Rhode Island College
Feinstein School of Education and Human Development
Department of Elementary Education
Teaching Elementary School Science
ELED 437

CONTENTS

COURSE INFORMATION

Catalog Description: The role of science in elementary schools and the development of teaching/learning strategies related to teaching science to all children are examined, including special populations. Laboratory/conference required.

Prerequisites: BIOL 109 and PSCI 103, each with minimum grade of C, except for students electing content major in general science; ELED 300, with minimum grade of B-; ELED 422, 424, 435, 436, 438, each with minimum grade of C+; admission to the elementary education teacher preparation program; or consent of department chair.

Use of Instructional Technology: This is a "web-enhanced" course. By enrolling in this course, students are registered to use Blackboard Learning Management System for accessing course material, sharing ideas, and submitting/receiving electronic files. Support for Blackboard is located at https://blackboard.ric.edu/. Students use Microsoft Office (Word, Excel, PowerPoint) and web browsers. And, students use digital cameras and image scanners, insert images into files, and create hyperlinks.

Relationship to the Professional Preparation: This course is one of the six courses in the elementary education curriculum that deals with methods of teaching in specific curriculum areas. It serves as a bridge between the general education courses of the college program, academic majors, foundation courses in education and the teacher candidate's student teaching experience.

Relationship to the Conceptual Framework:
The "Developing Reflective Practitioners: A Conceptual Framework" consisting of the model of process (planning, acting, and reflecting) and shared knowledge base [four themes of knowledge, pedagogy, diversity and, professionalism (are reflected in the objectives, pedagogical content, practicum, classroom activities, assignments, readings, and assessments. Teacher candidates acquire pedagogical, subject matter, a nd curricular knowledge. They use *National Science Education Standards* to plan standards-based lessons.

The practicum component includes planning, teaching, and reflecting upon standards-based lessons. Lessons are drawn from National Science Foundation-funded curriculum project, *Full Option Science System* developed by Lawrence Hall of Science. While preparing to teach the module, teacher candidates analyze the curriculum and instructional materials to determine how the developers intended the users to address diverse learning needs diversity and multi-cultural perspectives of all learners. Planning for teaching during the practicum includes developing a systematic plan for assessing student learning. Teacher candidates plan for continuous assessment that includes a performance assessment. Teacher candidates also reflect upon the semester experiences and communicate their new understanding, concerns, and questions.

The course includes the study of methods and materials appropriate for intellectually and culturally diverse populations. Integral to the course is learning to develop science concepts/principles and processes in the context of investigations. Teacher candidates use computer technology and digital photography to gather, store, and present information. The instructor uses Blackboard with teacher candidates as a means of providing course information and resources and creating an electronic dialogue. The course culminates in the submission of a portfolio entry focusing on assessment of student learning and RIPTS 9. The course requirements serve as performance assessments for teacher candidates.

COURSE TEXTS AND MATERIALS

Required:

Bass, J. E., Contant, T. L. & Carin, A. A. (2009). *Methods for Teaching Science as Inquiry.* Upper Saddle River, NJ: Pearson Education.

Chalk and Wire Assessment Management System subscription. Available at the Campus Store.

Recommended:

Hein, George H. and Price, Sabra. (1994). *Active assessment for active science.* Portsmouth NH: Heinemann.

National Research Council. (1996). *National science education standards.* Washington DC: National Academy Press. (NOTE: Available free online)

Other Required Documents and Materials:

Documents:

BCI Report. For more information go to:
http://www.ric.edu/feinsteinschooleducationhumandevelopment/bci.php

Materials:

1. *Blackboard.* Students use Blackboard (https://blackboard.ric.edu/) to access course material, share ideas, and submit/receive Microsoft Office documents. Students need access to a computer, printer, Microsoft Office, Adobe Acrobat Reader and the Internet. Students use web browsers (Internet Explorer, Safari) and e-mail (composing messages, attaching/receiving Word files). See http://www.ric.edu/software/ about the loan of Microsoft Office software (no additional charge to students) or purchase for a nominal fee in the Campus Store.

2. *Technology:* It's recommended that teacher candidates use a scanner and digital camera. A "flash drive" is useful in transporting files from home to campus, and field placement. A "timer" (e.g.,, kitchen timer) will improve pacing while teaching during the field placement. Teacher candidates can check out digital cameras from RIC's Audio-Visual Department for a short-term loan. Teacher candidates can download the free software, Adobe Acrobat Reader, at http://www.adobe.com/products/acrobat/readstep.html.

