

EDUCATION 325 - Fall 2023
TECHNIQUES FOR TEACHING IN THE ELEMENTARY SCHOOL: SCIENCE

Section 1: Tuesdays & Thursdays, 8:00 - 9:15am Rm CPS 206/208
Section 2: Tuesdays & Thursdays, 9:30 - 10:45am Rm CPS 206/208
Section 3: Tuesdays & Thursdays, 1:00 - 2:15pm Rm CPS 206/208

Instructor: Perry A. Cook, Ph.D. Office: Room 452 CPS - 346-3263
Office Hours: By appointment

Course Philosophy

Welcome to an exciting semester of learning how to teach science in an elementary education setting! Throughout this semester you will be involved in cooperative and independent activities, both on campus and in an elementary education field experience setting, that will enable you to become a confident, competent, and motivating teacher of science.

Tell me and I forget;
Teach me and I may remember;
Involve me and I learn!

Ben Franklin

Course Materials

Required: Text Rental –

Contant, Bass, Tweed & Carin (2018). **Teaching Science Through Inquiry-Based Instruction, (13th Edition)** Pearson. ISBN – 13:9780134516790

Additional readings on reserve in the LRC or Resource Room – TBA

Major Course Goals & Learner Outcomes

Students will:

1. Develop and increase confidence in teaching science.
2. Develop and demonstrate enthusiasm for teaching science.
3. Investigate basic science concepts that are appropriate for elementary students.
4. Become familiar with and implement DPI guidelines for science instruction.
5. Explore and practice strategies to use in the science classroom including: cooperative learning, conceptual change, problem solving, critical thinking, learning cycles and classroom management.
6. Plan and teach a hands-on science lesson in an elementary classroom.
7. Develop a deeper understanding of the nature of science: it's attitudes, processes, and products.
8. Begin to develop a philosophy of teaching elementary science (learner's role, teacher's role, and learning environment).
9. Design, construct and display an interactive science discovery learning center.
10. Become more knowledgeable about science resources, including technology, to enhance classroom teaching.
11. Gain experience in evaluating student conceptual development and performance in elementary science.
12. Become aware of and learn strategies to provide for equity and safety in the science classroom.
13. Become familiar with national and state standards in science.
14. Become familiar with the Wisconsin Teacher Standards.

15. Value the importance of utilizing learning activities, resources and assessments that are effective/appropriate (best practice) for students with diverse backgrounds (gender, multi-cultural, socio-economic), needs and learning styles.

Although all Wisconsin Teaching Standards will be addressed to some degree the following list identifies those that will be the major focus of this course. Please refer to pages 20 and 21 of the following link for more details

<https://www.uwsp.edu/wp-content/uploads/2022/11/CPS-Education-Advising-Guide.pdf>

WISCONSIN TEACHER STANDARDS

This course will focus on the following WTS:

WTS #5 Application of Content. The teacher 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.

WTS #6 Assessment. The teacher 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.

WTS #7 Planning for Instruction. The teacher 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.

WTS #8: Instructional Strategies. The teacher 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.

Points	Assignments	WTS Applicability
10	Black Box Science Presentation	1,3,4,6,7,8,9
15	Science Discovery Learning Center	1,3,4,6,7,8,9
10	Science Activities Pinterest Account	1,2,4,7,8
10	PEER Teaching	1,3,4,6,7,8,9
35	Unit Plan Must earn 80% or better to pass class	1,3,4,5,6,7,8
10	Student Choice	Variable
10	Professionalism and Participation	All

Common Core Standards and Rtl

Wisconsin has adopted the common core standards in several subject areas. However, the Department of Public Instruction has not adopted the Next Generation of Science Standards that was recently released. Here is a link to the NGSS: <http://www.nextgenscience.org/next-generation-science-standards>. The NGSS breaks down the science content for each grade level. We will continue to use the Wisconsin Model Academic Standards to guide our curriculum and learning until a change is made at the state level. Here is a link to the WMAS in Science: http://standards.dpi.wi.gov/stn_sciintro. The WMAS is more general in that it only breaks the content into by grades 4, 8 and 12.

