EDUC542 16

Course Summary

Course : EDUC542 **Title :** Elementary School Science
Length of Course : 16
Prerequisites : N/A **Credit Hours :** 3

Description

Course Description: The course explores the objectives, methods, and instructional emphasis of elementary school science. It examines research related to elementary school science instruction with emphasis on innovative science programs. It includes an analysis of teaching science to elementary school children with emphasis on current science education trends, science curricular materials, and techniques applicable in the teaching of science in the elementary school. Objectives, philosophy, selection, and organization of science materials and methods are also addressed. Please be aware that candidates in the M.ED Teaching Elementary Education program will need to purchase a classroom science lab pack for EDUC 542: Elementary School Science. The set contains items that can be used in your elementary classrooms and is an investment for you and your future students. The lab materials will be ordered from a company called “LabPaq” will need to be ordered 1 – 3 months prior to the anticipated start of the course, EDUC 542. You can order the lab materials from www.LabPaq.com. The item is # SM-1 and costs $289. You must have purchased and received the LabPaq prior to the start of EDUC 542 in order to successfully complete the course assignments. Therefore, please plan accordingly.

Course Scope:

THe course descrption is outdated. There is no longer a LabPaq required.

New Course Description

The course explores the objectives, methods, and instructional emphasis of elementary school science. It examines research related to elementary school science instruction with emphasis on innovative science programs. It includes an analysis of teaching science to elementary school children with emphasis on current science education trends, science curricular materials, and techniques applicable in the teaching of science in the elementary school. Objectives, philosophy, selection, and organization of science materials and methods are also addressed. A field experience requiring a visit to an elementary school is a required assignment of the course.

Course Scope

The course is designed to help prospective teachers interpret children's science experiences and guide their development of scientific concepts. This course is intended for prospective elementary school teachers who will teach several subjects including science. It explores objectives, methods, and content in elementary

school science instruction and provides opportunity for preparation of materials for actual classroom use.

Objectives

After successfully completing this course, students will:

1. Analyze recent trends in science education policy and goals. (WVPTs 1A ;CAEP 1.1; NSTA 1a)
2. Evaluate the compatibility between science studies (history, philosophy, and sociology of science), constructivist learning theory, and practices that promote science literacy. (WVPTS 1B; CAEP 1.1; NSTA 1a)
3. Evaluate a range of curricular approaches available to elementary science educators, including environmental, STS, inquiry, and interdisciplinary curricula. (WVPTs 1B; CAEP.1.1; NSTA 3a)
4. Create science lessons and units that are developmentally appropriate and sensitive to the needs, values, and interests of a diverse group of students. WVPTs 2A; CAEP 1.1; NSTA 2a).
5. Create assessment plans that are compatible with teaching goals and methods and that allow for multiple ways of representing knowledge. (WVPTS 1E; CAEP 1.1; NSTA 3c).
6. Apply diagnostic observation skills, instructional strategies, and classroom management techniques to promote science learning in small group or whole-class settings. (WVPTs 2B; CAEP 1.1; NSTA 3a).
7. Apply multimedia technologies and trade books to support meaningful learning. (WVPTs1D; CAEP 1.1; NSTA 2b).
8. Apply rules and procedures that ensure the physical safety of children. (WVPTs 2F; CAEP 1.1; NSTA 3d).
9. Apply STEAM (STEM + the Arts) approaches and resources to lesson planning.(WVPTs 1A; CAEP 1.1; NSTA 1b)
10. Analyze the role of reflection in professional development and lifelong learning. (WVPTs 4C; CAEP 1.1; NSTA 6a).

Outline

Week 1: Standards, Why teach science?

Learning Objective(s)

Analyze recent trends in science education policy and goals. (WVPTs 1A ;CAEP 1.1; NSTA 1a)

Reading(s)

Fink, J.L.W. (n.d.). *Blast off: The Next Generation Science Standards.*

https://www.scholastic.com/teachers/articles/teaching-content/blast-next-generation-science-standards/

Huff, K. L. (2016). Addressing three common myths about the Next Generation Science

Standards. Science and Children, 53(5), 30-33.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1753971369?accountid=8289

Lederman, N. G. (2014). Nature of science and its fundamental importance to the vision of the

Next Generation Science Standards *Science and Children*, *52*(1), 8-10.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1559841385?accountid=8289

National Science Teachers Association. (NSTA). *NSTA Position Statement- Elementary School*

Science.

http://www.nsta.org/about/positions/elementary.aspx

Next Generation Science Standards. (n.d.). *Three Dimensional Learning.* Retrieved from

http://www.nextgenscience.org/three-dimensions

Next Generation Science Standards. (n.d.). The Need for Standards. Retrieved from

http://www.nextgenscience.org/need-standards

Palincsar, A. S. (2013). The Next Generation Science Standards and the Common Core State

Standards: Proposing a happy marriage. *Science and Children, 51*(1), 10-15.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1437616312?accountid=8289

Pruitt, S. L. (2015). The Next Generation Science Standards. *Science and Children,* 52(9), 7-9.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1691575298?accountid=8289

President's Council of Advisors on Science and Technology (PCAST). (2010). *Report to the*

President-Prepare and Inspire K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future.

https://nsf.gov/attachments/117803/public/2a--Prepare_and_Inspire--PCAST.pdf

Willard, T. (2013). A look at the Next Generation Science Standards. *Science and Children*,

50(7), 16-17.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1324444339?accountid=8289

