FAST TRAIN Programs
Center for International Education
4260 Chain Bridge Rd, MS; 1E8, Fairfax, VA 22030
Phone: 703-993-2794, Fax: 703-246-8996

College of Education and Human Development
George Mason University
Course Syllabus

EDUC 514 – Teaching Science K-6 in International Schools
Summer 2013 (CRN 41339)
July 5 – 16
8:30 a.m. – 3:20 p.m. (University Hall 1203)

Instructor: Wendy Frazier, Ed.D., Associate Professor of Science Education

Telephone: (cell) 202-320-9331

Office Hours: after class or by appointment

Email: wfrazier@gmu.edu

Course Description: Covers the theory and practices of effective teaching of K-8 science in international schools. Uses laboratory and discovery techniques to design essential science components and integrate them with other disciplines. Introduces students to the design and implementation of activities for developing concepts, solving problems, and strengthening thinking skills in K-8 science.

EDUC 514 is a licensure course in elementary education, as such and upon successful completion of the sequence of licensure courses in FAST TRAIN and 1 year of teaching in an authorized PYP school, you will be eligible to apply for the IB Teacher Award Scheme: Level I.

Course Delivery:

Course delivery will be accomplished in a variety of ways in order to meet the needs and styles of all learners. Methods of instruction will include:

- Presentations assisted by Power Point
- Whole group and small group discussions
- Cooperative learning groups
- Student presentations
- Field projects
- Video presentations
- Textbooks and journal articles
- Blackboard

Course Objectives:

Students completing EDUC 514 will:

- Understand how children learn and develop
- Understand the central concepts, tools of inquiry, applications, and structures of science
- Understand how students differ in their approaches to learning
- Understand the importance of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation
- Plan instruction based upon knowledge of subject matter, students, the community, and curriculum goals
- Understand the uses of formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the learner
- Be a reflective practitioner who continually evaluates the effects of his/her choices and actions on others and who actively seeks out opportunities to grow professionally
- Foster relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being
- Develop an understanding and appreciation of the organization and excitement of science
- Build a repertoire of science teaching and assessment strategies by reading, writing, observing, participating and reflecting on the teaching of science
- Develop strategies to help students to become scientifically literate, think critically and creatively, and see relationships among science, technology and society
- Create and teach a unit plan (PYP) that contains science lessons/activities that include:
    - learning experiences that make aspects of content meaningful to students (*National Standards, Constructivism, and Experimental Design*)
    - Learning opportunities that support students intellectual, social, and personal development (*Science Process Skills, Constructivism, and Cooperative Learning*)
    - Instructional opportunities that are adapted to diverse learners (*Multiple Intelligences and Science Integration*)
    - Instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills (*Problem Solving & Thinking Skills*)
    - A learning environment that encourages positive social interaction, active engagement in learning, and self-motivation (*Hands-On Learning and Cooperative Learning*)
    - Foster active inquiry, collaboration, and supportive interaction in the classroom (*Questioning Strategies, Classroom Management, and Cooperative Learning*)

- Formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the learner (*Assessment and Evaluation*)
- Integration of science with other subject areas
- Highlight safety issues
- Real world application
- A cohesive unit of study
- Strengthening existing knowledge of science content through hands-on investigations, reading, writing, and communicating
- Working cooperatively with peers to teach and discuss science and science teaching
- Identifying past, present, and future movements in science education

Relationship to Program Goals and Professional Organizations
EDUC 514 addresses the following program goals and professional standards:

Grad School of Education Goals

Diversity
- Infuse diversity into the experience, training, and practice of students, faculty, and staff
- Provide support and mentoring of minority students, faculty, and staff
- Enhance recruitment and retention of minority students, faculty, and staff
- Ensure that diverse issues are reflected in curriculum and syllabi
- Ensure that diverse issues are reflected in GSE partnerships with schools, communities, and families

Reflective, Research-based Practice
- Encourage reflective and research-based practice for GSE faculty and for our students in their own practice

Relationship to the following ACEI Standards: www.acei.org

1.0 Development, Learning and Motivation
2.2 Science Content and Process
2.6 Health Education
3.1 Integrating and Applying Knowledge for instruction
3.2 Adaptation to Diverse Learners
3.4 Active Engagement in Learning
4.0 Assessment
5.1 Professionalism

Correlation Chart: INTASC Standards for Beginning Teacher Licensing and Development to EDUC 514 Course Topics and Class Assignments

