

EDUC 206
Introduction to Secondary Science Teaching
Salish Kootenai College
Winter Quarter 2017

1) Course Information

Department and course number: EDUC 206

Credits: 3 undergraduate credits

Course meets: Tuesday and Thursday, 8:30 am to 9:50 pm, from January 9th, 2017 through March 17th, 2017.

The course utilizes the SKC Moodle course integration site.

This course includes 10 hours of required classroom observations of secondary science classroom in the Flathead Reservation schools. At least half of the classroom observations will be conducted as a class, during the regular course meeting time. Meeting sites for school visits will be announced and posted on the SKC Moodle.

Course Location: Room 118, Beaverhead Building

2) Instructor Information

Name: Wren Walker Robbins [**Dr. Wren**]

Email: address: wren_walkerrobbs@skc.edu

Office: Beaverhead, Room 120

Office Phone: 275-4780, *Cell:* [612] 615-2605

Office Hours:

- Monday & Wednesday, 1:00 – 3:00 PM
- Tuesday & Thursday: 10:00 – 11:00 AM
- Note: I also supervise student practicums and BSSE field experiences in local schools so my schedule can sometimes be unpredictable. Please contact me by email to make a firm appointment.

3) Required Materials

- *Bridging Cultures: Indigenous and Scientific Ways of Knowing Nature.* Glen Aikenhead and Herman Mitchell, authors. Copyright 2011, Pearson Canada. ISBN – 13: 978-0-13-210557. Because it is published in Canada, this book can take extra time to obtain so please plan accordingly. The BSSE office may have copies on hand for student use.
- Rutherford, F.J., and A. Ahlgren. 1990. *Science For All Americans.* New York, NY: Oxford University Press. The entire text of this book is online at <http://www.project2061.org/tools/sfaol/sfaatoc.htm>
- National Research Council. *Next Generation Science Standards: For States, By States.* Washington, DC: The National Academies Press, 2013. The full book can be read online at

<http://www.nap.edu/NGSS/> or it can be downloaded at <http://www.nextgenscience.org/next-generation-science-standards>. Alternatively, the NGSS are available on the National Science Teacher Association web site at <http://standards.nsta.org/AccessStandardsByTopic.aspx>

- National Research Council. *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas*. Washington, DC: The National Academies Press, 2012. The full book can be found and/or downloaded online at http://www.nap.edu/catalog.php?record_id=13165#
- Other readings and resources assigned by the instructor will be posted on the course Moodle.

4) **Course Description**

This course provides an introduction to secondary science teaching. Major topics include the nature of science across cultures, models of effective pedagogy for science teaching, science teaching as a profession, and the interplay of science, society and science education. An imbedded practicum of 10 hours of observations in local schools will be part of the course.

This course includes 10 hours of classroom observations in local secondary schools. On site meetings will include at least 5 hours of classroom observations which will be arranged by the instructor and conducted as a whole class during regular course meeting times. Schedules for the observations will be distributed via Moodle posting during the third week of October.

The course also utilizes the SKC Moodle for storing and providing access to course resources, and conducting online discussions. Students must submit course assignments via the Moodle.

5) **Course Objectives**

Through the successful completion of this course students will be able to

- A) generate concept maps that knowledgeably describe and compare the nature of science across cultures (Communication and Cultural Awareness);
- B) develop draft science lessons that effectively utilize research based pedagogy and culturally congruent instruction (Critical Thinking, Culture, and Communication);
- C) develop draft lesson plans that actively engage students in integrative STEM activities;
- D) employ learning theory to justify their positions on the use of research based pedagogy (Critical Thinking, Culture, Communication);
- E) describe the culture of teaching and the nature of the secondary science teaching profession (Cultural Awareness and Communication);
- F) explain the significance of the interaction of science and society and how it affects science education (Citizenship, Cultural Awareness and Communication); and
- G) effectively utilize technology to support their own and others' teaching and learning (Communication).

6) **Course Requirements and Schedule**

This course consists of two onsite meetings per week for the entire ten-week quarter, ten hours of individual and group classroom observations in local secondary schools, and online activities. Details are provided below and on the course Moodle.