Please refer to the link attached if you want to find the common core standards in other curricular areas. http://standards.dpi.wi.gov/stn_ccss

Wisconsin has a unique vision for the implementation of the framework for Rtl. The attached link provides you that framework as well as additional links to PBIS and SIMS. You are strongly encouraged to use this framework when thinking about instructional design. There is also a wealth of resources for understanding Wisconsin Rtl located at the Wisconsin Rtl Center website that is also included. <http://rti.dpi.wi.gov/> <http://www.wisconsinrticenter.org/>

UWSP Community Bill of Rights and Responsibilities

UWSP values a safe, honest, respectful and inviting learning environment. In order to ensure that each student has the opportunity to succeed, a set of expectations have been developed for all students and instructors. This set of expectations is known as the Rights and Responsibilities document, and it is intended to help establish a positive living and learning environment at UWSP. For information go to: <http://www.uwsp.edu/stuaffairs/Pages/rightsandresponsibilities.aspx>

The rights and responsibilities document also includes the policies regarding academic misconduct, which can be found in Chapter 14. A direct link can be found here:

<http://www.uwsp.edu/stuaffairs/Documents/RightsRespons/SSR-2010/rightsChapter14.pdf>

American with Disabilities Act

The American Disabilities Act (ADA) is a federal law requiring educational institutions to provide reasonable accommodations for students with disabilities. For more information about UWSP's policies, check here:

<http://www.uwsp.edu/stuaffairs/Documents/RightsRespons/ADAPolicyinfo.pdf>

If you have a disability and require classroom and/or exam accommodations, please register with the Disability and Assistive Technology Center and then contact me at the beginning of the course. I am happy to help in any way I can. For more information, please visit the Disability and Assistive Technology Center located on the 6th floor of the Learning Resource Center (Library). You can also find more information here:

<http://www.4.uwsp.edu/special/disability/>

Again, any special circumstances that are unique to you as a student learner can be discussed at any time. Please make special arrangements to meet privately during my office hours.

UWSP Diversity and Inclusion Statement

<https://www.uwsp.edu/diversity-inclusion/Pages/diversity-statement.aspx>

Course Framework and Evaluation

<u>Points</u>	<u>Assignment</u>
---------------	-------------------

10	<i>Black Box Science</i>
----	--------------------------

In teams of two (or 3 maximum), students will investigate a Black Box. Students must Pose a Scientific Question, Apply the Scientific Method, Answer the Question and Present their findings. Presentations may take the form of in person presentations, a short video (3-5 minutes maximum), Slides, PREZI, or Word Document. Clarity of question/problem/claim, experimental design, evidence that supports claim and strength of argument tying evidence to claim will all be used to assess investigations. **Each student** must upload a two to three page reflection paper highlighting what they have learned about the nature of science and how they plan to use what they learned in their own teaching of science.

15	<i>Science Discovery Learning Center</i>
----	--

Interactive Inquiry Based Science Discovery Learning Center
Plan, construct and set up at home an interactive science discovery learning center for an appropriate science topic of your choice (**NO EE PLEASE**). Please assemble your SDLC and include children's trade books that you would borrow from the school or local library. Take pictures before taking apart. Specific criteria for the SDLC are described in the SDLC Planning sheet and Self-Assessment found at the end of this syllabus. SDLC's should include: **at least FOUR** inquiry based hands-on activities; questions for students including handouts/worksheets/data sheets where appropriate; support materials, etc. See CANVAS for examples. Students may work in pairs or groups of threes on this task but please consider how you will divide the center upon completion.

All science discovery learning centers will be uploaded to the SDLC assignment folder in CANVAS. **Each student must submit their own self-assessment** along with your SDLC Folder to CANVAS. **(Please place all support materials in Discussion Folder to share with peers AND self-assessment in Dropbox to be graded by me).**

10	<i>Science Activities Pinterest Account</i>
----	---

Students must create and maintain a Science Activities Pinterest account for organizing web-based resources in science teaching and learning. Please be willing to share with your peers by posting your link without the need of password in Discussion Folder. Each pinterest board must have pinned a minimum of 50 activities Resources may include different science experiments/demonstrations/activities that illustrate specific elementary science concepts. Science disciplines that may be selected from include Biology/Life Science (plant, animal and EE), Chemistry, Physics, Earth Science (geology, climatology, etc.), Astronomy and General Science. Each student must try at least THREE of the activities or experiments on your own or with a peer. Each student must fill out the self-assessment sheet to document your account and describe the THREE activities you completed.

10	<i>PEER teaching</i>
----	----------------------

Please select a science activity that is **not Environmental Education** focused to develop into a detailed lesson plan then present to class during the PEER TEACHING weeks of class. Students may choose one from their Pinterest pinned activities, use lessons from their Ubd Unit Plan or any other resource made into an ORIGINAL lesson plan. NO PLAGIARISM or DOUBLE DIPPING from another class allowed.