COURSE OUTCOMES

1. Candidates know, understand, and use some of the major concepts, principles, theories, and research related to development of children and young adolescents to construct learning opportunities that support individual students' development, acquisition of knowledge, and motivation. (ACEI 1 Development, learning, and motivation). Course Assessments: Practicum, Essay Exam, Philosophy of Teaching and Learning

2. Candidates know, understand, and use some of the fundamental concepts in the subject matter of science—including physical, life, and earth and space sciences—as well as concepts in science and technology, science in personal and social perspectives, the history and nature of science, the unifying concepts of science, and the inquiry processes scientists use in discovery of new knowledge to build a base for scientific and technological literacy. (ACEI 2.2 Curriculum - Science) Course Assessments: Practicum, Essay Exam

   Supporting Explanation:
   - Candidates have a broad general understanding of science and they teach elementary students the nature of science, and the content and fundamentals of physical, life, earth and space sciences, and their interrelationships. They are familiar with, and teach, some of the major concepts and principles that unify all scientific effort and that are used in each of the science disciplines: (1) systems, order, and organization; (2) evidence, models, and explanation; (3) change, constancy, and measurement; (4) evolution and equilibrium; and (5) form and function.
   - Candidates engage elementary students in the science inquiry process that involves asking questions, planning and conducting investigations, using appropriate tools and techniques to gather data, thinking critically and logically about relationships between evidence and explanations, constructing and analyzing alternative explanations, and communicating scientific arguments and explanations. They introduce students to understandings about science and technology and to distinctions between natural objects and objects made by humans by creating experiences in making models of useful things, and by developing students' abilities to identify and communicate a problem, and to design, implement, and evaluate a solution.
   - Candidates know naive theories and misconceptions most children have about scientific and technological phenomena and help children build understanding.
   - Candidates understand the use of assessment through diverse data-collection methods as ways to inform their teaching and to help students learn scientific inquiry, scientific understanding of the natural world, and the nature and utility of science.

3. Candidates know, understand, and use the connections among concepts, procedures, and applications from given content areas to motivate elementary students, build understanding,

and encourage the application of knowledge, skills, and ideas to real world issues. (ACEI 2.8. Connections across the curriculum). Course Assessments: Practicum, Exam

4. Candidates plan and implement instruction based on knowledge of students, learning theory, subject matter, curricular goals, and community. (ACEI 3.1. Instruction-Integrating and applying knowledge for instruction) Course Assessments: Practicum, Exam

5. Candidates understand how elementary students differ in their development and approaches to learning, and create instructional opportunities that are adapted to diverse students. (ACEI 3.2. Instruction-Adaptation to diverse students) Course Assessments: Practicum, Exam, Philosophy of Teaching and Learning

6. Candidates understand and use a variety of teaching strategies that encourage elementary students' development of critical thinking, problem solving, and performance skills (ACEI 3.3. Instruction-Development of critical thinking, problem solving, performance skills) Course Assessments: Practicum, Exam, Hiring Portfolio - Philosophy of Teaching and Learning

7. Candidates use their knowledge and understanding of individual and group motivation and behavior among students at the K-6 level to foster active engagement in learning, self motivation, and positive social interaction and to create supportive learning environments SECI 3.4. Instruction-Active engagement in learning) Course Assessments: Practicum

8. Candidates use their knowledge and understanding of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the elementary classroom. (ACEI 3.5. Instruction-Communication to foster collaboration) Course Assessments: Practicum

9. Candidates know, understand, and use formal and informal assessment strategies to plan, evaluate and strengthen instruction that will promote continuous intellectual, social, emotional, and physical development of each elementary student. (ACEI 4. Assessment for instruction) Course Assessments: Practicum, Science Content Exam, RIPTS 9 Artifact

10. Candidates understand and apply practices and behaviors that are characteristic of developing career teachers. (ACEI 5.1. Professionalism - Practices and behaviors of developing career teachers) Course Assessments: Practicum

11. Candidates are aware of and reflect on their practice in light of research on teaching and resources available for learning; they continually evaluate the effects of their decisions and actions on students, parents, and other colleagues in the learning community and actively seek out opportunities to grow as a teacher. (ACEI 5.2. Professionalism-Reflection and evaluation) Course Assessments: Practicum, RIPTS 9 Artifact, Dispositions

12. Candidates foster relationships with school colleagues and agencies in the larger community to support students' learning and well-being. (ACEI 5.4. Professionalism-Collaboration with colleagues and the community) Course Assessments: Practicum

Source of Course Outcomes: Association for Childhood Education International (ACEI)

Elementary Education Standards

Outline of Pedagogical Content

I. What is the Nature of Science?

A. Science is a set of interrelated thinking processes, scientific attitudes, and body of information
B. Scientific inquiry is a way of finding out and knowing.
C. Children's science is similar to scientists' science.

II. How Do Children Learn Science?

A. Results of current research
B. Naïve theories and misconceptions
C. Implications for standards, curriculum, instruction, and assessment

III. **What is an Exemplary Science Curriculum?**

A. Standards
   1. National Science Standards: National Research Council's *National Science Education Standards* and AAAS' Project 2061 *Benchmarks for Scientific Literacy*
   2. Rhode Island Science Framework and Grade Span Expectations
   3. Rhode Island Beginning Teaching Standards and Feinstein School of Education and Human Development's Conceptual Framework

B. Instructional Materials
   a) Science curriculum projects such as FOSS and STC
   b) Community resources: scientists, engineers, and science-rich organizations

C. Instruction
   1. Approach to learning: hands-on/multi-sensory, pictorial, symbolic
   2. Approach to teaching: constructivist, coaching, didactic; inquiry
   3. Learning cycle ("feedback loop")
   4. Technical skills: unit planning, questioning and responding, cooperative learning, materials management, instructional technology, accommodations
   5. Community resources