Week 1 - 2 The Nature of Science [NOS] and Science Teaching

- Required Readings [see Moodle site to see a finalized list of readings, and to download readings not in assigned text]:
 - 1) *Revising Instruction to Teach the Nature of Science*, Lederman, N.G., Lederman, J.S. *The Science Teacher* 71.9 (2004): 36-39.
 - 2) *Views on the Nature of Science [NOS] questionnaire: Toward valid and meaningful assessment of learners' conceptions of nature of science*. *Journal of research in science teaching*, 39(6), 497-521.
 - 3) *Bridging Cultures: Indigenous and Scientific Ways of Knowing Nature* - Introduction, through chapter 2.
 - 4) *Comparing Indigenous Science & Western Science*, excerpt from: from Michell, H., Vizina, Y., Augustus, C., & Sawyer, J. (2008). *Learning Indigenous Science from place - Research study examining Indigenous-based science perspectives in Saskatchewan First Nations and Métis community contexts*. Aboriginal Education Research Centre. Saskatchewan. p. 34-34)
 - 5) *Next generation science standards[NGSS] Appendix H: For states, by states*. National Academies Press, 2013.
 - 6) *Handbook for Culturally Responsive Science*
<http://www.ankn.uaf.edu/publications/handbook/handbook.pdf>
- Assignments Due – see Moodle site

Week 3 - 4 Science, Technology, Engineering and Mathematics [STEM]/Society/Learning Theory/Writing Learning Objectives

- Readings – [see Moodle site to see a finalized list of readings, and to download readings not in assigned text]:
 1. *Integrative STEM Education, Primer*, Sanders, M., *The Technology Teacher* 68.4 (2009): 20-26.
 2. *Developing Objectives and Relating them To Assessment*, Bannister, S., *Faculty Center for Teaching and e-Learning. University of North Carolina at Charlotte* (2002).
 3. *Next generation science standards[NGSS] Appendix H: For states, by states*. National Academies Press, 2013.
 4. *Bridging Cultures: Indigenous and Scientific Ways of Knowing Nature* - Introduction, through chapter 4, 5.
- Assignments Due – See Moodle Site

Midterm Note: If you do not have a minimum of a B grade on every course assignment to date you must meet during the midterm week with the instructor to determine your future in the course.

Week 5 - 6 Models of Effective Science Pedagogy Part I – Learning Cycles/Using Evidence in Learning Science/Developing Conceptual Sequences

- Readings – [see Moodle site to see a finalized list of readings, and to download readings not in assigned text]:

1. BSCS 5E Instructional Model, National Science Teacher Association
2. *Examining the Learning Cycle*, Brown, Patrick L., and Sandra K. Abell. "Perspectives: Research & Tips to Support Science Education, K-6 (2013).
3. Excerpt From: *The BSCS 5E instructional model: Origins and effectiveness*. Colorado Springs, CO: BSCS 5 (2006): 88-98.
4. *Next generation science standards[NGSS] Appendix E: For states, by states*. National Academies Press, 2013.
5. *Bridging Cultures: Indigenous and Scientific Ways of Knowing Nature* - Introduction, through chapter 7.

- Assignments Due – see Moodle site for assignments

Week 7 and 8 Models of Effective Pedagogy Part II – Inquiry and Culturally Congruent Instruction

- Readings: [see Moodle site to see a finalized list of readings, and to download readings not in assigned text]:
 - 1) *Science as inquiry in the secondary setting*. Luft, Julie, and Randy L. Bell. NSTA Press, 2008.
 - 2) *Simplifying inquiry instruction*, Bell, Randy L., Lara Smetana, and Ian Binns. *The Science Teacher* 72.7 (2005): 30-33.
 - 3) *Student-Centered Notebooks*, *Science & Children*, v42 n3 (2004) p 26-29.
 - 4) Yes, But How Do We Do It? Ladson-Billings, Gloria, In *White teachers, diverse classrooms: A guide to building inclusive schools, promoting high expectations, and eliminating racism*. Stylus Publishing, LLC., (2006) p 29-43.
 - 5) *Boarder Crossing*, Cajete, G., In *Igniting the Sparkle: An Indigenous Science Education Model*. Kivaki Press, Skyland, NC (1999) p 97-100.
 - 6) *Bridging Cultures: Indigenous and Scientific Ways of Knowing Nature* - Introduction, through chapter 6.

Assignments Due – see Moodle site for assignments

Week 9 and 10 Putting Theory Into Practice

- Readings: [see Moodle site to see a finalized list of readings, and to download readings not in assigned text]:
- Assignments Due – see Moodle site for assignments

Classroom Observations

As a student enrolled in EDUC 206, you are required to spend 10 hours observing instruction in secondary science classrooms on the reservation. About half of these hours will be done as a group during our class meeting time; the rest you will need to arrange yourselves. Group observations scheduled during class time will be posted on Moodle. I will also provide contact information to you for teachers who are willing to host preservice teachers so that you can contact them to arrange the rest of your observation hours. Scheduling of observations, both group and individually, will ultimately depend on the classroom teachers' availability. It's important to realize that class schedules in the K-12 are often interrupted and irregular due to assemblies, sports, fieldtrips, etc., and to plan accordingly. Please contact

teachers at least three days in advance to request a visit to their classroom. You are also required to keep a journal of your reflections on each observation, as well as a log of your hours signed by the teacher you are observing. **The final signed form and journal for the observations will be due by on March 16.**

**** Note: An approved background check is required for any SKC student to visit reservation school classrooms.** If you do not have an up to date file in the SKC Education Department, please do so asap. You cannot pass this course without full participation in these classroom observations.