Willard, T.. Pratt, H.; & Workosky, C. (2012). Exploring the new standards. *Science and*

Children, 50(2), 13-17.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1114147212?accountid=8289

Workosky, C.; & Willard, T. (2015). Answers to teachers' questions about the Next Generation

Science Standards. *Science and Children, 53*(1), 6-8.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1707482401?accountid=8289

Wysession, M. (2015). *Schools should teach science like sports.* Retrieved from

https://www.scientificamerican.com/article/schools-should-teach-science-like-sports/

Assignment(s)

Introduction Forum

Forum 1 (content discussion)

Forum 2 (experiment discussion)

Week 1 Lab Report

Week 2: STEM/STEAM

Learning Objective(s)

Evaluate a range of curricular approaches available to elementary science educators, including environmental, STS, inquiry, and interdisciplinary curricula. (WVPTs 1B; CAEP.1.1; NSTA 3a)

Reading(s)

Anonymous. (2012). Adding arts to STEM. *Science and Children, 49*(5), 19-21.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1318923171?accountid=8289

Brock, P.; Dunifon, S.; & Nagel, L. (2016). Start with a story. Science and Children, 53(6), 48-53.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1762828275?accountid=8289

Cook, K.; Bush, S.; & Cox, R. (2017). From STEM to STEAM. Science and Children, 54(6), 86-93.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1863563332?accountid=8289

Delaney, M. (2014). Schools shift from STEM to STEAM. Retrieved from

http://www.edtechmagazine.com/k12/article/2014/04/schools-shift-stem-steam

Froschauer, L. (2016) STEAM: Beyond the acronym. *Science and Children, 53*(6), 5.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1762828306?accountid=8289

Grinnell, S.; & Angal, S. (2016). Luminous lighting. *Science and Children*, 53(6), 54-59.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1762828269?accountid=8289

iTEAMChicago. (2015). From STEM to STEAM: Using brain-compatible strategies to integrate the arts. Retrieved from

https://iteamchicago.wordpress.com/2015/09/29/from-stem-to-steam-using-brain-compatible-strategies-to-integrate-the-arts-a-review/

John Hopkins University School of Education Department of Interdisciplinary Studies in Education Neuro-education Initiative. (2009). Neuroeducation: Learning, Arts, and the Brain. Retrieved from http://dev.steamnotstem.com/wpcontent/uploads/2010/11/Neuroeducation.pdf

Kurson, R. (2016). Learning about plants with STEAM. *Science and Children, 53*(9), 58-63.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1800399497?accountid=8289

Maeda, J. (2012), STEM to STEAM: Art in K-12 Is Key to Building a Strong Economy.

Retrieved from

https://www.edutopia.org/blog/stem-to-steam-strengthens-economy-john-maeda

Morgan, E.; & Ansberry, K. (2016). The science of art. *Science and Children,53*(6), 15-21.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1762828248?accountid=8289

Tate, K.J. (n.d.). Arts-based teaching in elementary schools. Retrieved from

http://www.ednewsdaily.com/arts-based-teaching-in-elementary-schools-tate/

Optional reading

Sousa & Pilecki Chapters 1-3

Assignment(s)

Forum 3 (content discussion)

Forum 4 (experiment discussion)

Week 2 Lab Report

Week 3: The Learning Cycle

Learning Objective(s)

3. Evaluate a range of curricular approaches available to elementary science educators, including environmental, STS, inquiry, and interdisciplinary curricula. (WVPTs 1B; CAEP.1.1; NSTA 3a)

Reading(s)

Brown, P. L; & Abell, S. K. (2007). Examining the learning cycle. Science and Children, 44(5), 58-59.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236904853?accountid=8289

Counsell, S.; Peat, F.; Vaughan, R.; & Johnson, T. (2015). Inventing mystery machines. *Science and Children*, *52*(7), 64-70.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1666339067?accountid=8289

Duran, E., Duran, L., Haney, J., & Scheuermann, A. (2011). A learning cycle for all students. *Science Teacher, 78*(3), 56-60.

http://ezproxy.apus.edu//login?url=https://search.proquest.com/docview/859330101?accountid=8289

Goldston, M Jenice , D.; Allison, E.; Fowler, L.; & Glaze, A. (2013). The dynamic earth:

Recycling naturally. S*cience and Children, 50*(8)38-45.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1349250796?accountid=8289

Lottero-Perdue, P.; Bolotin, S.; Benyameen, R.; Brock, E.; & Metzger, E. The EDP-5E. *Science and Children,53*(1), 60-66.

http://ezproxy.apus.edu//login?url=https://search.proquest.com/docview/1707482394?accountid=8289

Marek, E. A. (2008). Why the learning cycle? *Journal of Elementary Science Education, 20*(3), 63-69.

http://ezproxy.apus.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=34585973&site=ehost-live&scope=site

Assignment(s)

Forum 5 (content discussion)

Week 3 - Inquiry Lesson Analysis

Week 4: Inquiry Nature of Science Pedagogy Environmental Science Physical Science Life Science

Learning Objective(s)

Evaluate a range of curricular approaches available to elementary science educators, including environmental, STS, inquiry, and interdisciplinary curricula. (WVPTs 1B; CAEP.1.1; NSTA 3a)

Reading(s)

Bybee, R. W. (2013). The Next Generation Science Standards and the life sciences. *Science and Children, 50*(6), 7-14.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1314910769?accountid=8289

