

**Lesson Plan Components: Grades 1-12**

<b>Subject/Course:</b> Science (Biology)	<b>Name:</b> Adapted from EDUC 4736 teacher candidates' plans
<b>Grade Level:</b> Grade 10	<b>Date(s) &amp; Time(s):</b> February 13, 2023, 9:00-10:00 am
<b>Topic:</b> Tissues, organs and systems of living things	<b>Length of Lesson:</b> 60 minutes

**EXPECTATION(S)**

**Specific Expectation(s):**

Strand B. Biology: Tissues, Organs, and Systems

**B2.1** Use appropriate terminology related to human cells, tissues, organs, and systems, including, but not limited to: absorption, anaphase, capillaries, concentration, differentiation, diffusion, interphase, metaphase, osmosis, prophase, red blood cells, regeneration, and telophase [C]

**B2.2** Examine cells under a microscope or similar instrument to identify the various stages of mitosis in animals [PR, AI]

**Learning Goal(s)/Refined Expectations(s):**

Learners will move from one microscope station to the next investigating the different stages of cell division: view, identify, distinguish and illustrate the image of the cell cycle observed in each microscope (Four stages: Prophase, Metaphase, Anaphase, Telophase)

**Success Criteria (if appropriate):**

- Label illustration for each of the 4 stages;
- Order stages to reflect the cell cycle.

**ASSESSMENT/EVALUATION**

**Curriculum**

*Strategy:* Cell Structure Observations (4 stages) Handout

*Recording Device:* Rubric

**Learning Skills**

*Skill(s):* Responsibility, collaboration, self-regulation

*Recording Device:* Rating Scale & Anecdotal Notes

**DIVERSITY AND INCLUSIVITY**

Learners have basic knowledge of animal cells (content of the cell) and ability to coherently describe what is seen in the microscope slide.

Learner # 1: Learner with broken arm - use a scribe within the group to draw/write the differences in cell.

Learner # 2: Visual impairment - have a learner within the group describe what is being seen on the slides. Print off a hand out of cell divisions and have the group label the handout for them.

Learner # 3: Behavioural - reward or point system for every slide identified and recorded. If all the slides are recorded by the end of the lab they receive a reward. Award learner with a bring your device to class day (cell phone, iPod, tablet). If learners show ANY improvement, reward such improvements.

### **LEARNING ENVIRONMENT (Physical Space)**

- Group work (four people/group)
- Science lab

Adjustment to Learning Environment (before class):

- Have web link open for both of the Bill Nye videos that will be shown during the lesson and ready to play in full screen on the projector/SMART board projector
- Set up eight microscopes around the room for the different stations (two microscopes for each of the 4 stages of the cell cycle)
- Place a prepared slide for each of the four stages of the cell cycle on the stage of each microscope

### **RESOURCES AND MATERIALS**

- Ontario Ministry of Education. (2008). *The Ontario Curriculum, Grades 9 and 10: Science (revised)*. <https://www.dcp.edu.gov.on.ca/en/curriculum/secondary-science>
- Ontario Ministry of Education. (2010). *Growing Success: Assessment, Evaluation, and Reporting in Ontario schools—Covering Grades 1 to 12*. <http://www.edu.gov.on.ca/eng/policyfunding/growSuccess.pdf>
- Microscopes set up for each stage of cell cycle (Four Stages: Prophase, Metaphase, Anaphase, Telophase)
- Slides of animal cells (Four Stages: Prophase, Metaphase, Anaphase, Telophase)
- Paper and Pen (record differences)
- Handout with instructions and depiction of what cell cycles should be seen as well as open space to draw and describe what is seen through each stage of the microscope
- Smart Board/projector
- White board and white board markers

### **TEACHING/LEARNING SEQUENCE**

**Beginning/Activation:** (24 minutes)

Hook: Bill Nye the science guy video on cell division (LINK= <https://vimeo.com/116866613>) (7 minutes)

Activation of learners' prior knowledge:

- Quick review of how to focus and use the microscope. Ask learners to recall previous use of microscope and understanding of animal cell.
- Continuously circulate classroom during discovery time to keep learners engaged and focused.
- Can you recall the different parts of the microscope? - Remembering
- How would you describe the process of focusing a microscope? - Remembering

Procedures: Verbal instruction complemented with written instructions on hand out