7) Credit Hours

Following the SKC Credit Hour policy, to meet the identified student learning outcomes of this course delivered over a 10 week term, each student will spend approximately

- an average of 4 hours per week in onsite work in the college classroom and in field work in secondary classrooms including observations and pre/post observation discussions, and
- an average of 6 hours each week working on other course assignments to meet the course learning objectives.

8) Evaluation

Students enrolled in the course will receive a traditional letter grade. Students will be evaluated using multiple methods and **ALL assignments must be completed to at least a “B” proficiency in order to receive a passing grade for the course.** Students are required to actively participate in all onsite class activities as well. All course assignments must be completed and submitted by the deadlines stated above. **Late work will docked 20% of the total possible points for each day it is late.**

An Incomplete grade (“I”) is NOT an option except in extreme emergency or the death of a family member. In either case, the instructor must be notified within 48 hours. All requests for Incompletes must be approved by the academic vice president.

<i>Assignment:</i>	<i>Maximum Points Awarded</i>
Concept Map	10
Discussion Forums #1: What Is Science?	6
Discussion Forum #2: Indigenous & Western Science	6
Interview A Scientist	15
Evaluate Two Science Lessons	15
Writing Learning Objectives	15
Micro Teaching Lesson –Final Draft	30
Classroom Observations – 1 st Set	30
Conceptual Sequence	15
Learning Cycle Lesson Template	15
Reflection – Inquiry Based Instruction	10
Final Lesson Plan Sketch	40
Classroom Observations – Final Set	30
Total Possible Points Awarded	239

Grades will be awarded using the following scale:

- 90 to 100% = A
- 80 to 89% = B
- 70 to 79% = C
- 60 to 69% = D
- Less than 60% = F

Attendance

- Regular and frequent participation in ALL class activities is required in order for students to have access to a rich and comprehensive learning experience. Completion of all assignments, and full participation in classroom and field work is also required for the successful completion of the course with a passing grade.
- **For the online discussions, students are required to post on the course Moodle at least 3 times per forum with substantive, meaningful posts in order to pass this course.** Moodle discussions will close to additional postings at 11:55 pm on the deadlines dates provided on the Moodle.
- Absences will only be excused if the student obtains prior approval from the course instructor, Regina Sievert. Opportunities for make up work will be limited and require prior approval by the instructor.

Other Important Information

Students with disabilities

Reasonable accommodations are provided for eligible students with identified disabilities. The College complies with the Rehabilitation Act of 1973 and the Americans with Disabilities Act. Students may contact the college's Disability Officer, Linda Pete, (linda_pete@skc.edu, 406.275.4968) or consult the SKC web page for Students with Disabilities for more information.

Academic integrity

All students must practice academic honesty. Academic misconduct is subject to an academic penalty by the course instructor and/or a disciplinary sanction by Salish Kootenai College. Violations of the college's policies (including plagiarism or other forms for cheating) may result in the student failing the course.

Behavioral expectations for students enrolled in this course

- 1) You are studying to become a teacher. Successful teachers must have a high level of self initiative and self-responsibility and should be able to work constructively as part of a team. You will find both of these scenarios in this course and you are expected to be able to have a high level of function in both.
- 2) **All** course assignments, completed to a minimum of a "B" proficiency, are required in order to pass this course.
- 3) Your full attention is also expected during class activities. No communication technology should be visible, turned on, or in use during class unless they are directly related to a course activity – this includes cell phones, iPads, and laptops.
- 4) You are responsible for communicating directly with the instructor concerning all aspects of the course including attendance and assignments. Do not expect other to deliver messages to the instructor.
- 5) You must use your SKC student e mail account for all communication regarding the course, including

communicating with the instructor. You are expected to submit your assignments through the Moodle using your Moodle account.

Title IX: The U.S. Department of Education’s Office for Civil Rights (OCR), enforces Title IX of the Education Amendments of 1972. Title IX protects people from discrimination based on sex in education programs or activities that receive Federal financial assistance. Title IX states that:

No person in the United States shall, on the basis of sex, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any education program or activity receiving Federal financial assistance.