Colson, M.; & Colson, R. (2016). Planning NGSS-based instruction. Where do you start? *Science and Children, 53*(6), 23-25.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1762828281?accountid=8289

Gillani, B.; & Gillani, R. (2015). From droughts to drones. *Science and Children, 53*(2), 50-54. http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1720293128?accountid=8289

Gooding, J.; & Metz, B. (2012). Folding inquiry into cookbook lab activities. *Science Scope, 35*(8), 42-47.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1720293128?accountid=8289

Hanuscin, D, L; & Lee, E. J. (2009). Helping students understand the nature of science. *Science and Children, 46*(7), 64-65.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236908794?accountid=8289

Hawkins, S,; & Rogers, M. P. (2014). THREE, TWO, ONE…BLAST OFF! *Science and Children, 52*(1), 53-59.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1559841176?accountid=8289

Hoisington, C.; & Winokur, J. (2015). Tools for science inquiry that support life science investigations. *Science and Children, 52*(6), 24-25.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1654998279?accountid=8289

Jones, R. (2012). What were they thinking?. *Science Teacher*, *79*(3), 66-70.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1000411249?accountid=8289

Krajcik, J. (2015). Three-dimensional instruction: Using a new type of teaching in the science classroom. *Science and Children, 53*(3), 6-8.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1728411904?accountid=8289

Krajcik, J. (2013). The Next Generation Science Standards: A focus on physical science. *Science and Children, 50*(7), 7-15.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1691575216?accountid=8289

Kuhn, M.; McDermott, M. (2017). Using argument-based inquiry strategies for STEM infused science teaching. *Science and Children, 54*(5), 80-87.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1855049747?accountid=8289

Miranda, R. J., & Hermann, R. S. (2012). An integrated instructional approach to facilitate inquiry in the classroom. *Science Scope, 35*(8), 66-72.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/963335151?accountid=8289

Meyer, D. Z.; Kubarek-Sandor, J.; Kedvesh, J.; Heitzman, C.; Yaozhen, P.; & Faik, S. (2012). Eight ways to do inquiry. *Science Teacher*, *79*(6), 40-44.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1038160131?accountid=8289

Peers, S. (2011). How to make science inquiry happen in your classroom. *Primary & Middle Years Educator*, *9*(2), 11.

http://ezproxy.apus.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=aph&AN=66537906&site=ehost-live&scope=site

Richards, J; Johnson, A.; & Nyeggen, C. G. (2015). Inquiry-based science and the Next

Generation Science Standards: A magnetic attraction. *Science and Children, 52*(6), 54-58.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1654998438?accountid=8289

Sterling, D. R; & Hargrove, D. L. (2014). How healthy is our pond? *Science and Children, 51*(7), 45-51.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1506150038?accountid=8289

Wilcox, J., & Kruse, J. (2012). Springing into inquiry. *Science Scope*, *35*(6), 26-31.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/920348790?accountid=8289

Assignment(s)

Forum 6 (content discussion)

Forum 7 (experiment discussion)

Week 4 – Teaching Science

Week 5: Collaborative Learning, Constructivism

Learning Objective(s)

Apply diagnostic observation skills, instructional strategies, and classroom management techniques to promote science learning in small group or whole-class settings. (WVPTs 2B; CAEP 1.1; NSTA 3a).

Evaluate the compatibility between science studies (history, philosophy, and sociology of science), constructivist learning theory, and practices that promote science literacy. (WVPTS 1B; CAEP 1.1; NSTA 1a)

Reading(s)

Gallardo-Virgen, J. A.; & DeVillar, R.A. (2011). Sharing, talking, and learning in the elementary school science classroom: Benefits of innovative design and collaborative learning in computer-integrated settings. *Computers in the Schools, 28*(4), 278-290.

http://ezproxy.apus.edu/login?url=http://search.ebscohost.com/login.aspx?

direct=true&db=ehh&AN=69733153&site=ehost-live&scope=site

Kruckeberg, R. (2006). A Deweyan perspective on science education: Constructivism, experience, and why we learn science. *Science & Education, 15*(1), 1-30.

http://ezproxy.apus.edu/login?url=http://search.ebscohost.com/login.aspx?direct=true&db=ehh&AN=19894608&site=ehost-live&scope=site

Lamanauskas, V. (2010). Integrated science education in the context of the constructivism theory: Some important issues. *Problems of Education in the 21St Century*, *25*, 5-9. Retrieved from

http://oaji.net/articles/2014/457-1404980232.pdf

Ransdell, M. (2003). Using cooperative learning in elementary science classrooms. *Professional Educator, 26*(1), 23-35.

https://eric.ed.gov/?id=EJ842388

Assignment(s)

Forum 8 (content discussion)

Start Working on Midterm

Week 6: Advanced Organizers Concept Maps Science Safety

Learning Objective(s)

Create science lessons and units that are developmentally appropriate and sensitive to the needs, values, and interests of a diverse group of students. WVPTs 2A; CAEP 1.1; NSTA 2a).

Apply rules and procedures that ensure the physical safety of children. (WVPTs 2F; CAEP 1.1; NSTA 3d).

