



just add students™

Kidney Donor

Teacher Information

Summary

Students collect and analyze data to determine which potential living kidney donor could safely donate a kidney to a patient with kidney failure. They perform simulated urinalysis, blood typing, and HLA testing.

Core Concepts

- Organisms have feedback mechanisms that detect deviations from the normal state and take corrective actions to return their systems to normal.
- Failure to maintain the chemical aspects of the internal environment within narrow limits favorable for cell activities can result in disease or death.
- The immune system protects against antigens associated with foreign substances.
- Some white blood cells produce antibodies that attack invaders or mark them for killing.
- Sometimes the immune system may attack transplanted organs

Time Required

Two 40-minute class periods plus homework

Kit contains

- Simulated “urine” samples – Patient, Donor X, Donor Y, Donor Z
- Simulated urinalysis test strips
- Simulated “blood” samples – Patient, Donor X, Donor Y, Donor Z
- Simulated Anti-A and Anti-B antibodies
- Stirrers
- Blood typing test strip
- Simulated “white blood cells” – Patient, Possible Donor
- HLA Tissue Typing Card

Teacher Provides

- Safety goggles
- Access to tap water
- Paper towels for clean up

Warning: Choking Hazard

This Science Take-Out kit contains small parts. Do not allow children under the age of seven to have access to any kit components.

This document may be copied for use only with Science Take-Out educational materials.
This document may not be reproduced or distributed for any other purpose without written consent from Science Take-Out.

Reusing *Kidney Donor* kits

Teachers will need to instruct students on how to handle clean-up and return of the re-usable kit materials. For example, teachers might provide the following information for students:

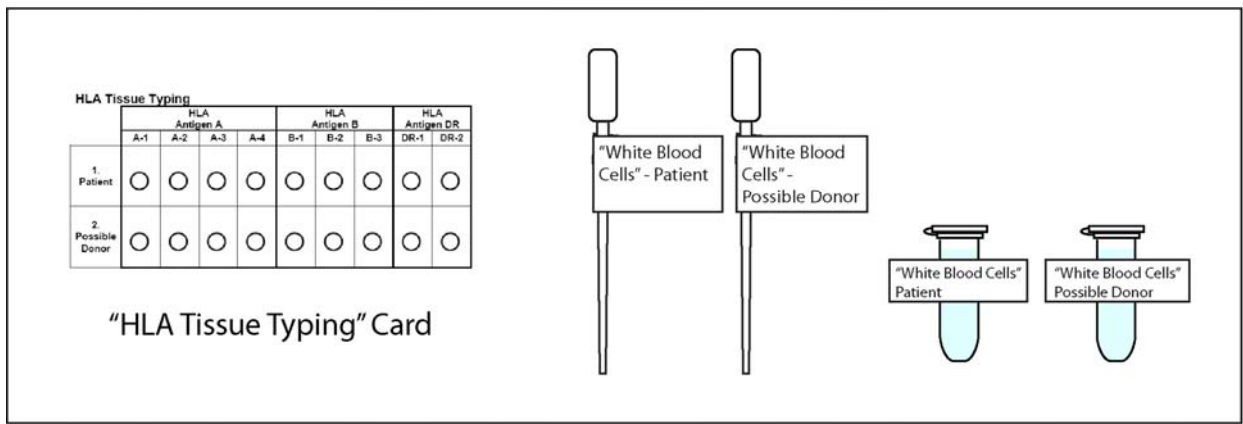
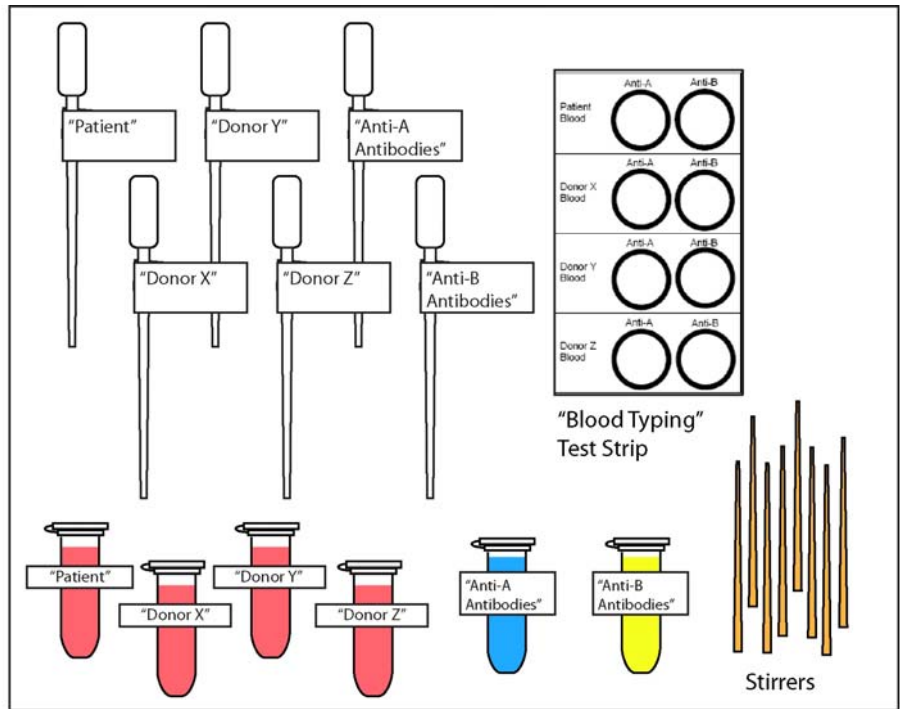
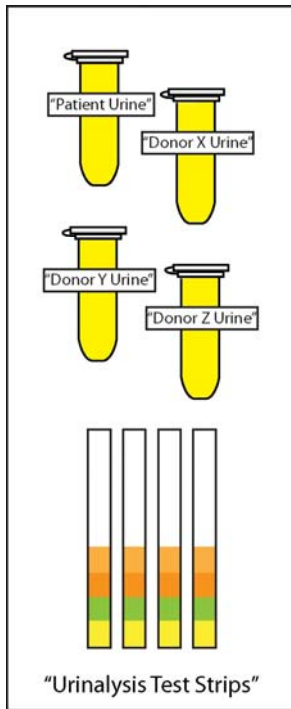
Discard	Rinse with water and dry with paper towel	Return to kit
<ul style="list-style-type: none"> • Used urinalysis test strips • Used HLA Tissue Typing card 	<ul style="list-style-type: none"> • Droppers • Blood Typing test strip 	<ul style="list-style-type: none"> • All labeled microtubes • Labeled plastic bags • Droppers (rinsed) • Urinalysis test instruction cards* • Blood Typing test instruction cards* • HLA Tissue Typing test instruction cards*

