



## Next Generation Science Standards Series

### Planning a NGSS Unit Emphasizing Math and ELA

EDUO 9541 One semester unit/credit

Instructors: Gina Bergskaug [gbergskaug@dominicancaonline.com](mailto:gbergskaug@dominicancaonline.com) and  
John Boucher [jboucher@dominicancaonline.com](mailto:jboucher@dominicancaonline.com)

***Understanding NGSS (K-12) is a prerequisite***

### Other Courses In the Next Generation Science Standards Series

#### Understanding NGSS (K-12)

**EDUO 9539** Two semester units/credits

Instructors: Gina Bergskaug and John Boucher

#### Planning a NGSS Unit with a STEM Emphasis

**EDUO 9540** One semester unit/credit

Instructors: Gina Bergskaug and John Boucher

***\*Understanding NGSS K-12 EDUO 9539 is a prerequisite for this course***

### Course Description

With the guidance of a course template, teachers will develop a successful Next Generation Science Standard teaching unit. At least one of the lessons will involve Math, Science and English language arts. Website resources will give information to aid in planning the NGSS unit and the individual Math, Science and ELA lesson.

### Course Goals

Upon completion of this course the teacher will have:

- 1) developed a NGSS teaching unit
- 2) created one teaching lesson plan involving Math, Science and ELA
- 3) related the lesson in #2 to the unit in #1
- 4) plan for future improvements based upon assessments in lesson #2
- 5) communicated how to teach the plan in #2

### Course Objectives

In carrying out the goals of this course the teacher will:

- 1) Read, study and respond to given website resources concerning 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 teaching lesson plan as part of the unit in #3.
- 5) Develop classroom management plans with the help of the findings of #1 and #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 and 7 have been.
- 9) Consider future plans based upon #8
- 10) Write out instructions for a substitute so she/he can teach the plan.
- 11) Create a chart from a math, science and ELA Venn diagram.

### Grading Rubric

Exemplary: A+ to A-	Acceptable: B+ to B-	Unacceptable: Must be resubmitted
Responses are will organized with specific details excellently expressed and every requirement completed	Material is relevant as it connects to the 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 or no understanding of the how to transform knowledge into the classroom
Creatively and clearly assess the present lessons for future use	Assessment techniques are adequate	Few or no facts or specific details of how well the teaching unit was received

### Materials

The following - website resources are course materials to be read, studied and responded to

#1. <http://www.nsta.org/docs/ngss/VennDiagram-CommonCore-Framework.pdf>

#2. <http://www.raft.net/public/pdfs/tip-sheets/accessing-the-ela-ccssm-connections-in-the-ngss-tip-sheet.pdf>

#3. [https://www.mheonline.com/assets/pdf/ngss/white\\_papers/three-questions-from-town-hall-meeting-about-ngss.pdf](https://www.mheonline.com/assets/pdf/ngss/white_papers/three-questions-from-town-hall-meeting-about-ngss.pdf)

#4. <http://stem.browardschools.com/science/science-elementary/>

#5. <http://stem.browardschools.com/science/science-elementary/science-elementary-lesson-plans/>

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

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

#8. <http://www.k12center.org/rsc/pdf/herman.pdf>

#9. <http://nstahosted.org/pdfs/ngss/PracticesVennDiagram.pdf>

## **Knowledge**

*Study the Venn diagram in website #1 and read very carefully the material presented after the diagram.*

#1 <http://www.nsta.org/docs/ngss/VennDiagram-CommonCore-Framework.pdf>

Because you have taken this course and you have demonstrated the ability to integrate many teaching disciplines successfully into your NGSS program, your principal has asked you to meet with other teachers in your school to explain how to achieve this skill. You will concentrate on intertwining Math, Language Arts and Science into one lesson. Some of the teachers you will meet with are near retirement and may have polite resistant to your presentation.

*Websites #2 & 3 can also help in preparing your responses to A1- 4. Look them over.*

#2. <http://www.raft.net/public/pdfs/tip-sheets/accessing-the-ela-ccsm-connections-in-the-ngss-tip-sheet.pdf>

#3. [https://www.mheonline.com/assets/pdf/ngss/white\\_papers/three-questions-from-town-hall-meeting-about-ngss.pdf](https://www.mheonline.com/assets/pdf/ngss/white_papers/three-questions-from-town-hall-meeting-about-ngss.pdf)

**A1** In a brief paragraph, relate what you will say to capture the teachers' interest and minimize possible opposition.

Now that you have them with you, the next step is to explain the importance of teaching the NGSS with the interwoven disciplines of language arts, math and science.

You most likely would address self contained teachers a bit different than single subject teachers.

**A2.** explanation of importance to self contained teachers

**A3.** explanation of importance to single subject teachers

You are now ready to illustrate a lesson that would achieve what you have been talking about in A1-3. The center of the Venn diagram in website #1 encompasses standards from all three disciplines (E2, 4, 5, M3 & S7). You will use the standards in the center of the Venn diagram for your lesson illustration.

**A4.** Describe what your illustrated lesson would look like – no lesson plan – only explanation.

**A5.** Did websites #2 and #3 help you in answering A1-4 – yes (how) no (why not)?

## **B. Planning - NGSS Unit Plan with at least one lesson involving Math & ELA**

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 **Math & ELA**.

**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 #4-8 studying the areas that relate to your grade level.*

Use the information to help develop your **Math & ELA** NGSS teaching plan (C1- 13)

#4. <http://stem.browardschools.com/science/science-elementary/>

#5. <http://stem.browardschools.com/science/science-elementary/science-elementary-lesson-plans/>

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

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

#8. <http://www.k12center.org/rsc/pdf/herman.pdf>

**C. Individual lesson plan** This plan is one listed on your calendar (B5) that emphasizes **Math & ELA**.

**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 and 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 **Math & ELA** 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 (#4-8) did you find the most useful as you created your STEM NGSS teaching plan – why?

**Venn diagram**

*Study website #9*

#9. <http://nsta hosted.org/pdfs/ngss/PracticesVennDiagram.pdf>

Pencil out a Venn diagram of your individual math, English Language Arts and Science lesson plan and make a chart like the one in website 4.

**C18.** the chart