CURRICULUM PLAN/Syllabus

For TARGETED Professional Learning (face-to-face, online, or blended)

Title: Teacher Training - K-12 Science using GLOBE (Global Learning and Observations to Benefit the Environment)

Number of Credits Requested: 1 credit

Instructor of Record: Dr. Matt Gilmore (see attached CV)

Additional PRESENTER/FACILTATOR INFO:

Name: Dr. Laura Munski
Current Position/Title: Director of Dakota Science Center
Highest Degree and Field of Study: Ph.D. in Teaching and Learning (see attached CV)

1. Description

Please provide a *detailed* description to include purpose of the learning event, instructional strategies used to engage educators in the learning, and any other information which will explain what content is being covered during this event. This helps clarify the scope and depth of the learning event.

This blended learning event, taught by GLOBE trainers Drs. Laura Munski and Matt Gilmore, will focus on training K-12 teachers to use several of the GLOBE environmental measurement protocols and hands-on learning activities related to two interdisciplinary components of the earth system: atmosphere and biosphere. The training and written materials, developed and refined over 20 years by an international group of science educators, are focused on grade levels 6-12, although the materials can be scaled for K-5. During the trainings, teachers will be asked to participate through practicing the detailed instrument measurement protocols and learning activities during 11.3 face-to-face hours and 7 associated online training hours. Once certified, GLOBE-trained teachers will join the collaborative international network of science teachers and scientists.

2. Learning Objectives/Targets

Please provide 2-3 learning objectives which you will use as targets for participant learning. It's helpful to finish the sentence, "Participants will …" (Utilize action verbs, such as, ASSESS, DEFINE, ANALYZE, etc.)

Participants ***will know*** 1) the importance of atmosphere and biosphere to the earth system; and, 2) the general approaches to science inquiry. Participants will ***be able to*** 1) pick the appropriate GLOBE measurements and activities that satisfy their chosen classroom objectives; 2) properly use particular equipment and measurement instrumentation; and 3) demonstrate use of analysis tools that can help students to sort, analyze, interpret and explain scientific measurements.

3. Agenda/Learning Event Outline

Below, click on blue links for web content. Orange text represents GLOBE's website hierarchy, so that you can more easily find content. All face-to-face instruction will be lead by Drs. Laura Munski and Matt Gilmore.

Online Lesson, Thur (26 July 2018)		**Minutes (instruction in bold)**
Start/ End **Times**	**TOPICS**	
You Choose	**1. Create GLOBE Account** **(do before 3 PM)** http://www.globe.gov/join/become-a-globe-teacher	1
	2. Register for Workshop: **(do before 3 PM)** http://www.globe.gov/get-trained/workshops/workshop/jT1U/79501	5
	3. Sign up for Optional PDEs: **(before 5 PM)** http://educators.und.edu/	5
	4. Watch two videos **e-Training with GLOBE** https://youtu.be/LRih-tZomhs **"GLOBE 20th Anniversary"** https://youtu.be/yyqtqUdiNb4	**5**
	5. GLOBE e-training http://www.globe.gov/get-trained/protocol-etraining	**40**
	• Introduction to GLOBE (Read the slideshow and complete the 15-question graded quiz)	**75**
	• Introduction to Atmosphere (Read the slideshow and complete the 15-question graded quiz)	**60**
	• Rain & Rain pH (Read the slideshow & complete the 6-question graded quiz)	

Trouble? GLOBE Helpdesk (login, e-training, or other user account issues) 8 AM–4 PM, Mon-Fri: 1-800-858-9947 or email help@globe.gov