INTASC Standards	Course Topics	Class Assignments
Principle 1: Content *The teacher understands the central concepts, tools of inquiry, applications, and structures of science and of the science disciplines he or she teaches and can create learning experiences that make these aspects of content meaningful to students.*	Constructivism Hands-On Learning Science Process Skills National Science Standards Inquiry/Questioning Strategies Assessment & Evaluation Problem Solving & Thinking Skills Multiple Intelligences Experimental Design Science Integration Science Connections-Technology	Unit Plan Evaluation of Teacher Guides Articles & Readings Field Experience
Principle 2: Student Development *The teacher understands how children learn and develop and can provide learning opportunities that support their intellectual, social, and personal development.*	Constructivism Hands-On Learning Science Process Skills Inquiry/Questioning Strategies Assessment & Evaluation Problem Solving & Thinking Skills Multiple Intelligences Cooperative Learning	Unit Plan Evaluation of Teacher Guides Articles & Readings Field Experience
Principle 3: Student Diversity *The teacher understands how students differ in their approaches to learning and creates instructional opportunities that are adapted to diverse learners*	Assessment & Evaluation Problem Solving & Thinking Skills Multiple Intelligences Cooperative Learning Science Integration Science Connections - Technology	Unit Plan Evaluation of Teacher Guides Field Experience Articles & Readings
Principle 4: Instructional Variety *The teacher understands and uses a variety of instructional strategies to encourage students' development of critical thinking, problem solving, and performance skills.*	Science Process Skills Inquiry/Questioning Strategies Problem Solving & Thinking Skills Multiple Intelligences Experimental Design Cooperative Learning	Unit Plan Evaluation of Teacher Guides Field Experience Articles & Readings
Principle 5: Learning Environment *The teacher uses an understanding of individual and group motivation and behavior to create a learning environment that encourages positive social interaction, active engagement in learning, and self-motivation.*	Constructivism Hands-On Learning Science Process Skills Inquiry/Questioning Strategies Multiple Intelligences Science Safety Classroom Management Cooperative Learning Science Connections - Technology	Unit Plan Field Experience Articles & Readings

Principle 6: Communication *The teacher uses knowledge of effective verbal, nonverbal, and media communication techniques to foster active inquiry, collaboration, and supportive interaction in the classroom.*	Cooperative Learning Science Connections – Technology Classroom Management Inquiry/Questioning Strategies	Unit Plan Classroom Participation Field Experience Articles & Readings
Principle 7: Curriculum Decisions *The teacher plans instruction based upon knowledge of subject matter, students, the community, and curriculum goals.*	National Science Standards Assessment & Evaluation Classroom Management Science Integration Science Resources	Unit Plan Classroom Participation Field Experience Articles & Readings
Principle 8: Assessment *The teacher understands and uses formal and informal assessment strategies to evaluate and ensure the continuous intellectual, social, and physical development of the learner*	National Science Standards Inquiry/Questioning Strategies Assessment & Evaluation Cooperative Learning Performance Assessment	Unit Plan Classroom Participation Evaluation of Teacher Guides Field Experience Articles & Readings
Principle 9: Reflective Practitioners *The teacher is a reflective practitioner who continually evaluates the effects of his/her choices and actions on others and who actively seeks out opportunities to grow professionally.*	Assessment & Evaluation	Classroom Participation Electronic Journal Field Experience
Principle 10: Community Membership *The teacher fosters relationships with school colleagues, parents, and agencies in the larger community to support students' learning and well-being.*	Science Connections – Technology Science Resources	Field Experience

Correlation Chart: ***PYP Practitioner Award Programme Requirements (pages 30-38)***

Course	Curriculum	Teach/Learn	Assessment	Professional
Teaching Elementary Science in International Schools	A, B, C, D	E, F, G, H	I, J, K, L,M	N, O

Textbooks

All required books have been ordered through the GMU bookstore.

Required Texts:

Bass, J., Contant, T., & Carin, A. (2009). *Teaching science as inquiry, 11th edition*. Upper Saddle River, NJ: Pearson. OTHER EDITIONS ARE FINE.

Recommended Text:

National Research Council (1996). *National science education standards.* Washington, DC: National Academy Press. Available Online: http://www.nap.edu/readingroom/books/nses/html/ DO NOT PRINT.

IB Primary Years Programme

Publication	URL
Making the PYP Happen: A curriculum framework for international primary education	http://occ.ibo.org/ibis/documents/pyp/p_0_pypxx_mph_0912_2_e.pdf
Making the PYP Happen: Pedagogical leadership in a PYP school	http://occ.ibo.org/ibis/documents/pyp/p_0_pypxx_mph_0912_1_e.pdf
Programme standards and practices	http://occ.ibo.org/ibis/documents/general/g_0_iboxx_amo_0509_1_e.pdf
A continuum of international education (2009)*	http://www.ibo.org/communications/powerpoint/index.cfm
IB Learner Profile Booklet and Video*	http://www.ibo.org/programmes/documents/learner_profile_en.pdf http://www.ibo.org/programmes/profile/
A basis for practice: the Primary Years Programme	http://occ.ibo.org/ibis/documents/pyp/p_0_pypxx_mon_0108_1_e.pdf
Learning in a language other than mother tongue in IB programmes*	http://occ.ibo.org/ibis/documents/general/g_0_iboxx_amo_0804_1_e.pdf http://publication-service.ibo.org/g_0_iboxx_amo_0804_1_e
Developing a transdisciplinary programme of inquiry	http://occ.ibo.org/ibis/documents/pyp/p_0_pypxx_poi_0801_1_e.pdf
PYP Exhibition Guidelines	http://occ.ibo.org/ibis/documents/pyp/p_0_pypxx_exg_0807_2_e.pdf
The PYP as a model of transdisciplinary learning	http://occ.ibo.org/ibis/documents/pyp/p_0_pypxx_poi_1002_1_e.pdf

All elementary candidates have been enrolled in the online curriculum center for IB and should reference this in their work. Log in is at: http://occ.ibo.org/ibis/occ/guest/home.cfm

Course Requirements

1. Participation 20%

Students will be expected to actively participate in class by questioning, commenting and critically analyzing relevant issues and topics. Students will make a presentation and lead a discussion on a journal or research article. Students will read, participate in activities, and perform reflective observations and journaling during class time.

