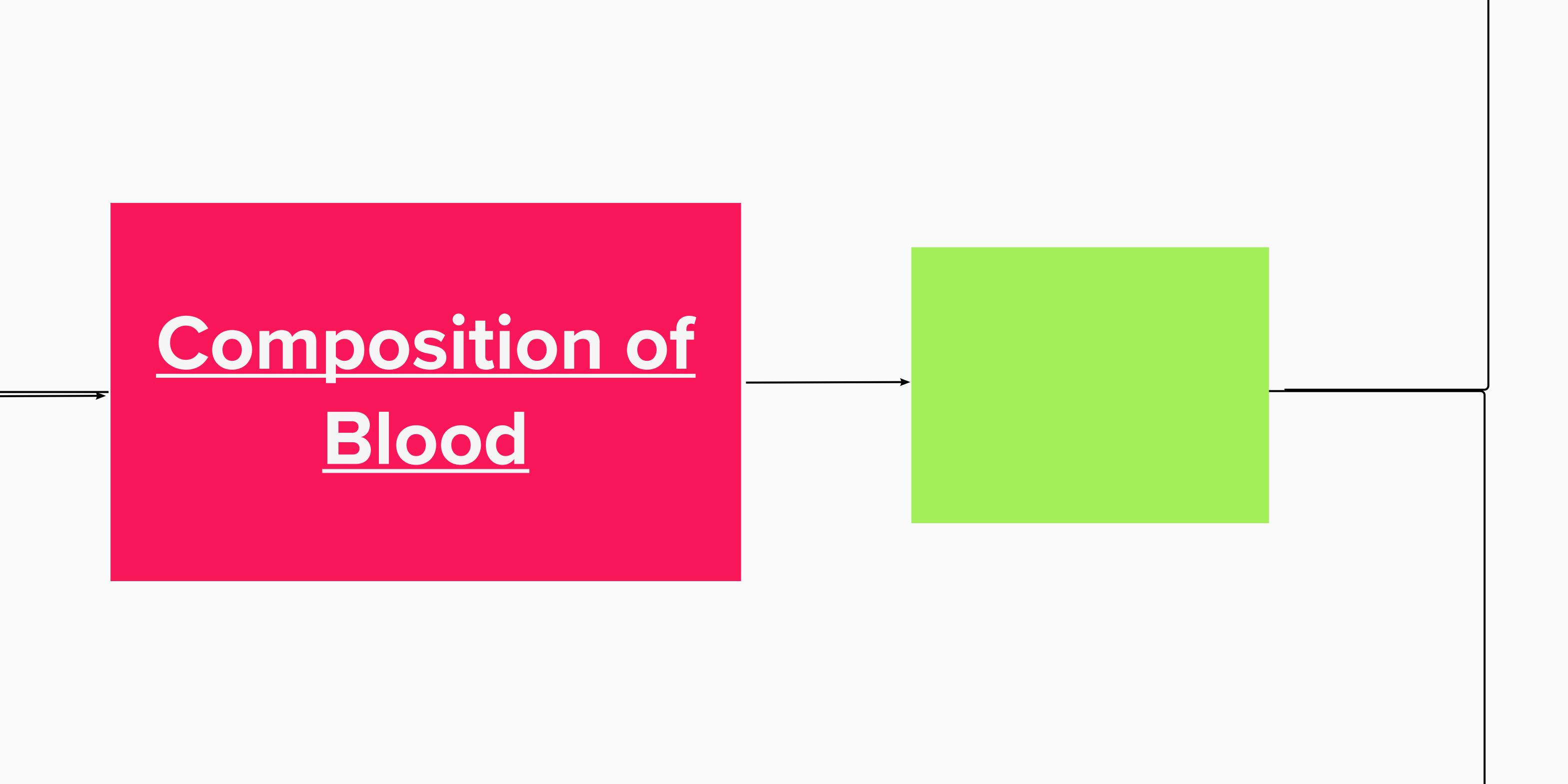
Use the Field Guide to the right to study images A-F.

Do you spy any white blood cells? If so, which kind? Bonus! Can you identify the red blood cells and platelets as well?

Why do white blood cells appear purple?

Before smearing, Wright's stain is used to stain blood cells. Wright's stain contains Methylene blue which binds to nucleic acids , and eosin

Complete the diagram below.



Let's help the Monkey Health Explorer project scientists analyze their blood smears!

