

Methods of Teaching Science/Biology in the Secondary School

EEND and MEDU-691/BIOL-390

Template 2021 Section TMPL 3 Credits 03/29/2021 to 07/29/2100 Modified 11/30/2022

MISSION STATEMENT

As a Catholic university rooted in the liberal arts, we are a welcoming community of learners challenged by Franciscan values and charism, engaged in a continuous pursuit of knowledge, faith, wisdom, and justice, and ever mindful of a tradition that emphasizes reverence for creation, compassion and peacemaking. We strive for academic excellence in all programs, preparing women and men to contribute to the world through service and leadership.

Description

Examines methods and techniques for teaching science to middle grades and high school students. Focus will be upon laboratory experiences, teaching in the field, applications of the scientific inquiry method, use of technology, questioning and listening skills, delivery methods, differentiation, instructional planning, and assessment procedures. Classroom organization and management, relevant content and instructional standards, and professional development are also addressed.

Objectives

College of Education Mission

The mission of the College of Education is to prepare competent and caring educators who understand students, serve the community and develop professionally to become ethical decision-makers and leaders.

Understanding Students

- Demonstrate the ability to integrate courses in the Science content area, Mathematical instruction, and other disciplines in a manner adhering to the goals and standards for teaching Science. (NSTA 1.0)
- Plan instruction of the science content area utilizing a variety of teaching methods and strategies by incorporating instructional technology, educational materials, and scientific equipment. (NSTA 2.0)
- Apply strategies to engage students in effective scientific inquiry and convey the understanding of the role inquiry plays in the acquisition of knowledge. (NSTA 3.0)

Serving the Community

- Utilize parents and community resource connections to enhance the science education learning environment. (NSTA 7.0)

Finding Our Professional Selves

- Identify and implement multiple types of assessment to provide opportunities for students to demonstrate learning and to acquire data for instructional improvement. (NSTA 8.0)
- Relate scientific knowledge to other academic disciplines, particularly Mathematics and Social Sciences, through cooperative relationships and communications with educational professionals and to investigate current trends and issues in Science education. (NSTA 10.0)

Outcomes

Access to standards referenced in this section can be found [HERE](https://myusf.stfrancis.edu/portal/secure/content/8F295CCBB83C48C882D94A15B887B320)
(<https://myusf.stfrancis.edu/portal/secure/content/8F295CCBB83C48C882D94A15B887B320>)

By the conclusion of the course candidates will be able to:

1. Prepare appropriate and adequately constructed lesson plans that include behavioral/instructional objectives, curriculum content and materials, teaching strategies assessments to meet the needs of large groups, small groups, and individual students.
2. Design a minimum of one multi-dimensional unit of study within the biological or general sciences content area.
3. Develop and apply techniques of teaching biology as a laboratory science.
4. Write instructional objectives for use in the implementation of science learning standards and benchmarks in a middle or high school classroom.
5. Plan and teach lessons using a variety of teaching methods and strategies to encourage inquiry-based learning.
6. Design a lesson plan utilizing technology in a multimedia instructional approach to teaching science.
7. Select materials related to students' interests and promote career exploration in the Field of Science.
8. Design multiple assessments to address the different learning needs of a diverse student population.
9. Engage in professional development by investigating current trends in science education, communicate and build cooperative relationships with professionals in science and other academic disciplines.
10. Develop and maintain artifacts that relate to the Illinois Professional Teaching Standards for inclusion in a professional portfolio.

Illinois Professional Teaching Standards Addressed

- Introduced (I), Developing (D), Proficient (P)
- Proficient: *1a,1b, 1d, 1e, 1f, 1g, 1h, 1i, 1j, 1k, 1l, 3a, 3b, 3c, 3d, 3e, 3f, 3g, 3i, 3j, 3k, 3m, 3n, 3o, 3p, 3q*

NSTA Standards for Science Teachers Addressed

- 2a, 2b, 2c, 3a, 3b, 3c, 3d, 4a, 4b, 4c

NGSS standards Addressed

- MS-LS1, MS-LS 2, MS-LS 3, MS-LS4, MS-LS4; HS- LS1, HS-LS2, HS-LS3, HS-LS4

Assignments

Class Discussions/Participation

Candidates will respond to discussion prompts and engage in discourse with their classmates and instructor.

Lesson Plan/Unit Review, Analysis & Development

Candidates will create and evaluate instructional lessons for grades 6-12 utilizing the NBSS Standards.

- Course Outcome: 1,2,3,4,5,6,7,8,9,10
- NSTA: 2a, 2b, 2c, 3a, 3b, 3c, 3d, 4a, 4b, 4c
- NGSS Standards: MS-LS1, MS-LS 2, MS-LS 3, MS-LS4, MS-LS4; HS- LS1, HS-LS2, HS-LS3, HS-LS4
- Illinois Professional Teaching Standards: 1a,1b, 1d, 1e, 1f, 1g, 1h, 1i, 1j, 1k, 1l, 3a, 3b, 3c, 3d, 3e, 3f, 3g, 3i, 3j, 3k, 3m, 3n, 3o, 3p, 3q

Laboratory Safety

Candidates will analyze, reflect and critique laboratory safety scenarios.