FAST TRAIN students are expected to attend ***all*** class periods of courses for which they register. In-class participation is important not only to the individual student, but to the class as a whole. Class participation is a factor in grading; instructors may use absence, tardiness, or early departure as de facto evidence of nonparticipation and as a result lower the grade as stated in the course syllabus (Mason Catalog).

Mason uses electronic mail to provide official information to students. Examples include notices from the library, notices about academic standing, financial aid information, class materials, assignments, questions, and instructor feedback. Students are responsible for the content of university communication sent to their Mason e-mail account and are required to activate that account and check it regularly (Mason catalog).

2. Electronic Journals/Article Critiques 10%

Students will submit two electronic journals/article critiques regarding two of the assigned readings or articles from other sources. The articles should relate to the topics covered in class. Students will peer review the electronic journal entries using the rubric provided in the syllabus.

3. Teacher Guides Evaluation 10%

Students will read and review several commercial teacher guides/textbooks using a self-created rubric. Students will also write a two page evaluation covering topics such as process skills addressed, developmental level, science integration ideas and correlation to standards.

4. Field Project 30%

A. All FAST TRAIN licensure courses have a required Performance Based Assessment (PBA). The Field Project is the PBA for this course. Students will design an integrated, inquiry-based, hands-on science unit (minimum of six connected lessons) that demonstrates an understanding of topics presented during the semester. Units may be based on National or State Standards K-6. Students also need to complete a PYP Planner. Students will post the Unit Plans to Taskstream for review and grade assignment. Be sure to identify your cohort.

B. Students will teach at least two lessons from their unit and reflect on their experience with respect to student learning as part of their unit submission. A peer or administrator should observe both of the lessons taught and complete a Science Teaching Feedback Form on each lesson for a total of two completed

forms. Feedback from these two forms should be incorporated during your reflections. Please see the Science Teaching Feedback Form in this syllabus.

5. Field Experience **10%**

All FAST TRAIN courses require 20 hours of field experience in elementary classrooms. For this course, teaching the two science lessons and submitting two Science Teaching Feedback Forms in this syllabus along with the Reflective Paper on your field placement site's physical environment, learning climate, the teacher, and the students; FAST TRAIN Field Experience Record (includes log of hours); and FAST TRAIN Field Experience Evaluation Form can be considered the field experience component of the class. If you cannot teach the two science lessons during your regularly scheduled field work, you will need to make arrangements to complete the science teaching assignments at another time. After a "satisfactory" completion of Field Experience a course grade will be provided. Signed documents must be submitted to the instructor. Please see "Fieldwork Log and Evaluation" and "PBA and Fieldwork Guidelines – Elementary" at http://fasttrain.gmu.edu/resources/forms. All field experience documents must be loaded into Task Stream. Also, please see EDUC 514 Field Experience Assessment Rubric in this syllabus.

6. Final Project **20%**

Take home final exam. Students will select two topics to address that show understanding of issues that are presented during the semester. Responses should be limited to two to three pages, double-spaced.
All assignments should be in APA format.
**If you need access to students in a classroom setting to conduct your Field Project, you can either join a teacher in this class or see me to make arrangements no later than the first week of class.*

GSE Student Expectations

- Students must adhere to the guidelines of the George Mason University Honor Code [See http://oai.gmu.edu/honor-code/].
- Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See http://ods.gmu.edu/].
- Students must follow the university policy for Responsible Use of Computing [See http://universitypolicy.gmu.edu/policies/responsible-use-of-computing/].
- Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. All communication from the university, college, school, and program will be sent to students solely through their Mason email account.
- Students must follow the university policy stating that all sound emitting devices shall be turned off during class unless otherwise authorized by the instructor.

Campus Resources

- The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See http://caps.gmu.edu/].
- The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intened to support students as they work to construct and share knowledge through writing [See http://writingcenter.gmu.edu/].

Professional Dispositions

- Students are expected to exhibit professional behaviors and dispositions at all times.

Core Values Commitment

- The College of Eudcation & Human Development is committed to collaboration, ethical leadership, innovation, research-based practice, and social justice. Students are expected to adhere to these principles. [See http://cehd.gmu.edu/values/]

Task Stream Requirement

- Every student registered for any FAST TRAIN course with a required performance-based assessment is required to submit this assessment (*Field Project*) to Task Stream (regardless of whether a course is an elective, a onetime course or part of an undergraduate minor). Evaluation of the performance-based assessment by the course instructor will also be completed in Task Stream.

