Locally Developed Courses

Myth Busting Methods

For the 2023-2024 School Year

Introduction to the Myth Busting Methods Course Sequence

Subject: Sciences - Discipline: Other Sciences

Myth Busting Methods encourages students to explore the nature of science through practical inquiry and problem-solving. Students examine the history of science as a methodology that challenges cultural and contemporary myths.

This course begins with an introduction to the nature of both mythological and scientific thinking by taking a critical look at thought-provoking research. Other topics of discussion include ethical (versus unethical!) research methods, and how the media influences public perceptions of science. Students will also be supported in designing and implementing their own research project. Student access to electronic, digital and/or print resources is necessary for the delivery of this course, and research project development.

In order to develop student understanding about the nature of scientific thinking, students must make comparisons with other perspectives, which includes mythological and sometimes faith-based ways of constructing our understanding of the world. According to Section 58.1 (1) Notice to Parent of the Education Act, “A board shall provide notice to a parent of a student where courses of study, educational programs or instructional materials, or instruction or exercises, include subject-matter that deals primarily and explicitly with religion or human sexuality.”

Safety in the Science Classroom (Alberta Education, 2006)

Canadian Institutes of Health Research (2023)

Natural Sciences and Engineering Research of Canada (2023)

Social Science and Humanities Research Council of Canada (2022)

Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans (2022)

Student Need

Myth Busting Methods recognizes that students benefit from grounding scientific ways of thinking within the social and historical frameworks of modern society. By using myths as a compelling starting point, students will gain appreciation for why the scientific process was developed and how science differs from other ways of thinking.

The overarching goal of this course is for students to be able to critically read and evaluate literature in the sciences and social sciences in order to discern the validity and reliability of published claims. This course also aims to develop students’ ability to engage in their own “myth-busting” by generating their own questions which they can investigate using qualitative or quantitative research methods.

Courses in the Myth Busting Methods Course Sequence

Myth Busting Methods 25 (LDC2295)

Myth Busting Methods encourages students to explore the nature of science through practical inquiry and problem-solving. Students examine the history of science as a methodology that challenges cultural and contemporary myths. Myth Busting Methods recognizes that students benefit from grounding scientific ways of thinking within the social and historical frameworks of modern society and by myths as a compelling starting point, students will gain appreciation for why the scientific process was developed and how science differs from other ways of thinking.

Myth Busting Methods is designed to give students multiple opportunities to experience the nature of science and to use scientific processes to help them critically evaluate some of the many myths that persist today. Myth Busting Methods will also give students some familiarity and understanding of non-scientific ways of knowing, and to help them appreciate when and how alternative ways of knowing contribute to our understanding of the world.

The overarching goal of this course is for students to be able to critically read and evaluate literature in the sciences and social sciences in order to discern the validity and reliability of published claims. This course also aims to develop students' ability to engage in their own "myth-busting" by generating their own questions which they can investigate using qualitative or quantitative research methods.

Students will have opportunities to write critically and creatively about both myth and science as ways of knowing, display their learning through alternative means (e.g. visual documentaries, poster presentations, group construction of creative representations, etc.), and will become more able to evaluate statistical and graphical scientific evidence (numeracy skills).

The Essential Understandings of this course are:
1. By investigating historical and contemporary topics, students will appreciate various understandings of the world through multiple frameworks.
2. Critically examining myths deepens understandings and ways of knowing.

This course begins with an introduction to the nature of both mythological and scientific thinking by taking a critical look at thought-provoking research. Other topics of discussion include ethical (versus unethical) research methods, and how the media influences public perceptions of science. Students will also be supported in designing and implementing their own research project. Student access to electronic, digital and/or print resources is necessary for the delivery of this course, and research project development.

In order to develop student understanding about the nature of scientific thinking, students must make comparisons with other perspectives, which includes mythological and sometimes faith-based ways of constructing our understanding of the world.**According to Section 58.1 (1) Notice to Parent of the Education Act,"A board shall provide notice to a parent of a student where courses of study, educational programs or with religion or human sexuality."**
It must be made clear to students that the intention of this course is not to criticize or refute other ways of thinking. The intention of addressing these topics is to provide contrast which serves to highlight how and why science is unique. It is expected that both students and teachers address these topics in a way that respects individual differences. Students will be required to submit their topics for an ethics and safety approval before performing their final project. This approval will comply with the Interagency Advisory Panel on Research Ethics (Government of Canada, 2003).

