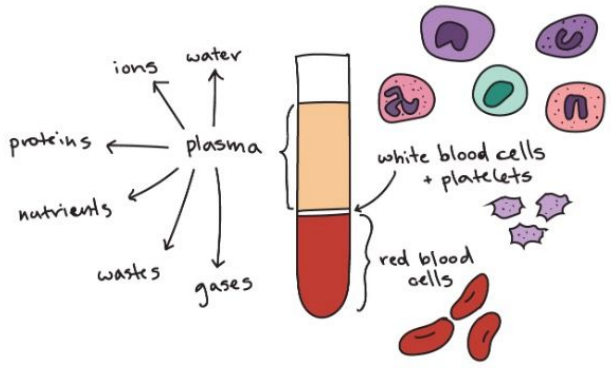
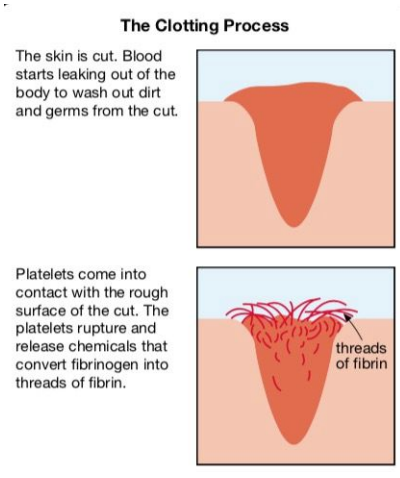
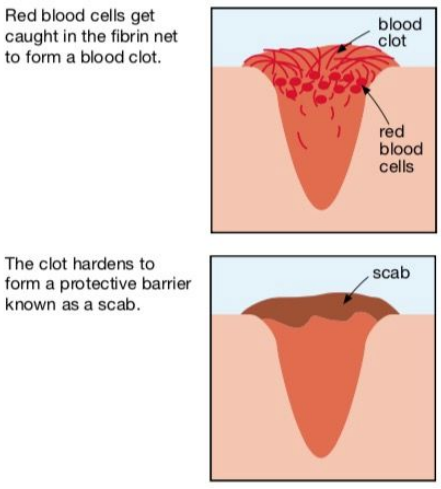
Science 30	Unit A: Biology
Lesson 6 - The Blood	84 mins

Blood Components



Made of: - Red Blood Cells: a biconcave shaped cell with hemoglobin to carry oxygen	45% Erythrocytes, Hemoglobin is a protein that can change shape to hold oxygen to become oxyhemoglobin, replaced every 120 days.
- plasma: the pale yellow fluid portion of blood where the cells are suspended	55% of the total volume, acts as a kind of soup broth.
- white blood cell: a colourless blood cell that acts to defend the body against diseases and other foreign invaders	Leukocytes, 1 for every 600 red blood cells, replaced every 20 days
- platelet: a particle found in the bloodstream that begins the blood-clotting process at the site of a wound	They rupture (explode) to produce chemicals to fight off disease and activate fibrinogen. Fibrinogen - fixes cuts but ONLY when a platelet “calls” for it. Converts to fibrin to help make a “net” to prevent cells from exiting a wound.

The clotting process

fibrin: a thread-like insoluble protein formed from fibrinogen The threads of fibrin mesh to form the fabric of a blood clot. blood clot: a jellylike, solid mass consisting mainly of red blood cells trapped in a net of fibrin fibres hemophilia: a blood disorder involving the blood’s reduced ability to clot, which can lead to excessive bleeding		

Science 30 - Lesson 6 - The Blood

Name: _____

1) List the four components of blood in decreasing order of their relative volume in whole blood (from most abundant to least abundant).

2) Carbon monoxide is a colourless, odourless gas produced during the combustion of fossil fuels, including gasoline. Carbon monoxide binds to the hemoglobin in red blood cells much faster and more strongly than does oxygen. Based on your knowledge of the role of red blood cells, explain why exposure to carbon monoxide can be so dangerous.

_____

_____

_____

3) Leeches and vampire bats are both parasites that feed on animal blood. After they use their sharp teeth to cut the surface of the animal's skin, they release a blood-thinning chemical called an anticoagulant that not only stops blood from clotting but also allows greater blood flow by dilating blood vessels.

   Explain why an anticoagulant might be useful for treating circulatory system problems.

_____

_____

_____

4) Leukemia is a type of cancer where the body produces large numbers of abnormal blood cells—particularly white blood cells—that do not function properly.
   a) How could having improperly functioning white blood cells affect people with leukemia?

_____

_____

_____

   b) Why would doctors treat leukemia by giving patients a bone marrow transplant?

_____

_____

_____

5) Burn victims suffer a significant loss of skin tissue and are, therefore, highly susceptible to deadly dehydration. What blood component best addresses this problem?

_____

_____

_____

6) A cancer patient receiving radiation treatment is often unable to produce enough of a key blood component that prevents uncontrollable internal bleeding. Identify the blood component given to this patient in a transfusion.

_____

_____

_____

7) The body produces millions of red blood cells in the bone marrow every second. White blood cells are made in bone marrow at twice the rate of red blood cells. However, in a given sample of blood, nearly 45% of the blood consists of red blood cells and less than 1% is made of white blood cells.
    a) Suggest a reason for the lower volume of white blood cells in a sample of blood even though they are produced at twice the rate of red blood cells.

    _____

    _____

    _____

    b) Most agents that cause disease are outside the bloodstream and are found in the fluid spaces between tissue cells. Use this information to develop another reason for the lower volume of white blood cells in a sample of blood.

    _____

    _____

    _____