Website For Additional Information

- For additional information on the College of Education and Human Development, Graduate School of Education, please visit our website [See http://gse.gmu.edu]

Grading Scale for FAST TRAIN:
A+ = 100
A = 94-99
A- = 90-93
B+ = 85-89
B = 80-84 (no B- grades)
C = 70-79 – does not meet licensure requirements or Level I award recommendation
F = Does not meet requirements of the Graduate School of Education

All students will receive an IP or "In Progress" at the conclusion of this course. Students will be required to turn in the required Fieldwork Log, Fieldwork Evaluation Form, and the final assignment (Performance Based Assessment) to the instructor according to the FAST TRAIN Fieldwork Timeline posted here: http://fasttrain.gmu.edu/current-students/field-req/ The deadline for posting the PBA to Task Stream and for completing

the required fieldwork document in this course is January 15, 2014. Failure to submit this work to the instructor by this deadline will result an "F" for the course.

Incomplete (IN): This grade may be given to students who are in good standing, but who may be unable to complete scheduled course work for a cause beyond reasonable control. The student must then complete all the requirements by the end of the ninth week of the next semester, not including summer term, and the instructor must turn in the final grade by the end of the 10th week. Unless an explicit written extension is filed with the Registrar's Office by the faculty deadline, the grade of IN is changed by the registrar to an F. (Mason catalog); Faculty may grant an incomplete with a contract developed by the student with a reasonable time to complete the course at the discretion of the faculty member. The faculty member does not need to allow up to the following semester for the student to complete the course. A copy of the contract will be kept on file in the FAST TRAIN office.

Attendance Policy: FAST TRAIN students are expected to attend *all* class periods of courses for which they register. In class participation is important not only to the individual student, but to the class as whole. Class participation is a factor in grading; instructors may use absence, tardiness, or early departure as de facto evidence of nonparticipation and as a result lower the grade as stated in the course syllabus (Mason Catalog). Any unexcused absences will result in a 10 point deduction from your participation grade.

Technology in Class: Students will not be permitted to use cell phones during class. Please silence cell phones (not vibrate) while class is in session. Students may not use laptops unless specifically directly by instructor to do so during class.

GMU E-mail & Web Policy: Mason uses electronic mail (**https://thanatos.gmu.edu/masonlive/login**) to provide official information to students. Examples include notices from the library, notices about academic standing, financial aid information, class materials, assignments, questions, and instructor feedback. Students are responsible for the content of university communication sent to their Mason e-mail account and are required to activate that account and check it regularly (Mason catalog).

Course Withdrawal with Dean Approval: For graduate and non-degree students, withdrawal after the last day for dropping a course requires approval by the student's academic dean, and is permitted only for nonacademic reasons that prevent course completion. (Mason catalog). Students must contact an academic advisor in FAST TRAIN to withdraw after the deadline. There is no guarantee that such withdraws will be permitted.

Schedule of Topics, Assignments and Readings

Class	Date	Topics	Readings
1	7/5 a.m.	--Investigation: Mealworms and poetry --Discussion: How are the mealworm activities aligned with the Virginia science SOLs? (Introduce science SOLs and curriculum framework website) --Discussion: Investigation at the elementary level, National Science Standards, Community resources – How does science relate to the real world?	--Chapter 1 (Children, Science, and Inquiry: Some Preliminary Questions)
2	7/5 p.m.	--Discussion: Safety --Discussion: Nature of Science --Investigation: Cornstarch putty --Discussion: Parts of controlled experiment --Investigation continued: Group cornstarch putty or mealworms experiments --Article Discussion	--Chapter 2 (Processes and Strategies for Inquiry) --Chapter 5 (Planning and Managing Inquiry Instruction) --Article provided by instructor
3	7/8 a.m.	--Share: Findings from group experiments --In-class reading and discussion: Poetry and the nature of science (Article distributed in class) --Discussion: Learning cycles in science --Discussion: Learning cycles in science and the role of children's literature ***--Bring or borrow from instructor a children's book*** --Work on annotated bibliography entries	--Read article "Poetry in Two Voices: Poetry and the Nature of Science" during class --Chapter 4 (Teaching Science for Understanding: The 5-E Model of Instruction)
4	7/8 p.m.	--In-class reading and discussion: Inquiry and Nature of Science (Article distributed in class) --Share: Findings from Annotated Bibliography work --Discussion: Why hands-on? Why inquiry-based? --Discussion: Unifying principles in science --Exploring articles	--Read article "Inquiry and Nature of Science" during class
5	7/9 a.m.	--Investigation: Technology and science (microscope; probeware) --Investigation: Mentos (if time) --Share: Findings from technology work --Discussion: Strategies for integrated curriculum planning (Problem-based, project-based, and Jacobs model) --In-class reading and discussion: Weather Tamers (Article distributed in class) --Population Connection website (http://www.populationconnection.org) as example of integrated social studies and science instruction	--Chapter 8 (Technology Tools and Resources for Inquiry Science --Read article "Weather Tamers" during class --View Population Connection website during class --Chapter 9 (Connecting Science With Other Subjects)
6	7/9 p.m	--Discussion: Guiding questions ***--Unit Plan Rubric*** ***--Science Teaching Feedback Form*** --Work on units and plan for micro-teaching (explore resources available in class) --Article Discussion	--Chapter 7 (Effective Questioning) --Article provided by **group #1**
7	7/10 a.m.	--Discussion: Questioning strategies ***--Teacher Eval. Guides Rubric***	--Chapter 7 (Effective Questioning)

