

CONCEPT REVIEW  
**30**

**BLOOD AND BLOOD TYPES**

PAGES 177 TO 182  
Complete this concept review handout and keep it as a record of what you have learned.

**BLOOD CONSTITUENTS**

Liquid element ( 55 % of blood volume)

Name	Water composition	Dissolved substances	Functions
<u>plasma</u>	<u>90%</u>	<u>nutrients</u> <u>waste</u> <u>hormones</u> <u>antibodies</u>	<u>-transport</u> <u>-keeps blood fluid</u>

Formed elements ( 45 % of blood volume)

Illustration	Name	Functions
	<u>RBC</u>	<u>carry O<sub>2</sub> + CO<sub>2</sub></u>
	<u>WBC</u>	<u>protect body by phagocytosis and producing antibodies</u>
	<u>platelets</u>	<u>clotting</u>

**BLOOD TYPES**

Blood type	Substance(s) present on the membrane of red blood cells		
A <sup>+</sup>	<input checked="" type="checkbox"/> Substance A	<input type="checkbox"/> Substance B	<input checked="" type="checkbox"/> Rh factor
A <sup>-</sup>	<input checked="" type="checkbox"/> Substance A	<input type="checkbox"/> Substance B	<input type="checkbox"/> Rh factor
B <sup>+</sup>	<input type="checkbox"/> Substance A	<input checked="" type="checkbox"/> Substance B	<input checked="" type="checkbox"/> Rh factor
B <sup>-</sup>	<input type="checkbox"/> Substance A	<input checked="" type="checkbox"/> Substance B	<input type="checkbox"/> Rh factor
AB <sup>+</sup>	<input checked="" type="checkbox"/> Substance A	<input checked="" type="checkbox"/> Substance B	<input checked="" type="checkbox"/> Rh factor
AB <sup>-</sup>	<input checked="" type="checkbox"/> Substance A	<input checked="" type="checkbox"/> Substance B	<input type="checkbox"/> Rh factor
O <sup>+</sup>	<input type="checkbox"/> Substance A	<input type="checkbox"/> Substance B	<input checked="" type="checkbox"/> Rh factor
O <sup>-</sup>	<input type="checkbox"/> Substance A	<input type="checkbox"/> Substance B	<input type="checkbox"/> Rh factor

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### BLOOD TRANSFUSIONS

#### Definitions

- A blood transfusion is the injection of blood into a person
- A blood donor is a person who gives blood for the purpose of a transfusion
- A blood recipient is a person who receives blood from a transfusion

The primary rule governing blood transfusions is that the donor's RBC membrane must not carry substances (antigens) that differ from those on the RBC membranes of the recipient

### BLOOD COMPATIBILITY

#### Definitions

- Blood compatibility means that one person can receive blood from another
- A universal donor is O<sup>-</sup>, it can donate to anybody
- A universal recipient is AB<sup>+</sup>, it can receive from anybody

Blood type	Can donate blood to	Can receive blood from
A <sup>+</sup>	A <sup>+</sup> , AB <sup>+</sup>	A <sup>-</sup> A <sup>+</sup> O <sup>+</sup> O <sup>-</sup>
A <sup>-</sup>	A <sup>+</sup> A <sup>-</sup> AB <sup>+</sup> AB <sup>-</sup>	A <sup>-</sup> O <sup>-</sup>
B <sup>+</sup>	B <sup>+</sup> AB <sup>+</sup>	B <sup>+</sup> B <sup>-</sup> O <sup>+</sup> O <sup>-</sup>
B <sup>-</sup>	B <sup>-</sup> B <sup>+</sup> AB <sup>+</sup> AB <sup>-</sup>	B <sup>-</sup> O <sup>-</sup>
AB <sup>+</sup>	AB <sup>+</sup>	universal recipient
AB <sup>-</sup>	AB <sup>-</sup> AB <sup>+</sup>	AB <sup>-</sup> A <sup>-</sup> B <sup>-</sup> O <sup>-</sup>
O <sup>+</sup>	O <sup>+</sup> A <sup>+</sup> B <sup>+</sup> AB <sup>+</sup>	O <sup>+</sup> O <sup>-</sup>
O <sup>-</sup>	universal donor	O <sup>-</sup>

Name: \_\_\_\_\_

Date: \_\_\_\_\_

### Practice: Blood Groups

Use the following legend to represent the antigens present on the red blood cells:

A antigen



B antigen

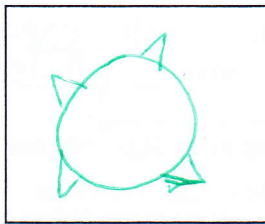


Rh antigen

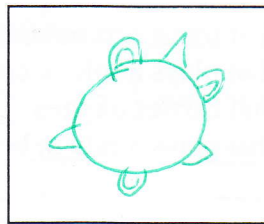


1. Using the above symbols, represent the following:

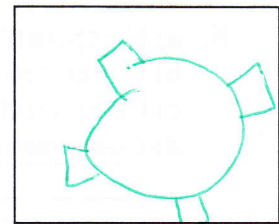
a) A red blood cell belonging to the group B-



b) A red blood cell belonging to group AB-



c) A red blood cell belonging to O+



2. Draw symbols that could represent antibodies for the three symbols representing antigens above:

Anti-A:



