

Canadian Biology Olympiad 2017

The 2017 Canadian Biology Olympiad/Les Olympiades Canadiennes de Biologie (CBO/OCB) is a nation-wide organization involved in the selection of four secondary school students talented in the field of biological sciences to represent Canada at the International Biology Olympiad. Students will be selected on the basis of a two round competition process (see below). The top four performing students in the CBO/OCB competition are invited to represent Canada at the 28th annual International Biology Olympiad (IBO) to be held in Coventry, United Kingdom in July 2017.

A) Who can participate in the CBO/OCB competition?

- Competitors must be residents of Canada and Canadian Citizens or Landed Immigrants.
- Competitors are students of a regular secondary school for general education in Canada. In Quebec, first year CGEP students are also eligible to participate.
- Competitors have not obtained a diploma allowing them to study at a university or equivalent institution, before the 1st of January 2017.
- Competitors have not yet started study at a university or equivalent institution as regular or full time students.
- Competitors must be under the age of 20 as of July 1st, 2017.
- Competitors have not already participated in the IBO (can only participate once).

Selection of the national team and participation in the IBO

In addition to the rules stated above:

- Competitors cannot compete in another International Olympiad in the same year they are participating in the IBO.
- No school can have more than 2 members on the CBO team
- At least 2 provinces should be represented.

B) The National Competition

The CBO/OCB competition is a two round contest. Round one is the submission of a Skills Portfolio to test your lab skills (see details below). The second round is the University of Toronto National Biology Competition to test your theoretical skills. (<http://www.biocomp.utoronto.ca/>). Please ensure you have your school registered for the University of Toronto Competition.

Final placing is based equally on the results from the Skills Portfolio and the University of Toronto competition

The four selected students will be required to attend the CBO National Training Camp taking place a week before the international competition. The camp provides a unique experience for students to work alongside professionals in a variety of biology fields and develop laboratory skills through intensive hands-on activities. Please note that the camp is also open to other young biology enthusiasts who will train alongside the four selected students (check the

National Training Camp tab on the web site for more information).

Important dates:

- The laboratory portfolio is due before April 20th, 2017.
- The University of Toronto Biology Competition exam is on April 27th, 2017.
- The national skills training camp will be held from July 16th to 20th, 2017 (details to come).
- The IBO will be held in Coventry, United Kingdom from July 23rd to 30th, 2017.

We currently have limited sponsorship and as a result participants should expect to cover their own costs to participate in the national training camp and the IBO should they earn a position on Team Canada (last year the students paid \$3,300). We hope that this situation may change.

LABORATORY SKILLS PORTFOLIO: CBO2017

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 **Thursday April 20, 2017** in digital format (flash drive to the address below). It is suggested that all students participating in the Canadian Biology Olympiad consider performing the experiments multiple times prior to completing the requirements for evaluation. Completing the tasks will improve laboratory skills for future studies in biology, even if you are not successful in being selected for the team.

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 yours, and the skills performed must have been completed during the past year of study. A teacher (supervisor if completed off school campus—in the case that you are working in a college or university setting, or other school) must sign for authenticity and original work—see forms below. NOTE: the supervisor of your work **cannot** be a direct family member.

The portfolio is presented in advance so work on skills and development represents the student's true abilities and strengths. Please ensure the completed portfolio is received by the CBO on or before 23:59 April 20, 2017—in ONE package (if submitting as a digital series of documents, on a single thumb drive is appropriate with specific details noted when opening up the storage device—pdf, or Microsoft Office documents are most suitable)—if the documents are blank or cannot be read, there will be no contact to resubmit. Any portfolios arriving after 23:59 April 20 will not be accepted—no extensions (this includes all student documents). Letters of reference from a teacher may arrive late, if the teacher has sent an electronic request prior to the deadline.

Note: A French translation of the Skills Portfolio is available upon request but the U of T exam is only available in English.

Submission of 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.

Digital Video of the 2 labs and the written essay should be submitted on a single flash drive. These will not be returned. Videos should be in .mp4 format and check that the files can be opened on a computer other than your own.

The entire Skills Portfolio **MUST** be submitted to:

Dr. Sylvie Bardin
Canadian Biology Olympiad
UOIT Faculty of Science
2000 Simcoe Street North
Oshawa, ON, L1H 7K4

If you require clarification regarding the portfolio, please do not hesitate to ask. Questions are to be directed to: admin@canadianbiologyolympiad.ca

***Remember: The Lab Skills portfolio must be received on or before
April 20, 2017.***

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 (8 marks): A maximum ONE page response to this question

The CRISPR – CAS 9 gene editing system has the potential to revolutionize all aspects of biotechnology. Using specific examples, outline the pros and cons of using this technology in immunotherapy. Your response should include a brief description of the technology and a discussion on the ethics of using the technology.