8	7/10 p.m.	--Examine and share findings from teacher guides --***Teacher Guides Evaluations Due*** --Article Discussion	--Chapter 3 (Learning Science with Understanding) --Article provided by **group #2**
9	7/11 a.m.	--Unit exploration --Article Discussion	--Chapter 3 (Learning Science with Understanding) --Article provided by **group #3**
10	7/11 p.m.	--Unit exploration --***Article Critique #1 (Due)***	--Chapter 9 (Connecting Science With Other Subjects)
11	7/12 a.m.	---Micro-teaching: --Discussion: Differentiation in science	--Chapter 5 (Planning and Managing Inquiry Instruction) --Chapter 10 (Science for All Learners)
12	7/12 p.m.	--Micro-teaching: --***Bring one lesson plan from your unit to class today for peer feedback*** --Peer feedback: One lesson plan from unit --Article Discussion	--Chapter 5 (Planning and Managing Inquiry Instruction) --Article provided by **group #4**
13	7/15 a.m.	--Micro-teaching: --Discussion: Assessment in Science	--Chapter 5 (Planning and Managing Inquiry Instruction) --Chapter 6 (Assessing Science Learning)
14	7/15 p.m.	--Micro-teaching: --Course evaluations --Course reflection --Article Discussion	--Article provided by **group #5**
15	7/16 a.m.	--Review and ***Final Exam*** --***Article Critique #2 due***	
	7/16 p.m.	***Final Exam - due by 3:20pm via email***	

Important Dates To Remember:

: Teacher Guides Evaluations due July 10, 2013
: Electronic Journals/Article Critiques due July 11 and July 16, 2013
: Take Home Final Exam due July 16, 2013 by 3:20 p.m.
: Unit Plans with Two Science Teaching Feedback Forms due January 15, 2014
: Field Experience Materials due January 15, 2014

1. Class Participation Rubric

Rating Demonstrated Competence

Excellent (90-100)
Consistently asks thoughtful, analytic questions or makes astute observations that indicate reflection and reading of assigned material. Participates very actively in small groups or class discussions. Attends class regularly and on time.

Competent (80-89)
Frequently asks questions or makes observations that indicate reflection and some reading of assigned material. Participates very actively in small groups or class discussions. May be tardy two or three times or one unexcused absence.

Minimal (70-79)
Rarely asks questions or makes observations that indicate familiarity with the assigned readings. Does not participate actively in small groups or class discussions. Is tardy more than three times or two unexcused absences.

Unsatisfactory (69 or below)
Does not ask questions or make any observations that indicate reading of assigned material. Does not participate in small groups and is frequently tardy or absent.

2. Article Critique Rubric

	Relevance	Summary	Critique	Due Date
Outstanding (90-100)	Relates personal reactions and/or raises relevant questions throughout response.	Summarizes article clearly, articulately and briefly.	Critique is expressed clearly and supported with reference(s).	Instructor receives critique before or on due date.
Above Expectations (80-89)	Relates a few personal reactions and/or raises relevant questions to elementary science.	Summarizes article clearly and briefly.	Critique is expressed clearly and supported with a reference.	Instructor receives critique before or on due date.
Meets Expectations (70-79)	May relate personal reactions and/or raises relevant questions to elementary science.	Summarizes article briefly with some coherence.	Critique is expressed clearly.	Instructor receives critique on due date.
Minimal (0-69)	Stretches to raise relevant questions and/or make a relevant personal reaction to elementary science.	Summary is unclear and poorly written.	Critique is unclear.	Instructor receives critique after due date.

4. Field Project: Inquiry-Based Science Unit

Criteria	Standard	Score			
		4	3	2	1
Unit Content - Science	ACEI Standard 2.2 – Science Content Knowledge	Unit convincingly demonstrate understanding of fundamental science concepts and meaningfully conveys the nature of science to students	Unit demonstrate understanding of fundamental science concepts and conveys the nature of science	Unit demonstrate some understanding of fundamental science concepts and only partially convey the nature of science	Unit does not demonstrate an understanding of science concepts
Unit Content - Instructional Differentiation	ACEI Standard 3.2 – Adaptation to Diverse Learners	Unit has extensive differentiation among lessons that are adaptive to diverse learners. Includes 14/22 activities from the instructional variety checklist.	Unit has differentiated lessons that are adaptive to diverse learners. Includes 10/22 from instructional variety checklist.	Unit has few differentiated lessons. Includes 8/22 from instructional variety checklist.	Unit does not demonstrate differentiation among lessons Includes 4/22 or less from instructional variety checklist.
Unit Content - Integration of Science with other subjects	ACEI Standard 3.1 – Integrating and Applying Knowledge for Instruction	Unit integrates with several other subjects skillfully an creatively to make meaning for students	Unit integrates with several other subjects clearly to create meaning for students	Unit integrates with only one other subject.	Unit shows lack of integration with other subjects