D. Assessment
   1. Systematic planning: aligning with purpose of learning, goals of unit and standards, sequencing assessments to monitor student progress
   2. Internal and external sources of assessment data
   3. Types of assessment: formative and summative assessment; matching pre- and post-assessments; learner self-assessment
   4. Reporting and recording
   5. Using assessment data to improve teaching and learning

E. How Can You Integrate Science with Other Disciplines?
   1. Writing (expository, procedural, report); Use of scientists' notebooks
   2. Reading (children's science literature, vocabulary development, and literature circles)
   3. Environmental education
   4. Engineering and technology

IV. What is an Appropriate Learning Environment for Science?

A. Diversity and equity
B. Stereotyping and bias
C. Accommodating for special needs
D. Collaborative relationships with colleagues, families, and the community
E. Guiding principles for teaching and learning: authenticity, autonomy, and community of learners

COURSE REQUIREMENTS (ASSIGNMENTS)

Alignment with Standards

COURSE REQUIREMENT	CONCEPTUAL FRAMEWORK	RIPTS	ACEI STANDARDS	COURSE OUTCOMES
Practicum (30%)	PAR, Knowledge, Diversity, Pedagogy	1-11	Development, Learning, Motivation Curriculum Instruction Assessment Professionalism	1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11
RIPTS 9 Artifact (30%)	PAR, Knowledge, Diversity, Pedagogy	9, 10	Assessment	9, 11
Interview (5%) and Hiring Portfolio (15%)	PAR, Knowledge, Diversity, Pedagogy, Professionalism	1-11	Development, Learning, Motivation Curriculum Instruction Assessment Professionalism	1, 2, 3, 5, 6, 10, 11
Science Content Exam (10%)	Knowledge, Pedagogy	1-2	Curriculum	2, 3
Dispositions (10%)	Professionalism	10	Professionalism	11

Extended Descriptions with Due Date. Percent of course grade is in parentheses.

Science Content Exam (10 %)

Type of assessment: A combination of selected response (multiple choice) and academic prompt (brief constructed response).
Purpose: The purpose is to diagnose your understanding of the subject matter needed for effective teaching of the unit you are assigned to teach.
What will be assessed? Science knowledge
How will evidence be collected? Paper and pencil exam
Time required: 60 minutes
Criteria for evaluating: Understanding of science knowledge

How grade is determined: Scoring guide will be provided.
Exam Date: **2/23**

Practicum (30%)

Purpose: To plan, teach, and reflect upon classroom teaching of science; to relate theory to practice; and to receive feedback from instructors and peers

Task:

1. Participate in eight classes that include a classroom observation, pre-assessment, six science kit classes, and summative assessment
2. Plan and reflect as a team with clinical instructor during the practicum component. Attend weekly conferences.
3. Inventory and prepare materials for science kit classes and assessments. Develop subject matter knowledge related to science kit.
4. Observe clinical instructor teach a hands on science lesson. Interview instructor about learners, their families and community, and science curriculum.
5. Submit a one-page letter of introduction to your assigned clinical instructor.
6. Submit Science Planning files to clinical instructor and post in assigned Bb *Discussion* forum.
7. As a team, devise a one-page business letter to the families of the students you are teaching which introduces them to the unit of instruction and approach to learning.
8. Share load of planning, preparing materials, and lead teaching. Take turns lead teaching. Lead teachers will open and close the class, conduct whole class discussions, use direct instruction to teach procedures and handle transitions. If not "lead teaching, other team members observe, facilitate hands on, small group learning components and assess science learning of assigned students.
9. Write two reflections using suggested reflection form in Bb Practicum. Post reflections in assigned Bb Reflection Assignment and e-mail to clinical instructor.
10. Identify a subgroup of learners to analyze assessment data and compare performance with other students.
11. Provide feedback to children in scientist notebooks at least two times.
12. Meet as a team with course instructor in a conference to reflect on inquiry teaching and learning.

How Grade is Determined: Clinical instructor will evaluate two implemented lessons using an evaluation form and recommend a grade.

DUE DATES

ITEM	MATERIALS DUE *
Letter of Introduction to Instructors (Individual)	TU 2/2
Team Letter to Families	TH 2/11
Team Unit Plan	TH 2/18
TH 2/25 Pre-Assessment	TU 2/23
TU 3/2 Science Class 1	TH 2/25
TH 3/4 Science Class 2	TU 3/2
Reflection 1 (Individual)	TU 3/2
Sci Notebook Feedback	TH 3/4
TU 3/9 Science Class 3	TH 3/4
TH 3/11 Science Class 4	TU 3/9
Sci Notebook Feedback	TH 3/11
TU 3/23 Science Class 5	TH 3/11
TU 3/30 Science Class 6	TH 3/25
TH 4/1 Post-Assessment	TU 3/30
Reflection 2 (Individual)	TH 4/1

* Email to Clinical Instructor and post in assigned Bb Discussion forum. Lesson planning materials include PowerPoints and all handouts to students.

