Preschoolers & STEM: Developing Curiosity

Course number: PRDV 73726  
Title: Preschoolers & STEM/STEAM: Developing Curiosity  
Credit: 1  
Location: Online  
Date: January 13 – February 7  
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(Note: When contacting me by email, please state the course name in the subject area.)

Course Overview

Course Description:  
This course is designed for early childhood PreK/K2 educators and specialists. Through Special Topics, the course explores the development of math and science curiosity in young children. Emphasis is placed on STEM and STEAM in the PreK/K2 classroom.

Course Objectives/outcomes  
Participants will:

- Explain the importance of developing Math and Science Curiosity as it relates to the Massachusetts Curriculum Frameworks, and the PRE-K Standards.
- Define curiosity and what that looks like in young learners.
- Explain how young learners, learn about science and math.
- Differentiate between STEM and STEAM.
- Describe the implications of STEAM in the PreK classroom.
- Explain strategies to help families’ foster curiosity of the math and sciences at home.
- Describe the impact of STEAM on the PreK classroom.
- Demonstrate the use of STEAM in the PreK classroom.

Course Expectations:  
Online attendance is mandatory, posting several times throughout the week. Refer to the Discussion Board Rubric. In the event of an unplanned absence, it is the responsibility of the student, at the discretion of the instructor to complete all missed work. Note: Discussions cannot be made up.

Participants will come to the Discussion Board, prepared for in depth discussions and ready to participate actively in the online discussion forum, throughout the four weeks including the final week.

One grade will be deducted for any late assignments not cleared by the instructor. Assignments may be resubmitted with prior approval from the instructor. A final project is required and due on or before the last day of class, no exceptions.

Course Content/Outline:
Description: This course is heavily reliant upon Discussion Board posts. Each week begins on a Monday and has a Guiding Question (GQ) Assignment, which typically has several parts. Every
student is expected to provide their own initial response to the GQ, and continue the discussion through subsequent posts to the group, utilizing the readings. (See the Discussion Board Rubric)

**Grading Components:**

40 points = Readings and Videos (tied to the frequency and quality of posts (See Rubric for Discussion Board).

40 points = Weekly Assignments (See Rubric for Weekly Assignments).

20 points = Final Project: PowerPoint, Prezi, Podcast, Adobe Spark or Research Paper (APA)

100 points

**Grading/Grade Points**

A, A- (95-100 A, 90-94 A-) Indicates that the level of work is of superior quality and exceeds specific guidelines in one or more ways. Work and discussion posts exceed expectations.

B+, B, B- (87 - 89 B+, 83 - 86 B, -80 – 82, B-) Indicates that the course work has met the requirements and was judged acceptable. Work and discussion posts meet expectations.

C+, C, C- (77 – 79 C+, 73 -76 C, 70-72 C) indicates that the level of work did not adequately meet the requirements.

D+, D, D-, (69-67, 66-63, 62-60) F, (59-0) indicates that the level of work was unacceptable.

**Week 1: The Importance of Developing Curiosity**

Description: We will explore The Importance of Developing Curiosity through our readings, podcasts and videos. Refer to the assigned Guiding Questions before and as you read, think about the natural curiosity in young learners. When you post, explain the importance of developing math and science curiosity in preschoolers, and the impact that natural curiosity has upon learning.

**Required Readings or Videos**


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Week 2: Why STEM/STEAM?
Description: We will examine STEM and STEAM, through our readings and viewings. Refer to the assigned Guiding Questions before and as you read. We will provide resources that will enable you to incorporate STEAM into your own classroom.
Explain the relationship between STEM and STEAM.
Identify how STEM becomes STEAM, and differentiate between what STEM and STEAM in the PreK classroom setting.

Required Readings or Videos

Week 3: STEAM - A Look at Science & Math through the Arts
Examine Science and Math through the Arts
Explain how children can learn math and science by studying the arts.
Identify ways in which children are natural scientists and how that natural ability can be used in the classroom.
Explain why STEAM belongs in the Prek-2 classroom.

Required Readings or Videos
Week 4: STEM & STEAM in Action & Bringing the Excitement Home

STEM and STEAM in Action
Examine how school across the country are implementing STEAM.
Identify ways in which STEAM could be implemented into the PreK-2 classroom.
Explain how STEAM can help children develop math and science skills.
Examine the activities that children participate in during their time after school hours, and how this information provides us with insight into our own planning and expectations.