Reading(s)

Barrier, R. (2005). Making sense of safety. *The Science Teacher, 72*(6), 30-33.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/214617097?accountid=8289

Hodgson-Drysdale, T.; & Rosa, H. (2015). Go with the flow. *Science and Children, 52*(6), 32-38.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1654998414?accountid=8289

Jackson, J.; & Durham, A. (2016). Put your walls to work: Planning and using interactive word walls to support science and reading instruction. *Science and Children, 54*(3), 78-84.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1833947761?accountid=8289

Jackson, J.; & Narvaez, R. (2013). Interactive word walls. *Science and Children,51* (1), 42-49.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1437616022?accountid=8289

Longfield, J. (2006). Safety first! *Science and Children, 43(*5), 26-27.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236902500?accountid=8289

Lott, K.; & Read, S. (2015). Map it then write it! *Science and Children, 53*(3), 46-52.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1728349112?accountid=8289

Roy, K. (2012). Modeling safety in clay use. *Science and Children, 50*(4), 84-85.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1270300595?accountid=8289

Roy, K. (2013). Getting wired on safety. *Science and Children, 50*(7). 80-81.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1324444325?accountid=8289

Roy, K. (2013). Safety: The elementary mission. *Science and Children, 51*(2), 86-87.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1460567596?accountid=8289

Roy, K. (2014). Feather, feet, and fin safety in the classroom. *Science and Children, 52*(1), 72-74.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1559840762?accountid=8289

Roy, K. (2015). Safer science explorations for young children. *Science and Children, 52*(7), 26-28.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1666340006?accountid=8289

Roy, K. (2015). Safety at first sight. *Science and Children, 53*(2), 93-95.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1720293126?accountid=8289

Roy, K. (2016). Safety picks up “STEAM.” *Science and Children, 53*(6), 28-29.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1762828280?accountid=8289

Williams-Rossi, D.; & Campbell, L. O. (2012). Sparking old and new ideas. *Science and Children, 50*(3), 63-67.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1152021010?accountid=8289

Assignment(s)

Forum 9 (content discussion)

Week 6 - Safety Brochure

Work on Midterm

Week 7: Assessment

Learning Objective(s)

Create assessment plans that are compatible with teaching goals and methods and that allow for multiple ways of representing knowledge. (WVPTS 1E; CAEP 1.1; NSTA 3c).

Reading(s)

Froschauer, L. (2013). Seamless assessment. *Science and Children, 51*(3), 6.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1463706924?accountid=8289

Keeley, P. (2011). How far did it go? *Science and Children, 48*(5), 24-26.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/857720077?accountid=8289

Keeley, P. (2011). The mitten problem. *Science and Children, 48*(7), 26-28.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/859115102?accountid=8289

Keeley, P. (2012). Birthday candles: Visually representing ideas. *Science and Children, 50*(3), 32-35.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1152021329?accountid=8289

Keeley, P. (2013). Is it a rock? Continuous formative assessment. *Science and Children, 50*(8), 34-37.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1349250795?accountid=8289

Martin, R. A. (1997). Everything I ever needed to know about assessment I can learn in

kindergarten. *Science and Children, 35*(1), 50-53.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236920132?accountid=8289

Miranda, R. J; & Hermann, R. S. (2015). Teaching in real time. *Science and Children, 53*(1), 80-85.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1707481340?accountid=8289

Schussler, E.; & Winslow, J. (2007). Drawing on students' knowledge. *Science and Children, 44*(5), 40-44.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236900194?accountid=8289

Varelas, M.; Pappas, C. C; Kokkino, S.; & Ortiz, I. (2008). Students as authors. *Science and Children, 45*(7), 58-62.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236900194?accountid=8289

Assignments

Forum 10 (content discussion)
Work on Midterm.

Week 8: Midterm

Learning Objective(s)

Create science lessons and units that are developmentally appropriate and sensitive to the needs, values, and interests of a diverse group of students. WVPTs 2A; CAEP 1.1; NSTA 2a).

Create assessment plans that are compatible with teaching goals and methods and that allow for multiple ways of representing knowledge. (WVPTS 1E; CAEP 1.1; NSTA 3c).

Reading(s)

None

Optional Reading;
Read either Chapter 4 Implementing Arts Integration in the Primary Grades (K-4) or
Chapter 5 Implementing Arts Integration in the Intermediate Grades (5-8)
in the Sousa & Pilecki textbook as a model of STEAM lesson planning

Assignment(s)

Midterm Lesson Plan Due

Week 9: Families, Community, and Professionalism Earth's Systems

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Learning Objective(s)

Analyze the role of reflection in professional development and lifelong learning. (WVPTs 4C; CAEP 1.1; NSTA 6a).

Reading(s)

Connors, L M. (2011). Trail blazers. *Science and Children 49*(4), 46-50.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/916226541?accountid=8289

Froschauer, L. (2016). Creating meaningful products. *Science and Children, 54*(1), 5.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1814305400?accountid=8289

Gillan, A. L.; & Hebert, T. (2014). It's a zoo out there! *Science and Children, 51*(9), 59-65.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1540457510?accountid=8289

Kelly, J.; Stetson, R.; & Powell-Mikel, A. (2002). Science adventures at the local museum.

Science and Children, 39(7), 46-48.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236893635?accountid=8289

Maurer, M. J. (2010). Lessons learned. *Science and Children, 47*(9), 32-35.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/521215477?accountid=8289

Miele, E.; & Bennett, S. (2014). Collaborating for success. *Science and Children, 51*(6), 70-76.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1498084911?accountid=8289

McCubbins, S.; Thomas, B.; & Vetere, M. (2014). Family science day. *Science and Children, 51*(9), 41-47.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1540457331?accountid=8289

National Science Teachers Association. (NSTA). (n.d.). N*STA Position Statement: The Role of eLearning in Science Education.*

http://www.nsta.org/about/positions/e-learning.aspx

Nelson, T. H.; LeBard, L.; & Waters, C. (2010). How to create a professional learning

community. *Science and Children, 47*(9), 36-40.

