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GREEN-EDU Learning Activity

Title: Blood types and heredity

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Summary

Lesson plan summary	
Subject	Green Chemistry / Green Biotechnology / Green Engineering and Robotics
Topic	*Genetics*
Age of students	*12-18*
Preparation time	*30Minutes*
Teaching time	*60Minutes*
Online teaching material (links for online material)	
Offline teaching material	*red food color* *green food color* *water* *4 test tubes* *test tube rack* *graduated cylinder* *beaker* *medicine dropper or pipette*

Aim of the lesson

By the end of this lesson students will:

1) see if they can discover the pattern of genetic transfer for blood type

2) Analyze bioethical issues and consider the role of science in determining public policy.

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Trends

STE(A)M Learning / Collaborative Learning etc.

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Activities

Describe here in detail all the activities during the lesson and the time they require. Remember, that your lesson plan needs to revolve around the topic of bioeconomy.

Name of activity	Procedure
Introduction	British physician James Blundell recorded the first blood transfusions in 1825. About half of his patient benefited from them but many had severe reactions and several died. Would you have volunteered for a transfusion given these odds? After careful investigation it was discovered that blood cells contain surf proteins on the cell membrane that identify 4 different blood types. A has "A" surface proteins, B has "B surface proteins, AB has both "A" and "B" surface proteins and O blood has no marker proteins on the c membrane. Later experiments showed that not all blood types can be mixed together without a clumpi reaction that occurs when a "foreign invader" enters a human body. Our immune system "knows" whic cells belong in our body. It is able to recognize intruding cells and kill them. Some blood types are recognized as foreign and the clumping reactions occur that may harm the patient. In this activity, you find out which types of blood are safe to transfuse into people with different blood types. You will also how blood types are genetically determined.
Prediction	Which type of blood might be safe to put in anyone?
Experiment	1. Use this key to the blood types and colors: A= red water B=green water AB=red + green water=brow water O=clear water 2. Add 20 ml of each kind of "blood" to a test tube. One tube will be empty. It will b the "test" tube. 3. Start with "A" or red blood. Add 5 ml of "A" blood to the empty test tube. Then add 10 drops more of "A" blood. Look for a color change. Since red + red = red, write "safe" on the data table to show no change. 4. Continue adding by adding 5 drops of "B" blood to the "A" blood. If there is a color change, write down "unsafe" on the data table. Empty the test tube and start over with 5 ml of "A" blood then add 5 drops of the AB and then O. Every time you get a color change, empty the test tube. 5. Do the same thing for B, AB and O blood. Record your findings.
	Data :

Donors

Receivers	A	B	AB	O
A				
B				
AB				
O				

Analysis

Summarize this data by filling in this chart to showing which transfusions are safe or unsafe:

If you have blood type:	You can donate to:	You can receive from:
A		
B		
AB		
O		

Going on

Accurate blood tests were soon developed so that people could be transfused with the correct blood types for them. But the question of how blood type was transferred genetically was still unknown. Like most questions in genetics, the answer was found by first looking at family pedigrees.

What happens when B blood is transfused in an O blood person?

Assessment

Describe here the assessment method of the lesson, if any. For example, if you plan on assessing your students with a quiz, include here questions and answer options with color-coding the correct answers.