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There are two required assessments for Myth Busting Methods:
1. Literature Review:

- Students will gather and evaluate appropriate literature about a myth / topic of their choice.
- Students will summarize the historical development of the myth / topic.
- Students will identify the limitations of the body of knowledge and provide suggestions about what further research is needed in this area.
- Literature review is intended to assess but not limited to the outcomes identified under guiding question 5. Students should be able to arrive at an individual response to the guiding question based on their topic of choice and learning experiences.

2. Myth-Busting Research Project:

As a culminating activity for this course, students will do a study of a topic of choice reflecting myths found within the natural sciences or the social sciences. Students will then prepare a final research project. Given that this project represents a significant portion of the course evaluation, students will be expected to hand in portions of the project in stages before submitting their final product. In this report, students must include:

- A research proposal identifying the topic of study and a focusing research question
- Background information / research on the top
- A suitable methodological design
- Evidence of ethical/ safety considerations regarding methods used or content studied
- Justification for the choice of data collection methods
- Clear data processing and analysis
- Clear conclusions the reflect the relevance and validity of the research done
- Discussion of issues that occurred throughout the research leading to unsolved questions and new questions that have emerged as a produce of the research activity
- The Research Project is intended to assess but not limited to the learning outcomes found under guiding questions 4 and 6

Prerequisites:

- 1 of the following:
  - Science 10 (SCN1270)
  - Science 14 (SCN1288)

Versions Available: (Each version must be locally approved by Board Motion prior to offering to students.)

Credit Level	First School Year	Last School Year
3	2023-2024	2026-2027

Curriculum Outline

Curriculum Elements		Myth Busting Methods 25-3
1	**Topic** Understanding the Role of Myths	✓
1.1	**General Outcome** How have myths shaped early and modern society?	✓
1.1.1	**Specific Outcome** explore some of the common myths in early civilizations	✓
1.1.2	**Specific Outcome** explore some common myths of pre-industrial societies	✓
1.1.3	**Specific Outcome** explore some common myths present in modern, industrialized societies	✓
1.1.4	**Specific Outcome** explore and analyze some common myths about science and the scientific process	✓
2	**Topic** Using Scientific Inquiry When Exploring Myths	✓
2.1	**General Outcome** How is scientific inquiry different from myths and other ways of knowing?	✓
2.1.1	**Specific Outcome** explain the characteristics of scientific thinking as it compares to other ways of thinking	✓
2.1.2	**Specific Outcome** analyze the differences between science and pseudoscience to be able to classify examples using evidence	✓
2.1.3	**Specific Outcome** critically analyze reports in popular media to determine their validity and reliability	✓
2.1.4	**Specific Outcome** describe the function of myth and other ways of thinking within society	✓
2.2	**General Outcome** How has scientific inquiry changed over time?	✓

Curriculum Elements		Myth Busting Methods 25-3
2.2.1	**Specific Outcome** describe the role of several major historical figures in the development of the scientific method; including Plato, Aristotle, Bacon, Descartes, Newton, Hume, Kuhn, Popper, Einstein and post-modernist views of 'scientism'	✓
2.2.2	**Specific Outcome** generate questions to which the scientific method can be appropriately applied and iterate these within the historical continuum	✓
2.3	**General Outcome** What modern scientific methodologies do we use to answer questions about the world around us and how do we effectively apply them?	✓
2.3.1	**Specific Outcome** explore key research methods used in the natural and social sciences including experiments, observational studies, correlational studies, case studies, models and simulations	✓
2.3.2	**Specific Outcome** determine the role of certainty with respect to measurement and be able to calculate certainty in research	✓
2.3.3	**Specific Outcome** understand the concepts of validity and reliability and how they are applied to research	✓
2.3.4	**Specific Outcome** differentiate between inductive and deductive reasoning and determine when each type of reasoning is appropriate	✓
2.3.5	**Specific Outcome** differentiate between quantitative and/or qualitative research and determine when each approach is appropriate	✓
2.3.6	**Specific Outcome** evaluate the strengths and weaknesses of different research methodologies	✓
2.3.7	**Specific Outcome** consider ethical and legal implications that affect the social and natural sciences	✓
2.4	**General Outcome** How do we determine the accuracy and validity of information and popular claims?	✓
2.4.1	**Specific Outcome** compose a literature review on a myth or popular claim of choice	✓