* Note: Consider laminating printed parts of the kits that will be reused.

Refills for *Kidney Donor* kits are available at www.sciencetakeout.com. The **10 Kit Refill Pack** includes the following materials:

- 1 Quick Guide for refilling kit
- 12 graduated transfer pipets (teacher use only)
- 20 ml of each simulated urine sample (Patient and Donors X, Y, and Z)
- 40 "Urinalysis Test Strips"
- 5 ml of each simulated blood sample (Patient and Donors X, Y, and Z)
- 10 ml of each simulated antibodies (Anti-A and Anti-B)
- 5 ml of each simulated white blood cells (Patient and Donor)
- 10 "HLA Tissue Typing" cards
- 80 toothpicks

Kit Contents Quick Guide



Read these instructions before using Science Take-Out kits

Parental or Adult Supervision Required

This kit should be used only under the supervision of an adult who is committed to ensuring that the safety precautions below, and in the specific laboratory activity, are followed.

Safety Goggles and Gloves Strongly Recommended

We encourage students to adopt safe lab practices, and wear safety goggles and gloves when performing laboratory activities involving chemicals. Safety goggles and gloves are not provided in Science Take-Out kits. They may be purchased from a local hardware store or pharmacy.

Warning: Choking and Chemical Hazard

Science Take-Out kits contain small parts that could pose a choking hazard and chemicals that could be hazardous if ingested. Do not allow children under the age of seven to have access to any kit components. Material Safety Data Sheets (MSDS) provide specific safety information regarding the chemical contents of the kits. MSDS information for each kit is provided in the accompanying teacher instructions.

Chemicals Used in Science Take-Out Kits

Every effort has been made to reduce the use of hazardous chemicals in Science Take-Out kits. Most kits contain common household chemicals or chemicals that pose little or no risk.