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Pittman, J. (2016). Celebrating science with the community. *Science and Children, 54*(1), 46-51.

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Reese, J.; & Miller, K. (2017). Crowdfunding for elementary science educators. *Science and Children, 54*(6), 55-59.

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Schon, J. A.; Eitel, K. B; Bingaman, D.; Miller, B. G.; & Rittenburg, R. A. (2014). Big project, small leaders. Science and Children, 51(9), 48-53.

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Thomas, J.; & White, K. (2012). Aligning the Stars. *Science and Children, 49*(6), 42-46.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/938070280?accountid=8289

Weiser, B. (2012). Collegiality and better science teaching. *Science and Children, 49*(5), 52-55.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1318923198?accountid=8289

Assignment(s)

Forum 11 (content discussion)

Forum 12 (experiment discussion)

Week 9 Lab Report

Week 10: Students with Special Needs Giftedness Differentiated Instruction Personalized Learning

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Learning Objective(s)

Create science lessons and units that are developmentally appropriate and sensitive to the needs, values, and interests of a diverse group of students. WVPTs 2A; CAEP 1.1; NSTA 2a).

Reading(s)

None

Assignment(s)

Forum 13 (content discussion)

Week 10 Lesson Modifications Activity

Week 11: Diversity Science and Culture

Learning Objective(s)

Create science lessons and units that are developmentally appropriate and sensitive to the needs, values, and interests of a diverse group of students. WVPTs 2A; CAEP 1.1; NSTA 2a).

Reading(s)

Adams, C.M.; & Pierce, R. L. (2003). Teaching by tiering. Retrieved from

http://www.nsta.org/publications/news/story.aspx?id=48723

Brown, T. (2015). A teacher's guide to using the Next Generation Science Standards with gifted and advanced learners. *Science and Children, 52*(8), 74.

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Dill, M. (2012). Differentiation in science class to reach all learners. Retrieved from

http://www.brighthubeducation.com/teaching-methods-tips/70502-using-differentiation-in-science-to-teach-every-student/

Sondergeld, T. A.; & Schultz, R. A. (2008). Science, standards, and differentiation. It really can be fun! *Gifted Education Today, 3*(1), 34-40. Retrieved from http://files.eric.ed.gov/fulltext/EJ781689.pdf

Steele, M. M. (2007). Science success for students with special needs. *Science and Children, 45*(2), 48-51.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236902843?accountid=8289

Taylor, J; & Villanueva, M G. (2014). The power of multimodal representations. *Science and Children, 51*(5), 60-65.

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Carlone, H.; & Smithenry, D. (2014). Creating a “We” culture. *Science and Children, 52*(3), 66-71.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1627727342?accountid=8289

Januszyk, R.; Miller, E. C.; & Lee, O. (2016). Addressing student diversity and equity. *Science and Children, 53*(8), 28-31.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1780962423?accountid=8289

Keeley, P. (2014). Assessment for all. *Science and Children, 51*(5), 32-35.

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Keenan, S. (2004). Reaching English language learners. *Science and Children, 42*(2), 49-51.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236894087?accountid=8289

Madden, L.; & Joshi, A. (2013). What does culture have to do with teaching science? *Science and Children, 51*(1), 66-69.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1437616234?accountid=8289

Miller, E.; & Januszyk, R. (2014). The NGSS case studies: All standards, all students. *Science and Children, 51*(5), 10-13.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1477880214?accountid=8289

Miller, E.; Lauffer, H. B.; & Messina, P. (2014). NGSS for English language learners. *Science and Children, 51*(5), 55-59.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1477880244?accountid=8289

Pang, V. O; Lafferty, K. E.; Pang, J. M; Griswold, J.; & Oser, R. Culture matters in science

education. *Science and Children, 51*(5), 44-49.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1477880263?accountid=8289

Yarema, S.; Grueber, D.; & Ferreira, M. (2014). Learning science in cultural context. *Science and Children, 51*(5), 66-69.

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Assignment(s)

Forum 14 (content discussion)

Week 12: Technology, Robotics, and Engineering

Learning Objective(s)

Evaluate a range of curricular approaches available to elementary science educators, including environmental, STS, inquiry, and interdisciplinary curricula. (WVPTs 1B; CAEP.1.1; NSTA 3a)

Apply STEAM (STEM + the Arts) approaches and resources to lesson planning.(WVPTs 1A; CAEP 1.1; NSTA 1b)

Reading(s)

Dare, E. A; Childs, G. T; Cannaday, E. A.; & Roehrig, G. H. (2014). Blasting off with engineering. *Science and Children, 52*(3), 60-64.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1627727618?accountid=8289

French, J. L; & Hilleary, P. (1999). Virtual field trip to Antarctica. *Science and Children, 36*(7), 27-31.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236923489?accountid=8289

Hansen, A. K.; Iveland, A.; Dwyer, H.; Harlow, D. B.& ; Franklin, D. (2015). Programming digital stories and how-to animations. *Science and Children, 53*(3), 60-64.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1728349095?accountid=8289

Jensen, J. (2012). The science of safety. *Science and Children, 50*(4), 40-45.