Each student must please post their own PEER TEACHING self-assessment in the appropriate CANVAS dropbox to earn their grade.

Specific criteria for this assignment will be forthcoming in EMB seminars. **This is the signature assessment for EDUC 325. DPI requires all students earn a minimum of 80% on this task to be eligible for student teaching. No EE Please!**

10 *Student Choice – Professional Development*

Students must select **ONE** of the following activities to complete. When deciding what to do, keep in mind what will truly be of most benefit to you!

A. Professional Development. Attend a professional **science** conference or workshops. The WCEE and Science Departments on campus regularly list possible options. Submit a two-page summary of your experience including the title of the conference, sponsoring organization, workshops attended, presenter's name and a rough outline of the presentation. Attach copies of any handouts received in the sessions. Professional journals and newsletters often list scheduled conferences. **PRIOR APPROVAL REQUIRED** for this option. **Another strongly encouraged option for any K-9 EMB student considering teaching at the middle level in Science is to attend and participate in the WinStep Environmental Toxicity training workshops.** We are offering two trainings at UW-Stevens Point this Fall:

1. The Nerve and Muscular Basis of Earthworm Movements: Effects of Physical and Chemical Environmental Agents, and
2. Zebrafish: Effects of physical and Chemical Environmental Agents on embryonic development.

We are also inviting Middle and Secondary Level Science Educators from central Wisconsin schools to participate in the trainings. This will be an opportunity for you to work with possible cooperating teachers and some of them may be available to help you implement these modules in their classrooms during student teaching or practicum experiences.

The dates for the trainings will be:

Earthworms: Sept 12 and 14th from 5:30-7:30 and

Zebrafish: Sept 19 and 21st from 5:30-7:30

Additional Opportunities for Participating Teachers (and students)

Winter Training for Teachers – Feb or early March

Spring Student Research Conference: April 16, 2024 at UWM Student Union

A brief reflection paper on what you learned will be turned in for credit.

B. Interview on Science Ideas. You will interview a child of your choice on his/her ideas about an everyday science experience: rain, plants, stars, magnets, animals, light, electricity, etc. Plan to have props/hands-on materials for your interview so the child has something to touch or look at. Your purpose will be to probe their thinking in a non-threatening way by continuing to ask them what they know and why they think the way they do. Prepare a written summary and analysis of the child's thoughts, your reflections on the child's responses in terms of implications for classroom instruction and a brief presentation of your findings to be given to this class. Your written summary should include a list of materials used in the interview, a list of possible questions prepared prior to the interview, an analysis of the child's scientific understandings and your personal reflections on how this analysis would drive your instruction and curricular decision making.

C. Field Trip Plan. Develop a plan for a class field trip to the Downtown Central Wisconsin Children's Museum, the UWSP Museum of Natural History or any other appropriate location for teaching and learning science. Think of unique opportunities to learn science concepts while utilizing process skills being learned in class. Include objectives, relevance to classroom work, grade level, logistical considerations, parental permission forms, at least three student activities, and follow-up. Follow general field trip lesson plan (pre/during/post) formats.

D. Set up and maintain a terrarium or freshwater aquarium in this classroom or set up a chick incubator and hatch chicks in class. You should:

1. Collect information on how to prepare and maintain the center, where and how to collect specimens, as well as safety and ethical concerns related to having plants and animals in the classroom (I'll provide you with sources to use). Plan for what you will do with terrarium, aquarium or chicks when task is completed.
2. Construct at least one activity you would have children participate in (two pages each). Each activity should include learning objectives, science concepts and/or processes being explored, materials list and description of the activity itself. PARTNERS are strongly encouraged for this student choice.
3. Empty, clean, rebuild, restock and maintain Room 206 classroom aquarium. Dr. Cook will pay for materials and assist in decision making. This project is open to two students who must work together and write up a practical classroom aquarium manual for teachers. A lesson plan with 2 or 3 activities for fish, water studies, carrying capacity, general ichthyology, etc. must be included.

E. Instructional Technology Project. Using available technology resources, develop a technology based module on an elementary science topic. Possible projects include developing a complete and robust webquest that includes assessment; designing a MOODLE project for elementary students; designing a SMARTBOARD presentation; developing a set of PODCASTS with teacher and student participation; create a VERNIER probe lab for a science class; develop a set of science demo's and video tape using digital camera for classroom use. Each of these technology based projects must start with a written proposal to Dr. Cook. PRIOR APPROVAL REQUIRED for this option.

