



Planning a NGSS Unit with a STEM Emphasis (K-12)

EDUO 9540 Once semester unit/credit

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Course Syllabus

Course Overview

With the guidance of a course template, teachers will develop a successful STEM Next Generation Science Standard teaching unit. Website resources will provide information to aid in the planning of the STEM NGSS unit. Upon completion of this class the teacher will:

- develop a NGSS teaching unit involving at least one STEM lesson
- create one STEM teaching lesson plan
- relate the STEM lesson referenced above to the unit developed
- plan for future improvements based upon assessments in the created lesson
- communicate how to teach the created lesson

Course Objectives: In this course, participants will demonstrate competency in developing a unit and lesson plan by:

1. Read, study and respond to given website resources concerning STEM NGSS
2. Analyze the students for whom the NGSS unit plan will be prepared
3. Produce a teaching unit plan based on the results of #2
4. Make a complete STEM NGSS teaching lesson plan as part of the unit in #3
5. Develop classroom management plans with the help of the findings of #1&2
6. Identify all elements that will be used in #4
7. Describe how the elements in #4 will be interwoven through the plan
8. Create assessment strategies that reflect how successful #4, 5, 6&7 were
9. Consider future plans based upon #8
10. Write out instructions for a substitute so she/he can teach the plan.

Course Relation to CCS or other Professional Standards

This course aligns to the standards for:

[Next Generation Science Standards](#)

How to Submit Coursework

Combine all individual assignments and submit one document to the instructor for review. Follow assignment instructions on how to prepare and submit in the Assignment Dropbox. Name the file submitted with your last name and the course number (i.e. Brown, EDUO 9540). Make sure you place your full name, course number and assignment number at the top of each document page. You will receive feedback from your instructor within 5 days indicating successful completion of the assignment or the need for revision. Assignment grades will be averaged for the final course grade. A grading assessment rubric is located in this document.

Course Assignments –

A. Knowledge

After reading and studying the resource in website #1 respond to **A1-5**

1. https://www.nextgenscience.org/sites/default/files/Appendix%20I%20-%20Engineering%20Design%20in%20NGSS%20-%20FINAL_V2.pdf

Because of your knowledge of how engineering and technology intertwines with the NGSS, your principal has asked you to define the terms science, engineering and technology as they relate to NGSS at a PTA meeting. These terms mean something different to the parents' generation. Explain in A1-3 how you can effectively define the following.

- A1.** science
- A2.** engineering
- A3.** technology

One of the parents at the PTA meeting belongs to a group of engineers. She asks you to address the group at their next meeting. The engineers are interested in how you make your science curriculum emphasizing engineering and technology relevant to the student's life.

- A4** Summarize what you will tell the engineers.

Find and read in website #1 about the three component ideas (define, optimize and develop solutions) for the grade that you teach.

- A5** How will or have you incorporate (d) these three components in your science program?

B. Planning

NGSS Unit Plan with at least one lesson involving STEM

Follow the template below B1-6 to create the NGSS unit plan.

- B1** description and title
- B2** goals
- B3** objectives

Use the above **description, goals and objectives** designed for **this** course as a guideline in creating B1-3.

- B4** Describe the students the unit is intended for - include the following:

- academic and language abilities,
- learning modalities,
- different intelligences,
- cultural differences
- maturity

B5 List the lessons involved in the unit and what NGSS standards they will involve – indicate which one(s) emphasize STEM.

B6 calendar - create a calendar (or pacing guide) that details sequence, flow, and timing as you put all the lessons of your teaching unit together

Look over website resources #2-5 studying the areas that relate to your grade level. Use the information to help develop your STEM NGSS teaching plan (C1- 13)

#2 . <https://ngss.nsta.org/Classroom-Resources.aspx>

#3. <http://www2.ivcc.edu/mimic/nsf/Middle%20School%20Activities/STEM%20Activities%20Handbook.pdf>

#4. <http://marsed.asu.edu/stem-lesson-plans>

#5. <https://www.resa.net/curriculum/curriculum/science/professionaldevelopment/ngss-pd/lesson-plans-exploring-ngss/>

C. Individual lesson plan This plan is one listed on your calendar (B5) that emphasizes STEM.

Classroom Management

C1 What classroom management and community building strategies will you use for providing a safe classroom that will encourage risk taking?

C2 What strategies will you use to foster a sense of belonging and ownership for students?

Elements of the Plan

Identify the elements listed below that will be used in this teaching plan.

C3 text books

C4 materials and resources (print, video, audio, online, visual, other)

C5 activities

C6 discussion

C7 other

If any of the elements listed (C3-7) are not employed - explain why.

C8) Explain how each element relates as it is woven throughout the plan

C9) Discuss how each element influences B4 (students), and C1&2 (management).

Assessment

C10 What strategies will be used to assess pre-knowledge.

C11 Which ongoing techniques will be used to assess each of the elements as the unit progresses?

C12 Describe culminating assessment methods and or activities.

C13 How will you use the results of the assessments in C10-13 to design future classroom planning?

Calendar

C14. Create a calendar (or pacing guide) that details sequence, flow, and timing of your teaching plan.

C15. Explain the calendar as it relates specifically to **Elements** and **Assessment**.

Relationship to Unit Plan

C16 Discuss how this Stem NGSS teaching plan and its standards relate to B1-5 of the unit plan.

Instructions

C17 In case you are absent when the lesson is to be presented, write out instructions so the substitute can easily follow the plan without additional communication.

Website Resources

C18. Which website resources (#2-5) did you find the most useful as you created your STEM NGSS teaching plan – why?

Course Assessment Rubric

EXCELLENT Meets or Exceeds Course Objectives: A to A -	ACCEPTABLE Majority of Work Meets Course Objectives: B + to B -	NOT ACCEPTABLE Needs Considerable Improvement: Resubmit Work Suggested: C or below
Responses are well organized with specific details excellently expressed and every requirement completed	Material is relevant as it connects to each assignment	Ideas are not clear or relevant and not well organized
Shows ability to transform knowledge into very successful teaching lessons	Shows the ability to transform knowledge into the classroom	Shows little to no understanding of the how to transform knowledge into the classroom
Creatively and clearly summarized the	Summarized the knowledge learned	Provided few or no facts or specific

knowledge learned		details of the learned material
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Addendum:

- You are allowed 9 months to complete the course. Course questions? Contact your instructor by email.
- For questions involving your registration please contact us at support@dominicanCAonline.com or call (800) 626-5080. To change your address, link to your Dominican Store account at https://www.dominicanaonlinestore.com/store/index.php?main_page=login