

**Flipped Classroom Example**  
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**Course: General Biology I Lecture**

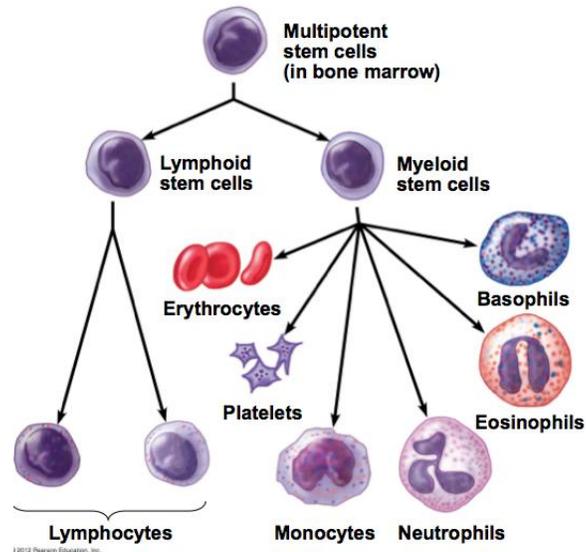
**Class size: 100 / section (4 sections) [in the past 200 / section in 2 sections]**

**Student demographic: General Education, open to all majors at RIT**

- **Overarching goal/learning outcome/topic for this part of the course**
  - Compare major organ systems, structures, and functions in animals (CLO)
- **Goal for this example involving the flipped model**
  - Have the students apply their knowledge of the circulatory system (blood components) to a disease.
- **The out-of-class video or other "content" (ideally a link to the content, but could also be a simple written description)**
  - **Time goal = 30 minutes**
  - <http://www.youtube.com/watch?v=KSbbDnbSEyM>
    - Rap video discussing the circulatory system in general
    - Note: A light-hearted intro to the topic is always a welcome lead in.
    - < 3 minutes
  - <https://www.khanacademy.org/science/healthcare-and-medicine/blood/v/what-s-inside-of-blood>
    - Khan Academy video – blood cells and components
    - Note: You may need a Khan Academy account to view this, as the YouTube version does not have the settings option for the captions.
    - 11 minutes
  - <http://www.youtube.com/watch?v=0AyB0eYt51I>
    - Video discussing what myelodysplastic syndrome (MDS) is, it's symptoms, and treatments.
    - Note: I have the students look at this video without sound, as the notes that they need are on the slides.
    - 9 minutes
  - <http://www.youtube.com/watch?v=PIFhC1egESI>
    - Note: Surgical content showing a bone marrow harvest. Bone marrow transplant is a common treatment for MDS patients.
    - 8 minutes

- **Description of in-class activities**

- Students are given the following diagram to consider (from their textbook):



- The students get in to groups and discuss the following questions that are presented on the display in class. These questions are answered in the student's notes.
  - What is the function of a multipotent cell?
  - What is the function of a myeloid cell?
    - How do these two cell types differ?
  - If leukemia is a cancer of the white blood cells, which cells *could* be involved in causing this cancer form to develop?
- The students change groups and discuss the following questions that are presented on the display in class. These questions are answered on the worksheet below.
  - What symptoms do you think an individual would present with who is then diagnosed with myelodysplastic syndrome (MDS)?
  - What treatments would you propose?
- These questions are discussed in class. The students are selected to contribute (occasionally with names randomly drawn from a "hat"), therefore the discussion is not always driven by the same 5% (or less) of the class.
  - Why would you propose the treatment(s) that you did?
  - What effect will these treatments have on the individual?
  - What effect will these treatments have on the disease (hint: cure or treatment of symptoms only.)?

Partner #1: \_\_\_\_\_  
 Partner #2: \_\_\_\_\_  
 Partner #3: \_\_\_\_\_

	<b>Write what you think ...</b> I think that _____, because _____.	<b>Listen and respond to your partner ...</b> Are your ideas similar? Very different? What points do you share in common and which are different?	<b>Share with the class ...</b> We agreed that _____. One important idea we discussed was _____.
<b>Question</b>	<b>What I think</b>	<b>What my partner(s) think(s)</b>	<b>Common summary points</b>
1: Symptoms of the disease			
2: Treatment of the disease			

- **Brief summary of expected and, if available, actual results**

- The students who have done the work outside of class and watched the videos have no problem with the group work associated with this exercise. Those who have not, do a lot of guessing! However, in the age of technology, a quick web search will get them most of the information, but it will not easily give them the discussion question answers. They will need to apply a lot of information to get all that is needed for those conversations.