General Safety Precautions

1. Work in a clean, uncluttered area. Cover the work area to protect the work surface.
2. Read and follow all instructions carefully.
3. Pay particular attention to following the specific safety precautions included in the kit activity instructions.
4. Goggles and gloves should be worn while performing experiments using chemicals.
5. Do not use the contents of this kit for any other purpose beyond those described in the kit instructions.
6. Do not leave experiment parts or kits where they could be used inappropriately by others.
7. Never taste or ingest any chemicals provided in the kit – they may be toxic.
8. Do not eat, drink, apply make-up or contact lenses while performing experiments.
9. Wash your hands before and after performing experiments.
10. Chemicals used in Science Take-Out experiments may stain or damage skin, clothing or work surfaces. If spills occur, wash the area immediately and thoroughly.
11. At the end of the experiment, return ALL kit components to the kit plastic bag. Dispose of the plastic bag and contents in your regular household trash.

No blood or body fluids from humans or animals are used in Science Take-Out kits. Chemical mixtures are substituted as simulations of these substances.

Kidney Donor:

The Case:

Your patient is a 20-year old woman who is experiencing kidney failure. She needs a kidney transplant. Three of the patient's relatives, her mother ("Donor X"), her younger brother ("Donor Y"), and her grandmother ("Donor Z") are willing to donate one of their kidneys to her. This type of "living donor" kidney donation is possible because a healthy person can live with only one kidney.

There are three major concerns that need to be addressed in selecting the person who can donate a kidney to a patient:

- The condition of potential donors' kidneys
- The compatibility of the patient's and potential donors' blood and tissue types
- The potential donors' health and chances for surviving the removal of one kidney

Your Task:

Conduct clinical laboratory tests and evaluate data to determine which of the relatives (Donor X, Donor Y, or Donor Z) could safely donate a kidney to the patient. **As you work, be certain to record the results of your testing.**

CLINICAL LABORATORY TEST 1: Urinalysis: Evaluate the Condition of Potential Donors' Kidneys

Urinalysis involves a number of tests to measure the concentrations of various substances present in the urine. If the level of any of these is not normal, it could indicate that the person may have kidney disease. Urinalysis test strips contain indicators that change color when they come in contact with specific substances in urine.

1. Test the urine from the patient and the three potential kidney donors (Donors X, Y, and Z) by following the directions in the bag of urinalysis test strips. Record the results of your tests in the table below.

	Urinalysis Results Tests			
	Ketones	Blood	Protein	Glucose
Patient				
Donor X				
Donor Y				
Donor Z				

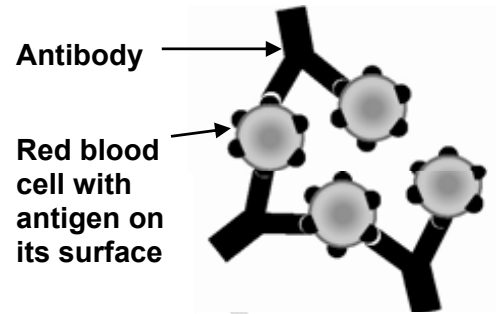
2. Based on the **urinalysis test results only**, which relatives (Donor X, Y, and/or Z) would you conclude should not be a kidney transplant donor?

Support your conclusion with evidence from the urine testing data.

3. Explain why it might be dangerous for this donor to provide a kidney for the patient.

CLINICAL LABORATORY TEST 2: Blood Typing: Evaluate the Compatibility of the Donors' and Patient's Blood

A dangerous reaction may occur if incompatible blood types are mixed. Antigens on the surface of the donor red blood cells may cause the recipients (patient's) immune system to produce antibodies against the donor's blood. When the patient's antibodies react with antigens on the donor's red blood cells, dangerous clumps form and block the patient's blood vessels.



1. Test the blood from the recipient (the patient) and three potential kidney donors (X, Y, and Z) by following the directions for "Blood Typing". Record the results in the table below.

