Forensic Science: Blood Basics Notes Name _____

1. What makes up the blood in our bodies?

• <u>_Red Blood Cells</u> (erythrocytes) – The most abundant cells in our blood; they are produced in the bone marrow and contain a protein called hemoglobin that carries oxygen to our cells.

• <u>White Blood Cells</u> (leukocytes) – They are part of the immune system and destroy pathogens.

• _Plasma_ – The yellowish liquid portion of blood that contains electrolytes, nutrients and vitamins, hormones, clotting factors, and proteins such as antibodies to fight infection.

• _Platelets_ (thrombocytes) – The clotting factors that are carried in the plasma; they clot together in a process called coagulation to seal a wound and prevent a loss of blood.

2. Blood Facts

A. The average adult has about _5_ liters of blood inside of their body, which makes up 7-8% of their body weight.

B. This red liquid is living <u>_tissue</u> that carries oxygen and nutrients to all parts of the body, and carries carbon dioxide and other waste products back to the lungs, kidneys and liver for disposal. It fights against <u>_infection</u> and helps heal <u>_wounds</u>.

C. There are about one <u>one billion</u> red blood cells in two to three drops of blood. For every <u> $_{600}$ </u> red blood cells, there are about <u> $_{40}$ platelets and <u> $_1$ </u> white cell.</u>

3. Genetics of Blood

Your blood type is established before you are <u>born</u>, by specific <u>genes</u> inherited from your parents.

These two genes - one gene from your <u>_mother_</u> and one from your <u>_father_</u> - determine your blood type by

causing proteins called <u>agglutinogens</u> to exist on the surface of all of your red blood cells.

4. Blood Types

A. There are three alleles or genes for blood type: _A_, _B_, and _O_.

B. What are the four types of blood? Give the genotypes for each.

Type A = <u>AA or AO</u> Type B = <u>BB or BO</u> Type AB = <u>AB</u> Type O = <u>OO</u>

5. How common are the four blood types?

A = <u>38.8</u> % B = <u>11.1</u> % AB = <u>3.9</u> % O= <u>46.1</u> %

6. Blood Transfusions

A. What blood type is known as the "Universal Donor"? _0_

B. What blood type is known as the "Universal Recipient"? _AB_

C. Complete the diagram using the class notes.

D. Complete this statement: A person with Rh + blood may receive blood that is

+ or _-_, while a person with Rh - blood can only receive _-_ blood.

7. Rh (Rhesus) Factors

What animal helped scientists discover Rh proteins in blood? _Rhesus Monkeys_If

someone has the Rh protein, they are said to have Rh _positive_ blood. If someone does not have this

protein, they have Rh _negative_ blood.

8. How can blood be used as evidence in a crime?

• Blood samples - Can be analyzed to determine _Blood Type_ and _DNA_, which can be

matched to possible suspects.

• Blood droplets - Can be analyzed to give clues to the location of a _crime_, movement of a

victim, and type of _weapon_.

• Blood spatter – Can be analyzed to determine <u>_pattern</u> that give investigators clues to how a crime might have happened.

9. Online Activity: Blood Typing Game

Patient #1 – Man with purple hair

What was his blood type? _A+_

Which bags of blood did you give to him? _A+/- or O+/-_

Patient #2 - Older man with white hair

What was his blood type? _O+_

Which bag of blood did you give to him? _O+/-_

Patient #3 – Young lady with red hair

What was her blood type? _AB-_

Which bags of blood did you give to her? _AB-, A-, B-, O-_

NOTE: A Rh + should be written as A+.