

Round Two: **LABORATORY SKILLS PORTFOLIO: CBO2011**

The results of Round One will be released in early March 2011. The top 40 candidates from Round One will be invited to submit their Laboratory Skills Portfolio. To be considered for the finals in the Canadian Biology Olympiad and National Team Selection, one must submit this Laboratory Skills Portfolio on or before **Wednesday, April 13, 2011** to the address below. It is suggested that all students participating in the Canadian Biology Olympiad consider completing a portfolio, and have it ready for submission, because Round One results and portfolio due-date follow in close succession. Completing the tasks will improve laboratory skills for future studies in biology, even if not invited to submit.

The skills portfolio is designed to select candidates best suited to compete at the International Biology Olympiad. The IBO is more than just a knowledge competition; competitors must possess lab skills, and ability to work under pressure. It is expected by creating this portfolio students will demonstrate exemplary laboratory skills, and ability to complete tasks within set parameters.

All work presented is to be the students, and the skills performed must have been completed during the past two years of study. A teacher (supervisor if completed off school campus) must sign for authenticity and original work—see forms below. This outline is presented in advance so work on skills and development of the portfolio represents the student's true abilities and strengths. Please ensure the completed portfolio is received by the CBO on or before 23:59 April 13, 2011—in ONE package. Any portfolios arriving after 23:59 April 13th will not be accepted—no extensions (this includes all documents and letters of reference).

Submitting the Portfolio:

You may perform tests/labs as often as you wish (to work on technique and mastery), but only one lab sample is to be submitted for each category. Please remember, at the International Biology Olympiad you will be expected to be able to complete a multitude of lab exercises independently under pressure and time constraints, so it is in your best interests to work on laboratory skills and be proficient in these. Note, the labs here are not necessarily the same labs you will encounter at the International Biology Olympiad—the IBO labs remain unknown until the competition begins.

The entire Skills Portfolio MUST be submitted to:

Canadian Biology Olympiad
762 Upper James Street
Suite #137
Hamilton, ON
L9C 3A2

If you require clarification regarding the portfolio, please don't hesitate to ask.
Questions are to be directed to: Biologypob@live.ca

***Remember: The Lab Skills portfolio must be received on or before
April 13, 2011.***

The Portfolio must contain:

1. Personal Profile: This is NOT part of the evaluation for the Canadian Biology Olympiad, but will describe you as the participant!

2. Teacher Reference: each candidate must submit a confidential teacher reference. Please ensure this letter is sealed in an envelope, with the teacher signature across the seal. Teachers are to include the following information in the reference letter:

- a. In terms of Biology knowledge and skills, how would you rate this individual?
- b. In terms of maturity for international travel and ambassador for Canada, can you cite any examples of this student's ability to be a role model at an international venue?
- c. Do you have any concerns about this student, such as social behaviours or other issues? Would you travel with the student on an international expedition? Why or why not?

3. Personal Essay Response (10 marks): A maximum ONE page response to this question

How will pharmacogenomics, epigenome research, and the human genome mapping affect how the medical profession treats patients in the future? Include some discussion regarding how these fields will have to train future practitioners and what courses will need to be included in their studies.

You will be assessed on the following:

- How effective you were able to create a solid answer
- Use of effective communication including the use of scientific and question specific terminology
- Ability to fuse current medical field with the future needs of this large profession
- Effective use of examples and research to support your point
- Appropriate research and citations provided

What **must** be submitted:

- ONE page, single spaced, 12 font response, New Times Roman, one inch margins
- Additional page(s) for cited references acceptable

4. Completed Activity for EACH category below (40 marks):

Category A: Plant Anatomy and Physiology Lab

Category B: Insect/Arthropod Video Dissection

Category C: Measuring Lab

Category D: Inquiry Into Microbial Techniques

Category A: Plant Anatomy and Physiology Lab (10 marks)

Objective: In this lab, you are to create your own Stained Onion Root tip slide (or any other plant specimen root tip). The wet mounted slide should demonstrate clearly observable stages of mitosis. This is a timed lab, and you will have to videotape and submit an unedited 15 minute (maximum) video showing your ability **to make and stain** a root tip slide. You are to **FREE** section this task, and not use a microtome. The choice of stain will be made by you and your teacher; please indicate your stain either in the video or on the Lab Cover Sheet for this category.

Skills to demonstrate:

- Proper Lab Technique to create a proper stained wet mount
- Ability to accurately focus a microscope at high power (400x is sufficient)
- Ability to describe the roles the tissues of the root tip play in root formation

What must be submitted:

1. Lab Cover Sheet
2. 15 minute DVD (can be on the same DVD as other taped sections, but clearly label your DVD if you have multiple filming on a single disc).
3. A **labeled photograph of your section under 400x magnification**. Labels to include identification of metaphase, prophase, and anaphase. NOTE: the labelled photograph is to be of YOUR hand sectioned root tip, not a prepared root tip. The focussing of the microscope is not included in your video; your teacher/supervisor will verify you did it by signing the Lab Cover Sheet.
4. ½ page typed description of the tissues found in a root tip, AND what they end up becoming (just at the tip of the root).