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Kruse, J; & Wilcox, J. (2017). Building technological literacy with philosophy and nature of technology. *Science and Children, 54*(7), 66-73.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1874043110?accountid=8289

Lott, K.; Wallin, M.; Roghaar, D.; & Price, T. (2013). Catch me if you can! *Science and Children, 51*(4), 65-69.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1467533421?accountid=8289

Lottero-Perdue, P.; Bowditch, M.; Kagan, M.; Robinson-Cheek, L.; Webb, Tedra; et al. (2016). An engineering design process for early childhood: Trying (again) to engineer an egg package. *Science and Children, 54*(3), 70-77.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1833943044?accountid=8289

Maguire, C.; Kang, E. J. S.; Hogan, T.; & McCarthy, M. J. (2016). Robots, bookmarks, and guitars, oh my! *Science and Children, 54*(4),70-75.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1844621120?accountid=8289

Milano, M. (2013). The Next Generation Science Standards and engineering for young learners: Beyond bridges and egg drops. *Science and Children, 51*(2), 10-16.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1460567177?accountid=8289

Morgan, E.; & Ansberry, K. (2014). The science and technology of sound. *Science and Children, 51*(6), 20-

25.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1498085464?accountid=8289

Wang, H.; Billington, B. L.; & Chen, Y. (2014). STEM in a hair accessory. *Science and Children, 52*(3), 54-59.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1627727369?accountid=8289

Assignment(s)

Forum 15 (content discussion)

Forum 16 (experiment discussion)

Week 12 Lab Report

Week 13: Science and Literacy, Earth's Systems

Learning Objective(s)

Apply multimedia technologies and trade books to support meaningful learning. (WVPTs1D; CAEP 1.1; NSTA 2b).

Reading(s)

Adams, K. L; & Phillips, K. B. (2016). Read all about it. *Science and Children, 54*(3), 32-39.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1833947536?accountid=8289

Anonymous. (2014). Outstanding science trade books for students K-12. *Science and Children, 51*(7), 67-74.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1506150418?accountid=8289

Baldwin, K.; & Wilson, A. (2017). Acting like rain. *Science and Children, 54*(6), 29-35.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1863558959?accountid=8289

Clary, R. (2016). Science storybooks. *Science and Children, 54*(1), 76-79.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1814305392?accountid=8289

Froschauer, L. (ed.). (2012). The importance of visual literacy. *Science and Children, 50*(3), 6.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1152020976?accountid=8289

Froschauer, L. (2011). From whimsy to literacy. *Science and Children, 49*(3), 8.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/903209449?accountid=8289

Morgan, E.; & Ansberry, K. (2014). The poetry of plants. *Science and Children, 51*(8), 18-20.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1518522190?accountid=8289

Novakowski, J. (2010). Nonfiction literacy in Kindergarten. *Science and Children, 48*(3), 40-43.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/762477847?accountid=8289

Royce, C. A. (2015). The earth's changing surface. Science and Children, 52(8), 16-22.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1672865362?accountid=8289

Royce, C. A. (2005). Teaching through trade books: Antarctic adaptations. *Science and Children, 42*(4), 16-18

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236903153?accountid=8289

Van Meeteren, B. D.; & Escalada, L.T. (2016). Science and literacy centers. *Science and Children, 47*(7),74-78.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236949187?accountid=8289

Vick, M. (2016). Beyond the textbook-but not just "hands on." *Science and Children, 53*(7), 76-80.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1768607772?accountid=8289

Werderich, D.; Farris, P.; & McGinty, A. (2014). Biography as mentor. *Science and Children, 52*(2), 66-69.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1611001222?accountid=8289

West, A.; Sullivan, K.; & Kirchner, J. (2016). How about teaching literacy with science. *Science and Children, 53*(8), 47-53.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1780962086?accountid=8289

Wysession, M. E. (2013). The Next Generation Science Standards and the earth and space sciences. Science and Children, 50(8), 17-23.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1349392369?accountid=8289

Assignment(s)

Forum 17 (content discussion)

Week 13 Science Literacy Activity

Week 14: Science and the Arts, Chemistry

Learning Objective(s)

Evaluate a range of curricular approaches available to elementary science educators, including environmental, STS, inquiry, and interdisciplinary curricula. (WVPTs 1B; CAEP.1.1; NSTA 3a)

Apply STEAM (STEM + the Arts) approaches and resources to lesson planning.(WVPTs 1A; CAEP 1.1; NSTA 1b)

Reading(s)

Hendrix, R.; & Eick, C. (2014). Creative sound dramatics. *Science and Children, 51*(6), 37-43.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1498084795?accountid=8289

Lee, M.; Lostoksi, M.; & Williams, K. (2000). Diving into a schoolwide science theme. *Science and Children, 38*(1), 31-35.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236890248?accountid=8289

McGregor, D.; Precious, W. (2010). Dramatic science. Science and Children, 48(2), 56-59.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/756204634?accountid=8289

Robertson, B. (2014). Q: What determines the quality of musical notes? *Science and Children, 51*(6), 77-81.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1498085252?accountid=8289

Schaffer, L.; Pinson, H.; & Kokoski, T. (1998). Listening to rain sticks. *Science and Children, 35*(5)22.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236952489?accountid=8289

Sullivan, P. T.; Conner, L D C.; Guthrie, M.; Pompea, S.; Tsurusaki, B. K; et al. (2017). Colorful chemistry. *Science and Children, 54*(8), 34-40.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1886211020?accountid=8289

Thompson, W. J. (1998). A moving science lesson. *Science and Children, 36*(3), 24-27, 70.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236910203?accountid=8289