Curriculum Elements		Myth Busting Methods 25-3
2.4.2	**Specific Outcome** investigate the role of the digital media, social media, and print media in transmitting scientific discoveries/concepts to the public	✓
2.4.3	**Specific Outcome** read online and print journal, magazine and newspaper articles and evaluate the validity and reliability of their claims	✓
2.4.4	**Specific Outcome** engage in debates / discussions reflecting different (including scientific) ways of thinking about a topic of choice	✓
2.5	**General Outcome** How can scientific inquiry be used and designed to dispel common modern myths?	✓
2.5.1	**Specific Outcome** use electronic, digital, print or other resources to develop a historical and contextual literature-based background for a research topic of interest	✓
2.5.2	**Specific Outcome** use background research to develop a simple research question on a limited topic in the natural or social sciences	✓
2.5.3	**Specific Outcome** design and implement an appropriate method for conducting research	✓
2.5.4	**Specific Outcome** explore and address ethical / safety issues that may arise concerning the chosen research topic and prepare a plan to deal appropriately with these issues	✓
2.5.5	**Specific Outcome** perform research during the time period given in the course and creatively solve challenges that may arise during the course of the research	✓
2.5.6	**Specific Outcome** evaluate the validity and reliability of student preformed research	✓
2.5.7	**Specific Outcome** present research in a matter of student choice, placing the topic within a meaningful context	✓
2.5.8	**Specific Outcome** present research in a matter of student choice, placing the topic within a meaningful context	✓

Curriculum Elements		Myth Busting Methods 25-3
2.5.9	**Specific Outcome** properly cite references/resources used for student research. - APA (American Psychological Association) format is preferred in the natural and social sciences	✓

Statement of Overlap with Existing Programs

Similar / Overlapping Courses	Description of Similarity / Overlap - Rationale
Big History 15	Big History and Myth Busting Methods both address scientific inquiry, and how with new information what we know about the world around us changes and evolves.
	Myth Busting Methods is necessary because it addresses different scientific methodologies that Big History does not. Big History asks questions about our universe, where Myth Busting Methods asks students to investigate myths and topics of choice, use the scientific inquiry to dispel those myths, and become critical consumers of the information they encounter on a daily basis, on social media, and in news media, relating to science and the world around us.
Science 10	There is overlap in the Nature of Science section of curriculum of the Science 10, 20, 24 and 30 courses. In all of these courses' and in Myth Busting Methods students will be asked to test their scientific knowledge through experimentation, investigation and scientific inquiry to answer questions about the world around them.
	Myth Busting Methods is necessary because students research, develop and implement a scientific inquiry of their own design, while evaluating the biases, validity and reliability of different scientific methodologies. Students also have an in-depth opportunity to think critically about the information they find and are presented in class. This LDC is specifically research and literature driven, providing students with the opportunity to write a literature review on their topic of choice, participate in ethical research methods supported by their teacher and experience the rigor of proving or disproving scientific or (nonscientific) claims.
Science 20	There is overlap in the Nature of Science section of curriculum of the Science 10, 20, 24 and 30 courses. In all of these courses' and in Myth Busting Methods students will be asked to test their scientific knowledge through experimentation, investigation and scientific inquiry to answer questions about the world around them.
	Myth Busting Methods is necessary because students research, develop and implement a scientific inquiry of their own design, while evaluating the biases, validity and reliability of different scientific methodologies. Students also have an in-depth opportunity to think critically about the information they find and are presented in class. This LDC is specifically research and literature driven, providing students with the opportunity to write a literature review on their topic of choice, participate in ethical research methods supported by their teacher and experience the rigor of proving or disproving scientific or (nonscientific) claims.

Similar / Overlapping Courses	Description of Similarity / Overlap - Rationale
Science 24	There is overlap in the Nature of Science section of curriculum of the Science 10, 20, 24 and 30 courses. In all of these courses' and in Myth Busting Methods students will be asked to test their scientific knowledge through experimentation, investigation and scientific inquiry to answer questions about the world around them.
	Myth Busting Methods is necessary because students research, develop and implement a scientific inquiry of their own design, while evaluating the biases, validity and reliability of different scientific methodologies. Students also have an in-depth opportunity to think critically about the information they find and are presented in class. This LDC is specifically research and literature driven, providing students with the opportunity to write a literature review on their topic of choice, participate in ethical research methods supported by their teacher and experience the rigor of proving or disproving scientific or (nonscientific) claims.
Science 30	There is overlap in the Nature of Science section of curriculum of the Science 10, 20, 24 and 30 courses. In all of these courses' and in Myth Busting Methods students will be asked to test their scientific knowledge through experimentation, investigation and scientific inquiry to answer questions about the world around them.
	Myth Busting Methods is necessary because students research, develop and implement a scientific inquiry of their own design, while evaluating the biases, validity and reliability of different scientific methodologies. Students also have an in-depth opportunity to think critically about the information they find and are presented in class. This LDC is specifically research and literature driven, providing students with the opportunity to write a literature review on their topic of choice, participate in ethical research methods supported by their teacher and experience the rigor of proving or disproving scientific or (nonscientific) claims.