Criteria	Standard	Score			
		4	3	2	1
Unit Content - Assessment	ACEI Standard 4.0 – Assessment for Instruction	Includes various assessments (at least 3) throughout unit to monitor student understanding and differentiate instruction.	Includes various assessments (at least two) throughout unit to monitor student understanding and differentiate instruction.	Includes various assessments (at least one)throughout unit to monitor student understanding and differentiate instruction.	Includes one assessment at end of unit to monitor student understanding.
Lesson Content – Science Inquiry Process	ACEI Standard 3.3 – Development of Critical Thinking and Problem Solving	Lesson content, objectives and standards requires students to repeatedly demonstrate critical thinking and extensive problems solving skills	Lesson content, objectives, and standards requires students to demonstrate critical thinking and problem solving skills	Lesson content, objectives, and standards requires students to demonstrate critical thinking and problem solving skills only in some cases	Lesson content, objectives, and standards do not require students to demonstrate critical thinking or problem solving skills
Lesson Content – Developmental Appropriateness	ACEI Standard 1.0 – Development, Learning & Motivation	Lesson content, objectives, and standards are developmentally appropriate	Lesson content, objectives, and standards are developmentally appropriate in most cases	Lesson content, objectives, and standards are developmentally appropriate only in some cases	Lesson content, objectives, and standards are not developmentally appropriate

Criteria	Standard	Score			
		4	3	2	1
Lesson Content – Critical thinking and problem solving	ACEI Standard 3.3 – Development of critical thinking and problem solving	Includes multiple opportunities for students to engage in critical thinking and problem solving	Includes some opportunities for students to engage in critical thinking and problem solving	Includes few opportunities for students to engage in critical thinking and problem solving	No authentic opportunities are provided for students to engage in critical thinking and problem solving
Lesson Content – Active Engagement	ACEI Standard 3.4 – Active engagement in Learning	Includes 2 or more high quality, engaging hands-on/minds-on activities/experiments	Includes 2 high quality, engaging hands-on/minds-on activities/experiments	Includes one hands-on/minds-on activities/experiment	Includes a low-quality, unengaging hands-on/minds-on activity/experiment(s)
Lesson Content - Health and Safety	ACEI Standard 2.6 – Health Education	Highlights potentially dangerous health and safety issues in all unit activities to help students clarify misconceptions to bring extensive real world applications to the unit	Mentions potentially dangerous health and safety issues in all unit activities to help students clarify misconceptions to bring extensive real world applications to the unit	Some health and safety issues are addressed in the unit but without addressing misconceptions or real world applications	No health or safety issues are addressed

Criteria	Standard	Score			
		4	3	2	1
Reflection and Follow Up On Two Lessons Taught	ACEI Standard 5.1 – Professional Growth, Reflection & Evaluation	Ideas for follow-up (extension or remediation) stem from the observation and assessment. Clearly includes input from student and/or teacher. Follow-up ideas demonstrate a strong understanding of learning styles and/or MI theory.	Ideas for follow-up (extension or remediation) stem from the observation and assessment. Clearly includes input from student and/or teacher. Follow-up ideas include understanding of learning styles and/or MI theory.	Ideas for follow-up (extension or remediation) stem from the observation and assessment. May include input from student and/or teacher. Follow-up ideas may include understanding of learning styles and/or MI theory.	Ideas for follow-up (extension or remediation) stem from the observation and assessment. Does not include input from student and/or teacher. Follow-up ideas do not include understanding of learning styles and/or MI theory.

George Mason University

Graduate School of Education

Science Teaching Feedback Form

Teacher:_____ **Date:**_____

Observer:_____ **Title:**_____

School:_____ **Grade/Subject(s):**_____

Lesson Observed:_____

Please score the teacher on the following aspects based on your observation of their teaching two lessons from their science unit completed as a portion of their course requirements for EDUC 514. This form should be completed for each observation so that you have completed the form twice. It is not required that the same person complete both forms. Please note that the content of your feedback does not influence the teacher's course grade in EDUC 514. Instead, the teacher is requested to reflect on your feedback as a valuable opportunity to grow as a professional educator, and the quality of their reflection is scored as part of their final grade on their unit assignment.

Criteria	4 (exceeds expectations)	3 (meets expectations)	2 (does not meet)	1 (does not meet)
Lesson Content – Science Inquiry Process SCORE _____ *ACEI 2.2*	Lesson content, objectives and standards requires students to repeatedly demonstrate critical thinking and extensive problems solving skills	Lesson content, objectives, and standards requires students to demonstrate critical thinking and problem solving skills	Lesson content, objectives, and standards requires students to demonstrate critical thinking and problem solving skills only in some cases	Lesson content, objectives, and standards do not require students to demonstrate critical thinking or problem solving skills
Lesson Content – Developmental Appropriateness SCORE _____ *ACEI 1.0*	Lesson content, objectives, and standards are developmentally appropriate	Lesson content, objectives, and standards are developmentally appropriate in most cases	Lesson content, objectives, and standards are developmentally appropriate only in some cases	Lesson content, objectives, and standards are not developmentally appropriate
Lesson Content – Critical thinking and problem solving SCORE _____ *ACEI 3.3*	Includes multiple opportunities for students to engage in critical thinking and problem solving	Includes some opportunities for students to engage in critical thinking and problem solving	Includes few opportunities for students to engage in critical thinking and problem solving	No authentic opportunities are provided for students to engage in critical thinking and problem solving
Lesson Content – Active Engagement SCORE _____ *ACEI 3.4*	Includes 2 or more high quality, engaging hands-on/minds-on activities/experiments	Includes 2 high quality, engaging hands-on/minds-on activities/experiments	Includes one hands-on/minds-on activities/experiment	Includes a low-quality, unengaging hands-on/minds-on activity/experiment(s)
Lesson Content - Health and Safety SCORE _____ *ACEI 2.6*	Highlights potentially dangerous health and safety issues in all unit activities to help students clarify misconceptions to bring extensive real world applications to the unit	Mentions potentially dangerous health and safety issues in all unit activities to help students clarify misconceptions to bring extensive real world applications to the unit	Some health and safety issues are addressed in the unit but without addressing misconceptions or real world applications	No health or safety issues are addressed