F. If you have other ideas or activities you feel would be more beneficial to your development as a science educator please make an appointment with me to discuss your idea. For example, building a set of smaller Black Boxes for your own class to discover the Nature of Science would give you a practical resource to use when you begin your career!

10 *Professionalism and Participation*

Each student must complete the self-assessment for Professionalism and Participation and submit to the assignment dropbox. Your active participation is a crucial aspect of this course. If you do not regularly attend class or visit your elementary school field placement, you will be unable to share in the many activities and experiences that will be undertaken during this semester. Remember that school administrators are seldom understanding of unexcused absences or chronic lateness. Now is the time in your professional development to work on your attendance and promptness. Participation in class activities CANNOT be made up and NO extra credit/supplementary work will be provided. In case of an emergency, which will require you to be absent from class, call me at my office or send an email before the absence if possible. Lack of participation may result in multiple **five (5) point reductions** in your participation grade. **No late work will be accepted.**

NOTE: Participation requirements for the practicum experience at a local field site must be met. Students who meet the on campus expectations for this class yet exhibit excessive tardiness, unexcused absences, poor or unsatisfactory performance in their practicum field experience with respect to the Wisconsin Teacher Standards will receive one of the following:

- A. a **failing grade in this class** with or without the option of repeating the entire experience,
- B. an **incomplete grade earned in this class**, the *disqualification* of student teaching the following semester and the requirement of successfully completing an additional practicum experience prior to student teaching. The Office of Field Experiences coordinates all placements.

Course Format

This course is divided into three distinct sections. The first five weeks include an introduction to elementary science topics such as The Nature of Science, Science Learning, Discovery Centers, Science Resources, Science Safety and Science Instruction. The second three weeks will include student led science activities that provide an overview of a variety of K-9 elementary science concepts and instructional approaches. The last seven weeks include the practicum field experience at a local elementary school.

Grading Scale

Points	Grade
100-93	A
92-90	A-
89-88	B+
87-83	B
82-80	B-
79-78	C+
77-73	C
72-70	C-
69-60	D
Below 60	F

Education 325 – Dr. Cook Science Discovery Learning Center Planning Sheet

Description

In groups of 2-3 you must plan, construct and display an interactive Science Discovery Learning Center that depicts a specific scientific topic (**NO EE PLEASE**). The scientific topic may be as narrow as a single concept or as broad as a bridging theme (i.e. primary colors to the visible spectrum of energy). Keep in mind these are different from bulletin boards - they involve manipulatives beyond a visually, aesthetically pleasing bulletin board. The purpose of a Science Discovery Learning Center is to engage students in active, inquiry based learning about a topic. They should be informative and interactive in nature and include a literacy component of some form. An opportunity to present your SDLC's in a professional setting will be provided in the spring semester (perhaps in the fall, too... TBD).

Evaluation Criteria

Your Science Discovery Learning Center will be evaluated on several criteria. Please take several pictures of your SDLC. Submit those pictures, a two page narrative (that describes the level, concepts explored, learning activities and learning assessments), a list of materials, activity directions and data sheets; an annotated APA/MLA bibliography of trade books and other sources of information as a SINGLE DOCUMENT (Science Discovery Learning Center Document) to CANVAS on the completion date. Please complete and submit the SDLC *Student Self-Assessment* form to CANVAS, as well. No more than \$40 should be spent on the entire project. SDLC's must be portable. Preprinted, professional posters and materials will not be accepted. Each of the submitting students will receive the same point grade for this project so please work together and assign the work equitably. Grades for the Science Discovery Learning Center project will be based on the following:

Folder information
Informative, Accurate Content and Concept Development
Fun
Visually stimulating
Interactivity
Creativity/Originality/Neatness/Format
Appropriate level
Literacy Component

Each Science Discovery Learning Center Project will be carefully assessed. Dr. Cook will look at your group self-assessment and determine the overall grade you will earn.

Education 325 - Science Discovery Learning Center *Student Self-Assessment*

SDLC Title: _____

Names: _____

<u>Issue/item</u>	<u>Points</u>
Included all SDLC Document Components (2)	_____
Informative, Accurate Concept Development (3)	_____
At least 4 Inquiry Based HO ³ Activities (4)	_____
Visually stimulating / Fun (2)	_____
Creativity / Originality/Neatness /Format (2)	_____
Literacy Component (2)	_____

Total: _____

Any additional comments (please write about your SDLC strengths and weaknesses):

Final Point Total: _____