- Step 1: Class has some previous knowledge of microscopes and cell division. Following the short 'Bill Nye' video, engage learners in a question answer period to garner and gauge understanding of previous skill sets and knowledge of cell division. -10 minutes
- Step 2: Provide learners with handout. Begin to instruct learners on the goal of the lesson. (View, identify, distinguish and illustrate the image of the cell cycle observed in each microscope) - 2 minutes
- Step 3: Have learners break up into heterogeneous groups of four that are chosen by the teacher and have them move to one of the eight stations that have been set up previous to the beginning of the lesson. - 5 minutes

**Activities:**

- Use of microscopes to view, identify, distinguish and illustrate the image of the cell cycle stage observed in each microscope
- Group Illustration of the different stages and labelling the stages in order
- Question and answer period at the end of the class

**Compelling Problem:**

- Identify and differentiate stages of cell division. Recreate what is seen through the microscope by illustrating the images on the handout.

**Middle/Action/Application/Exploration: (26 minutes)**

- Have learners begin to view, identify, distinguish and illustrate the image of the cell cycle observed in each microscope.
- Continuously circulate the classroom to help keep learners motivated and attentive to the task at hand.
- Ensure each learner is taking a turn to view every slide, through the microscope and learners are working effectively as a group to accomplish the task at hand.
- Ask learners what they think the importance of having the cell cycle progress in stages
- Ask the learners what the key differences between the stages of mitosis are
- Learning will be demonstrated as learners develop and garner the ability to identify the different stages of cell division.
- As learners demonstrate the ability to clearly identify what they see through the microscope. Have them describe, illustrate and differentiate the stage of cell division
- As learners' progress, use of microscopes should become proficient and illustrations should be correct.
- Learners will move between the four stations that correspond to each of the four stages of development
- At each station, every learner in the group will look through the eye piece and use the course/fine adjustment knobs to focus the slide they are looking at
- After viewing the stage of mitosis, they will draw what they see in the area designated on their handout
- After all groups have had a chance to see and illustrate each stage of mitosis they will return to their desks to review their observations.

**End/Consolidation/Communication: (10 minutes)**

- Flicker the lights when learners have one minute to be seated at their desk quietly
- Ask learners to discuss what they saw in the microscope at each stage
  - This will be done by having volunteers come up and illustrate what they saw for each of the four stages
  - As a class, we will decide what cell stage label goes with each of the illustrations on the board
- Have learners number the cell stages in the proper order on their handout and hand in their observation hand-out.

## **REFLECTION**

### Instruction:

To help all learners, meet expectations there will be adequate time allotted to each of the stages in our experiment, allow for a scribe to record the observations for our learner with a broken arm, create a separate worksheet with large images for the learner with low vision to have at the end of the lesson and have the learners in their group explain what is seen through the microscope, and finally our lesson helps to cater to boys in that as teachers we will circulate the room and help to guide them in their discovery of the knowledge as opposed to lecturing them on the topic being discussed.

### Next Steps:

Marking the Cell Observation hand-out shows most learners were able to identify the 4 stages from the slides. Tomorrow, I will conference with the level 1 and level 2 learners. During the following class, we will look at the stages of meiosis and will then be able to compare the differences between mitosis and meiosis. The next steps that can be taken in implementing this lesson would be to allow for differentiation in the representation of the different stages of cell division, this can be achieved by allowing learners to represent the stages of mitosis in a way that allows them to fully understand the concept. This can take the form of illustrating, a written description of what you see at each of the stages, or possibly even a skit where the learners themselves represent the parts of the cell that are involved in the process.

### Classroom Management:

To manage the class, I will implement a few strategies to ensure that the lesson flows smoothly. First, I will give specific instructions on how the learners will carry out the activity before they are separated into groups and at the stations, doing this will keep the learners attention on the instructions. Second, set up the stations required for the activity portion of this lesson prior to the start of the lesson in order to cut down on the distraction that comes along with the having learners set up for an activity. Next, I will be circulating the classroom during the activity, this will allow me to provide descriptive feedback and ensure that the learners are doing the activity properly along with allowing me to make sure that the learners are on task during this portion of the lesson. Another form of classroom management we have implemented is to choose the activity groups ourselves. This way we can ensure that learners who "goof" around together are separated for this portion for the lesson. Finally, we will be having the learners return to their desks for the consolidation of the lesson where we will be reviewing the stages, doing this will ensure that the learners are focused on their observation handout without the distraction of the microscopes.