RIPTS 9 Artifact (30%)

Purpose: To understand the role of assessment in teaching and learning science; to prepare a component of the "Preparing to Student Teach" portfolio.

Task: Complete the task related to *Rhode Island Professional Teaching Standards Standard 9.*

Product: Microsoft Office Word file

Criteria for Evaluating: See file in Bb RIPTS 9 Artifact.

How Grade is Determined: Scoring on analytic rubric.

*Due Dates**:***

- Upload Part 1 and Part 2 in Bb RIPTS 9 Artifact – Parts 1&2 **Due 3/30.**
- Upload All Parts, charts, graphs, samples of student work in Bb RIPTS 9 Artifact Assignment. **Due 5/4.**
  Bb RIPS 9 Artifact Assignment. Upload as a Microsoft Office Word file**. (**Re-submission for Acceptable rating **due 5/14**)

Interview (5%) and Hiring Portfolio (15%)

Purpose: According to a recent survey of principals who hire new teachers, two most important selection factors are written and oral communication skills. The mock job

interview provides you an opportunity to test your oral communication skills and use a hiring portfolio to illustrate points you would like to make while responding to questions. This course requirement will cause you to reflect on what you have learned and improve your oral and written communication skills.

Task: Compose an electronic hiring portfolio that you can use during a 15-minute oral interview. The components serve as evidence during a job interview. There is no standard design for a hiring portfolio. The portfolio can contain but not limited to

- Brief reflective paragraph preceding evidence in several sections.(*)
- A cover, table of contents with hyperlinks to different components (*)
- a 1-2 page resume used for applying for a teaching position (*)
- brief video clip of (science) teaching and reflecting
- a philosophy statement about teaching of science (*) PowerPoint slide show or photo essay 500 word statement about *Who are you as a teacher of science? What do you value or believe?Why do you want to teach science* Relate your thinking to PAR and four themes of FSEHD Conceptual Framework.
- photographs of you and your students in the (science) classroom or on a field trip (*)
- a plan for a well-managed science classroom (*)
- several different samples of student work in science (*)
- a science unit plan, two implemented science lesson plans, and types of science assessments with rubrics (*)
- a summary of results of an evaluation of your teaching by your students and/or supervisors (*)
- photographs of bulletin boards
- a sample of a brochure that you could use with families during an open house or "curriculum night"
- a description of training or unique experience that has strengthened your teaching ability.

For this assignment, items with an asterisk are required (*)

Submit file in Bb Portfolio *Assignment.*

Product and Performance:

Product: Hiring Portfolio developed in Chalk and Wire Assessment Management System;

Performance: Mock Job Interview

Criteria for Evaluating: See file in Bb Hiring Portfolio.

How Grade is Determined: Scoring on analytic rubric.

Hiring Portfolio: Send Chalk and Wire Portfolio url to Dr. Kniseley **Due 5/4**

Interview with Hiring Portfolio **Scheduled for 5/4 and 5/6**

Dispositions (10 %):

Purpose: To demonstrate dispositions related to teaching and learning that includes attending and active participation; to self-assess performance during the course.

Task: Download Word file at Bb Disposition Assignment. Complete the form. Upload file at Bb Dispositions Assignment.
Product: Self-assessment.
Criteria for Evaluating: List of Dispositions in Bb Dispositions; attendance; and participation.
How Grade is Determined: Identification of dispositions (strengths and goals for future learning); record of attendance
Due Date: **5/6**

COURSE EVALUATION
Grading System: You will earn a number grade for each course requirement based on a 4.0 grading scale.

A = 4.00 (3.85-4.17); A- =3.67 (3.51-3.84); B+ =3.33 (3.18-3.50); B= 3.00 (2.85-3.17); B- = 2.67 (2.51-2.84); C+ =2.33(2.18-2.50); C= 2.00 (1.85-2.17); C- = 1.67 (1.51-1.84); D+ =1.33 (1.18-1.50); D= 1.00 (1.17-0.85); D- = 0.67 (0.51-0.84); F = 0.00

Grade Definitions:

A Achieves standards *above the expected level of proficiency.* Carefully completes all assignments above the expected level of proficiency. Reads and thoughtfully reacts to assigned readings. Actively participates in class discussions and practicum experiences. Demonstrates excellence in planning; implementing effective lessons; interacting with students; reflecting upon teaching/learning; a command of methods, materials, and theory; a creative flair--solves problems; and a strong commitment to education. Takes initiative, sets personal learning goals, and takes action for developing understanding and abilities. The student is expected to be outstanding during student teaching.

B Achieves the standards. Completes all assignments at the expected level of proficiency. Reads and reacts to assigned readings. Participates in class discussions and practicum experiences. Demonstrates competence in planning; implementing effective lessons; interacting with students; reflecting upon teaching/learning; understanding methods, materials, and theory; a commitment to education.

C+ Achieves the standards in most areas. Completes all assignments at the expected level of proficiency. Reads and reacts to assigned readings. Participates in class discussions and practicum experiences. Conducts peer observations. Demonstrates competence (necessary for elementary science teaching) in most areas. The student will probably need special attention during student teaching to ensure success and certification.

