# 🖉 🛛 Blood Smear

# STEM Sims

# Lesson 1: Analyzing a Peripheral Blood Smear

Many blood-related health issues arise when patients experience variations in the normal amounts of red and white blood cells in their blood. Sometimes these variations have genetic causes, while other times pathogens and other disease agents create the changes in the quantities of blood cells.

## **Doing the Science**

- 1. Start the Blood Smear simulation by selecting the "Simulation" tab.
- 2. Your first task is to create a procedure to prepare a slide of the patient's blood sample. Do this by dragging the "Possible Steps" in the right-hand column to the "Blood Smear Procedure" in the left-hand column. Make sure to order the steps in the procedure correctly. You can reorder the steps in the left-hand column by dragging a step higher or lower in the list.
- 3. When finished, select "Check Your Procedure." If errors exist, revise your procedure until it is correct. When correct, select "Stain" from the bottom of the screen.
- 4. Next, create a procedure for staining your slide using the same method used in the previous section by dragging steps to the left-hand column in the correct order.
- 5. When finished, select "Check Your Procedure." If errors exist, revise your procedure until it is correct. When correct, select "Analyze" from the bottom of the screen.
- 6. Select one of the six smear fields to view them under a microscope. Make sure the "High-Powered Objective" is selected.
- 7. Count and record in Table 1 the number of red blood cells (RBC) in the field. Repeat the process for the white blood cells (WBC) in the field. When you complete counting and recording, select "Back to Slide" and repeat steps 6 & 7 until you have analyzed all six fields.
- 8. After returning to the slide view, again select the first smear field.
- 9. Select the "Oil-immersion Objective."
- 10. Count and record in Table 2 the number and type of each *white blood cell* appearing in the field view. When you complete counting and recording, select "Back to Slide" and repeat steps 8–10 until you have analyzed all six fields.
- 11. Select "Evaluate" and then either the practice or test mode specified by your instructor.
- 12. Make sure to complete both data tables prior to completing the evaluate section.

Field of View	Number of Red Blood Cells	Number of White Blood Cells		
1				
2				
3				
4				
5				

#### Table 1. RBCs and WBCs Count

Name\_

6	
Total # of cells	
Average # of cells/field view	

#### Table 2. Number and Type of WBCs

Field of view	# Basophils	# Eosinophils	# Lymphocytes	# Monocytes	# Neutrophils
1					
2					
3					
4					
5					
6					
Total # of cells					
Average # of cells/field view					

### **Do You Understand?**

- 1. Using the total number of cells observed, calculate the ratio of red blood cells to white blood cells for the smear. Is the RBC-to-WBC ratio higher or lower than expected for a normal blood sample? Please explain your response.
- 2. Which, if any, of the five types of white blood cells appeared to be outside of the normal abundance range? If abnormal, make sure to state whether the WBC type is too high or too low.

12-digit code:

3. Rank the following observed in the blood smear in order of abundance (from lowest to highest): RBC, basophils, eosinophils, lymphocytes, monocytes, and neutrophils.