Historical Overview

• 1800s: Agricultural & industry needs drove curriculum, schedule; little formal teacher preparation; “3 R’s”

• Early 1900s: Normal Schools to train teachers; curriculum still basic/traditional

• 1960s: "new math"; more teacher prep programs in more universities; more in-service professional development
Historical Overview

• 1970s: backlash to “new math”
• 1980s-1990s: Standards movement to set higher standards for all students; growth of alternative certification programs & “reform” curricula
• 2000s: No Child Left Behind (NCLB) to hold states accountable for levels of student proficiency; high-stakes testing; preservice teacher institutes try to catch up to prepare teachers to teach in new ways
Historical Overview

• Teacher Induction
  – never a national program
  – at best some good local models
  – mostly: go into your classroom and shut the door

• Thus, teaching as a profession has had a fairly high rate of teachers leaving within their first 5 years of teaching
Education System: K-16

Pre-K (ISCED 0)

Elementary School: Grades K-3, K-5, K-6, K-8, or 4-5 (ISCED 1)

Middle School: Grades 6-8, 7-8, 6-9, 7-9, or 5-8 (ISCED 2)

High School: Grades 9-12 or 10-12 (ISCED 3)

Community College (first 2 years) or College/University
Teacher Education: Preparation

- Institute of Higher Education (IHE)
  - Certification through approved Bachelor’s degree program
    - Coursework in content and pedagogy (elementary, middle and secondary programs differ)
    - Typical secondary program has content expectations similar to that of a bachelor’s degree in mathematics
    - Fieldwork and Internship experiences
  - Certification through Master’s degree program after a Bachelor’s degree (M.A.T., M.S., M.Ed., or M.A.)
    - Coursework in content and/or pedagogy
    - Fieldwork and internship experiences
  - Programs do not certify teachers, states do. But an IHE program may be approved to verify eligibility for certification by the state
“Alternative” Route

- Programs vary -- Some are affiliated with universities.
- Often include fewer hours of education coursework prior to work in classrooms (e.g., one summer).
- Does not typically include a supervised internship experience.
- May include issuance of a 2- or 3-year teaching certificate by the state and employment in a full-time teaching position concurrent with participation in an “alternative teacher preparation program”.
- Can lead to continual assignment of differing novice teachers who leave a school within 3 years.
Teacher Education: Induction

• School districts may do the following:
  – Assign mentor teachers to new teachers
  – Encourage/require new teachers to complete a general program for new teachers
  – Evaluate first-, second-, and third-year teachers more frequently than veteran teachers
  – Require novice teachers to complete coursework or other professional development to earn the next level of certification

• Not the case in all states
Teacher Education: In-Service

• School districts may do the following:
  – Require all teachers to participate in Professional Learning Communities
  – Institute general professional development around issues common to all teachers, regardless of discipline
  – Institute content-specific professional development
  – Offer pedagogy courses for teachers
  – Reimburse teachers for tuition expenses associated with completion of graduate coursework
“National” Standards

• *Principles and Standards for School Mathematics (2000)*
  – National Council of Teachers of Mathematics
  – Grades PreK-12
  – Guidance document used by many states when defining state standards

• *Common Core State Standards for Mathematics (2010)*
  – Grades K-8 and high school
  – Specifies mathematical practices that are not grade specific (e.g., problem solving and modeling) as well as math content (e.g., number and operations)
  – K-8 math content standards are grade specific; high school content standards are categorized by “conceptual theme” (e.g., geometry, functions, modeling), but not course of study
  – All but 8 states have adopted
Accountability Measures

• **No Child Left Behind (NCLB)**
  – State-level, high-stakes assessments (annual census administration in Grades 3-8 and a single high school measure)

• **National Assessment of Educational Progress (NAEP)**
  – National public and private sample (Grades 4, 8, and 12) with state reports (public Grades 4 and 8)