Required Readings or Videos
Preschoolers & STEM: Developing Curiosity

Weekly Assignments

Assignment 1: How can we help our young learners to continue to develop their natural curiosity in the classroom/at school?

Assignment 2: Considering the new information which you have gathered, how has your thinking changed as you implement STEM or STEAM activities into your classroom?

Assignment 3: How would you captivate your students by incorporating the arts?

Assignment 4: Through a constructivist’s lens, why do we need to model and encourage creativity?

Discussion Board Rubric for Asynchronous Discussion Participation

A Quality of Postings Indicator
Asynchronous discussion enhances learning as participants share their ideas, perspectives, and experiences with the class. Participants develop and refine their thoughts through the writing process, plus broaden their classmates’ understanding of the course content. Each weekly discussion is organized around the Guiding Questions, which participants must respond to.

Post your thoughts and provide supporting evidence using the readings and videos. DO NOT just give the facts. Posts MUST reflect how the readings and videos have impacted upon your thinking and the work that you do.

Participants will use the following guidelines to improve the quality of their discussion contributions.

Grading Discussion Board Posts
Discussion postings that meet all criteria for a grade level will receive the highest points possible at that level. Postings that meet mixed levels of criteria will receive a score within the point range of the appropriate levels.

Participation in discussion activities can only be measured by the date on the discussion posting. For example, participating 3 times during the week is measured by postings on 3 different days; there may actually be 5-6 postings, but participation only occurred 3 times during the week.

Rubric for Discussion Board
There are four criteria, Posts throughout the week, Details in each post, The quality of information in response to other’s posts, and the Frequency of Weekly Discussion Posts. The highest amount of points that can be earned in one week, for a score of excellent, is a score of 10 points.

*Criteria — Excellent 10 points
*Posts throughout the weekly discussions - Build on other’s posts & comments analytically. Quotes directly from other’s posts.
*Information* - Posts refer to what others have written, provides details from information gathered within the course, and encourages new ideas.

*Details in posts on the discussion board* - Posts offer information that is highly detailed & correct. Quotes 3 or more times from readings or videos to support statements.

*Frequency of posts* - Posts often, at least 7-8 times throughout the week.

*Criteria* – Good 8 points  
*Posts throughout the weekly discussions* - Builds on others posts & comments analytically w/o direct quotes.
*Information* - Posts refer to what others have written, provides some details from information gathered within the course.
*Details in posts on the discussion board* - Posts offer information that is detailed & correct. Quotes 1 to 2 times from readings to support statements.
*Frequency of posts* - Posts at least 5-6 times throughout the week.

*Criteria* – Good 6 points  
*Posts throughout the weekly discussions* - Posts respond to others posts, w/o quoting directly or indirectly. Posts lack depth.
*Information* - Posts refer only to what others have written, does not provide information gathered within the course.
*Details in posts on the discussion board* - Posts offer information that is somewhat detailed & correct. Does not quote but refers to readings/videos.
*Frequency of posts* - Posts at least 3-4 times throughout the week.

*Criteria* – Unacceptable 4 points  
*Posts throughout the weekly discussions* - Posts are not relevant to the discussion.
*Information* - Posts do not refer to what others have posted.
*Details in posts on the discussion board* - Post responds to others with few details or facts. Does not refer to readings/videos.

What to Consider when posting:
• Guiding Questions (GQ)  
• Refer to at least two specific points, from the article or reading.
• Conveying new information  
• Contrasting earlier information learned in the course of new information (after week1).
• Convey information from the read, watch, listen information gathering, to personal experiences.
• Consider the importance of the final post to the Discussion board  
• Discussion at a *critical level is not just facts from information gathering, but rather provides supporting evidence (see below).*  
• Discussion at a critical level means discussing, for example, the following:  
  • Opinion of the facts gathered or facts mentioned by others in the discussion group  
  • Why the opinion is held  
  • What is wrong with the fact/s mentioned  
  • Are the points, facts, opinions, consistent and or inconsistent with the material presented so far
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• What are the implications for the future, consistencies, and or inconsistencies within the readings or videos?

Note: Participants will review readings/videos, by analyzing the content for information, what is interesting, and what is new, and what is considered the pros and cons of the information. Participants should justify their analysis, providing their own opinions, not just quote information. However, your opinion must be backed up by quoting from the readings/videos.

