Instructor: Dr. Margaret McNay  mmcnay@uwo.ca  
519-661-2111, ext. 88558  
Teacher Education Office, room 1039  
Hello, Teacher Candidates! I am the lead instructor in your science course, and fortunate to be teamed with two other teachers who love science as much as I do. You can get in touch with us by e-mail or through Anna Zuber in the Teacher Education Office (zuber@uwo.ca). We are happy to make appointments to meet with individuals or groups upon request—just ask.

Instructor: Ms. Rachelle Campigotto  rachellecampigotto@gmail.com  
Hello! I am very pleased to be helping with the planning and instruction of your science course this year. I am a PhD student at York University as well as an Ontario-certified teacher. My particular areas of interest are environmental education, food literacy, and how to support pre-service teacher learning. I look forward to working with you!

Instructor: Ms. Mary Lynch  mjlynch99@gmail.com  
Hello, everyone! I am very excited to be part of the PJ science course this year. As a classroom teacher for 30 years in both primary and junior grades, I always looked forward to teaching science. For many students, this is the subject that sustains their desire to learn by building on their natural curiosities. I am happy to be spending this year with you!

Calendar Copy: Approaches to and strategies for the teaching of science in the elementary school grades. Course content focuses on curricula and pedagogies that are true to the nature of science, consistent with desired educational aims, and appropriate for young learners. Significant attention is paid to environmental and sustainability education. Two hours per week, full year, .5 credit.

Course Description: PJ & JI Science is formatted for weekly 2-hour classes utilizing large group auditorium sessions and small group break-out sessions. Presentations, discussion, and hands-on activities are part of every class.
**Learning Outcomes:**

By the time you have completed this course, you should have developed knowledge & understandings—*habits of mind*—about:
- elementary school-level science and science concepts;
- the Ontario Science & Technology Curriculum, Grades 1-8;
- the place of environmental education in elementary science programs;
- how elementary school students think about and learn science;

developed *habits of thinking* about science and science teaching that are characterized by:
- a critical, creative, analytical, and reflective stance;
- a basis in evidence;
- inquiry processes;

acquired skills and abilities—*habits of hand*—to:
- plan science lessons, units, and programs;
- conduct science demonstrations and student hands-on activities;
- foster student inquiry and teach for understanding;
- communicate with others about science and about teaching, using a variety of media;
- apply your knowledge in a variety of ways (e.g., in planning, creating, teaching, evaluating, connecting to other subjects), and in a variety of settings (different grades, different students, different communities);

embraced *habits of heart* that tell you
- science can be engaging and enriching in the lives of the students in your classrooms;
- you can teach science in ways that are engaging and enriching.

**Course Materials:**

All documents and materials required during the course will be available on OWL under the *Resources* tab.

**Using Technology:**

Use the following sites to access the technological tools you may use during this course.

https://www.edu.uwo.ca/CSW/using_technology/index.html

<table>
<thead>
<tr>
<th>Learn OWL</th>
<th>Classroom Technologies</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technology Toolbox</td>
<td>Technology Requirements</td>
</tr>
</tbody>
</table>

| Get Support |

**Course Content:**

**Fall Term:** Course content is organized by date—but *the order of topics could change* depending upon needs and preferences of Teacher Candidates and instructors. You will be informed of any changes at least one week in advance.

