*Science for Young Children Methods/Curriculum*
*Instructor: Dr. Bob Louisell*[1]

Course Purpose: Children are curious about their physical worlds. When you graduate from the St. Ambrose program in early childhood education, most of you will accept positions teaching young children. Children begin learning about science as infants and continue to do so throughout childhood. The purpose of this course is to help prepare you for helping children to learn about science. After completing this course, you should know how to:

- converse with children to find out how they think about particular topics in science.
- foster a child's curiosity about the natural and physical world.
- model your own curiosity in your personal life and in the classroom
- use a hands-on, minds-on approach to science teaching in your own classroom.
- identify content standards for science and develop lessons to teach them.
- utilize alternative strategies to assess children's learning in science.

| **Dates** | **Class Topics** | *Type of Activity* |
|---|---|---|
| Session 1 | Introductions, Course Syllabus<br>Constructivism: A Philosophy of Teaching | *Lecture- discussion*<br>*Discussion* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 1, pages 10-19.* | |
| Session 2 | Children's ideas about the Moon and Sun | *Video-discussion* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 2, pages 21-26.* | |
| Session 3 | Children's Ideas About Science | *Journal-Discussions* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 2, pages 26-41.* | |
| Session 4 | Interviewing Children About Their Science Ideas | *Lecture-Discussion/Videos* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 3.* | |
| Session 5 | How Should We Teach Young Children Science ?<br>Pendulums: Activity for Future Teachers 7.4 | *Discussion*<br>*Hands-on Activity* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 7, pages 129-132.* | |
| Session 6 | Science Processes<br>Activity for Future Teachers 7.1: Mealworms | *Lecture-Discussion*<br>*Hands-on Activity* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 7, pages 133-141.* | |

[1] Note: This is a course syllabus. It is like a tentative lesson plan. Changes will occur.

| | | |
|---|---|---|
| Session 7 | Clay Boats/Sink & Float | *Activities for Children 7.4 & 7.7* |

**Readings:** ***I Do, and I Understand,*** *Chapter 7, pages 134-141.*

---

| | | |
|---|---|---|
| Session 8 | Science Curricula for Kindergarten and Primary Grades | *Lecture-Discussion* |
| | *SCIS, ESS, and FOSS: Models for Primary Science* | *Workshop with Kits* |
| | The Learning Cycle | *Lecture-Discussion* |

**Readings:** ***I Do, and I Understand,*** *Chapter 7, pages 141-148.*

---

| | | |
|---|---|---|
| Session 9 | Importance of Play for Young Children Learning | *Discussion* |
| | Thematic Units With a Science Focus for Preschool | *Lecture-Discussion* |

**Readings:** ***I Do, and I Understand,*** *Chapter 8, pages 153-156.*

---

| | | |
|---|---|---|
| Session 10 | **Instructional Experiences in Science for Preschoolers** | |
| | Physical Knowledge Activities | *Hands-on Activities* |

**Readings:** ***I Do, and I Understand,*** *Chapter 8, pages 157-161.*

---

| | | |
|---|---|---|
| Session 11 | **Instructional Experiences in Science for Preschoolers (Continued)** | |
| | Activities With (Safe) Chemicals | *Hands-on Activities* |

**Readings:** ***I Do, and I Understand,*** *Chapter 8, pages 160-161.*

---

| | | |
|---|---|---|
| Session 12 | **Instructional Experiences in Science for Preschoolers (Continued)** | |
| | Life Science Activities | *Hands-on Activities* |
| | Selection of Activities for Preschool Science Day | |

**Readings:** ***I Do, and I Understand,*** *Chapter 8, pages 162-165.*

---

| | | |
|---|---|---|
| Session 13 | **Instructional Experiences in Chemistry During the Primary Grades** | |
| | Activities Involving Chemical Reactions | *Hands-On Activity* |
| | Activity for Children 9.1: Mystery Powders | *Hands-On Activity* |

**Readings:** ***I Do, and I Understand,*** *Chapter 9, pages 169-171.*

**<u>Assignment Due</u>: Lesson plans for Preschool Science Day.**

---

| | | |
|---|---|---|
| Session 14 | **Instructional Experiences in Chemistry During the Primary Grades** | |
| | Activity for Children 9.2: Colored Solutions | *Hands-On Activity* |