Continued on next page

Additionally, please use the space below to provide feedback to the teacher in following areas:

PREPARATION and PLANNING:

INSTRUCTIONAL METHODS and MANAGEMENT:

ASSESSMENT:

PROFESSIONALISM:

RECOMMENDATIONS:

Observer's Signature _____ Date _____

Teacher's Signature _____ Date _____

EDUC 514- Science K-6
Summer 2013

Observers: When completing the second page of the Science Teaching Feedback Form please consider the following list of characteristics and practices of effective teachers.

An effective teacher…

Planning and Preparation:

- Uses curriculum guidelines and learning standards during planning to meet the needs of learners
- Develops unit and lesson plans to meet the developmental and academic needs of diverse learners.
- Plans a sequence of engaging activities, which are focused on achievement of the instructional objective(s).
- Selects learning experiences, technology and materials to accommodate different styles and levels of learning.
- Relates activities to students' culture, interests, knowledge, and experiences.
- Integrates materials and activities that are sensitive to culture, disabilities and gender.
- Gathers, creates and organizes materials and equipment in advance.
- Plans for using various methods to assess students' learning.
- Collaborates with other teachers and specialists in planning.

Instructional Methods and Management:

- Uses a variety of teaching methods, techniques and strategies.
- Consistently presents accurate content.
- Consistently provides clear instruction.
- Provides opportunities for learners to participate actively and successfully at different levels.
- Provides opportunities for learners to work independently and in cooperative groups.
- Encourages critical thinking and problem solving.
- Appropriately uses a variety of materials, technology and other media to achieve instructional objectives.
- Motivates students through interesting and challenging activities.
- Communicates high expectations while respecting individual differences and cultural diversity.
- Creates and/or uses established routines to provide an orderly and supportive environment.
- Creates and/or uses established routines to provide an orderly and supportive environment.
- Demonstrates courtesy and caring in relationships with students.
- Manages time, space and materials to keep students productively involved in learning.
- Demonstrates ability to manage 2/+ classroom activities simultaneously, with evidence of attention to each.
- Works toward developing a positive classroom community.
- Handles disruptive or destructive behavior firmly and fairly.

Assessment:

- Uses assessment that matches the objective.
- Uses assessment to inform future instruction.
- Adapts pacing, methods and materials using feedback from students.
- Assesses for understanding and mastery through observation of students' performance.
- Assesses for understanding and mastery through evaluation of students' work.
- Assesses for understanding and mastery through evaluation of students' work.
- Keeps records of students' progress and problems.
- Communicates with students to inform them of their progress.
- Gathers, organizes, and analyzes student data to communicate progress to others.

Professionalism:

- Possesses the basic skills and knowledge needed to guide students' learning.
- Demonstrates effort to continue learning both content and pedagogy.
- Reflects on his/her professional practice.
- Welcomes assistance for improvement.
- Implements suggestions and recommendations for improvement.
- Can develop and explain professional judgments.
- Engages in productive relationships with professional colleagues and support staff.
- Demonstrates stamina, flexibility and a positive attitude.
- Is responsible, dependable and observant of school policies and procedures.
- Demonstrates dispositions associated with an effective career educator.
- Projects a professional image in terms of demeanor and appearance.

5. Field Experience

Documentation of Fieldwork Experiences

All FAST TRAIN courses require 20 hours of field experience in elementary classrooms. All those observing in a classroom are required to submit a **FAST TRAIN Field Experience Record (includes log of hours) and FAST TRAIN Field Experience Evaluation Form** to your **instructor** via Task Stream no later than **the last date of the semester** of your fieldwork (or by the relevant extended summer deadline). The documents **must have signatures from either their teachers/or supervisors before submission.** Those conducting fieldwork in their own schools should provide the **principal/head's permission**.

Additionally, for this course you must teach two science lessons from your unit and submit two completed Science Teaching Feedback Forms from this syllabus along with the Reflective Paper on your field placement site's physical environment, learning climate, the teacher, and the students. If you cannot teach the two science lessons during your regularly scheduled field work, you will need to make arrangements to complete the science teaching assignments at another time.

Full-Time Summer Courses Timeline:

For courses taken during the full-time intensive summer program, observations must be completed using the due date timeline below.