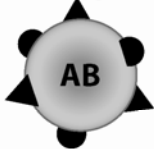
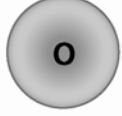
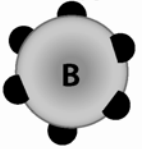
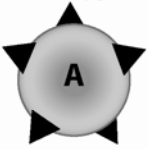

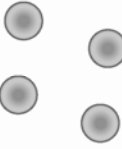

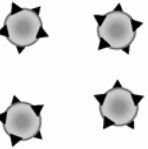

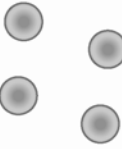

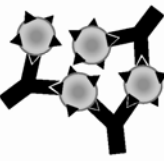
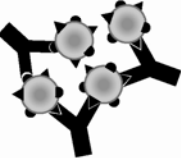
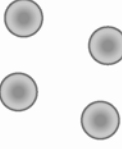

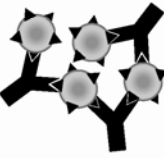
Results of Blood Typing

Blood Sample from:	Observations (clumped or not clumped)		Blood Type A, B, AB, or O (Use the information in the Antibody Testing Reactions table)
	Antibody A	Antibody B	
Patient			
Donor X			
Donor Y			
Donor Z			

2. Use the information in the following table to interpret the results of the blood type testing.

Antibody Testing Reactions		
Antibody Solution A	Antibody Solution B	Blood Type
Clumped	Not clumped	A
Not clumped	Clumped	B
Clumped	Clumped	AB
Not clumped	Not clumped	O

Reactions When Donor Red Blood Cells Are Mixed With Recipient Antibodies

		DONOR RED BLOOD CELLS			
		Blood Type AB	Blood Type O	Blood Type B	Blood Type A
RECIPIENT (PATIENT) ANTIBODIES	Blood Type AB no antibodies to A or B	 SAFE	 SAFE	 SAFE	 SAFE
	Blood Type A Anti B antibodies	 DANGEROUS	 SAFE	 DANGEROUS	 SAFE
	Blood Type B Anti A antibodies	 DANGEROUS	 SAFE	 SAFE	 DANGEROUS
	Blood Type O Anti A + B antibodies	 DANGEROUS	 SAFE	 DANGEROUS	 DANGEROUS

3. Based on the results of the **blood typing (and the information in the chart above) only**, which relatives (X, Y, and/or Z) would you conclude should not donate a kidney to the patient?

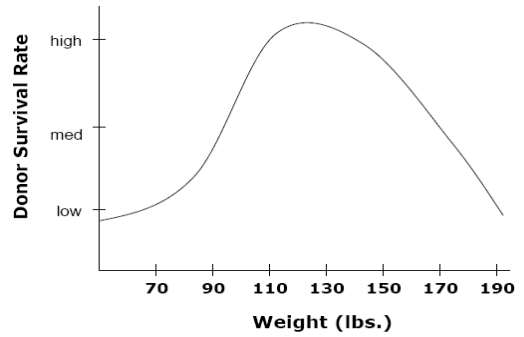
Support your conclusions with evidence from the blood typing data.

4. Explain why it might be dangerous for the patient, to receive a kidney from these donors.

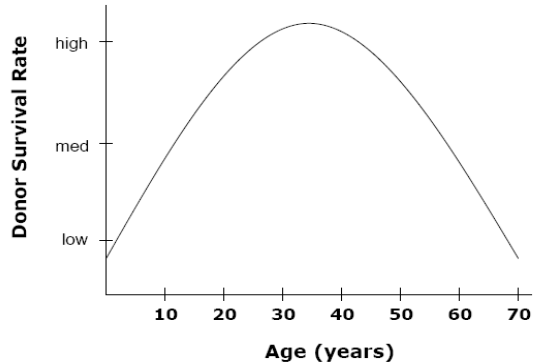
CLINICAL LABORATORY TEST 3: Evaluate the Health of the Donor

It is important that kidney donors are healthy enough to survive the loss of one of their kidneys. Medical researchers have investigated the relationship between weight, age, and exercise on the long term survival of kidney donors (survival of 10 years or more after donating a kidney). The results of their research are shown in the three graphs below.

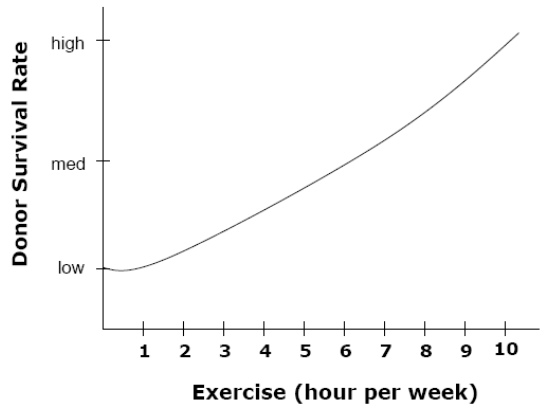
**Graph 1:
Donor Weight versus Donor Long Term Survival**



**Graph 2:
Donor Age versus Donor Long Term Survival**



**Graph 3:
Donor Exercise versus Donor Long Term Survival**



1. Use the donor survival graphs to determine the characteristics of an individual who would make an ideal kidney donor. Record this information in the appropriate row on the Donor Survival Research Data table below.
2. Use the information provided in the Donor Survival Research Data table to rank the donors' health (1 = highest survival rate, 2 = medium survival rate, 3 = lowest survival rate).