**Readings:** ***I Do, and I Understand,*** *Chapter 9, page 171.*

**<u>Assignment Returned</u>: Lesson plans for Preschool Science Day.**

---

| | | |
|---|---|---|
| Session 15 | **Preschool Science Day!** | *Teaching* |

---

| | | |
|---|---|---|
| Session 16 | **Instructional Experiences in Physics During the Primary Grades** | |
| | Exploring Light and Shadows | *Interview* |
| | Activity for Future Teachers 9.1 with Mirrors | *Hands-On Activity* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 9, pages 172-178.* | |
| Session 17 | **Instructional Experiences in Physics During the Primary Grades (Continued)** | |
| | Activity for Children 9.6: Light and Shadows | *Hands-On Activity* |
| | Note: Bring Mirrors! | |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 9, pages 176-178.* | |
| Session 18 | **Instructional Experiences in Physics During the Primary Grades (Continued)** | |
| | Batteries and Bulbs | |
| | Activity for Children 9.8 | *Hands-On Activity* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 9, pages 178-180.* | |
| Session 19 | **Instructional Experiences in Life Science During the Primary Grades** | |
| | Activities Involving Life Science | *Lecture-Discussion* |
| | SCIS Life Cycles: Wax Moths and Monarchs | *Hands-On Activity* |
| | **Selection of Lesson Topics for Primary Science Day** | |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 9, pages 180-187.* | |
| Session 20 | Activities with Rocks and Minerals for Primary Children | |
| | Activity for Children 7.2: Rocks | *Hands-On Activity* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 9, page 187.* | |
| **<u>Assignment Due</u>:** | **Lesson plans for Primary Science Day.** | |
| Session 21 | Astronomy Night at the Observatory! | *Hands-On Activity* |
| Session 22 | Astronomy Activities with Primary Children | *Hands-On Activities* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 9, pages 187-188.* | |
| **<u>Assignment Returned</u>: Lesson plans for Primary Science Day.** | | |
| Session 23 | Managing Hands-on Science Activities | *Lecture-Discussion* |
| | Safety in the Primary Science Classroom | *Lecture-Discussion* |
| | Adapting for ELL and Special Needs | *Lecture-Discussion* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 9, pages 188-192* | |
| Session 24 | **Primary Science Day!** | *Teaching* |

| | | |
|---|---|---|
| Session 25 | Thematic Project Work in Primary Grades | *Slides from England* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 11, pages 213-216.* | |
| Session 26 | Planning Project Work | *Lecture-Discussion* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 11, pages 216-223.* | |
| Session 27 | Carrying Out a Project Unit | *Lecture-Discussion* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 11, pages 223-228* | |
| Session 28 | Culminating a Project and Reporting Student Progress | *Lecture-Discussion* |
| **Readings:** | ***I Do, and I Understand,*** *Chapter 11, pages 229-232.* | |
| Session 29 | Work On Project Units | *Workshop (Cooperative)* |
| Session 30 | **Present Project Units** | |

**Requirements:**

1. Prepare a written journal response to each assigned reading by answering focus questions provided by me (Focus Questions will be distributed in class). Submit typed responses at the start of class on the day that they are listed for the course syllabus. Also, keep a "running journal" of your observations and questions related to the moon. Try to observe the moon every other night. Include drawings to clarify your questions and ideas. (**Note: Journal assignments will not be accepted via email.** If you are ill, you may submit via email only if the server stamp says you submitted before the start of class!).

2. Prepare 2 different science lessons and teach each one during "Science Days" and again during your field experiences. One should be taught to preschoolers and the other to primary students. Lessons must be developmentally appropriate. Submit your lesson plans in the format of a learning cycle. Submit your plans by the scheduled due date so you may receive feedback from me. Teach them to a small group of students during "Science Days" and during your field experience, and write a reflection about how the lesson went. Important Note: Primary science activities must come from a Science and Children article or a constructivist science curriculum (a list of these curricula will be provided and they will be identified in the Curriculum Lab).

3. Prepare and complete an interview with a child on a science topic. Repeat the interview with another child after receiving feedback and a grade for the first one.

4. Complete your field experiences and provide required documentation.

5. Attend and participate in all class sessions. I expect lively, informed discussions ("Informed means that you have read and thought about the assigned reading). I also expect you to participate in the set up and clean up of materials.

6. Prepare a thematic unit according to the topic work course handout.

7. Complete one of the following activities.[2]

   a. Book or journal about science topic/articles. (*Lost Discoveries, Scientific American, Discover, National Geographic*, etc.)

   b. Visit an approved "science resource" site and write up a report which answers the questions on the "science resource site" form (See course handout).

   c. Subscribe to boghopper@smm.org and write summary report of what you learned from it.

   d. Listen to Science Friday on National Public Radio (available live, streaming online, and via Warble) and report on what you learned from it.

   e. Read a *New York Times* Tuesday Science Edition, and report on what you learned from it.

**Assignment Weighting:** Assignments will be graded on the conventional St. Ambrose scale.

| | |
|---|---|
| journal/focus questions | =25% |
| moon journals (included with journals above) | |
| science lessons | =15% |
| interviews | =15% |
| field experience | =10% |
| attendance & Participation | =10% |
| thematic unit | =15% |
| science curiosity assignment | =10% |

**Required Text**

I Do, and I Understand: Helping Young Children Discover Science and Mathematics, by Robert Louisell (Constructivist Press, 2015).

***Recommended Texts***

*The Languages of Learning: How Children Talk, Write, Dane, Draw, and Sing Their Understanding of the World,* by Karen Gallas.
*Engaging Children's Minds: The Project Approach (2e)*, by Lillian Katz

---

**Professor Contact Information:**

www.constructivistpress.com

---

[2] Note: Each of these activities is explained in more detail in a packet which will be distributed in class.