Weekly Assignment - Levels of Achievement

*Criteria*

*Proficient:* 9-10 Points - The Post fully addresses the Guiding Question (GQ). The post demonstrates a proficient understanding of the content. Three or more quotes from reading or videos are used to support your statements.

*Competent:* 7-8 Points - The Post addresses the Guiding Question (GQ). The post demonstrates above average or competent understanding of the content. Two quotes from readings or videos are used to support your statements.

*Adequate:* 5-6 Points - The Post addresses the Guiding Question (GQ) and demonstrates an adequate understanding of the content. One quote from readings or videos is used to support your statements.

*Unacceptable:* 0-4 Points - The Post does not clearly address the Guiding Question (GQ) and does not appear to be tied to the topic. Quotes from readings or videos are not used to support statements. The post is found unacceptable.

Final Project – Due on or before the last day of class

Participants are required to create a Final Project. The Final Project should address how the course content has influenced their thinking. The Final Project can be a tool to be used by you for professional purposes, a presentation or an activity. It should be short, for example, no more than 20 slides, concise, and cite from course content. DO NOT provide an overview of the course content.

*Format choices:
1. PowerPoint (Visual & Audio) might be useful if the intent is to share the information.
2. A Prezi (instead of a PowerPoint)
3. A Podcast may be useful to create a report, much like a newscast **
4. Writing a 10-page double-spaced APA style paper. One page of the paper may include a Wordle.
5. Or use of any other application that you choose to create your Final Project.

**Note: If a participant chooses to create a Podcast, a summary of the podcast and sources cited, using APA style guidelines is required.
Rubric for the Final Project

Five criteria for the Final Project are as follows: Question, Information, Quotes and Encourages new ideas.

**First criteria, the question**
If the question directly relates to the course topics and the work that you do, this question earns a score of 4 points.
If the question is somewhat related to the course topics, and the work that you do, this question earns a score of 3 points.
If the question indirectly relates to the course topics, and the work that you do, this question earns a score of 2 points.
If the question does not directly relate to the course topics, and or the work that you do, this question earns a score of 1 to 0 points.

**Second criteria, the information**
If the information is highly detailed and correct, you earn a score of 4 points.
If the information is somewhat detailed and correct, you earn a score of 3 points.
If the information has some detail and somewhat correct you earn a score of 2 points.
If the information lacks detail, and or is not correct, you earn a score of 1 to 0 points.

**Third criteria, how analytical is it**
If the information is analytical and demonstrates a proficient understanding, you earn a score of 4 points.
If the Information is analytical and demonstrates above average understanding, you earn a score of 3 points.
If the Information is analytical and demonstrates an acceptable level of understanding, you earn a score of 2 points.
If the Information is not analytical and or demonstrates a poor understanding, you earn a score of 1 to 0 points.

**Fourth criteria, using quotes**
If 4 quotes or more are used to support statements/assertions you earn a score of 4 points.
If 3 quotes or more are used to support statements/assertions you earn a score of 3 points.
If 2 quotes or more are used to support statements/assertions you earn a score of 2 points.
If quotes are not used, or 1 quotes are used to support statements/assertions you earn a score of 1-0 points.

**Fifth criteria, encouraging new ideas or new thinking**
If the Final Project responds to the Final Project question and responds to misconception, new ideas or new thinking you earn a score of 4 points.
If the Final Project responds to the Final Project question and responds somewhat to misconception, new ideas or new thinking you earn a score of 3 points.
If the Final Project responds the Final Project question and responds to misconception yet does little to encourage new ideas or new thinking you earn a score of 2 points.
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If the Final Project does or does not respond to the Final Project question, and does or does not respond to misconception, or new ideas or new thinking you earn a score of 1 to 0 points.

College Policy Regarding Academic Honesty
Integrity is essential to academic life. Consequently, students who enroll at Framingham State College agree to maintain high standards of academic honesty and scholarly practice. They shall be responsible for familiarizing themselves with the published policies and procedures regarding academic honesty. Refer to FSU Graduate Catalog, Student Conduct section, page 7 at: http://www.framingham.edu/graduate-and-continuing-education/documents/grad-catalog-0910.pdf.

Research
Additional supporting information can be researched at the Framingham State University Online Library. Just logon to you FSU My Campus account and go to the tab that says Library.

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Note: Syllabus is subject to change with notice. Check Blackboard regularly for updates.