Donor Survival Research Data Table

	Weight (lb)	Age (years)	Exercise (hours per week)	Donor Survival Rank 1 = High survival 2 = Medium survival 3 = Low survival
Ideal Donor				
Donor X	130	35	10	
Donor Y	110	15	7	
Donor Z	190	70	2	

3. Based on the **donor survival research data only**, which relative (Donor X, Y, and/or Z) would you conclude should not be a kidney transplant donor?

Support your conclusions with evidence from the donor health data.

4. Explain why it might be dangerous for this donor to provide a kidney for the patient.

Based on **ALL of the information that you have collected so far** and your knowledge of biology:

5. Who is the best kidney donor for the patient (Donor X, Y, or Z)?

Explain your reasons for selecting this donor.

6. State one concern that doctors or the patient's family might have about allowing this donor to donate a kidney.

Clinical Laboratory Test 4: Tissue Typing: Evaluate the Match for Donor and Recipient Antigens

Once you have identified a possible donor, further testing is necessary to determine whether the potential donor's tissues are a good match for the patient. If the antigens on the donor's kidney do not match the antigens on the patient's tissue, the patient's immune system may produce antibodies that attack the transplanted kidney and cause a rejection reaction.

Human leukocyte antigens (HLA) are special proteins found on the surfaces of cells in the body that are very important for transplantation. There are many different antigens on the surfaces of cells, but the ones that seem to be most important for transplantation are HLA Antigen A, HLA Antigen B, and HLA Antigen DR. Each person has two specific forms of these three HLA antigens.

Because HLA antigens can be recognized as foreign by another person's immune system, it is important that the donor has as many as possible of the same HLA antigens as the patient. That way, there is less of a chance that the patient's body will reject the donated organ.

Doctors use a method called HLA tissue typing to identify which HLA antigens are present on the surface of the leukocytes (white blood cells) of the patient and the potential donor.

1. Use the HLA tissue typing kit to determine the HLA antigens present in the tissues of the patient and the HLA antigens present in the tissues of the potential donor.
2. Record the results of the HLA tissue typing by coloring in the circles that turned pink indicating the HLA antigens present in the donor and patient.

HLA Tissue Typing

	HLA Antigen A				HLA Antigen B			HLA Antigen DR	
	A-1	A-2	A-3	A-4	B-1	B-2	B-3	DR-1	DR-2
1. Patient	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Possible Donor	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

3. If a possible donor has antigens that are not found in the patient those “foreign” antigens may trigger a rejection reaction. In row 2, write an **X** on the colored circles that represent donor antigens that would be foreign (mismatched) if they were transplanted into the donor.
4. How many of the possible donor’s antigens would be mismatched (foreign) if they were transplanted into the donor?
5. Explain why tissue type mismatches are potentially dangerous.

Read the following information on HLA Research Data and then use this information to answer the questions below.

HLA Research Data
HLA Mismatches and Kidney Transplant Survival

Patients who receive a kidney transplant are given special drugs – called immunosuppressive drugs - which suppress their immune system to help prevent rejection of the new kidney. With the new immunosuppressive drugs that are given to patients who receive a kidney, kidney rejection is not as great a problem today as it was years ago. Even with mismatched HLA antigens, 95% of all transplanted kidneys are still functioning at the end of 1 year.

6. What actions could the patient take to reduce the chance that she will reject a transplanted kidney from this donor?
7. Based on the results of the HLA testing and the HLA Research Data, do you think that this donor should provide a kidney for the patient? Support your answer with information from the results of the HLA testing and the reading.

MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name (as printed on the label): "Urine" (simulated)

Product identity: Yellow food coloring – 1% Inorganic salts – 99%

Manufacturer: Science Take-Out, LLC
P.O. Box 205
Pittsford, NY 14534

Telephone number for information: (585)764-5400

Preparation date of this MSDS: 10/5/08

Medical emergency phone number (Chemtrec): (800) 424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

This product contains no hazardous materials as defined by the OSHA Hazards Communications Standard

Chemical Ingredients: Food coloring (1%); Inorganic salts (99%)

Chemical Name: N/A

CAS Number: N/A

Formula: N/A

Synonyms: N/A

Principle Hazardous Components: No Data

TLV and PEL units: No Data

OSHA-PEL 10ppm (TWA): No Data

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Avoid skin and eye contact.

Potential Health Effects EYES: May cause irritation. SKIN: May cause irritation.

4. FIRST AID MEASURES EYES - Flush with water for at least 15 minutes, raising and lowering eyelids occasionally. Get medical attention if irritation persists.
SKIN - Thoroughly wash exposed area.

5. FIRE FIGHTING MEASURES No data available

6. SPILL OR LEAK PROCEDURES

Wear proper eye and skin protection. Mop/wipe spill area. Rinse with water.

7. HANDLING AND STORAGE Avoid eye and skin contact

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection: N/A

Ventilation: N/A

Protective Gloves: Natural rubber, Neoprene, PVC or equivalent.

Eye Protection: Splash proof chemical safety goggles should be worn.

Other Protective Clothing or Equipment: None

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight: No data

Melting Point: N/A

Boiling Point: No data

Vapor Pressure: No data

Vapor Density (Air=1): No data

Specific Gravity (H₂O=1): No data

Percent Volatile by Volume: No data

Evaporation Rate (BuAc=1): No data

Solubility in Water: Soluble

Appearance and Odor: Yellow liquid

10. STABILITY AND REACTIVITY

Stability: Stable

Conditions to Avoid: No data

Incompatibility (Materials to Avoid): None

Hazardous Decomposition Products: No D

Hazardous Polymerization: Will not occur

11. TOXICOLOGICAL INFORMATION

Toxicity Data: No data

Effects of Overexposure: See section 3

Target Organs: Eyes and skin

Primary Route(s) of Entry: Eye or skin contact.

Conditions Aggravated by Overexposure: See section 3

12. ECOLOGICAL INFORMATION No data

13. DISPOSAL CONSIDERATIONS Can be disposed of in the trash or down the sink.

14. TRANSPORTATION INFORMATION D.O.T. SHIPPING NAME: N/A

15. REGULATORY INFORMATION N/A

16. ADDITIONAL INFORMATION

The information provided in this Material Safety Data Sheet represents data from the manufacturer and/or vendor and is accurate to the best of our knowledge. By providing this information, Science Take-Out LLC makes no guarantee or warranty, expressed or implied, concerning the safe use, storage, handling, precautions, and/or disposal of the products covered or the accuracy of the information contained in this fact sheet. It is the responsibility of the user to comply with local, state, and federal laws and regulations concerning the safe use, storage, handling, precautions, and/or disposal of products covered in this fact sheet.

MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name (as printed on the label):

"Blood" (simulated) - Patient, Donor X, Donor Y, Donor Z
Anti-A, Anti-B antibodies (simulated)

Product identity: Food coloring – < 0.1% Inorganic salts – 8-16%
Water – 84-92%

Manufacturer: Science Take-Out, LLC
P.O. Box 205
Pittsford, NY 14534

Telephone number for information: (585)764-5400
Preparation date of this MSDS: 10/5/08
Medical emergency phone number (Chemtrec): (800) 424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

This product contains no hazardous materials as defined by the OSHA Hazards Communications Standard

Chemical Ingredients: Red food coloring (1%) Chemical Name: N/A
CAS Number: N/A Formula: N/A Synonyms: N/A
Principle Hazardous Components: No Data
TLV and PEL units: No Data OSHA-PEL 10ppm (TWA): No Data

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Avoid skin and eye contact.

Potential Health Effects EYES: May cause irritation. SKIN: May cause irritation.

4. FIRST AID MEASURES

EYES - Flush with water for at least 15 minutes, raising and lowering eyelids occasionally. Get medical attention if irritation persists.
SKIN - Thoroughly wash exposed area.

5. FIRE FIGHTING MEASURES No data available

6. SPILL OR LEAK PROCEDURES

Wear proper eye and skin protection. Mop/wipe spill area. Rinse with water.