C Does not achieve the standards. The student does not demonstrate the competencies necessary for elementary science teaching. The student does not complete all assignments and will not be allowed to student teach.

D, F Unsatisfactory--Failure. Complete failure early in the term will signal a grade of D or F. The student will be counseled to drop the class.

0 = UNACCEPTABLE: No evidence whatsoever of accomplishing the criteria or task/product

COURSE SCHEDULE, TOPICS, ACTIVITIES, READINGS, ASSIGNMENTS
*Subject to change. Changes will be announced through Web CT.
CALENDAR: 2/15-2/19: Washington Oak Winter Break; 3/15-3/19: RIC Spring Recess; 3/25 WO School Holiday; 4/19-4/23; Washington Oak Spring Recess; Grades Due May 17

DATE	TOPIC ACTIVITY	TEXT READING Bb Content	DUE
# 1 Tu 1/26	Topic Who are we, where we're going, how, and why --Course Outcomes --Schedule --Course requirements --Prior experiences, beliefs and attitudes affecting our view towards teaching/learning of science, curriculum and instructional materials Activity -Assign Tablet PCs -Present information about course and different types of Pre-Assessment		
# 2 Th 1/28	Topic -National Science Education Standards -Reasons for Teaching Science -Science Planning Activity - Clickers Pre-Assessment - Assign teams and explain tasks for Wednesday's team meetings. Arrange place to meet for team meeting.	Bass et. al., Chapter 1 *Children, Science, and Inquiry* NSES An Overview	Bb Questionnaire
# 3 Tu 2/2	Topic --Unit Design, Sample of Science Planning and Template. Activity -- Schedule Team Planning Times. --Assign tasks for writing science plan. .		Bb Letter of Introduction
# 4 Th 2/4	PRACTICUM - Videoconference with Washington Oak School Prepare for Classroom Observation	Go to http://www.ric.edu/faculty/mkniseley/ScienceEducation/resources.html	

		-Click on *Instructional Materials* on left column. Click on *Instructional Materials in Rhode Island.* Browse the titles science kits and other related resources used by Rhode Island teachers. -Click on *Published Curriculum* on left column. Browse different links. Bass et. al., Chapter 2 *Processes and Strategies for Inquiring*	
# 5 Tu 2/9	<u>Topic</u> -Different types of investigations -Investigating using a scientist notebook -Science Instructional Materials in Rhode Island. -Community Resources <u>Activity</u> -Hands on Activity Using Scientist Notebook	Bass et. al., Chapter 3 *Learning Science with Understanding*	.
# 6 Th 2/11	PRACTICUM - Classroom Observation at Washington Oak School	Bass et. al, Chapter 4 *Teaching Science for Understanding. The 5E Model of Instruction* Bb Scientist Notebooks: *Science Notebook Essentials (PDF).* Read article. Bb Scientist Notebook Toolkit (URL). Browse resource	Bb Team Letter
# 7 Tu 2/16	RIPTS 9 Methods of Pre-Assessing Student Learning -using scientist notebook (predicting,	Bass et. al., Chapter 6 *Assessing Science Learning*	

	next step/new questions) -different types of pre (diagnostic) assessments -linking pre- and post- assessments -external and source sources -making rubrics	**NSES Assessment Standards**	
# 8 Th 2/18	RIPTS 9 Continued Methods of Learner Self-Assessment -using scientist notebook (linking conclusion with prediction) -rating scales and open-ended questions - KWAL Assessing to provide "SMART" feedback Methods of Reporting and Recording -Devising and using rubrics -Analytic vs. holistic rubrics -Using teacher checklists -Maintaining informal anecdotal notes -Grading subject of science on school report cards Planning Systematically – Visual Organizer <u>Activity</u> Analyze plan for pre-assessments	Bass et. al, Chapter 5 *Planning and Managing Inquiry Instruction*	Bb Science Unit Plan
# 9 Tu 2/23	Science Content Exam Team Conferences – Prepare for Pre-Assessment Lesson		Upload Pre-assessment lesson planning materials in assigned Bb Group Discussion; email to clinical instructor.
# 10 Th 2/25	PRACTICUM Pre-Assessment		Upload Science Class 1 lesson planning materials in assigned Bb Group Discussion; email to clinical instructor.
# 11 Tu 3/2	PRACTICUM Science Class 1		Upload Science Class 2 lesson planning materials Bb Practicum:

			Reflection 1
# 12 Th 3/4	PRACTICUM Science Class 2		Scientist Notebook Feedback Upload Science Class 3 lesson planning materials in assigned Bb Group Discussion; email to clinical instructor.
# 13 Tu 3/9	PRACTICUM Science Class 3		Upload Science Class 4 lesson planning materials in assigned Bb Group Discussion: email to clinical instructor.
# 14 Th 3/11	PRACTICUM Science Class 4		Scientist Notebook Feedback Upload Science Class 5 lesson planning materials in assigned Bb Group Discussion; email to clinical instructor.
# 15 Tu 3/23	PRACTICUM Science Class 5		
# 16 Th 3/25	<u>Topic</u> Scoring of Science Content Exam Self Reflection—Graphing and Interpreting Pre (Diagnostic) Assessments Using Excel spreadsheets and charts/graphs <u>Activity</u> Analyze Results of Pre-assessment Sign up for Team Conferences	Bass et.al., Chapter 10 *Science for All Learners*	-Bring student response sheets/results of pre-assessment to class. -Quantify the results of pre-assessment. --Chart/graph results of pre-assessment. Upload Science Class 6 lesson planning materials in assigned Bb Group Discussion; email to clinical instructor.
# 17 Tu	PRACTICUM Science Class 6		Bb RIPTS 9 Artifact: Part 1+2.