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
- Effective use of examples and research to support your point
- Appropriate research and citations provided

What **must** be submitted:

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

4. Completed Activity for EACH category below (24 marks):

Category A: Plant Biology

Category B: Biochemistry

Category A: Plant Anatomy and Physiology Lab (12 marks)

Objective:

Through the use of a photo-essay, you must demonstrate the morphological and structural differences between phylogenetically ancestral versus derived eudicot plants highlighting vascular tissue, roots, leaves, symmetry, flowers, seeds/fruit.. You must select your own samples species to complete this photo-essay. You must provide the scientific classification for the two samples used in your photo essay. You must use your own slides and samples for photographs (except for the comparison of the seeds and fruits) . These are NOT to be taken from other places or other peoples' work.

Photos should be labeled correctly and have descriptions explaining the key differences observed to showcase understanding between the two types of plants. Both macro and micro differences should be included and explained.

You also need to include a video (maximum of 5 minutes) demonstrating your ability to make hand sections an Asteraceae flower and name and label all the reproductive organs(without the use of a commercial microtome) and use of a dissection scope to demonstrate your ability to focus at a the appropriate magnification and take digital photo of the specimen. If you are staining your specimen, it is important to include what stains that were used in your photo essay.

What must be submitted:

1. Lab Cover Sheet.
2. Digital Photo-essay: this photo essay is to include LABELLED and/or annotated photographs, demonstrating the differences between your samples. You are limited to 12 photographs. These photos are to be of YOUR completed sections and samples and your ability to use a microscope! There is to be some text that explains how the differences account for the plants structures.
3. A maximum 5 minute video (mp4 format) demonstrating your ability to hand section, for preparation of your slides.
4. You must include references for any information you obtained.

Category B: Biochemistry (12 marks)

Objective:

Design an experiment to extract actin and myosin proteins from chicken breast using differential solubility. Determine the amount of proteins in the two extracts using the Bradford assay (colorimetric assay). Present the standard curve graphically and conclude your experiment.

Skills to Demonstrate:

- Design your own experiment for the extraction of actin and myosin from chicken breast using differential solubility.
- Ability to quantify protein concentrations using a spectrophotometer or other methods.
- Ability to graphically represent data.
- Effectively communicate through graph and text the outcome of your lab exercise.

What must be submitted:

1. Lab Cover Sheet.
2. A one page (maximum) outlining the protocol in a step-by-step fashion. Also explain the theory behind using differential solubility to extract the two muscle proteins from chicken breast.
3. A 5-minute (maximum) video (mp4 format) of you performing your experiment. The video should demonstrate your ability to effectively use instruments and equipment. You may pause the recording of your experiment when procedures are being repeated but the video should show the key aspects of your complete procedure. Your video should highlight your technique. If using a spectrophotometer, demonstrate how you use a blank and how absorbance or transmittance is measured.
4. A graphical representation of the standard curve. This graph is to be completed by hand on a graph paper. You cannot use the computer for this. NOTE: at the IBO graphs are often completed in a very strict time and must be done correctly by hand!
5. One $\frac{1}{2}$ page (maximum) commenting on the data obtained and explaining how you would ensure that you actually extracted the actin and myosin proteins.

PERSONAL PROFILE:

(None of this information will be used in determining the Canadian Biology Olympiad...this is so the organizing committee can get a sense of who you are)

Participant Name:	
Home Address:	
Home Phone number (evening contact number):	
E-mail Address:	
School Attending (include City and Province):	
Age:	Birth date:
Status in Canada (check the appropriate box):	
Canadian Citizen <input type="checkbox"/>	Landed Immigrant <input type="checkbox"/>
Country of your issuing passport:	
What would it mean for you to be one of the four selected students to represent Canada at the next IBO?	
Do you have any limitations that might prevent you from attending the National Training Camp (in Ontario) from July 16 to July 20, 2017, and the International Biology Olympiad (in Coventry, United Kingdom) from July 23 until July 30, 2017?	

Lab Cover Sheet

(print ONE for each submitted lab category—should have 2 in the portfolio—Category A and B)

Participant Name:		
School:		
Date Lab Was Completed:		
Lab Skills Category (circle/highlight):	A	B
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, confirm 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)