7. HANDLING AND STORAGE Avoid eye and skin contact

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection: N/A Ventilation: N/A
Protective Gloves: Natural rubber, Neoprene, PVC or equivalent.
Eye Protection: Splash proof chemical safety goggles should be worn.
Other Protective Clothing or Equipment: None

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight: No data Melting Point: N/A
Boiling Point: No data Vapor Pressure: No data
Vapor Density (Air=1): No data Specific Gravity (H₂O=1): No data
Percent Volatile by Volume: No data Evaporation Rate (BuAc=1): No data
Solubility in Water: Soluble
Appearance and Odor: Simulated "blood" - Red liquid; Anti-A – Yellow liquid; Anti B – Blue liquid

10. STABILITY AND REACTIVITY

Stability: Stable Conditions to Avoid: No data
Incompatibility (Materials to Avoid): None Hazardous Decomposition
Products: No Data Hazardous Polymerization: Will not occur

11. TOXICOLOGICAL INFORMATION

Toxicity Data: No data Effects of Overexposure: See section 3
Target Organs: Eyes and skin Primary Route(s) of Entry: Eye or skin contact.

12. ECOLOGICAL INFORMATION No data

13. DISPOSAL CONSIDERATIONS Can be disposed of in trash or down the sink.

14. TRANSPORTATION INFORMATION D.O.T. SHIPPING NAME: N/A

15. REGULATORY INFORMATION N/A

16. ADDITIONAL INFORMATION

The information provided in this Material Safety Data Sheet represents data from the manufacturer and/or vendor and is accurate to the best of our knowledge. By providing this information, Science Take-Out LLC makes no guarantee or warranty, expressed or implied, concerning the safe use, storage, handling, precautions, and/or disposal of the products covered or the accuracy of the information contained in this fact sheet. It is the responsibility of the user to comply with local, state, and federal laws and regulations concerning the safe use, storage, handling, precautions, and/or disposal of products covered in this fact sheet.

MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name (as printed on the label): "Donor Y Blood" (simulated)

Product identity: Red food coloring – 1%

Manufacturer: Science Take-Out, LLC
P.O. Box 205
Pittsford, NY 14534

Telephone number for information: (585)764-5400
Preparation date of this MSDS: 10/5/08
Medical emergency phone number (Chemtrec): (800) 424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

This product contains no hazardous materials as defined by the OSHA Hazards Communications Standard

Chemical Ingredients: Red food coloring (1%) Chemical Name: N/A
CAS Number: N/A Formula: N/A
Synonyms: N/A Principle Hazardous Components: No Data
TLV and PEL units: No Data OSHA-PEL 10ppm (TWA): No Data

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Avoid skin and eye contact.

Potential Health Effects EYES: May cause irritation. SKIN: May cause irritation.

4. FIRST AID MEASURES EYES - Flush with water for at least 15 minutes, raising and lowering eyelids occasionally. Get medical attention if irritation persists.
SKIN - Thoroughly wash exposed area.

5. FIRE FIGHTING MEASURES No data available

6. SPILL OR LEAK PROCEDURES

Wear proper eye and skin protection. Mop/wipe spill area. Rinse with water.

7. HANDLING AND STORAGE Avoid eye and skin contact

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection: N/A Ventilation: N/A
Protective Gloves: Natural rubber, Neoprene, PVC or equivalent.
Eye Protection: Splash proof chemical safety goggles should be worn.
Other Protective Clothing or Equipment: None

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight: No data Melting Point: N/A Boiling Point: No data
Vapor Pressure: No data Vapor Density (Air=1): No data
Specific Gravity (H₂O=1): No data
Percent Volatile by Volume: No data Evaporation Rate (BuAc=1): No data
Solubility in Water: Soluble Appearance and Odor: Yellow liquid

10. STABILITY AND REACTIVITY

Stability: Stable Conditions to Avoid: No data
Incompatibility (Materials to Avoid): None Hazardous Decomposition
Products: No Data
Hazardous Polymerization: Will not occur

11. TOXICOLOGICAL INFORMATION

Toxicity Data: No data Effects of Overexposure: See section 3
Conditions Aggravated by Overexposure: See section 3
Target Organs: Eyes and skin Primary Route(s) of Entry: Eye or skin contact.