3/30			Upload Post Assessment planning materials in assigned Bb Group Discussion; email to clinical instructor.
# 18 Th 4/1	PRACTICUM Post Assessment		Bb Practicum: Reflection 2
# 19 Tu 4/6	Teaching Science as Inquiry -What's Hands on Learning? -What's Inquiry Learning? -What's the Difference?	Bass et. al., Chapter 7 *Effective Questioning*	
# 20 Th 4/8	TEAM CONFERENCE WITH DR. KNISELEY AT RIC Debrief –Inquiry and Practicum Team Conferences Questions I will ask: --What is inquiry? --What is inquiry teaching? --What is inquiry learning? --How has your understanding of inquiry changed? --How has your understanding of managing a science classroom changed? --How has your understanding of science instructional materials changed?		
# 21 Tu 4/13	<u>Topic</u> Accommodating Diverse Learners -Universal Design -Scientist Note-booking -Clickers		
# 22 Th 4/15	Explain Book Share Assignment <u>Topic</u> Connecting Science with Reading -FOSS Science Stories -Using content area reading to engage learners in an investigation and to extend knowledge following an investigation -Reading Formats: narrative-descriptive accounts, biography; expository-informational, historical-	Bass et. al, Chapter 9	

	timelines, technical-directions for constructing something, poetry		
# 23 Tu 4/20	<u>Activity</u>: -Book Share – science trade books -Explore a reading lesson from FOSS Science Stories		Bring two "high quality" trade books to class representing nonfiction and one other genre <u>related to the topic</u> you're teaching. Be prepared to talk about your reasons for selecting it as a high quality book, how you selected the book, and to read a brief excerpt to others.
# 24 Th 4/22	<u>Topic</u> Integrating Technology while Teaching Science • RI PBS Video Streaming Curriculum • Tablet PC • Probeware • ProScopes • Digital photography • Smartboard • Gizmos – Interactive Simulations - Using digital photography to for assessing student learning and reflecting on teaching.	Bass et. al, Chapter 8 *Technology Tools and Resources for Inquiry Science*	
#25 Tu 4/27	<u>Topic</u> RIPTS 9 Interpreting data - Analyzing Scientist Notebooks Dispositions Course Requirement	Bass et. al., Chapter 6 *Assessing Science Learning* NSES Assessment Standards	Bring student scientist notebooks to class
# 26 Th 4/29	Practice - Interview with Hiring Portfolio Course Evaluations		Bring your "draft" e-portfolio to class. Bb RIPTS 9 Artifact-All Parts
#27 Tu 5/4	Individual Interview with Hiring Portfolio		E-mail Chalk and Wire - Hiring Portfolio url to Dr. Kniseley using Bb

			Course email.
#28 Th 5/6	Individual Interview with Hiring Portfolio		Bb Dispositions Self-Assessment
Th 5/14			Re-submission of RIPTS 9 Artifact.

REFERENCES: Suggested Reading, Internet, and Multi-Media Resources

AAAS. (1993). *Benchmarks.* New York: Oxford Press.

AAAS. (2001). *Atlas of science literacy*. Washington, DC: AAAS.

Allen, David. (1998). *Assessing student learning.* New York: Teachers College Press.

Baker, Linda, Dreher, Mariam Jean, Guthrie, & John T. (Editors). (2000). *Engaging young readers*. Guilford Press.

Baxter, G. P., Bass, K. M., & Glaser, R., (2000). *An analysis of notebook writing in elementary science classrooms.* CSE Technical Report 533. National Center for Research on Evaluation, Standards, and Student Testing (CRESST). School of Education & Information Studies. University of California, Los Angeles.

Blythe, Tina, Allen, D., and Powell, B. S. (1999). *Looking together at student work.* New York: Teachers College Press.

Bourne, B. & Saul, E.W. (1994) *Exploring Space: Using Seymour Simon's Astronomy Books in the Classroom.* New York, NY: Morrow Junior Books.

Bourne, B. (ed.) (1999) *Taking Inquiry Outdoors: Reading, Writing, and Science Beyond the Classroom Walls.* York, ME: Stenhouse.

Bransford, John D., Brown, Ann L. and Cocking, Rodney R. (Eds.) (1999). *How people learn: Brain, mind, experience, and school.* Washington, DC: National Academy Press.

Bredderman, T. (1982). Activity science: The evidence shows it matters. *Science and children. 20 (1) 39*-41.