**Winter Term:** Topics for the winter term will be selected from the list on p. 5 in November-December and then organized by date. You are encouraged to make suggestions about both the order in which the topics should be addressed, and about the topics themselves, particularly if you think something is missing from the list.
<table>
<thead>
<tr>
<th>September 11</th>
<th>Textbooks . . . should be burned. Standardized tests . . . should be outlawed.¹</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>• Why do so many kids hate science? What do we remember of our own experiences of science in school?</td>
</tr>
<tr>
<td></td>
<td>• How do kids view science and scientists?</td>
</tr>
<tr>
<td></td>
<td>• Why should we teach science anyway?</td>
</tr>
<tr>
<td></td>
<td><a href="https://search.proquest.com/docview/236910164/fulltextPDF/E2BFD4104EC44005PQ/8?accountid=15115">https://search.proquest.com/docview/236910164/fulltextPDF/E2BFD4104EC44005PQ/8?accountid=15115</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://www.wired.com/2012/06/opinion-scientist-stereotype/">https://www.wired.com/2012/06/opinion-scientist-stereotype/</a></td>
</tr>
<tr>
<td></td>
<td>Seif, Elliott (2013?). A dozen reasons why we need high quality science teaching and learning in a 21st century world.</td>
</tr>
<tr>
<td>September 18</td>
<td>Science is built up of facts, as a house is built of stones; but an accumulation of facts is no more a science than a</td>
</tr>
<tr>
<td></td>
<td>heap of stones is a house.²</td>
</tr>
<tr>
<td></td>
<td>What is science anyway? Theory, inquiry, and the nature of science.</td>
</tr>
<tr>
<td></td>
<td><a href="http://www.understandingscience.org">http://www.understandingscience.org</a></td>
</tr>
<tr>
<td>September 25</td>
<td>Science is one of my best subjects. I like it as much as gym. Science is a chance for you to really get a challenge,</td>
</tr>
<tr>
<td></td>
<td>and it’s one of the only times you get to use your brain to figure things out.³</td>
</tr>
<tr>
<td></td>
<td><a href="http://go.galegroup.com/ps/i.do?p=AONE&amp;u=lond95336&amp;id=GALE">http://go.galegroup.com/ps/i.do?p=AONE&amp;u=lond95336&amp;id=GALE</a></td>
</tr>
<tr>
<td></td>
<td>Campbell, T., Schwarz, C., &amp; Windschitl, M. (2016). What we call misconceptions may be necessary stepping-stones toward</td>
</tr>
<tr>
<td></td>
<td><a href="https://search.proquest.com/docview/1768607798?pq-origsite=summon&amp;accountid=15115">https://search.proquest.com/docview/1768607798?pq-origsite=summon&amp;accountid=15115</a></td>
</tr>
<tr>
<td></td>
<td><a href="http://go.galegroup.com/ps/i.do?p=AONE&amp;u=lond95336&amp;id=GALE">http://go.galegroup.com/ps/i.do?p=AONE&amp;u=lond95336&amp;id=GALE</a></td>
</tr>
<tr>
<td></td>
<td><a href="https://search.proquest.com/docview/236903079?pq-origsite=summon&amp;accountid=15115">https://search.proquest.com/docview/236903079?pq-origsite=summon&amp;accountid=15115</a></td>
</tr>
<tr>
<td>October 2</td>
<td>If you want . . . your students to be the best students, to keep them interested . . . , don’t just tell them the answers.</td>
</tr>
<tr>
<td></td>
<td>Give them clues to build on.⁴</td>
</tr>
<tr>
<td></td>
<td>How do children learn? The nature of inquiry.</td>
</tr>
<tr>
<td></td>
<td><a href="https://search.proquest.com/docview/236901022/fulltextPDF/995115CEDDEC4672PQ/12?accountid=15115">https://search.proquest.com/docview/236901022/fulltextPDF/995115CEDDEC4672PQ/12?accountid=15115</a></td>
</tr>
</tbody>
</table>

² Henri Poincaré, French mathematician
³ Grade 5 student
⁴ Grade 4 student
**October 16**

When I grew up, every kid put in some serious sandbox time, and it often involved building . . . complex sand structures around which fantasies were composed and competitions took place with neighborhood kids. The organic chemistry labs (at Yale . . .) were fun in the same way. We constructed molecules and competed with each other in the class on speed and yield. We mixed things up, and chemical transformations took place. We separated, we isolated, we analyzed. The odors were pleasant, and the physical process of working with our hands, as with sand, was satisfying. The biweekly organic labs became the high points of my week. By the end of the year, I knew that I wanted to be an organic chemist, as I realized one could play in the sandbox for a living.  

*Call it play if you wish; I call it work.*

**How do children learn?** The importance of play.


---

**October 23**

It’s better to know some of the questions than all the answers.

**How do children learn?** Children’s questions, teachers’ questions, fine questions, wait-time, think-time, & Socratic dialogue.


---

**October 30**

**Instructional Strategies and Techniques:** Alphabet Soup for Science Teachers—PEOE, KWL, TPS, C-Maps, the 5Es, PMI, CAF, AGO, OPV, and more.

---

**November 6**

**Planning for Teaching:** Creating and designing lessons. What curriculum guidelines and goals must I follow in teaching elementary science & technology? How do I plan to teach a science lesson?

---

**November 13—December 8, 2017: PRACTICUM**

*Break a leg!*

---

**December 11, 2017—January 5, 2018: SEASONAL HOLIDAY**

*Stay safe; stay warm; have a good break.*

---


7 James Thurber, 1894-1961, American writer & cartoonist.
### Welcome Back for the Winter Term

**First Day of Classes:** Monday, January 8, 2018

#### Topics for Winter Term will be selected from the following:

1. **Environmental Education for the elementary grades.**
   - what, why, how?
   - resources and teaching strategies
   - making a difference

2. **Instructional Strategies and Techniques:** Analogies, Metaphors, Drama, Role-Playing, Story-telling, Notes and Notebooks, & Other Strategies for Developing Understanding

3. **Cross Curricular Connections:**
   - How can I use writing to help children learn science?
   - What connections can be made between science and art? music?
   - **Aliens Ate My Homework**[^8]: Using Science Fiction to Teach Science

   - [http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/WW_science_literacy.pdf](http://www.edu.gov.on.ca/eng/literacynumeracy/inspire/research/WW_science_literacy.pdf)

5. **Special Events in Science:** Field trips, Science fairs, Science Olympics

6. **Assessment & Evaluation in Science and Technology**
   - What makes a good paper-and-pencil test? What is a “performance” test?
   - Isn’t teacher observation too “subjective” to use for report card marks?
   - How should notebooks, journals, & learning logs be evaluated?

7. **Science & Technology for All Children**
   - How can I teach science to meet individual student needs?
   - How can I ensure my science program is equitable in terms of gender, multicultural students, exceptional children, and so on?

8. **Forensic Science:** CSI in Intermediate School Classrooms
   - Evidence, Experiments, Models, & Other Tools for the Criminalist

9. **Instructional Strategies & Techniques:** Demonstrations & Discrepant Events
   - “Nothing Shocks Me; I’m a Scientist”[^9]: Lying on a Bed of Nails, Walking on Hot Coals, & Dipping Your Fingers in Molten Lead

10. **I Understand But I Don’t Believe It:** Learning & Conceptual Change

---

[^8]: Bruce Coville, teacher & writer of children’s fiction
[^9]: Harrison Ford, actor, as Indiana Jones, archeologist
Achievement of Learning Outcomes:

You must demonstrate your achievement of learning outcomes in several ways, including participation and both individual and group assignments.

<table>
<thead>
<tr>
<th>Course Activity</th>
<th>Knowledge Outcome</th>
<th>Performance Outcome</th>
<th>Due Date Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>During the course, you will:</strong></td>
<td>to enhance your learning about:</td>
<td>and to give you an opportunity to practice:</td>
<td></td>
</tr>
<tr>
<td><em>participate</em> in all class activities: e.g., prepare readings for class, complete entrance and exit tickets, engage with and support colleagues; evaluate your own participation levels;</td>
<td>all topics and all aspects of the course;</td>
<td>academic and professional <strong>accountability</strong>; academic and professional <strong>collaboration</strong>.</td>
<td>Weekly* 20%</td>
</tr>
<tr>
<td>browse the Teaching Channel; choose one video to <strong>analyze</strong> using recommended guidelines; report using a technological tool;</td>
<td>the shape, structure, and parts of a good science lesson; the use of technological tools to present information;</td>
<td>learning about teaching by analyzing a science lesson, and using a technological tool to communicate your findings to others.</td>
<td>October 16, 2017 20%</td>
</tr>
<tr>
<td>1: <strong>design and teach a science lesson</strong> during your practicum, or <strong>observe someone else</strong> teaching a science lesson; 2: <strong>analyze and report</strong> on the lesson you taught or observed using recommended guidelines;</td>
<td>1: the shape, structure, and sequence of parts of a science lesson; 2: what to look for and how to analyze a science lesson;</td>
<td>analyzing and reflecting critically on the planning and teaching of a science lesson.</td>
<td>January 22, 2018 20%</td>
</tr>
<tr>
<td><strong>research, demonstrate, &amp; report</strong> on a technique, strategy, or resource for teaching science, technology, or environmental education;</td>
<td>how to use a variety of techniques, etc., for teaching science, technology, and environmental education;</td>
<td>discovering, using, and teaching others about techniques for teaching science, technology, and environmental education.</td>
<td>February 12, 2018 20%</td>
</tr>
<tr>
<td><strong>develop your personal Manifesto on Science, Technology, and Environmental Education:</strong></td>
<td>what you will teach in a science and technology program, and why;</td>
<td><strong>articulating</strong> a coherent set of beliefs and ideas about your science program and your ongoing professional development as a teacher.</td>
<td>March 5, 2018 20%</td>
</tr>
</tbody>
</table>

* Participation is a basic expectation. The instructors reserve the right to refuse to accept or evaluate assignments from Teacher Candidates who are absent without excuse more than twice per term, or who demonstrate a lack of preparation for class, are reluctant to engage, or show other signs of a lack of academic or professional accountability.
**Policy Statements:**