Worch, E. A; Scheuermann, A. M; & Haney, J. J. (2009). Role-play in the science classroom. *Science and Children, 47*(1), 54-59.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236916203?accountid=8289

Assignments

Forum 18 (content discussion)

Forum 19 (experiment discussion)

Week 14 Lab Report

Week 15: Week 15 Integrated, Thematic Instruction Unit Planning

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Learning Objective(s)

None

Reading(s)

Week 15

Integrated, Thematic Instruction

Unit Planning

Cook, K.; & Block, C. (2016). Complementing curricula. *Science and Children, 54*(2), 36-42.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1824518588?accountid=8289

Constible, J.; Williams, L.; Faure, J.; & Lee, R. E, Jr. (2012). Bringing Antarctica home. *Science and Children, 49*(6), 32-36.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/938071071?accountid=8289

Gopal, J. (2015). Eating the alphabet. *Science and Children, 52*(9), 50-58.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1691575239?accountid=8289

Sneider, C.; Stephenson, C.; Schafer, B.; & Flick, L. (2014). Exploring the science framework and the NGSS:

Computational thinking in elementary school classrooms. *Science and Children, 52*(3),10-15.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1627727555?accountid=8289

Tank, K.; Pettis, C.; Moore, T.; & Fehr, A. (2013). Hamsters, picture books, and engineering design. *Science and Children, 50*(9), 59-63.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1401105929?accountid=8289

Tate, K. (2007). Tiny, powerful, awesome ants! *Science and Children,45*(3), 30-33.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236898931?accountid=8289

Week 16

Final Project

Measurement

Ashbrook, P. (2016). Preparing for spring gardening. *Science and Children, 54*(4), 16-17.
http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1844621160?accountid=8289

Assignments

Week 15-Week 16
Forum 20 (content/ reflection forum)

Week 16 Final Project

Week 16: Week 16 Final Project Measurement

Learning Objective(s)

None

Reading(s)

Week 15

Integrated, Thematic Instruction

Unit Planning

Cook, K.; & Block, C. (2016). Complementing curricula. *Science and Children, 54*(2), 36-42.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1824518588?accountid=8289

Constible, J.; Williams, L.; Faure, J.; & Lee, R. E, Jr. (2012). Bringing Antarctica home. *Science and Children, 49*(6), 32-36.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/938071071?accountid=8289

Gopal, J. (2015). Eating the alphabet. *Science and Children, 52*(9), 50-58.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1691575239?accountid=8289

Sneider, C.; Stephenson, C.; Schafer, B.; & Flick, L. (2014). Exploring the science framework and the NGSS: Computational thinking in elementary school classrooms. *Science and Children, 52*(3),10-15.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1627727555?accountid=8289

Tank, K.; Pettis, C.; Moore, T.; & Fehr, A. (2013). Hamsters, picture books, and engineering design. *Science and Children, 50*(9), 59-63.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1401105929?accountid=8289

Tate, K. (2007). Tiny, powerful, awesome ants! *Science and Children,45*(3), 30-33.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/236898931?accountid=8289

Week 16

Final Project

Measurement

Ashbrook, P. (2016). Preparing for spring gardening. *Science and Children, 54*(4), 16-17.
http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1844621160?accountid=8289

Assignments

Week 15-Week 16
Forum 20 (content/ reflection forum)

Week 16 Final Project

Evaluation

Lab Reports
Throughout the term you will complete science experiments. For each experiment you will complete a lab report. The lab report rubric, posted in the assignment area of the course, will be used to assess each lab report. Please use the rubric as a guide for your lab report.

Forum Postings
Each week includes required forum discussions about content and/or lab activities. Topics addressed will relate lab activities to classroom praxis. You are expected to actively engage in these activities and acquire a philosophical and practical understanding of effective inquiry based elementary science methods. The forum discussion rubric, posted in the forum area of the course, will be used to assess discussion postings and interactions.

Major Activities, Midterm, and Final Project
You will be required to engage in some activities related to the development and analysis of lesson plans and topics related to teaching science. Lesson plans should clearly address the application of a theory of your choice germane to the content of this course that can be gainfully explored within the inquiry framework of science education for elementary students. The lesson plan should become part of your program/professional portfolio. Rubrics are provided in the assignment area of the course **In addition, the professor may return lesson plans to students asking for more information or clarification prior to final grading as lesson plans and some key assignments require satisfactory mastery in order to meet state and national expectations, program requirements, etc.**

Activities:
Week 3 – Inquiry Lesson Analysis
Week 4 – Teaching Science
Week 6 – Safety Brochure
Week 10 – Lesson Modifications Activity
Week 11 – Diversity Analysis

Week 13 – Science Literacy Activity

Midterm Assessment – Science Lesson Plan
The midterm assessment requires creating a lesson plan related to course topics studied during the first half of the course. For your midterm, develop an elementary science lesson plan on one of the topics (i.e. life science) covered thus far in the course. If you select a lower grade (K-2nd) for this midterm, you will need to select an upper grade (3rd-6th) for the final lesson unit. If you select 3rd -6th for this midterm, you will need to select K-2nd for your final lesson unit. A template, rubric and guiding questions are provided in the Assignments area of the course.

Final Assessment – Science Mini Unit
The final assessment will consist of developing a mini lesson plan unit related to one or more science areas covered during the last half of the course (i.e. earth science). The mini unit should include 1-3 elementary science experiments. Lessons should include children's literature, technology, and all aspects required by the template provided. The mini unit should include at least 3 lessons created by you. The mini unit should cover 3-5 days of science instruction time.