Buck, Gayle A. (2000, Nov/Dec). Teaching, learning, and assessment strategies for elementary ESL students. *Science and Children.*

Caldwell, Jane. (2007). Clickers in the large classroom: Current research and best-practice tips. *CBE—Life Sciences Education.* Vol. 6, Spring 2007. Retrieved on September 2, 2008 from http://www.lifescied.org/cgi/content/full/6/1/9

Campbell, Brian & Fulton, Lori (2003). *Science notebooks: Writing about inquiry.* Portsmouth NH: Heinemann.

Carson, Rachel. (1956). *The sense of wonder*. New York: Harper and Row.

Charney, Ruth. (1991). *Teaching children to care*. Greenfield, MA: Northeast Foundation for Children.

Daniels, Harvey. (2002) *Literature circles: Voice and choice in book clubs and reading groups.* Portland, ME: Stenhouse.

Donovan, M. Suzanne, Bransford, John D. and Pellegrino, James W. (Eds.) (1999*). How people learn: Bridging research and practice*. Washington, DC: National Academy Press.

Duckworth, E. (1987). *The having of wonderful ideas.* New York: Teachers College Press.

Exploratorium Institute for Inquiry. (ND). *Moving kits towards increased inquiry.* Professional Development Tools for Inquiry-based Science. San Francisco, CA: Exploratorium.

Feynman, Richard. (1968). What is science? *The Physics Teacher 7*, 313-320.

Friedl, Alfred. *Teaching science to children: An integrated approach.* NY: McGraw Hill.

Gregory, Kathleen, Cameron, and Davies, Anne. (1997). *Setting and using criteria.* Mervillle, BC Canada: Connections Publishing.

Harlen, W. (1997). *Developing Science in the Primary Classroom.* Essex, England: Longman

Harvey, Stephanie. (1998). *Nonfiction matters: Reading, writing, and research in grades 3-8.* Portland, ME: Stenhouse.

Hawkins, D. (1965). Messing about in science. *Science and children, 2* (5), 5-9.

Hein, G. & Price, S. (1995). *Active assessment for active science.* Portsmouth, NH: Heinemann

Kagan, Spencer. (1995). *Cooperative Learning.* San Juan Capistrano, CA: Kagan Cooperative Learning.

Karplus, R. & Thier, H.D. (1967). *A new look at elementary school science--Science curriculum improvement study.* Chicago IL: Rand McNally.

Klentschy, Michael (2005, November/December) Science Notebook Essentials. *Science and Children.* p. 24-27

Klentschy, M., Garrison, L., Amaral, O.M. (2002, Summer). *Helping English learners increase achievement through inquiry-based science instruction* Bilingual Research Journal, 26: 2,pp. 213-239.

Klentschy, Michael P., and Elizabeth Molina-De La Torre. (2004). Students' science notebooks and the inquiry process." In *Crossing Borders in Literacy and Science Instruction*. Arlington, VA: NSTA Press. pp. 340-354.

Klentschy, Michael. (2001, August). The Science - Literacy Connection: A Case Study of the Valle Imperial Project in Science, 1995-1999. Paper presented at the *Crossing Borders: Connecting Science and Literacy Conference,* Baltimore, Maryland, August 24-26, 2001

LASER (1999). *Language Acquisition Through Science Inquiry.* University of California Santa Cruz. Symposium presentation at the American Educational Research Association, Montreal Quebec April 19-23 1999

Liem, Tik. (1987). *Invitations to science inquiry.* Chino Hills, CA: Science Inquiry Enterprises.

Loucks-Horsley, S., Carlson, M. O., Brink, L.H., Horwitz, P., Marsh, D., Pratt, H., Roy, K. R., & Worth, K. (1989). *Developing and supporting teachers for elementary school science education.* Andover MA: National Center for Improving Science Education.

Lowery, L. R. (1985). *The everyday science sourcebook: Ideas for teaching in the elementary and middle school.* Palo Alto, CA: Dale Seymour Publications.

Lowery, L. R. (ND). *The biological basis of thinking and learning.*

Lowery, Lawrence. (1998, November). How New Science Curriculums Reflect Brain Research. *Educational Leadership* Association for Supervision and Curriculum Development. Volume 56 Number 3.

National Research Council. (1996). *National Science Education Standards.* Washington DC: National Academy Press.

National Research Council. (1997). *Science for all children: A guide to improving elementary science education in your school district.* Washington DC: National Academy Press.

National Research Council. (2000). *Inquiry and the National Science Education Standards: A guide for teaching and learning.* Washington DC: National Academy Press.

National Science Foundation. (1999). *Inquiry thoughts, views and strategies for the K-5 Classroom.* Arlington VA: NSF.

National Science Resources Center. (1988). *Resources for teaching middle school science.* Washington, DC: National Academy Press.

National Science Resources Center. (1996). *Science for children: Resources for teachers.* Washington, DC: National Academy Press.

National Science Resources Center. (1996). *Resources for teaching elementary school science* (1996). Washington, DC: National Academy Press.