Field Experience Summer Course Due Dates			
	Session I	Session II	Session III
Field Experience Due Date	November 15	January 15	March 15

- ☐ In Progress (IP) grade is given to the student at the end of the course.
- ☐ Field experience requirements are due as indicated on the chart.
- ☐ Final grades are issued for each course once the field experience report is completed and submitted to the instructor for evaluation.
- ☐ Important Note: **Students who plan to graduate in summer, must complete field experience in early September to graduate in time.**

Observation Guide for the Elementary Science Classroom

(Use this to write your reflective paper on the physical environment, learning climate, teacher, and students)

This guide is to be used to identify essential elements of an effective elementary science classroom.

Physical Environment

In the classroom do you observe:

Charts/Posters of experimental design, graphic organizers, vocabulary lists, KWL, etc…?
Bulletin board displays reflecting current science units/topics?
Student projects displayed that relate to science work?
Science trade books?
Science models?
Hands-on science equipment/materials?
Science kits?
Exploration centers?
Technology: *Windows on Science*, computer software, science internet sites, computers, science videos, etc..?

Learning Climate

In the classroom do you observe:

Students learning science through hands-on investigations?
Students learning science through inquiry-based activities?
A focus on the scientific process---experimental design?
Students actively engaged in the learning process?
Adaptations to meet individual needs of students. Attention to multiple intelligences/learning styles?
Student knowledge and skills being reinforced?
Incorporation of technology?
Integration of science content across the curriculum—math, social studies, language arts, etc..?
Real-world application of activities?
Effective transition and connection of lesson activities?
Implementation of a variety of assessment strategies (performance assessments, rubrics, observation checklists, peer/self assessments, portfolios, journals, etc..)?
Supportive classroom environment to create a community of learners?

The Teacher

In the classroom do you observe:

Effectively managing the classroom by establishing routines?
Effectively managing the classroom by assigning students roles & responsibilities?
Effectively managing the classroom by advanced preparation of materials?
Effectively managing the classroom by ensuring a safe science environment?
Activating prior knowledge of the students through questioning, discussion, and/or assessment?

Presenting the objectives and goals of the lesson?
Defining student/teacher expectations?
Modeling/demonstrating science concepts and procedures?
Using various questioning strategies/techniques during and after the lesson (open-ended, small group discussions, large group discussions, implementing wait time) to assist students in building connections?
Teacher acting as a facilitator?
Assisting students in drawing conclusions and forming generalizations?
Actively observing, recording, and assessing students' responses and participation?
Providing appropriate extension and/or follow-up activities?
Teacher's understanding is evident of content/concepts presented?
Teacher's enthusiasm for science is apparent?

The Students

In the classroom do you observe:

Following a sequence of directions to complete science experiments and investigations?
Active participation in the learning process—on task behavior?
Students motivated to learn science?
Positive student reactions to the lesson/activities?
Working cooperatively and collaboratively in groups?
Using and maintaining science equipment and materials responsibly?
Using critical thinking skills by forming questions and solving problems?
Sharing observations and/or results informally and/or formally by presentations, written reports, science journals, models, displays, graphic representations, etc..?
Engaging and using science process skills—researching, formulating hypotheses, planning & designing an experiment, making insightful observations, predicting, using appropriate measurement tools to gather data, recording and classifying data on charts, graphs, and/or learning logs, analyzing data, communicating findings, etc..?

EDUC 514 Field Experience Assessment Rubric

Are all items Submitted?
____ Signed FAST TRAIN Field Experience Record (includes log of hours)
____ Signed FAST TRAIN Field Experience Evaluation Form
____ Two Signed Science Teaching Feedback Forms on two lessons taught from unit
____ Reflective paper on field site's physical environment, learning climate, teacher, and students

Excellent

- Completed 20 hours of Field Experience
- Responses to all areas are thorough [Description and Reflection] in regards to Physical Environment, Learning Climate, Teacher, and Students (page length of at least _____)
- Writes clearly with few stylistic and grammatical errors
- Organizes paper in deliberate manner
- Reflects thoughtfully for all areas
- Supports analysis and application by frequently citing class content
- Applies knowledge to future teaching situations

Satisfactory

- Completed 20 hours of Field Experience
- Responds incompletely to some areas in regards to Physical Environment, Learning Climate, Teacher, and Students (page length of at least _____)
- May write with some lack of clarity and/or consistent stylistic or grammatical errors
- May organize paper in loose fashion that is difficult to follow
- May not reflect for all areas or does not reflect with depth
- Supports analysis by citing class content inaccurately or using few citations
- May not apply knowledge to future teaching situations

Unsatisfactory

- Did not complete 20 hours of Field Experience
- Does not respond to all areas and/or incompletely to some areas in regards to Physical Environment, Learning Climate, Teacher, and Students (page length less than _____)
- Writes with some lack of clarity and/or many stylistic and grammatical errors
- Organizes paper in fashion that is difficult or impossible to follow
- Does not reflect for all areas or does not reflect with depth
- Does not support analysis by citing class content
- Does not apply knowledge to future teaching situations

Evaluator's Comments: