



Ontario  
College of  
Teachers

Ordre des  
enseignantes et  
des enseignants  
de l'Ontario

# **Additional Qualification Course Guideline Science and Technology, Grades 7 and 8**

**Schedule C  
Regulation 184/97  
Teachers' Qualifications**

**August 2009**

Ce document est disponible en français sous le titre *Ligne directrice du cours menant à la qualification additionnelle, Sciences et technologie – 7<sup>e</sup> et 8<sup>e</sup> année, août 2009*

# **Additional Qualification Course Guideline Science and Technology, Grades 7 and 8**

## **1. Introduction**

Successful completion of the course developed from this guideline enables teachers to receive the Additional Qualification: Science and Technology, Grades 7 and 8.

The Additional Qualification Course: Science and Technology, Grades 7 and 8 is open to all teachers. Candidates come to the Additional Qualification Course: Science and Technology, Grades 7 and 8 with an interest or background in this area and a desire to extend and apply knowledge, skills and practices in the design, implementation, and assessment of the program.

Critical to the implementation of this course is the creation of positive learning experiences that reflect care, professional knowledge, ethical practice, leadership and ongoing learning.

The Ontario College of Teachers recognizes that candidates working in the publicly funded school system, independent/private institutions and First Nations Schools will have a need to explore in an integrated delivery model, topics and issues of particular relevance to the context in which they work or may work.

## **2. Regulatory Context**

The College is the self-regulating body for the teaching profession in Ontario. The College's responsibility related to courses leading to additional qualification includes the following:

- To establish and enforce professional standards and ethical standards applicable to members of the College.
- To provide for the ongoing education of members of the College.
- To accredit additional qualification courses or programs and more specifically,

*The program content and expected achievement of persons enrolled in the program match the skills and knowledge reflected in the College's "Standards of Practice for the Teaching Profession" and the "Ethical Standards for the Teaching Profession" and in the program guidelines*

*issued by the College.* (Regulation 347/02, Accreditation of Teacher Education Programs, Part IV Subsection 24).

Additional qualifications for teachers are identified in Regulation 184/97, Teachers' Qualifications. This regulation includes courses/programs that lead to Additional Qualifications, Additional Basic Qualifications, the Principal's Qualifications and the Supervisory Officer's Qualifications. A session of a course leading to an additional qualification shall consist of a minimum of 125 hours of work that is approved by the Registrar. Accredited additional qualification courses reflect the *Ethical Standards for the Teaching Profession*, the *Standards of Practice for the Teaching Profession* and the *Professional Learning Framework*.

Successful completion of the course leading to the Additional Qualification: Science and Technology, Grades 7 and 8, listed in Schedule C of Regulation 184/97, Teachers' Qualifications is recorded on the Certificate of Qualification issued to the members of the College.

In this document, all references to candidates are to teachers enrolled in the additional qualification course. References to students indicate those in school programs.

### **3. The Ethical Standards and the Standards of Practice for the Teaching Profession**

A commitment to a clear vision of what it means to be a teacher is at the core of teacher professionalism. The *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* (Appendix 1) provide the focus for ongoing professional learning and are the foundation for the development of the Additional Qualification Course: Science and Technology, Grades 7 and 8. In addition, the *Professional Learning Framework for the Teaching Profession* is underpinned by the standards, articulates the principles on which effective teacher learning is based and acknowledges a range of options that promote continuous professional learning.

#### **Standards Resources**

The College has developed resources to support the effective integration of the standards within additional qualification courses and programs. These resources explore the integration of the standards through a variety of educative and inquiry-based processes. A list of these resources can be found in Appendix 2

and are available through the College website ([www.oct.ca](http://www.oct.ca)). This guideline has been designed to reflect the *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession*.

#### 4. Course Components

The design, course content and implementation of the Additional Qualification Course Guideline: Science and Technology, Grades 7 and 8 support effective teacher education practices. The following expectations and course components of this guideline support and inform effective professional knowledge and practice within the Additional Qualification Course: Science and Technology, Grades 7 and 8.