12. ECOLOGICAL INFORMATION No data

13. DISPOSAL CONSIDERATIONS Can be disposed of in trash or down the sink.

14. TRANSPORTATION INFORMATION D.O.T. SHIPPING NAME: N/A

15. REGULATORY INFORMATION N/A

16. ADDITIONAL INFORMATION

The information provided in this Material Safety Data Sheet represents data from the manufacturer and/or vendor and is accurate to the best of our knowledge. By providing this information, Science Take-Out LLC makes no guarantee or warranty, expressed or implied, concerning the safe use, storage, handling, precautions, and/or disposal of the products covered or the accuracy of the information contained in this fact sheet. It is the responsibility of the user to comply with local, state, and federal laws and regulations concerning the safe use, storage, handling, precautions, and/or disposal of products covered in this fact sheet.

MATERIAL SAFETY DATA SHEET

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name (as printed on the label): "White Blood Cells"

Product identity: pH 10 buffer solution

Manufacturer/Distributor: Science Take-Out
P.O. Box 205
Pittsford, NY 14534

Telephone number for information: (585)764-5400
Preparation date of this MSDS: 10/6/08
Medical emergency phone number (Chemtrec): (800) 424-9300

2. COMPOSITION/INFORMATION ON INGREDIENTS

Bromothymol Blue Sodium Salt	CAS# 34722-90-2	<0.01%
Sodium Bicarbonate	CAS# 144-55-8	0.21%
Sodium Carbonate Anhydrous	CAS# 497-19-8	0.26%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Avoid skin and eye contact.

Potential Health Effects EYES: May cause irritation. SKIN: May cause irritation.

4. FIRST AID MEASURES

FIRST AID: SKIN: Wash exposed area with soap and water. If irritation persists, seek medical attention. EYES: Wash eyes with plenty of water for at least 15 minutes, lifting lids occasionally. Seek Medical Aid. INHALATION: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. INGESTION: Give several glasses of water. Vomiting may occur, but it is not necessary to induce.

5. FIRE FIGHTING MEASURES

Fire Extinguisher Type: Any means suitable for extinguishing surrounding fire
Fire/Explosion Hazards: None
Fire Fighting Procedure: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and clothing.

6. SPILL OR LEAK PROCEDURES Wear proper eye and skin protection. Absorb spill with inert material. Mop/wipe spill area. Rinse with water.

7. HANDLING AND STORAGE

Store in a cool dry place. This Material is not considered hazardous. Handle using safe laboratory practices. Avoid eye and skin contact

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Respiratory Protection: N/A Ventilation: local exhaust
Eye Protection: Splash proof chemical safety goggles should be worn.
Protective Gloves: latex or vinyl. Other Protective Clothing or Equipment: None

9. PHYSICAL AND CHEMICAL PROPERTIES

Molecular Weight: No data Melting Point: ~ 0 degrees C
Boiling Point: ~ 100 degrees C Vapor Pressure: No data
Vapor Density (Air=1): No data Specific Gravity (H₂O=1): ~1
Percent Volatile by Volume: > 98% Evaporation Rate (BuAc=1): No data
Solubility in Water: Soluble Appearance and Odor: Clear, blue, odorless liquid

10. STABILITY AND REACTIVITY

Stability: Stable Conditions to Avoid: High temperature
Incompatibility (Materials to Avoid): None Hazardous Polymerization: Will not occur
Hazardous Decomposition Products: No Data

11. TOXICOLOGICAL INFORMATION

Toxicity Data: No data Effects of Overexposure: See section 3
Target Organs: Eyes and skin Primary Route(s) of Entry: Eye or skin contact.
Conditions Aggravated by Overexposure: See section 3

12. ECOLOGICAL INFORMATION No data

13. DISPOSAL CONSIDERATIONS Can be disposed of in trash or down the sink.

14. TRANSPORTATION INFORMATION D.O.T. Shipping - Not regulated

15. REGULATORY INFORMATION N/A

16. ADDITIONAL INFORMATION

The information provided in this Material Safety Data Sheet represents data from the manufacturer and/or vendor and is accurate to the best of our knowledge. By providing this information, Science Take-Out LLC makes no guarantee or warranty, expressed or implied, concerning the safe use, storage, handling, precautions, and/or disposal of the products covered or the accuracy of the information contained in this fact sheet. It is the responsibility of the user to comply with local, state, and federal laws and regulations concerning the safe use, storage, handling, precautions, and/or disposal of products covered in this fact sheet.