In this course, as in all others in your program, document important milestones of achievement as evidence of your learning and experience in the school community and as a graduate learner. In addition to important professional projects or artifacts, a narrative - also called a reflection - describes who, what, why, where, and when and will supplement the artifacts. An artifact can be a lesson plan, a PowerPoint presentation or other media that provide a record of your K-12 involvement. Please give special attention to issues and experiences with a diverse population, to include students at risk, English language learners, students with special needs or learning disabilities, and students and professionals who represent different ethnic groups. This documentation will be added to your ePortfolio throughout the program.
To ensure the portfolio's success, ask faculty members in the program to help you identify strong pieces of work that represent and document your journey as a professional educator.

The success of this course depends on our ability to have read the assigned readings closely, to have thought carefully about the points raised or ignored by authors, and to bring to the group your questions and concerns about their theses and positions into the discussions groups. Having prepared the readings prior to class ensures your productive participation.

In all participation and assignments I am looking for evidence of:
• demonstration of substantial knowledge and higher order thinking and analytic skills and application of facts, concepts, terms, and processes learned/read/discussed;
• critical contemplation, i.e., "grapple" with issues and topics;
• appropriate use of knowledge learned;
• imaginative thinking and responses to challenges/problems/issues;
• exploring underlying assumptions about education and schooling;
• clarity of expression and logical connection among ideas expressed;
• writing that reflects precise and concise thinking;
• excellent grammar, syntax, and spelling.

Grading:

Name	Grade %

Materials

Book Title: Course materials will change for November and beyond. Please email booklist@apus.edu for

the updated list.

Author:

Publication Info: Open Web Sources

ISBN: APUPOTI4

Book Title: Various resources from the APUS Library & the Open Web are used. Links provided inside the classroom in the Lessons section.

Author:

Publication Info:

ISBN: N/A

Optional Textbook

Sousa, D.A..; & Pilecki, T.J. (2013). From STEM to STEAM: Using brain-compatible

strategies to integrate the arts. Thousand Oaks, CA: Corwin.

Required Readings

Week 1

Standards, Standards, Standards

Why science?

Fink, J.L.W. (n.d.). *Blast off: The Next Generation Science Standards.*

https://www.scholastic.com/teachers/articles/teaching-content/blast-next-generation-science-standards/

Huff, K. L. (2016). Addressing three common myths about the Next Generation Science

Standards. Science and Children, 53(5), 30-33.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1753971369?accountid=8289

Lederman, N. G. (2014). Nature of science and its fundamental importance to the vision of the

Next Generation Science Standards *Science and Children*, *52*(1), 8-10.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1559841385?accountid=8289

National Science Teachers Association. (NSTA). *NSTA Position Statement- Elementary School*

Science.

http://www.nsta.org/about/positions/elementary.aspx

Next Generation Science Standards. (n.d.). *Three Dimensional Learning.* Retrieved from

http://www.nextgenscience.org/three-dimensions

Next Generation Science Standards. (n.d.). The Need for Standards. Retrieved from

http://www.nextgenscience.org/need-standards

Palincsar, A. S. (2013). The Next Generation Science Standards and the Common Core State Standards:

Proposing a happy marriage. *Science and Children, 51*(1), 10-15.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1437616312?accountid=8289

Pruitt, S. L. (2015). The Next Generation Science Standards. *Science and Children,* 52(9), 7-9.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1691575298?accountid=8289

President's Council of Advisors on Science and Technology (PCAST). (2010). *Report to the President-Prepare and Inspire K-12 Education in Science, Technology, Engineering, and Math (STEM) for America's Future.*

https://nsf.gov/attachments/117803/public/2a--Prepare_and_Inspire--PCAST.pdf

Willard, T. (2013). A look at the Next Generation Science Standards. *Science and Children*, *50*(7), 16-17.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1324444339?accountid=8289

Willard, T.. Pratt, H.; & Workosky, C. (2012). Exploring the new standards. *Science and*

Children, 50(2), 13-17.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1114147212?accountid=8289

Workosky, C.; & Willard, T. (2015). Answers to teachers' questions about the Next Generation Science Standards. *Science and Children, 53*(1), 6-8.

http://ezproxy.apus.edu/login?url=https://search.proquest.com/docview/1707482401?accountid=8289

Wysession, M. (2015). *Schools should teach science like sports.* Retrieved from

https://www.scientificamerican.com/article/schools-should-teach-science-like-sports/

Week 2

STEM/STEAM

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Inquiry

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Pedagogy

Environmental Science

Physical Science

Life Science

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Collaborative Learning

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Week 6

Advanced Organizers

Concept Maps

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Week 8

Midterm Project

Week 9

Families, Community, and Professionalism

Earth's Systems

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Week 10

Students with Special Needs

Giftedness

Differentiated Instruction

Personalized Learning

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Week 11

Diversity

Science and Culture

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Week 12

Technology, Robotics, and Engineering

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Week 13

Science and Literacy

Earth's Systems

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Week 14

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Week 15

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Week 16

Final Project

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Course Guidelines

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University Policies

Student Handbook

- Drop/Withdrawal policy
- Extension Requests
- Academic Probation
- Appeals
- Disability Accommodations

The mission of American Public University System is to provide high quality higher education with emphasis on educating the nation’s military and public service communities by offering respected, relevant, accessible, affordable, and student-focused online programs that prepare students for service and leadership in a diverse, global society.