Naylor, Stuart and Keogh, Brenda. (2000). *Concept cartoons in science education.* Cheshire, UK: Millgate House.
Osborne, R. and Freyberg, P. (1985). *Learning in science: The implications of children's science.* Portsmouth, NH: Heinemann.
Pearce, Charles R. (1999) *Nurturing inquiry.* Portsmouth, NH: Heinemann.
Piaget, J. (1964). Development and learning: Part 1 of cognitive development in children. *Journal of Research in Science Teaching, 2 (3).*
Portalupi, JoAnn and Fletcher, Ralph (2001). *Nonfiction craft lessons: Teaching information writing K-8.* Portland, ME: Stenhouse.
Raizen, S. and Michelsohn, A. (1994). *The future of science in elementary schools.* SF: Jossey-Bass.
Renner, John W. & Marek E. A. (1988). *The learning cycle and elementary science teaching.* Portsmouth, NH: Heinemann.
Rowe, M. B. (1969). Science, silence, and sanctions. *Science and children*, March, 1969.
Rutherford, F. J. & Ahlgren, A. (1990). *Science for all Americans.* New York: Oxford Press.
Saul, E.W. & Reardon, J. (eds.) (1996) *Beyond the Science Kit: Inquiry in Action.* Portsmouth, NH: Heinemann
Saul, Wendy & Jagusch, Sybille A. (Ed.) (1991). *Vital connections: Children, science, and books.* Portsmouth, NH: Heinemann.
Saul, Wendy et al. al. (1993). *Science workshop.* Portsmouth, NH: Heinemann Press.
Shapiro, Bonnie. (1994). *What children bring to light.* New York: Teachers College Press.
Shepardson, D. P., & Britsch, S. J. (1997). Children's science journals: Tool for teaching, learning, and assessing. *Science and Children*, 34(5), 13-17, 46-47.
Shepardson, Daniel P., and Susan J. Britsch. (2000, November/December), Analyzing children's science journals. *Science and Children.* pp. 29-33.
Shymansky, J. Kyle, W. and Alport, J. (1983). *The effects of new science curricula on student performance.* Journal of Research in Science Teaching. 20,387-404.
Stead, Tony. (2001). *Is that a fact?: Teaching nonfiction writing k-3.* Portland, ME: Stenhouse.
Stigler, J. W., & Hiebert, J. (1999). *The teaching gap: Best ideas from the world's teachers for improving education in the classroom.* New York, NY: Summit Books.
Wiggins, G. J. and (McTighe, 1998). *Understanding by Design.* Alexandria, VA: Association for Supervision and Curriculum Development.
Worth, Karen, Robin Moriarty, and Jeff Winokur. (2004, February). Capitalizing on literacy connections. *Science and Children.* pp. 35-39.
Zimmerman, S. (2003). *Seven Keys to Comprehension.* How to help your kids read it and get it. New York: Three Rivers Press.

Internet:

WEB CT Course

K-8 Science Education Resources

Feinstein School of Education and Human Development. (2006). *Conceptual Framework. Retrieved April 8, 2008 from* http://www.ric.edu/feinsteinSchoolEducationHumanDevelopment/pdf/ConceptualFrameworkrevsp06.pdf
Rhode Island Department of Education. (2007). *Rhode Island Professional Teaching Standards. Retrieved August 27, 2009 from* *http://www.ride.ri.gov/educatorquality/DOCS/General_Documents/PDF/RIPTS Final 08-2008.pdf*

Rhode Island Department of Education. (2007). *Rhode Island Grade Span Expectations*. *Retrieved April 8, 2008 from* http://www.ride.ri.gov/Instruction/gle.aspx

Video:

Thinking Science Elementary Science Integration Project, Dr. Wendy Saul, University of MD, Baltimore County. Heinemann.

Achieving Literacy Through Inquiry Science Science and Literacy Integration Project, Rhode Island College

Science Literature Circles, East Bay Educational Collaborative

ADDITIONAL COURSE INFORMATION

Students with Documented Disabilities

Rhode Island College is committed to making reasonable efforts to assist individuals with documented disabilities. If you are seeking reasonable classroom accommodations under the ADA of 1990 and/or Section 504 of the Rehabilitation Act of 1973, you are required to register with the Student Life Office (Craig-Less 127, 456-8061). To receive accommodations for this class, please obtain the proper Student Life Office forms and meet with me at the beginning of the semester. Student services may be found at http://www.ric.edu/studentlife/stuwdis.html

Expectations for Attendance, Deadlines, Use of Computers

Cell Phones, Beepers, and Pagers:
Please turn them off before you come to class.

Attendance:
Your course grade will be reduced by .33 (on a 4-pt. scale) for each absence. Arriving late and leaving early will count as absences. Each class will start and end on time. Please inform me in advance if you have problems arriving on time and staying for the duration. If you are late or absent for any class, ask a classmate to inform you of new assignments or changes in schedules and to collect handouts for you.

Deadlines:
If you are late in submitting a course requirement, the grade for the assignment will be reduced by 1 (on a 4-pt. scale). Please inform me *at the beginning of the semester* if you have problems meeting a deadline. You are expected to submit assignments on the day they are due (see course schedule for due dates).

Academic Dishonesty:
RIC's Academic Dishonesty Policy can be found in the Rhode Island College Handbook of Policies, Practices, and Regulations (Chapter 3: *Academic policies and procedures*, pp. 32-34, section 3.9.1), and will be followed in this class.