Category B: Insect Dissection (10 marks)

Objective: You are to dissect an insect (or other arthropod) in a maximum of 20 minutes. You are to submit an un-edited video of this dissection. To complete the task, you are to dissect and demonstrate pinning technique to show interior views of the thorax and abdomen, as well as dissect out and present on a piece of paper the following key parts

- a hind walking leg,
- one set of mandibles,
- an antenna

Skills to demonstrate:

- Ability to accurately dissect an invertebrate specimen
- Ability to locate and dissect out specific parts of the insect/arthropod
- Ability to work under time constraints to complete the task effectively
- Ability to identify parts of the arthropod during dissection and mounting

What must be submitted:

1. Lab Cover Sheet
2. 20 minute video that demonstrates your ability to dissect, pin, remove and mount specific appendages.
3. An accurate labelled photograph of mounted appendages, detailing the parts of the hind walking leg, with cited details outlining where you obtained the names for the particular parts labelled

NOTE: your photograph must be close enough to see detail of the appendages and details to help distinguish and identify the parts. If you are unable to submit a photograph, you are permitted to submit your mounted appendages, but ensure it is packaged in such a way to ensure it arrives intact.

Category C: Measurement (10 marks)

Objective:

You are to choose a lab that will demonstrate your ability to measure using a spectrophotometer, or the ability to measure differences in concentration in a quantifiable way. Common examples that could be used to support this information would be: Hill Reaction, Bradford Assay, or even a titration to determine pH of a solution that determines the specific acid/base concentration the renders an enzyme denatured could work. You must complete the lab, collect data and demonstrate your ability to “measure” accurately.

Skills to Demonstrate:

- Ability to quantify differences in concentrations through spectrophotometer or other method
- Ability to graphically represent and interpret your data
- Effectively communicate through graph and text the outcome of your lab exercise

What must be submitted:

1. Lab Cover Sheet
2. Unedited 20 minute (maximum) video of you completing your procedure. Should demonstrate your ability to effectively use instruments and equipment. If using a Spec20, or equivalent, demonstration of using a blank and how to measure is necessary. If completing a titration, you must ensure in the video you explain what is happening and how you plan to use the data to determine the pH/concentration of the unknown acid/base. The maximum length of the video is 20 minutes. This footage can on the DVD with your other video labs.
3. A graphical representation of your results. This can be completed on a computer, but NOTE at the IBO graphs are often completed in a very strict time and must be done correctly by hand!
4. One page (maximum) explaining in words what your lab discovered, and what the results demonstrate in terms of the objective of the lab.

Category D: Inquiry Into Microbiology Techniques (10 marks)

Objective: For this task, you are to design a lab that measures the effectiveness of a common herb/spice extract (choice is one of the following three: garlic, ginger, or ginseng) in acting as an antibacterial agent. You are to create a procedure (maximum one page) explaining your protocol—how to extract your antibacterial, and how to test for effectiveness. Next, you need to video your procedure of creating your plates before incubation of your culture (this includes inoculation of the bacteria and your treatment plan). The video is to be a maximum of 10 minutes. Finally you must present the results and provide a statistical analysis of these results. You should be able to state whether further investigation into this food as a use for antibacterial properties based upon your findings.

Skills to demonstrate:

- Ability to develop a controlled experiment with a standard approach
- Ability to isolate and create an antibacterial “solution”
- Ability to demonstrate a clear antiseptic method of inoculating bacterial cultures
- Ability to present coherent data and interpret significance using basic statistical analysis
- Ability to interpret results into a statement describing if further investigation is warranted

What must be submitted:

1. Lab Cover Sheet
2. Procedure: 1 page maximum explaining how you plan to complete the lab
3. Maximum 10 minute video of your skills in handling and working with bacterial cultures
4. Presentation of final data, including statistical analysis of the results
5. Final statement (maximum of ½ page of writing) outlining how effective your agent was, and if you would recommend further investigation of this as an antibacterial source.

Lab Cover Sheet

(print ONE for each submitted lab category—should have 4 in the portfolio—Category A, B C and D)

Participant Name:				
School:				
Date Lab Was Completed:				
Lab Skills Category (circle/highlight):	A	B	C	D
Species/Organism Used: _____				
Name of videographer:				
List of Materials/stains/solutions/chemicals used (add to back if necessary):				

Teacher/Mentor Agreement

(must be signed by a supervising official—someone to verify that the work is the participant's)

I, _____, the supervising teacher, agree that the work presented/demonstrated with this cover sheet is _____ (name of student) personal's work. The report submitted represents this person's own writing and understanding. I also certify with my signature that this student completed the requirements as outlined in the objectives of the portfolio assignment.

Signature of Teacher

Date

Position

Contact Information
(phone or email)