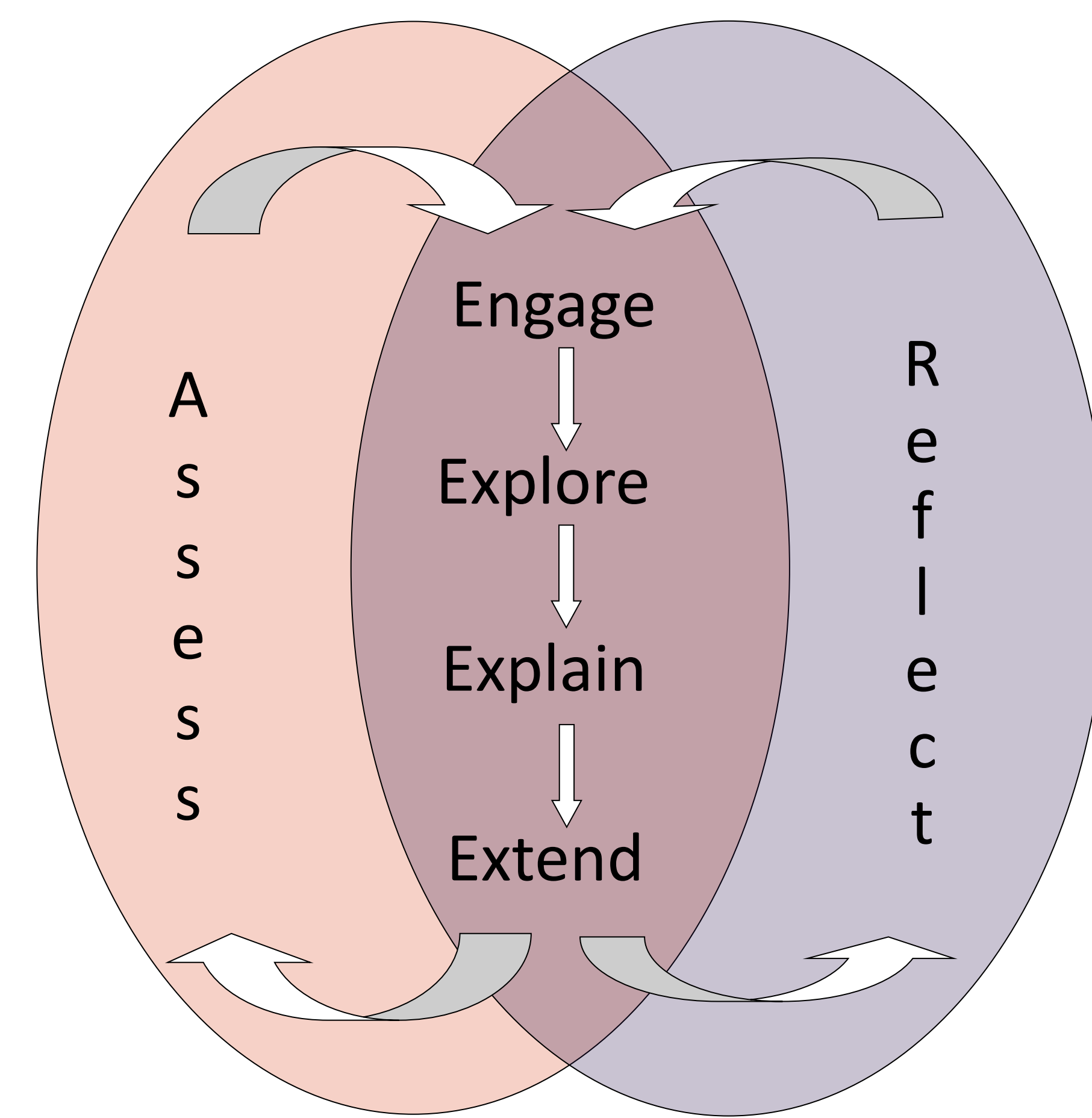


# Professional Development for Mathematics & Science Educators

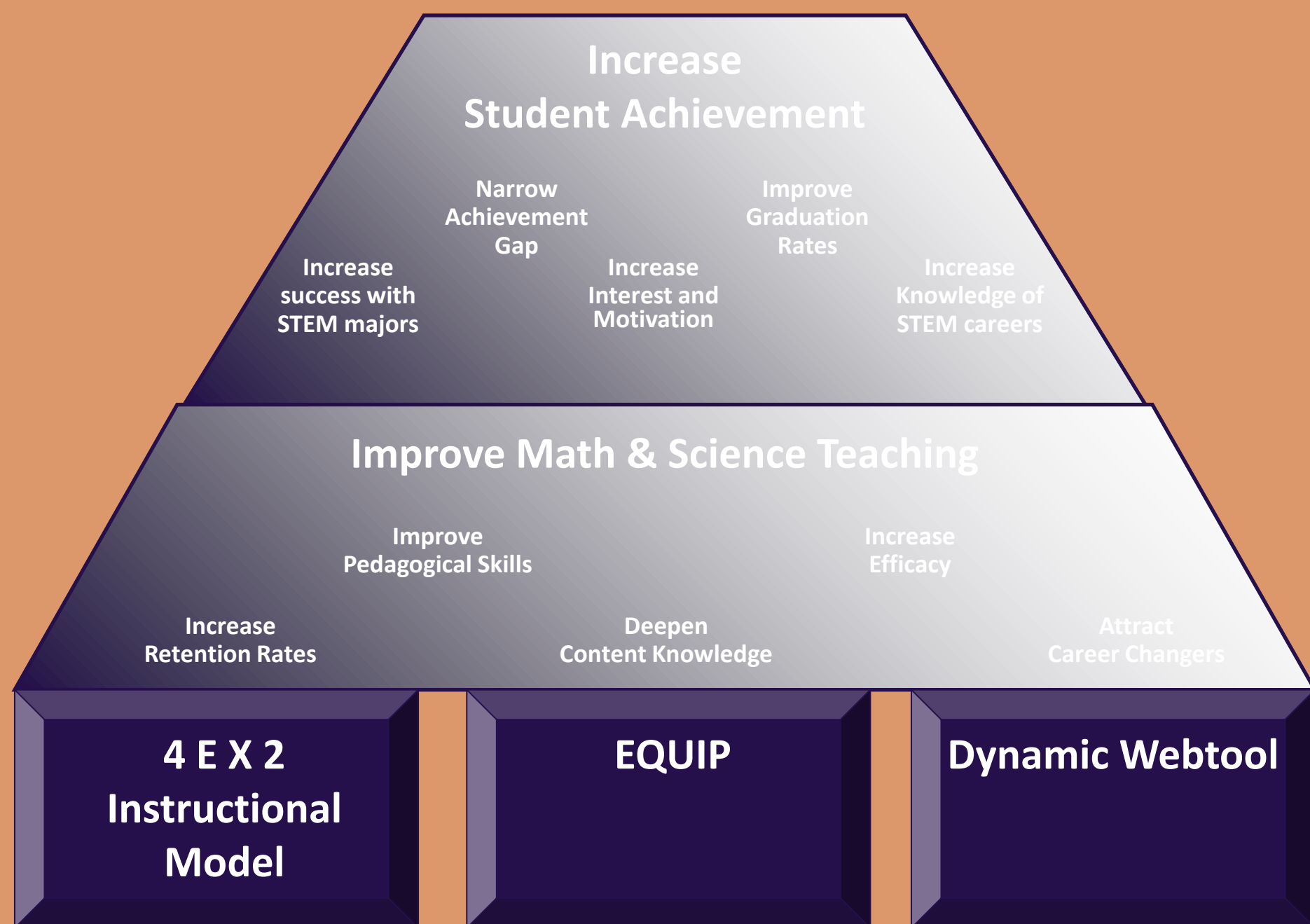
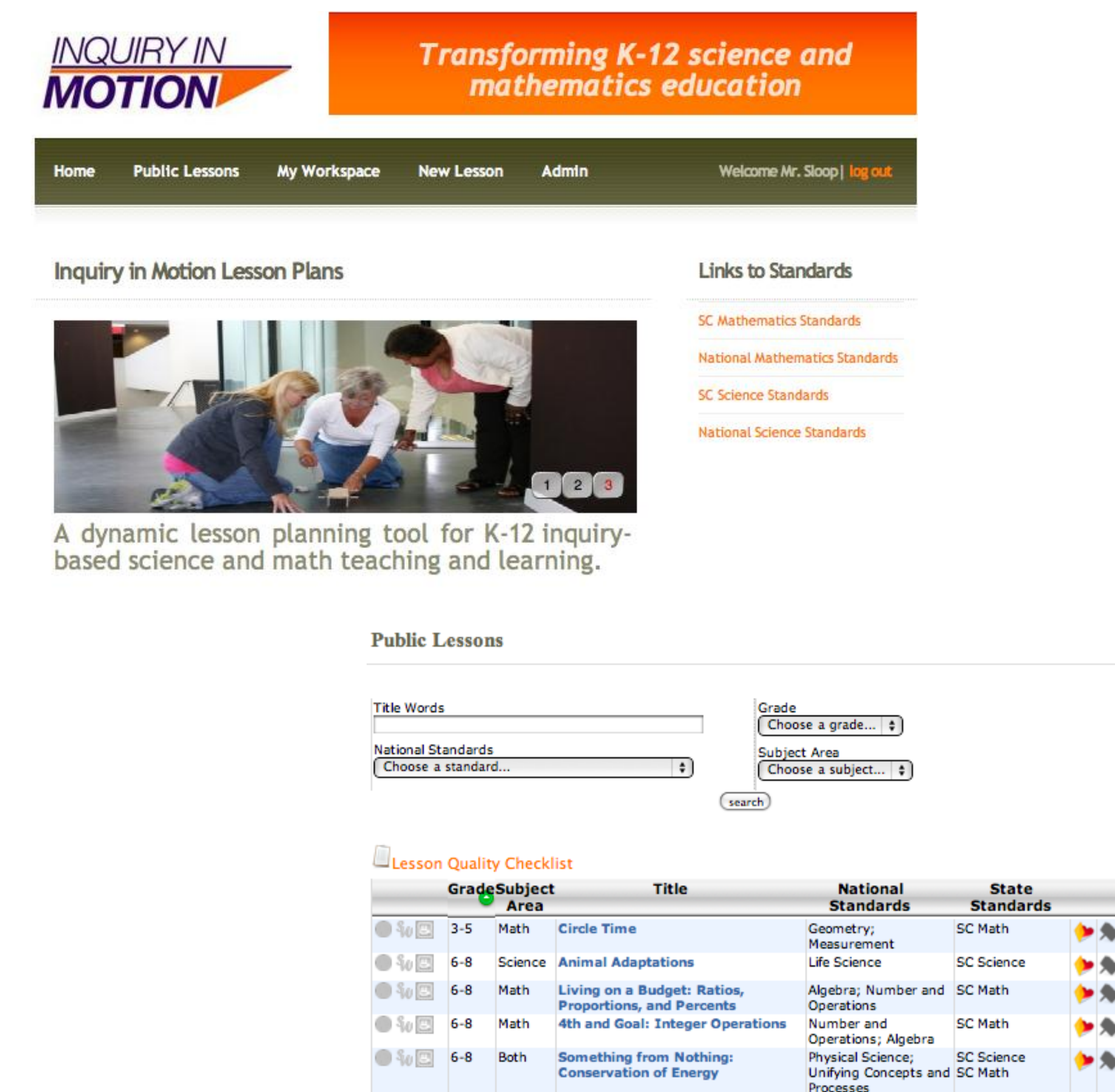


Center of Excellence for Inquiry in Mathematics and Science  
*"Inquiry in Motion seeks to improve motivation, potential, and achievement of students and teachers through rigorous, authentic inquiry-based learning experiences."*

## 4E X 2 Instructional Model



## Dynamic Webtool



## Purpose

- Enable participants to:
- Increase the quantity and quality of their inquiry-based instructional practice
  - Engage their students in meaningful learning experiences
  - Align instruction with state and national math and science standards

## Participants

Over 100 teachers from ten middle schools representing four upstate school districts

## Partners Involved

- Clemson University SC Commission on Higher Education
- National Science Foundation
- Greenville, Oconee & Anderson School District 4 & 5

## The Program

### PDI-1 Participants

- Attend summer institute
- Engage in inquiry-based activities in the role of a student learner
- Collaborate in designing exemplar lessons
- Attend 4 follow-up meetings

### PDI-2 Participants

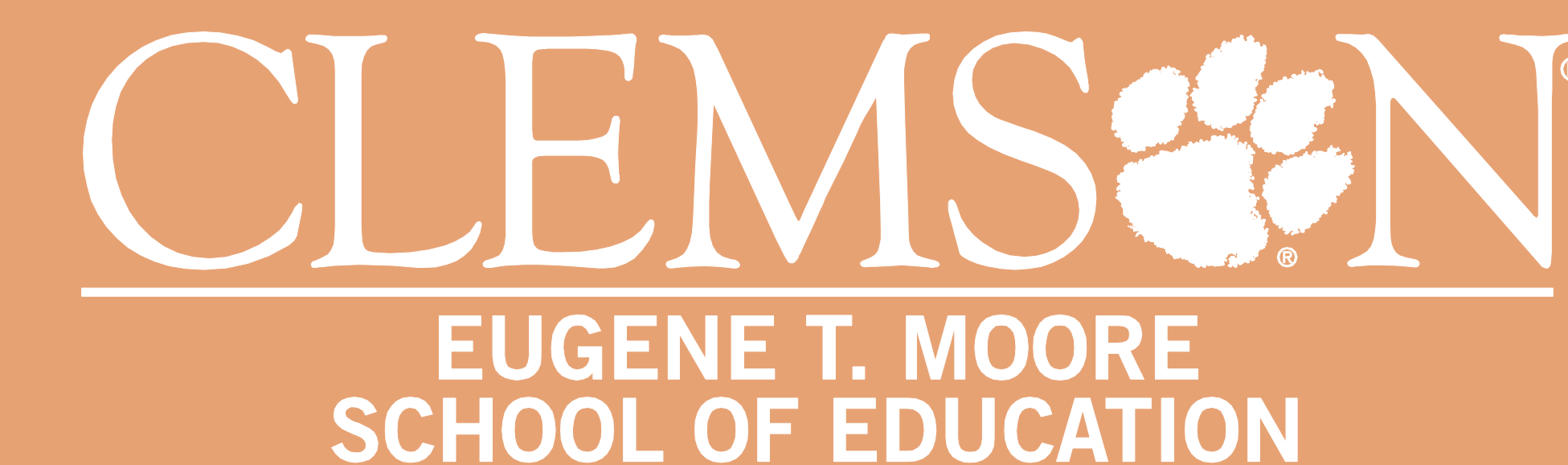
- Develop a school-based plan for implementing inquiry across the curriculum
- Serve as mentors to PDI-1 group
- Implement exemplar lessons and post work samples/video clips to web tool
- Attend 4 follow up meetings

## Implications

- Students of participating teachers outperform their peers who are matched on several criteria
- A higher level of inquiry-based instruction, as measured by EQUIP, is strongly correlated with increased student achievement
- More time spent on student exploration of ideas is positively correlated with achievement

## One of Four EQUIP Constructs: Instructional Factors

Construction Measured	Pre-Inquiry (Level 1)	Developing Inquiry (Level 2)	Proficient Inquiry (Level 3)	Exemplary Inquiry (Level 4)
Instruction Strategies	Teacher predominantly lectured to cover content	Teacher frequently lectured and/or used demonstrations to explain content. Activities were verification only.	Teacher occasionally lectured, but students were engaged in activities that helped develop conceptual understanding.	Teacher occasionally lectured, but students were engaged in investigations that promoted strong conceptual understanding.
Order of Instruction	Teacher explained concepts. Students either did not explore concepts or did so only after explanation.	Teacher asked students to explore concept before receiving explanation. Teacher explained.	Teacher asked students to explore before explanation. Teacher and students explained.	Teacher asked students to explore concepts before explanations occurred. Though perhaps prompted by the teacher, students provided the explanation.
Teacher Role	Teacher was center of lesson; rarely acted as facilitator.	Teacher was center of lesson; occasionally acted as facilitator.	Teacher frequently acted as facilitator.	Teacher consistently and effectively acted as a facilitator.
Student Role	Students were consistently passive as learners (taking notes, practicing on their own).	Students were active to a small extent as learners (highly engaged for very brief moments or to a small extent throughout lesson).	Students were active as learners (involved in discussions, investigations, or activities, but not consistently and clearly focused).	Students were consistently and effectively active as learners (highly engaged at multiple points during lesson and clearly focused on the task).
Knowledge Acquisition	Student learning focused solely on mastery of facts, information, and/or toe processes.	Student learning focused on mastery of facts and process skills without much focus on understanding of content.	Students learning required application of concepts and process skills in new situations.	Student learning required depth of understanding to be demonstrated relating to content and process skills.



This material is based upon the work supported by the National Science Foundation under Grant #DRL-0952160 and a grant from the South Carolina Commission on Higher Education under the auspices of the EIA Teacher Education Centers of Excellence Grant Program.