




Listening to the Masters

Great Science Teachers and Science
Teacher Mentors Redesign Science
Teacher Preparation



Presented by:

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SETS: Science Experts Teaching Students

A Noyce Capacity-Building Project, DUE -1240007

Goal: To design a new teacher preparation program for graduate students leading to a master's degree.

Unique in that it integrates the wealth of practical and theoretical knowledge of all SETS personnel for the preparation of quality science teachers.

COLLABORATION IS KEY

Collaboration between middle school and high school science teachers,
University scientists and teacher education faculty

Teacher Education Faculty

Student Teacher Candidates

High School Teachers



Middle School Teachers

University Scientists

Listening to the teachers - the first year

A multi-step approach:

1. An internet survey was sent to all middle and high school teachers in a 100 mile radius.
2. Focus group conversations at multiple schools in the region.
3. Nearly 70 applicants for the summer workshop. Choice made on the basis of representation of grade-level, science discipline, size and location of district and type of teacher preparation program completed.
4. Two weeks of group inquiry into science teacher preparation.

Participant Selection

Facilitator, grant PIs, Missouri State University grant participants, and 22 master teachers

Master teachers represented multiple paths to certification

Master teachers represented a variety of district sizes, courses taught, and both middle school and high school

Summer 1

WORKSHOP 1

Standards

Certification paths

Working groups

Culminating document

Standards

NSTA Pre-Service Teacher Standards

Missouri Standards for the Preparation of Educators

NAAEE, NGSS, CCSS

Our response

Certification Paths

Preexisting:

Master of Arts in Teaching Program

Post Bacc Certification

Undergraduate Certification

A new path is needed

Working Groups/ Culminating Document

Planning and Assessment

Instructional Strategies

Classroom Management

Teaching Laboratory and Field Experiences

General Knowledge of Education

Pedagogical and Content Knowledge

Workshop 1:

Integrate Practical and Theoretical Knowledge

Consensus was reached that an apprenticeship model is best, as is learning from master teachers and teacher education faculty concurrently.

Summer 1 Workshop Results

Goal of program:

Teacher certification and Master's Degree in Natural and Applied Sciences

Prerequisite:

Bachelor's Degree in a science, preference for physical science major or minor

Length of Program:

47 credit hours

15 months

2 summers in residence at MSU

Fall and Spring semesters in school settings

Summer 2 - Curriculum Refinement and Alignment

Review MoSPE, DESE and Subject Specific Competencies

Begin with Critical Questions & Student Learning Objectives

Individual Course Outline

Descriptions

Lesson/ Unit plans formatted

University professor & Master teacher in mind

Science Experts Teaching Students - Required Coursework 47 hours total

SUMMER ONE FOUNDATIONS SEMESTER 11 HOURS	FALL CLINICAL SEMESTER 15 HOURS	SPRING INTERNSHIP SEMESTER 12 HOURS	SUMMER TWO ADVANCED COMPETENCIES SEMESTER, 9 HOURS
<p>SCI 650—6 hours <u>Foundations of Science Teaching</u> M-W 9-12, 1-4, R 9—12 F 9—12 Performance Assessment</p>	<p>SCI 720— 6 hours <u>Clinical Experiences in the teaching and learning of Science.</u> Includes a 4 week Middle School experience</p>	<p>SCI 730— 10 hours, <u>Internship in Teaching of Natural Science.</u> 4 week/12 week placement middle and high school</p>	<p>SCI 750 — 6 hours <u>Advanced Pedagogies in Teaching Science</u></p>
<p>PSY 710—<u>Psychology of Education</u>, 3 hours Face-to-Face or Online</p>	<p>SPE 715—<u>Foundations of Special Education</u>, 3 hours Face-to-Face or Online</p>	<p>SCI 732—2 hours <u>Mentoring of Science Teaching Interns</u> Online and Biweekly seminars</p>	<p>RDG 640 or another Advanced Literacy Course 3 hours</p>
<p>RDG 660—<u>Diversity Issues in Literacy and Content Area Instruction</u> 2 hours Face-to-Face Evenings</p>	<p>RDG 710—<u>Content Area Literacy</u> 3 hours</p> <p>MID 725—<u>Advanced Theory and Practice in the Teaching of early Adolescents</u> 3 hours</p>		

Foundations of Science Teaching (SCI 650)

Each week the SETS students will attend classes daily:

Monday - Friday 9 - 12

Monday - Wednesday 1 - 4

Friday morning session - performance assessment of the unit topic

Week 1: What is Teaching? Philosophy and History of Education

Week 2: Focus on Inquiry in Science Education

Week 3: Focus on Assessment

Week 4: Laboratory Teaching and Safety

Week 5: Focus on Students

Week 6: Short Term Planning and Introduction to Technology in the classroom

Week 7: Curriculum Planning

Week 8: School Administration

Individual Unit Plans

5E model

began with SCI 650

weekly plans with activities & assessments

Done to:

aid in teacher assignment

evaluation rubrics

alignment for standards

meeting the needs of student teachers & cooperating school districts

Clinical Experiences in the Teaching & Learning of Science (SCI 720)

This clinical practicum course immerses teacher education candidates in professional communities in middle school and high school classrooms. Clinical work 20 hr/week fall semester.

Rotation	Duration
I. Primary Practicum Location	3 weeks
II. Specialized locations	
A. Literacy	2 weeks
B. Special Education	2 weeks
C. School Administration	1 week
III. Individualized Clinical Practicum	4 weeks
IV. Middle School Clinical Practicum	4 weeks

Assessment Connections:

Classroom Data to Research Findings

Focused Inquiries-Based on Pacific University at Woodburn's program

- synthesis of readings from background research
- data collected through classroom observations and interactions

Answering Critical Questions:

- Standards and Assessment Focused Inquiry
- Learning Environments Focused Inquiry
- Instructional Strategies Focused Inquiry
- Special Education Focused Inquiry
- Gifted Education Focused Inquiry
- Literacy in the Science Classroom Focused Inquiry
- Mathematics in the Science Classroom Focused Inquiry

Summer 3

Workshop 2 - Focus on Recruitment and Mentoring

Gather middle and high school teachers, administrators, and university personnel for feedback

Main goals:

- learn about mentoring and induction systems

- apply it to the design of a new teacher support system

- Networking system (virtual & face-to-face)

- develop a plan for the recruitment of future science teachers

Next Steps- msu.sets@gmail.com

Questions we need help with:

Candidates

How do we identify and recruit potential candidates?

Does the identification process begin in the high school through our master teachers?

What opportunities can we provide to measure potential success in the program and offer encouragement to the candidate?

Mentoring and Induction Programs

How are mentoring and induction programs implemented in other NOYCE programs?

Compare and contrast participating in an induction program and working with a mentor.

List the components of an effective induction program.