Online Lesson, Friday (27 July 2018)		**Minutes (instruction in bold)**
Start/ End **Times**	**TOPICS**	
You Choose	**1. Install Free *GLOBE Data Entry App*** http://www.globe.gov/do-globe/apps • Both are available on the App Store for iPhone or iPad, or GooglePlay for Android	5
	2. Install Free *Puffin* Web Browser App for Flash-based games & videos (iphone or iPad only) http://apple.co/1xWXzki	5
	3. Verify that you can find latitude/longitude on your smart phone *GPS Essentials App* (Android) – download to get "Compass" and "Satellites" (lat/lon) *Compass App* (iPhone) – already comes with iOS and does both compass and lat/lon.	5
	4. GLOBE e-training http://www.globe.gov/get-trained/protocol-etraining	
	• Introduction to Biosphere (Read slideshow & do the 15-question graded quiz)	**60**
	• Land Cover Classification (Read slideshow & do the 10-question graded quiz)	**90**
	PRE-WORKSHOP ONLINE INSTRUCTION = **5.5 hours**	

Face-to-Face Session, Day 1, Monday 30 July 2018		Notebook Tab	Minutes (instruction in bold)
Start/ End **Times**	**TOPICS**		
7:50 – 8:00	**Gather**		10
8:00 – 8:30	**Welcome and Introduction** • Welcome • Watch "Welcome to the GLOBE Program" (2 min) https://youtu.be/bEzdkvwSDn8 • Who are GLOBE Teachers and GLOBE Scientists? • Target ages • Watch "…Teachers & Importance of Engaged Students" (2 min) https://youtu.be/m2CuqOT6bBw • Importance of Collaborative (project-based) Learning • Resources • GLOBE teacher's guide (printed & web) • Implementation Guide and Appendix (for classroom planning) • Learning activities vs measurement protocols • Workshop objectives, structure, & logistics • Review itinerary		**30**
8:30 – 8:45	**GLOBE Activity Icebreaker** */ Teacher's Guide/ GPS* • *The Data Game* • learning activity to help develop "numbers sense" to avoid mistakes in making measurements (reasonableness of numbers,		**15**
8:45 – 9:30	**Atmosphere Site** */ Teacher's Guide/ Atmosphere/ Aerosols* • Selecting and Documenting your Atmosphere Study Site • Site Definition • Determining GPS location (hand-held GPS device or web-based) • Conversion of Deg Min Sec to Decimal Degrees • Registering your school's site with GLOBE • Set up white instrument house with digital hygrometer inside (equilibrates) • Where to install precipitation gauge & snowboard • Entering Site into GLOBE database */GLOBE Data/ Data Entry/ Training Data Entry*	**Atmos Site** **GPS Protocols**	**45**
9:30 –9:50	**Break**		20

Face-to-Face Session, Day 1, Monday 30 July 2018 (Cont'd)		Notebook Tab	Minutes (instruction in bold)
Start/ End **Times**	**TOPICS**		
9:50 – 10:50	**Atmosphere** • Measurement Protocols • Precipitation Interactive – Snow (online) • pH meter calibration • pH of simulated rain (quick method with salt, pH paper, and pH meter) • Entering Atmos. data into GLOBE database */GLOBE Data/ Data Entry/ Training Data Entry*	**Precipitation Protocol**	**60**
10:50 – 12:00	**Lunch** – Sack Lunch *Exploring Annual Changes (five learning activities)* using Earth System Science Poster		70
12:00 – 12:30	**Data and Science** • Value of data in science • Importance of instrument types/quality & accuracy/precision • Science Inquiry • GLOBE instrument specifications (see Toolkit pg 24-38) & vendors	**Toolkit**	**30**
PM: 12:30 – 12:45	**Show and Tell** • Briefly show other Atmospheric measurements (clouds, RH, surface T, pressure, wind)		**15**
12:45 – 1:15	**View GLOBE International STEM Network (GISN) List & "Featured Teacher" List Websites** • Find one of each for later show-and-tell. • Example scientist http://www.globe.gov/web/dorian.w.janney • Example Teacher: https://www.globe.gov/web/teachers/teachers-community/profiledetail/10157/2011-juliette-vogel • Search tool: */Community/ Find a Collaborator/* http://www.globe.gov/globe-community/find-a-collaboration-partner		**30**
1:15 – 1:30	**Show and Tell a Scientist / Teacher** • Each workshop participant verbally presents a short description of their teacher and scientist.		**15**
1:30 – 1:45	**Group Discussion on effective strategies for collaboration**		**15**
1:45 – 2:05	**Break**		20

Face-to-Face Session, Day 1, Monday 30 July 2018 (Cont'd)		Notebook Tab	Minutes (instruction in bold)
Start /End **Times**	**TOPICS**		
2:05 – 2:50	**Implementation – Part I** • Discuss implementation section of Teacher's Guide • Skim the *Implementation Guide* and *Implementation Guide Appendix* and be thinking about where GLOBE could be included in your current curriculum. Ideas are given on pp 13-22 of your notebook with example units, worksheets, & rubrics on pages 23-78. (Atmos. 23-33; EAS 70-73; Biosphere 74-78) Supplemental teaching strategies and rubrics can be found in the Implementation Guide Appendix.	**Implementation** **Implement Append**	**45**
2:50 – 3:05	**Reflection & Share** • Write a paragraph or two identifying a class you teach that could incorporate GLOBE. Brainstorm on a possible lesson plan.		**15**
3:05 – 3:20	**Create your GLOBE Website** • Edit "My Page / My Account" and edit your "Welcome" message and include a short bio, add a photo, post a "hello" message on your wall (under Collaboration). Think about the good examples you saw.		**15**
3:20 – 3:35	**Qualtrics Online Assessment / Survey on Each Unit Above**		15
	TOTAL DAY 1 FACE-TO-FACE INSTRUCTION = **5.5 hours**		

Online Lesson, Day 1, Monday 30 July 2018		Notebook Tab	Minutes (instruction in bold)
Start/ End **Times**	**TOPICS**		
Evening	**GLOBE e-training** http://www.globe.gov/get-trained/protocol-etraining • Biometry – Canopy and Ground Cover (Read slideshow and do the 10-question graded quiz)		**90**
	TOTAL DAY 1 ONLINE INSTRUCTION = **1.5 hours**		

Face-to-Face Session, DAY 2, Tuesday 31 July 2018		Notebook Tab	Minutes (instruction in bold)
Start /End **Times**	**TOPICS**		
AM: 8:05 – 8:10	**Introduction to Today's Activities & Goals**		**5**
8:10 – 8:40	**• Discuss Resources** • GLOBE e-training • GLOBE Professional Development Webinars • GLOBE & learning standards (state & national NGSS)		**30**
8:40 – 9:30	**Biosphere / Biometry / Land Cover Part I - indoors** • Inexpensive instruments (Densiometer & Clinometer) • MUC Protocol App – how to • Land Cover Sample Site – review discussion • How to Compare MUC-classified area to Landsat satellite images • Review of bio datasheets • Review of Canopy, Ground Cover, • Mention Tree height and circumference protocols – If interested, do online training.	**Landcover Standards**	**50**
9:30 – 9:50	**Break**		20
9:50 – 11:40	**Biosphere / Biometry / Land Cover Part II - outdoors** • Classifying land cover in the field • Canopy cover Protocol ("look up" using densiometer) • Ground Cover Protocol ("look down") • Show-and-tell Tree height (using clinometer) and Circumference Protocols • Entering bio data into GLOBE database *(/GLOBE Data/ Data Entry/ Training Data Entry)*	**Biometry**	**110**
11:40 – 12:55	**Lunch** – Sack Lunch Elementary Globe Preview (K-4) - *The Mystery of the Missing Hummingbirds* "Honing in on Hummingbirds" (K-4) Learning Activity		75
PM: 12:55 – 1:25	**Visualization System Tutorial** http://www.globe.gov/globe-data/visualize-and-retrieve-data		**30**

Face-to-Face Session, DAY 2, Tuesday 31 July 2018 (Cont'd)		Notebook Tab	Minutes (instruction in bold)
Start /End **Times**	**TOPICS**		
1:25 – 1:40	**Overview of Data Visualization and Student Research** • Visualizing Data */GLOBE Data/ Visualize & Retrieve Data* • Written Reports */Do GLOBE/ For Students/ Student Research Reports* • International Conferences */News & Events/ Meetings & Symposia/Student Research Exhibition* • Science & Engineering Fair (local; http://und.edu/ndssef/)	**Implementation**	**15**
1:40 – 2:40	**Classroom Planning –** • Find 1 example of each of the following, and leave a constructive/supportive comment • GLOBE STAR Example of Student Research */News and Events/ GLOBE Stars/* • Poster Abstract, GLOBE Annual Meeting */News and Events/ Meetings and Symposia/ Annual Meetings* • Student Written Report */Do GLOBE/ For Students/ Student Research Reports* • Identify units in your classroom where you could implement GLOBE Activities & Protocols. • Outline how you will guide students to successfully demonstrate inquiry skills *(see Implement Append pg 8-9)*	**Implementation** **Implement Append**	**60**
2:40 – 3:00	**Show and Tell –** • about your classroom planning • share your favorite student GLOBE research example		**20**
3:00 – 3:30	**Wrap-up and Review –** • What you learned • where to get help • grant writing and letters of support		**30**
3:30 – 3:40	**Qualtrics Online Assessment / Survey on Each Unit Above**		10
	TOTAL DAY 2 INSTRUCTION = **5.8 hours**		

	TOTAL WORKSHOP INSTRUCTION = **18.3 hours**

If required instructional hours (15 for 1 credit; 30 for 2 credits, etc.) aren't met during sessions listed above, please identify **the hours remaining**, and explain **what participants will be required to do** to complete them. **NA**
Total Hours (excluding mealtimes and breaks): 18.3

4. Resources/Course Materials

What resources/materials will be used (books, articles, videos, etc.)? Identify type of resource and list titles and authors.

All have too many authors to list here:	
GLOBE Website	http://www.globe.gov/
GLOBE Teacher's Guide	http://www.globe.gov/do-globe/globe-teachers-guide *(a printed excerpt of the Guide will be provided in 3-ring-binder to teachers)*
Elementary GLOBE Books (five)	http://www.globe.gov/web/elementary-globe
GLOBE YouTube Videos	https://www.youtube.com/user/globeprogram

5. Requirements for Participant Accountability

Required Criteria to Receive Credit
Attendance & Participation: Participants must be actively involved in all instructional hours provided. In addition, participants must pass with 80% or better (following GLOBE requirements) in six online quizzes associated with the 7-hour online learning component (total 71 questions).
Receiving credit is dependent upon **quality** evidence completed by participants that appropriately reflects the **amount of instructional hours** this event provides. *Please explain how or what the participants will do to provide evidence of the following required assessments of learning.* **Reflections on New Learning**: a) All measurement protocols and learning activities are being done in small groups so that teachers I. may share ideas on application of the activities and measurements II. may provide group feedback on GLOBE materials (website, videos, printed instructions, online quizzes, etc) that can, in turn, be provided back to the GLOBE International Office b) Teachers will plan a peer-to-peer website through GLOBE so that they can declare their interests. Teachers will also plan to contact & collaborate with 2 existing GLOBE teachers & 1 scientist. c) Teachers will have an online GLOBE website account where they enter their classroom's Earth Science data. **Application of New Learning**: a) Demonstrate measurement of earth science properties, using the detailed instructional protocols b) Construct and share a written plan for how existing classroom units can be augmented such that one or more GLOBE activities and/or measurement protocols can be used to demonstrate and develop student skills in scientific inquiry.

Submission Deadline Date of Assignments (if applicable): Wednesday 1 August 2018

6. Grading Rubric: N/A (S/U grading only)

When completed, SAVE this to your computer and upload into the online Credit Approval Request form. ***(You may submit/upload your own syllabus or program brochure, if it includes all the components in this form. Attachments must be MSWord or plain text documents.)***