The *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* are embedded within the overall expectations for candidates.

This additional qualification course has the following overall learning expectations for candidates:

- analyzing, interpreting and implementing Ministry of Education curriculum and district school board policies and guidelines
- having and applying the theoretical understanding necessary to design, implement and assess programs and/or practices
- modelling and adapting expectations, strategies and assessment practices in response to the individual needs of students
- facilitating the creation of learning environments conducive to the intellectual, social, emotional, physical, linguistic, cultural, spiritual and moral development of the student
- collaborating with in-school personnel, parents/guardians and the community
- accessing and exploring a variety of resources, including technological resources, within and beyond the educational system to enhance professional knowledge in support of student learning
- refining professional practice through ongoing inquiry, dialogue and reflection
- supporting and modelling ethical practices
- understanding the need to respect and conserve resources in the environment
- understanding how to create and sustain professional learning communities

- developing awareness of First Nations, Métis and Inuit (Aboriginal) ways of knowing and perspectives
- integrating environmentally respectful practices
- creating and sustaining safe, equitable and inclusive learning environments that honor and respect diversity.

Successful candidates will demonstrate their understanding of and ability to apply the following:

**A. Ontario Curriculum and Policies**

The Additional Qualification Course: Science and Technology, Grades 7 and 8 is aligned with current Ontario curriculum, relevant legislation, government policies and resources. These documents inform and reflect the development and implementation of the Additional Qualification Course: Science and Technology, Grades 7 and 8. These resources can be viewed at [www.edu.gov.on.ca](http://www.edu.gov.on.ca)

**B. The *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* by:**

- understanding and embodying care, trust, respect and integrity
- demonstrating commitment to students and student learning
- integrating professional knowledge
- enriching and developing professional practice
- supporting leadership in learning communities
- engaging in ongoing professional learning.

**C. Theoretical Foundations of Science and Technology, Grades 7 and 8**

- understanding the nature of scientific inquiry and its critical role in collecting evidence, finding relationships and proposing explanations in the development of scientific knowledge
- understanding the fundamental concepts and big ideas as identified in the elementary Ministry curriculum for science and technology

- understanding the nature of technology and technological problem solving in developing solutions and designing devices and/or systems that meet given criteria
- understanding how technology is used in many disciplines of study and on the other hand how technology uses knowledge and is influenced by other disciplines such as science
- distinguishing between processes and terms that are scientific and technological and those that are not
- exploring a variety of conceptual frameworks for Science and Technology, Grades 7 and 8 (for example, constructivism, scientific, technological and environmental literacy, sceptical and critical thinking)
- understanding the philosophical underpinnings, the conceptual framework and the skills continua of the Grades 1-8 Science and Technology curriculum and how they inform the overall and specific expectations
- understanding the learning theories of adolescent learners and learner exceptionalities to develop relevant, developmentally appropriate and engaging contexts for science and technology
- understanding the objectives of personal and social growth for the learner through the study of Science and Technology, Grades 7 and 8
- reflecting on personal teaching practice and engaging in professional dialogue on the relationship of theory and practice in the teaching of Science and Technology, Grades 7 and 8
- having awareness of policy and/or legislation relevant to Science and Technology, Grades 7 and 8 (for example, specialized skills related to health and safety)
- integrating the *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* as the foundation for teacher professionalism within the Additional Qualification Course: Science and Technology, Grades 7 and 8.

#### **D. Program Planning, Development and Implementation**

- creating and maintaining positive, accepting and safe learning communities
- applying the *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession* to inform a program planning framework for Science and Technology, Grades 7 and 8

- identifying and respecting cultural, religious and ethical sensitivities related to science and technology issues, contexts and student participation in hands-on/minds-on activities
- understanding how to integrate fundamental concepts, big ideas and achievement chart categories to assess and evaluate student achievement of the expectations for Science and Technology, Grades 7 and 8
- understanding how to safely manage, maintain and use materials and equipment for scientific inquiry/experimentation and technological problem solving
- connecting Science and Technology, Grades 7 and 8 to students' everyday experiences
- connecting science and technology with other subject areas, including utilizing science and technology as a context for literacy and numeracy skills development
- utilizing the local context/environment in the planning of learning experiences
- identifying appropriate and relevant contexts from the relating Science and Technology to Society and the Environment curriculum expectations for developing scientific, technological and environmental literacy
- utilizing backwards design in the planning and developing of the program and the implementation of the curriculum including assessment and evaluation methods, strategies and tools
- integrating universal design and differentiated instruction in the planning, development and implementation of learning experiences in Science and Technology, Grades 7 and 8
- utilizing and assessing professional knowledge to inform pedagogical practices
- identifying, accessing, integrating and assessing community, print, electronic and collegial resources
- reflecting on program effectiveness in terms of its support of student achievement of the science and technology expectations.

#### **E. Instructional Strategies and the Learning Environment**

- fostering social cohesiveness and a collaborative community of learners
- developing a learning environment that is based on critical thinking, questioning and open ended problem solving

- understanding risk management and adopting safe practices in the science and technology learning environments
- understanding how to modify physical space and resources to create a safe learning environment
- developing competency in the safe and appropriate use of materials and equipment particular to the science and technology learning environments in grades 7 and 8
- developing competency in the safe and appropriate care and handling of living things
- exploring a variety of instructional strategies that support the development of student understanding and nurture a community of science and technology learners
- creating learning environments that relate Science and Technology to Society and the Environment, and integrate process skills and basic concepts through rich tasks
- adapting, modifying and accommodating instructional strategies to meet the needs of all learners and to encourage full participation by all students
- creating a learning environment that reflects the *Ethical Standards for the Teaching Profession* and the *Standards of Practice for the Teaching Profession*
- using pedagogies that reflect the professional identity of educators as described in the standards and in the *Foundations of Professional Practice*.
- integrating information and communication technology to support student learning
- understanding a variety of instructional strategies to support the teaching of Science and Technology, Grades 7 and 8.

#### **F. Assessment and Evaluation**

- creating fair and equitable assessment and evaluation methods and tools to promote student learning
- integrating multiple assessment methods to support student learning: assessment for learning, including diagnostic, self and peer assessment, assessment of learning, and assessment as learning

- using a range of assessment and evaluation strategies that support the dignity, emotional wellness and cognitive development of all students and are appropriate to the expectations
- understanding and responding to the issues of assessment and evaluation particular to the study of Science and Technology, Grades 7 and 8
- developing assessment and evaluation plans as part of design down program planning
- understanding the significance of the science and technology achievement chart categories and criteria for assessing and evaluating student achievement of science and technology expectations.

### **G. Shared Support for Learners**

- understanding the importance of communicating with, involving and supporting parents/guardians in relationship to science and technology learning
- understanding and employing a variety of effective communication strategies for collaborating with parents/guardians, school personnel and members of the community (for example, experiential opportunities such as speakers, mentors and field trips)
- developing methods to provide continuous, meaningful, detailed and supportive information and feedback to parents/guardians
- understanding and respecting the importance of shared responsibility and partnership as conveyed in the standards and the *Foundations of Professional Practice*
- developing awareness of community resources in support of Science and Technology learning (for example, science and technology fairs, technology competitions and challenges, science olympics, family science night).

## **5. Instructional Practice in the Additional Qualification Course: Science and Technology, Grades 7 and 8.**

In the implementation of this additional qualification course, instructors use strategies that are relevant, meaningful and practical in providing candidates with learning experiences about program, instruction, pedagogy and assessment and evaluation. Instructors model the standards, honour the principles of adult learning, recognize candidates' experience and prior learning and respond to

individual needs. These include but are not limited to, small group interaction, action research, presentations, independent inquiry, problem solving, collaborative learning and direct instruction. Important to the course are opportunities for candidates to create support networks and receive feedback from colleagues and instructors and share the products of their learning with others. Opportunities for professional reading, reflection, dialogue and expression are also integral parts of the course.

Where possible, experiential learning and authentic school-based experiences are included in the course, for example, classroom observations, practicum experiences and action research projects. Instructors model effective instructional strategies and formative and summative assessment that can be replicated or adapted in the candidate's classroom.

## **6. Assessment and Evaluation of Candidates**

At the beginning of the course, candidates are provided with the specific learning expectations and forms of assessment and evaluation that will be used throughout the course. Opportunities will be provided by instructors for regular feedback regarding candidates' progress throughout the course.

A balanced approach to candidate assessment and evaluation is used. It includes the combination of self and peer assessment and instructor evaluation, and models effective practices. A variety of assessment approaches will be used that enable candidates to convey their learning. The course provides opportunities for both formative and summative assessment and evaluation.

Central to teachers enrolled in additional qualification courses is the opportunity to be engaged in relevant and meaningful work. Assignments, artefacts and projects enable candidates to make connections between theory and practice. At the same time, assignments must allow candidates flexibility, choice, and individual inquiry opportunities.

Part of the evaluation process may include a major independent project or action research component over the duration of the course. This project is an opportunity for candidates to illustrate a high level of professional knowledge, skills, pedagogy, ethical practices and instructional leadership. Similarly, if a portfolio assignment is used, it will also include reflections and analysis of a candidate's learning over time.

A final culminating experience in the course is recommended. This experience may take the form of a written assessment, a research paper, a performance, an inquiry project or a product that is genuinely new, meaningful and practical.

The following list of assessment strategies is not exhaustive; it is intended to serve as a guide only.

- a) Performance assessment: designing a sample unit which includes a culminating activity and appropriate assessment and evaluation tools, incorporates a variety of technologies and resources relevant to the study of Science and Technology, Grades 7 and 8, and is based on Ministry of Education expectations
- b) Written assignment: reflecting critically on issues arising from articles, publications, research and/or other resources related to the teaching or practice of Science and Technology, Grades 7 and 8
- c) Presentation: developing a digital story, presenting an issue related to the teaching and learning related of Science and Technology, Grades 7 and 8
- d) Portfolio: creating a portfolio of practical resources, artefacts, photographs and recording critical reflections for each component related to Science and Technology, Grades 7 and 8
- e) Action research: engaging in action research by reflecting and acting upon a specific inquiry into teaching practice related to Science and Technology, Grades 7 and 8
- f) Independent project: addressing any aspect of the course that is approved by the instructor
- g) Instructional resource: developing a meaningful resource that will support instruction and pedagogy related to the teaching and learning of Science and Technology, Grades 7 and 8
- h) Reflective writing: reflecting on professional practice through journal-writing, or writing a case or vignette that will support instruction and pedagogy related to the teaching and learning of Science and Technology, Grades 7 and 8.

- i) Skill demonstration: demonstrating competency in the safe and appropriate use of equipment particular to the Science and Technology learning environments
- j) Differentiated instruction: developing or adapting differing strategies/lessons to address the same topic
- k) Case Study: creating a case study that affirms or challenges particular Science and Technology practices in light of the curriculum and best practices.

## Appendix 1

### **The *Ethical Standards for the Teaching Profession***

The *Ethical Standards for the Teaching Profession* represents a vision of professional practice. At the heart of a strong and effective teaching profession is a commitment to students and their learning. Members of the Ontario College of Teachers, in their position of trust, demonstrate responsibility in their relationships with students, parents, guardians, colleagues, educational partners, other professionals, the environment and the public.

#### **The Purposes of the Ethical Standards for the Teaching Profession are:**

- to inspire members to reflect and uphold the honour and dignity of the teaching profession
- to identify the ethical responsibilities and commitments in the teaching profession
- to guide ethical decisions and actions in the teaching profession
- to promote public trust and confidence in the teaching profession.

#### **The Ethical Standards for the Teaching Profession are:**

##### **Care**

The ethical standard of *Care* includes compassion, acceptance, interest and insight for developing students' potential. Members express their commitment to students' well-being and learning through positive influence, professional judgment and empathy in practice.

##### **Respect**

Intrinsic to the ethical standard of *Respect* are trust and fair-mindedness. Members honour human dignity, emotional wellness and cognitive development. In their professional practice, they model respect for spiritual and cultural values, social justice, confidentiality, freedom, democracy and the environment.

##### **Trust**

The ethical standard of *Trust* embodies fairness, openness and honesty. Members' professional relationships with students, colleagues, parents, guardians and the public are based on trust.

##### **Integrity**

Honesty, reliability and moral action are embodied in the ethical standard of *Integrity*. Continual reflection assists members in exercising integrity in their professional commitments and responsibilities.

## ***The Standards of Practice for the Teaching Profession***

The *Standards of Practice for the Teaching Profession* provide a framework of principles that describes the knowledge, skills, and values inherent in Ontario's teaching profession. These standards articulate the goals and aspirations of the profession. These standards convey a collective vision of professionalism that guides the daily practices of members of the Ontario College of Teachers.

### **The Purposes of the Standards of Practice for the Teaching Profession are:**

- to inspire a shared vision for the teaching profession
- to identify the values, knowledge and skills that are distinctive to the teaching profession
- to guide the professional judgment and actions of the teaching profession
- to promote a common language that fosters an understanding of what it means to be a member of the teaching profession.

### **The Standards of Practice for the Teaching Profession are:**

#### **Commitment to Students and Student Learning**

Members are dedicated in their care and commitment to students. They treat students equitably and with respect and are sensitive to factors that influence individual student learning. Members facilitate the development of students as contributing citizens of Canadian society.

#### **Professional Knowledge**

Members strive to be current in their professional knowledge and recognize its relationship to practice. They understand and reflect on student development, learning theory, pedagogy, curriculum, ethics, educational research and related policies and legislation to inform professional judgment in practice.

#### **Professional Practice**

Members apply professional knowledge and experience to promote student learning. They use appropriate

pedagogy, assessment and evaluation, resources and technology in planning for and responding to the needs of individual students and learning communities. Members refine their professional practice through ongoing inquiry, dialogue and reflection.

#### **Leadership in Learning Communities**

Members promote and participate in the creation of collaborative, safe and supportive learning communities. They recognize their shared responsibilities and their leadership roles in order to facilitate student success. Members maintain and uphold the principles of the ethical standards in these learning communities.

#### **Ongoing Professional Learning**

Members recognize that a commitment to ongoing professional learning is integral to effective practice and to student learning. Professional practice and self-directed learning are informed by experience, research, collaboration and knowledge.

## Appendix 2

### Standards Resources

The following standards resources are available through the College web site at [www.oct.ca](http://www.oct.ca).

Allard, C.C., Goldblatt, P.F., Kemball, J.I., Kendrick, S.A., Millen, K.J., & Smith, D.M. (2007). Becoming a reflective community of practice. *Reflective Practice* (8)3, 299-314.

Goldblatt, P.F., & Smith, D. (2004). Illuminating and facilitating professional knowledge through casework. *European Journal of Teacher Education* (27)3, 334-354.

Goldblatt, P.F., & Smith, D. (2005). *Cases for teacher development: Preparing for the classroom*. Thousand Oaks, CA: Sage Publications.

Ontario College of Teachers. (2003). *Standards in practice: Fostering professional inquiry*. (2003). [Resource kit 1]. Toronto, ON: Author.

Ontario College of Teachers. (2006). *Foundations of professional practice*. Toronto, ON: Author.

Ontario College of Teachers. (In Press). *Living the standards*. [Resource kit 2]. Toronto, ON: Author.

Smith, D., & Goldblatt, P.F. (Eds.). (2006). *Casebook guide for teacher education*. Toronto, ON: Ontario College of Teachers.