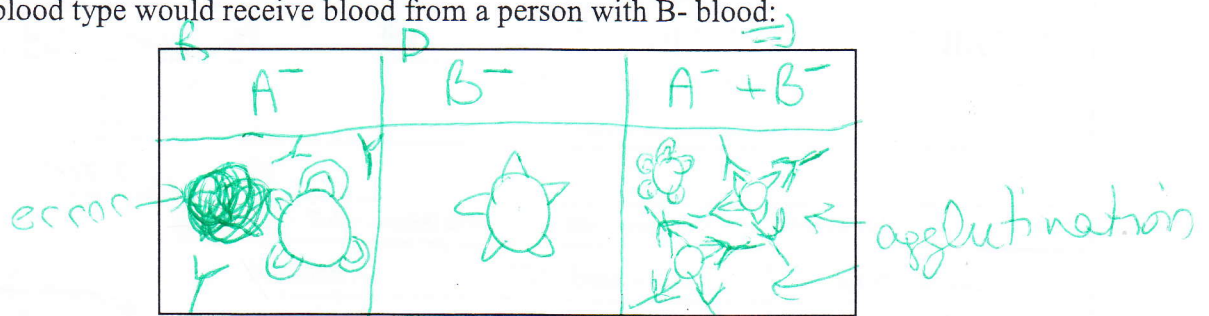
Anti-B:



Anti-Rh:



3. Models help us predict the behavior of matter. Draw what would happen if a person with A- blood type would receive blood from a person with B- blood:



4. What are the four blood types compatible with B+?

B<sup>+</sup>      B<sup>-</sup>      O<sup>+</sup>      O<sup>-</sup>

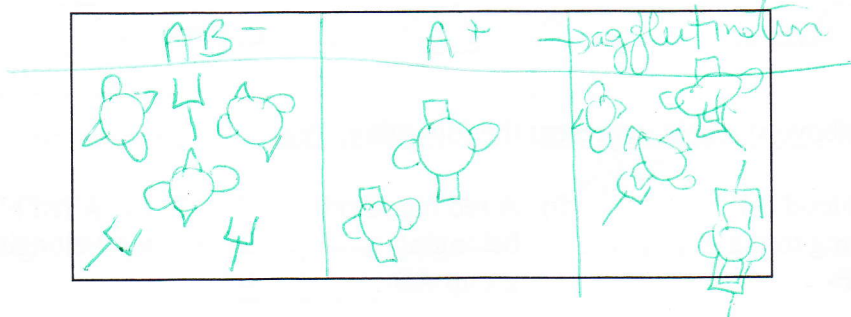
5. What blood type can we consider is the "Universal Donor"? Explain.

O<sup>-</sup>  
no antigen on RBC, therefore will not react with antibodies

6. What blood type can we consider the "Universal Recipient"? Explain.

AB<sup>+</sup> has all antigens on RBC therefore recognizes all antibodies

7. What would happen if someone with AB- blood type would receive blood from someone with A+ blood type?



8. a) Component of blood that transports nutrients and waste: plasma  
 b) Component of blood that plays a role in coagulation (scabs): platelets  
 c) Component of blood that carries oxygen: RBC  
 d) Component of blood that plays a role in body's defense against pathogens: WBC

9. What antibodies are present in people who are O+? anti A + B

10. Donor	Recipient	Yes or No?	Reason
A+	AB-	<u>N</u>	<u>+ - -</u>
O+	A-	<u>N</u>	<u>"</u>
B-	O+	<u>N</u>	<u>O has anti-B</u>
A-	AB+	<u>Y</u>	<u>AB has no antibodies</u>
AB-	B+	<u>N</u>	<u>B has anti-A</u>

Name: \_\_\_\_\_

Circulatory System Worksheet

1. What are the three formed elements in the blood? *RBC, WBC + platelets*
2. What are the two functions of white blood cells? *phagocytosis + produce antibodies*
3. What are the functions of the red blood cells? *carry O<sub>2</sub> + CO<sub>2</sub>*
4. When an infection occurs the number of antigens 1 and the body temperature 2. The infection is beaten when the number of antibodies is 3.
  - a) 1-decreases, 2-rises, 3-low
  - b) 1-increases, 2-rises, 3-high
  - c) 1-decreases, 2-drops, 3-low
  - d) 1-increases, 2-drops, 3-high
5. Why do people get many colds in one winter season?
  - a) Because each cold is different and requires a different antibody
  - b) They are getting the same cold over and over again
  - c) Because each cold is different and requires a different antigen
  - d) Because they are unlucky

6. Complete the chart

	Donate To	Receive From
A+	<i>A+ AB+</i>	<i>A+ A- O+ O-</i>
AB-	<i>AB- AB+</i>	<i>AB- A+ B- O-</i>
O+	<i>O+ A+ B+ AB+</i>	<i>O+ O-</i>
B+	<i>B+ AB+</i>	<i>B+ B- O+ O-</i>
B-	<i>B- B+ AB- AB+</i>	<i>B- O-</i>

7. What are the three types of antigens that exist? What are the three types of antibodies a person may produce?

*A anti A  
B anti B  
Rh anti Rh*

8. There are 4 people in the Sorella family. Lou AB+, Sandra is O+, Gabriella is B+ and Cassandra is B+. Which statement is correct about blood donations?

- a) Lou can give blood to Cassandra and Gabriella but not to Sandra
- b) Cassandra and Gabriella and give blood to Sandra and Lou
- c) Sandra can accept blood from all the other members in the family
- d) Sandra can donate blood to all the other members in the family

9. Cathy has had a serious car accident and need blood. The doctor wants someone in her family to donate blood to her. If Cathy is A+, use the following information to determine who she can receive blood from.

*Mother: A+      Brother: AB+      Father: B+      Sister: O+*

- a) Her mother
- b) Her mother, brother and sister
- c) Her mother and sister
- d) All of them