- Course Outcome: 3,10
- NSTA 3d, 4a, 4b, 4c

Institutional Policies

Students should use the [MyUSF portal \(https://myusf.stfrancis.edu/portal/secure\)](https://myusf.stfrancis.edu/portal/secure) as the first resource for guidance and support on items such as student complaints, safety, security and transportation questions, contact information for various USF departments, student support services such as counseling and academic resources. Information on these resources can be found in the *For Students* section of the MyUSF portal.

- A complete listing of university policies and procedures can be found in the [University of St. Francis Catalog \(https://www.stfrancis.edu/academics/university-catalog/\)](https://www.stfrancis.edu/academics/university-catalog/) and Student Handbooks. Students are expected to follow all policies in the USF Catalog and Student Handbook, both of which can be found in the student portal.
- Students are expected to be familiar with and follow the various procedures and guidelines regarding USF's COVID-19 Response, including the USF Preparedness Plan and other materials incorporated in the Saints United resource hub (<https://www.stfrancis.edu/saints-united/>).
- Policies not covered in this document will be handled in accordance with the USF Catalog, Student Handbook, and Program Handbook as applicable.

Academic Integrity

Academic integrity requires that all academic work be wholly the product of an identified individual or individuals. Collaboration is only acceptable when it is explicitly acknowledged. Ethical conduct is the obligation of every member of the University community, and breaches of academic integrity constitute serious offenses. Since a lack of integrity hinders the student's academic development, it cannot be tolerated under any circumstances. Violations include but are not limited to: cheating, fabrication, facilitating academic dishonesty, plagiarism, and denying others access to information or material. See the [University of St. Francis Catalog \(https://www.stfrancis.edu/academics/university-catalog/\)](https://www.stfrancis.edu/academics/university-catalog/) for further clarification and information on grievance procedures.

Services and Accommodations for Students with Disabilities (ADA)

The University strives to be in compliance with the Americans with Disabilities Act (ADA) and the ADA Amendments Act (ADAAA). A student who requires special accommodations or arrangements due to a disability should contact the Office of Disability Services. This contact preferably should occur no later than the first week of classes. Early contact before the semester starts is encouraged to allow sufficient time to provide accommodations. Extra time is needed for some types of accommodations such as sign language interpreters or special text formatting. Should a need arrive after the start of a semester, the student is encouraged to contact the Office of Disability Services as soon as possible. Note that accommodations are not retroactive. Each case will be reviewed on an individual basis to determine reasonable and appropriate accommodations.

USF is committed to ensuring the full participation of all students in its programs, regardless of the course format. If you have a documented disability and need a reasonable accommodation to participate in a course, complete course requirements, or benefit from the University's programs or services, please contact the Office of Disability Services at [815-740-3631](tel:815-740-3631) or ODS@stfrancis.edu. The Office of Disability Services is in the Academic Resource Center (ARC) and is located on the second floor of the LaVerne and Dorothy Brown Library in room L214. Consultations are welcome, please contact the Office of Disability Services for an appointment.

Technology Support

If you are experiencing any difficulty using Canvas or need technical assistance, you have several options to receive support:

1. **24x7 Live Canvas Support.** Canvas has a 24 hour support by clicking on ? **Help** while in Canvas. You can **Chat with Canvas Support**, **Report a Problem**, or call the **Canvas Support Hotline**. If you experience technical difficulties or have a question about Canvas, you can receive support 24 hours a day seven (7) days a week through the Canvas help menu. From the help menu; select **Report a Problem** to send an email support request, select **Chat with Canvas Support (Student)** for a "live" text-based click-to-chat session, or to speak to someone directly use the toll-free number listed under the **Canvas Support Hotline (Student)**. **NOTE: Responses to Canvas' email based Report a Problem request system will go to your USF stfrancis.edu email account, NOT your personal email.**
2. **Online Self-Service Help Resources.** A student user guide and other resources for solving issues related to Canvas can be found at techsupport.stfrancis.edu
3. You can phone the Technology Support Center for personal help at (815) 768-8324 or (866) 337-1497 (toll-free) between 8:00 AM and 4:30 PM Central Standard Time, Monday through Friday or [fill out a Technology Support Center ticket \(https://techsupport.stfrancis.edu/help/\)](https://techsupport.stfrancis.edu/help/) and select **Canvas/Online courses** as the component.

For any technical support issues that are not related to Canvas, you can also contact the USF Technology Support Center (TSC). You can reach them via:

- Phone: 1-815-768-TECH (8324)
- Email: techsupport@stfrancis.edu
- Web: techsupport.stfrancis.edu
- Or visit them on the first floor of Marian Hall

Academic Support Services

The Academic Resource Center (ARC) located in Room L214 in the Library (815-740-5060) offers various types of academic services. Online and distance learning students can contact ARC for appropriate resources. ARC serves students who need tutoring in many areas of study including writing and math. Library services include a number of online services and full text databases. Call the Library at 815-740-5041 for additional information. If you need academic-related resources or assistance, please contact the Academic Resource Center.