**Accessibility:** The University of Western Ontario is committed to recognizing the dignity and independence of all students and seeks to ensure that persons with disabilities have genuine, open and unhindered access to academic services. Please contact the course instructor if you require course materials in an alternative format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for information about requesting academic accommodation, or go to the following website: [http://www.edu.uwo.ca/teacher-education/docs/policies/Accessibility_Western.pdf](http://www.edu.uwo.ca/teacher-education/docs/policies/Accessibility_Western.pdf)

---

**ATTENDANCE:** The B.Ed. program is an intense and demanding program of professional preparation. You are expected to demonstrate high levels of both academic and professional integrity. Such integrity is demonstrated in part by your commitment to and attendance at all classes, workshops, tutorials, and practicum activities. Read more about the Faculty’s attendance policy on-line at [http://www.edu.uwo.ca/teacher-education/docs/Attendance%20Policy%202016.pdf](http://www.edu.uwo.ca/teacher-education/docs/Attendance%20Policy%202016.pdf).

**EXCUSED ABSENCES:** If you are ill, require compassionate leave, or must miss classes for religious observance, your absence is excused; you will not be penalized but you are responsible for work missed.

**UNEXCUSED ABSENCES:** Any absence that is not a result of illness, bereavement, or religious observance is an unexcused absence. Three unexcused absences will result in you being referred to the Associate Dean and placed on academic probation. Further unexcused absence will result in failure of the course and withdrawal from the program.

---

**Language Proficiency:** In accordance with regulations established by the Senate of the University, you must demonstrate the ability to write clearly and correctly. Work which lacks proficiency in the language of instruction is unacceptable for academic credit, and will either be failed or, at the discretion of the instructor, returned to you for revision to an acceptable level.

**Late Penalties:** Normally, the only acceptable reasons for late or missed assignments are illness (which you must report to the Teacher Education Office) or extreme compassionate circumstances. Unexcused late assignments may be penalized up to 5% per day, and will not be accepted more than 5 calendar days after the due date unless prior arrangements have been made with the instructor.

**Academic Offences:** Scholastic offences are taken very seriously in this professional Faculty. You are, after all, going to be a teacher. No one wants someone who cheats teaching their children. Read about Scholastic Offence at the following Web site: [http://www.edu.uwo.ca/teacher-education/docs/policies/WEB_ScholasticDiscipline.pdf](http://www.edu.uwo.ca/teacher-education/docs/policies/WEB_ScholasticDiscipline.pdf)

**Plagiarism:** Plagiarism means presenting someone else’s words or ideas as your own. The concept applies to all assignments, including lesson and unit plans, laboratory reports, diagrams, projects using technology, and so on. For further information, consult your instructors, the Associate Dean’s Office, and current style manuals. *Advice about plagiarism and how to avoid it can also be found here:* [http://www.edu.uwo.ca/preservice/downloads/Plagiarism%20Policy.pdf](http://www.edu.uwo.ca/preservice/downloads/Plagiarism%20Policy.pdf)

**Plagiarism-Checking:** All assignments are subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com ([http://www.turnitin.com](http://www.turnitin.com)).

**Use of Laptops & Notebooks in Class:** As a courtesy to members of the class, please put your cell phone on ‘vibrate’ or turn it off during class. Laptops and other electronic devices may be used in a professional manner to facilitate your activities in the course, but out of courtesy to colleagues and the instructor, please do not engage in personal networking and non-course communication during class time – save it for before or after class, or for the break.
**SUPPORT SERVICES:**

A variety of support services are available at Western. If you need advice or assistance, do not hesitate to access any of these services.

FINANCIAL ASSISTANCE: Registrarial Services ([http://www.registrar.uwo.ca](http://www.registrar.uwo.ca))

WRITING SUPPORT: Student Development Centre ([http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/))

LEARNING SKILLS SUPPORT: Student Development Centre ([http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/))

INTERNATIONAL STUDENTS: Student Development Centre ([http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/))

ABORIGINAL STUDENTS: Student Development Centre ([http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/))

STUDENTS with DISABILITIES: Student Development Centre ([http://www.sdc.uwo.ca/](http://www.sdc.uwo.ca/))

SOCIAL & CULTURAL ISSUES: University Students’ Council ([http://westernusc.ca/services/](http://westernusc.ca/services/)).

EMOTIONAL or MENTAL DISTRESS: Students who are in emotional or mental distress should refer to Mental Health @ Western [http://www.uwo.ca/uwocom/mentalhealth/](http://www.uwo.ca/uwocom/mentalhealth/) for a complete list of options about how to obtain help.

B.Ed. PROGRAM ISSUES: zuber@uwo.ca, Teacher Education Office, room 1131

If you are not sure what to do: zuber@uwo.ca, Teacher Education Office, room 1131