All employees at SKC are considered “**Responsible Employees**” which requires them to report incidents of gender-based discrimination (sexual violence, sexual harassment, rape, sexual assault, domestic violence, and/or stalking). In accordance with Title IX laws, students must be made aware of the following: If any employee of SKC, including instructors, learns of any potential gender-based discrimination, they are required to notify the Title IX Coordinator, **Rachel Andrews-Gould** (275-4985, located in BigKnife Building), immediately. Once an incident is reported to Title IX, the student will be contacted by the Title IX Coordinator for follow up. Students can also report directly to the Title IX coordinator in regards to any gender-based discrimination.

If any student wants to speak with someone confidentially, the following resources are available:

Center for Prevention and Wellness Agnes Kenmille Building Building #51 406.275.4913 or 406.275.4744	SAFE Harbor Advocacy Services 24-Hour Advocacy 406.676.0800
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Speaking with a confidential resource does not preclude students from making a formal report to the Title IX Coordinator if and when they are ready. In the confidential setting, students will be made aware of available resources and reporting options. An advocate is available for all students upon request through the Center for Prevention and Wellness.

****NOTE: The faculty reserves the right to change the course syllabus or course content. Students will be provided advanced notice of changes in writing.**

11) **Course Outline**

Please refer to section #6 earlier in this syllabus, “Course Requirements and Outline”.

12) **InTASC Standards Addressed**

The BSSE degree program’s learning outcomes are based on the Montana Professional Educator Preparation Program Standards and InTASC Model Core Teaching Standards, developed by the Council of Chief State School Officers. These standards describe the essential skills and knowledge that every teacher should possess and practice in order to support their students in preparation for entering college or the modern workforce. Through its course content and activities, EDUC 206 addresses and strives to help students gain an introductory understanding of the following InTASC Standards.

Standard #1 - Learner Development

The teacher candidate understands how learners grow and develop, recognizing that patterns of learning and development vary individually within and across the cognitive, linguistic, social, emotional, and physical areas, and designs and implements developmentally appropriate and challenging learning experiences.

Standard #2 - Learning Differences

The teacher candidate uses understanding of individual differences and diverse cultures and communities to ensure inclusive learning environments that enable each learner to meet high standards.

Standard #3 - Learning Environments

The teacher candidate works with others to create environments that support individual and collaborative learning, and that encourage positive social interaction, active engagement in learning, and self motivation.

Standard #4 - Content Knowledge

The teacher candidate understands the central concepts, tools of inquiry, and structures of the discipline(s) he or she teaches and creates learning experiences that make these aspects of the discipline accessible and meaningful for learners to assure mastery of the content.

Standard #5 - Application of Content

The teacher candidate understands how to connect concepts and use differing perspectives to engage learners in critical thinking, creativity, and collaborative problem solving related to authentic local and global issues.

Standard #6 - Assessment

The teacher candidate understands and uses multiple methods of assessment to engage learners in their own growth, to monitor learner progress, and to guide the teacher's and learner's decision making.

Standard #7 - Planning for Instruction

The teacher candidate plans instruction that supports every student in meeting rigorous learning goals by drawing upon knowledge of content areas, curriculum, cross-disciplinary skills, and pedagogy, as well as knowledge of learners and the community context.

Standard #8 - Instructional Strategies

The teacher candidate understands and uses a variety of instructional strategies to encourage learners to develop deep understanding of content areas and their connections, and to build skills to apply knowledge in meaningful ways.

13) PEPP Standards Addressed

EDUC 491 addresses the following Montana Professional Educator Preparations Program Standards.

10.58.522.7 - The candidate for an endorsement in broadfield science demonstrates the following knowledge and skills:

- b) exploration and inquiry learning as tools in investigating all aspects of the natural environment and knows how to apply and teach these methods when instructing students;

- f) conceptual understanding of the relationships among science, technologies, and the study of environmental education;
- l) facilitating classroom discourse through questioning, reflecting on, and critically analyzing ideas, leading students toward a deeper understanding of the inquiry process itself, and especially, using questions to define problems and potential solutions.

10.58.522.2 - The science endorsement requires that successful candidates:

- a) demonstrate a thorough understanding of inquiry-based learning across the sciences. This preparation includes:
 - iv) methods to engage in inquiry in a variety of ways;
- b) demonstrate knowledge and skills in the methods of guided and facilitated learning in order to interpret and communicate science research to others;
- c) apply instructional strategies which models learning environments with extended time, appropriate space, and resources with equipment and technology found in the contemporary secondary classroom;
- d) apply and evaluate models of interdisciplinary approaches to provide experiences in understanding science;
- e) articulate a well-defined rationale for instructional goals, materials, and actions in relation to state and national education standards and student achievement.