**ABO Blood Type Game**

The following lesson is adapted from the Red Cross ABO Blood Type Game



Materials

8 3.5 oz cups labeled “ A”

8 3.5 oz cups labeled “ B”

8 3.5 oz cups labeled “ AB”

8 3.5 oz cups labeled “ O”

32 pipettes

1 250 ml bottle water plus 15 drops red food coloring, labeled “A”

1 250 ml bottle water plus 10 drops blue food coloring, labeled “B”

1 250 ml bottle water plus 7 drops red + 5 drops blue food coloring, labeled “AB”

1 250 ml bottle water, labeled “O”

15 12-well plates

30 worksheets

**Color Concentration for food coloring:**I use the ratio of 5 drops of food coloring for every 100 mL water. So
a 1,000ml beaker or flask would have 50 drops. Set these up ahead of
time. For purple do half red and half blue drops, for green I would
just use the green food coloring at 5/100mL.

Blood Type A is Red (\*or Blue)
Blood Type B is Blue (\*or Yellow)
Blood Type AB is Purple (\*or Green)
Blood Type O is Clear

**Background Information**

**The following information is from the Red Cross**

* Almost 40% of the population has O+ blood
* Patients with Type O blood must receive Type O blood
* About half of all blood ordered by hospitals in our area is Type O
* Type O blood is the universal blood type and is the only blood type that can be transfused to patients with other blood types
* Only about 7% of all people have Type O negative blood
* Type O negative blood is the preferred type for accident victims and babies needing exchange transfusions
* There is always a need for Type O donors because their blood may be transfused to a person of any blood type in an emergency

If your blood type is:

|  |  |  |
| --- | --- | --- |
| **Type** | **You Can Give Blood To** | **You Can Receive Blood From** |
| A+ | A+  AB+ | A+  A-  O+  O- |
| O+ | O+  A+  B+  AB+ | O+  O- |
| B+ | B+  AB+ | B+  B-  O+  O- |
| AB+ | AB+ | Everyone  |
| A- | A+  A-  AB+  AB- | A-  O- |
| O- | Everyone | O- |
| B- | B+  B-  AB+  AB-  | B-  O- |
| AB- | AB+  AB- | AB-  A-  B-  O- |

Out of 100 donors . . . . .

|  |  |
| --- | --- |
| 84 donors are RH+  | 16 donors are RH-  |
| 38 are O+  | 7 are O-  |
| 34 are A+  | 6 are A-  |
| 9 are B+  | 2 are B- |
| 3 are AB+  | 1 is AB- |

**Experiment.**

**Tell students that:**

* If the color of the “blood” changes, it is not compatible.
* If the “blood” color stays the same, then it is compatible.
1. **Patient #1 is Type A.**

Patient #1 needs a transfusion. Ask students what blood types can this patient receive?

For patient #1, tell students to:
1) Pipette 3 squirts of liquid from Type A into the 1st well .

2) Do a “transfusion” by adding 3 more squirts of Type A to the 1st well and note if there is any change in color. **(There is no change.)**

Explain that **No change = Safe, Change = unsafe.**

1. Now pipette another 3 squirts of type A from patient #1 into the second well on row 1
2. This time, add 3 squirts of Type B to the patient for the ”tranfusion.”
	1. Students will notice a color change and see the change means that this is **Unsafe**,
3. Add 3 squirts of Type A to wells 3 and 4 on Row 1 and add Type AB and O to determine if these blood types are safe for patient 1.
4. **Patient #2 is Type B.**
5. **Patient #3 is Type AB.**
6. **Patient #4 is Type O.**

Tell students to make an hypothesis as to which blood types the patients #2, 3 and 4 could safely receive in a transfusions and then test it. Follow the same procedure as above.

Results and conclusions:

* Blood type A can only be given to type A and AB patients.
* Blood type B can only be given to type B and AB patients.
* Blood type AB individuals can receive blood from everyone, but they can only donate to other AB blood type patients.
* Blood type O individuals can only receive type O blood, but they can donate blood to every other type.

Adapted from the Red Cross Blood Typing game

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**Blood Type Chart:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Color change (yes/no)?A added** | **Color change (yes/no)?B added** | **Color change (yes/no)?AB added** | **Color change (yes/no)?****O added** |
| **Patient #1Type A** |    |    |    |    |
| **Patient #2Type B** |    |    |    |    |
| **Patient #3Type AB** |    |    |    |    |
| **Patient #4Type O** |    |    |    |    |

**Conclusions**Blood type A can only be given to type \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_patients. Blood type A patients can only receive\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_type blood.Blood type B can only be given to type \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_patients. Blood type B patients can only receive\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_type bloodBlood type AB can only be given to type \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_patients.Blood type AB patients can only receive\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_type bloodBlood type O can only be given to type \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_patients. Blood type O patients can only receive\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_type blood |