• Two consortia (one with 25 states and one with 31 states) are developing assessments for the Common Core State Standards
Teacher Unions/Associations

• National organizations
  – American Federation of Teachers (union)
  – National Education Association

• District and state affiliation
  – Varies by state and by school district in a state
  – May be state/district chapters of national entities
  – Some districts require teachers to be part of the teachers’ association/union, some do not

• Generally lobby for and support teachers in their work with students; serve as the contract negotiation organization for teachers
Novice Mathematics Teachers
Novice Mathematics Teachers
Recruitment and Induction: Maryland

• 24 school districts; 19 districts project a need to hire in the future in selected fields, including Grades 7-12 mathematics
• No shortage of elementary teachers in any district
• Typically hire ~ 1,400 elementary teachers a year but expected to decline (~ 950 novice teachers; ~350 in state) and 240 secondary math teachers a year (~140 novice teachers; ~ 30 in state)
• State requires each district to have a new-teacher orientation program, an assigned mentor, and a formative review procedure.
Curriculum and Standards: Maryland

- Has signed on to the Common Core State Standards for Mathematics
- Governing Board Member of the 25-state consortium (Partnership for Assessment of Readiness for College and Careers – PARCC)
- Currently has high-stakes mathematics tests for Grades 3-8 (Maryland School Assessments) and an algebra/data analysis test (high school assessment that can be completed in middle school; required for high school graduation) to meet No Child Left Behind mandate
The PARCC Design

English Language Arts and Mathematics, Grades 3 - 11

BEGINNING OF YEAR

25%

50%

75%

90%

END OF YEAR

PARTNERSHIP RESOURCE CENTER: Digital library of released items, formative assessments, model curriculum frameworks, curriculum resources, student and educator tutorials and practice tests, scoring training modules, and professional development materials

Through-course ASSESSMENT 1
• ELA
• Math

Through-course ASSESSMENT 2
• ELA
• Math

Through-course ASSESSMENT 3
• ELA
• Math

END OF YEAR COMPREHENSIVE ASSESSMENT

Through-course ASSESSMENT 4
• Speaking
• Listening

Summative assessment for accountability

Required, but not used for accountability

2-May-11
Opportunities to Learn Math: Maryland

• District-provided professional development does not typically earn “acceptable” professional development credits.

• Teachers are responsible for acquiring professional development to maintain certification.
  – Earn 6 “acceptable credits” and have 3 years of “school-related” experience every 5 years to renew certification
  – Beginning in Year 6 of certification, must either have a masters degree, 21 graduate credits & 15 “acceptable credits,” or have filed an approved professional development plan to earn a degree/credits in addition to renewal requirement above
  – Beginning in Year 11 of certification, must either have a masters degree or 21 graduate credits & 15 “acceptable credits” in addition to renewal requirement above
Recruitment and Induction: Nebraska

• 251 school districts (consolidated from over 500 just 5 years ago) arranged into 17 Educational Service Units (ESUs)
• Hiring data are not compiled at the state level; some K-12 shortages across the state
• Budget cuts this year mean little new hiring
• Teacher induction policy is set at the district level and varies widely
Curriculum and Standards: Nebraska

- Nebraska has not adopted the Common Core Standards
- State standards for math & language arts adopted in 1999, updated in 2009; science & social studies 2010
- Each district (ESUs helped) created its own measure of student achievement in math and reading for grades 3-8 and high school
- State math test began in March 2011, grades 3-8 and 11
- State reading test began 2010; state writing test since 2002; state science test begins in 2012
- Textbooks chosen at the school or district level (mostly traditional)
Opportunities to Learn Math: Nebraska

• Teachers are required to renew their teaching certificates every 5 years
• No ongoing professional development is required at the state level to renew certificates, but many districts do require ongoing professional development
• ESUs are the main deliverers of professional development
• University of Nebraska-Lincoln effort statewide to offer graduate courses to math & science teachers
Recruitment and Induction: Virginia

• 134 school districts; Virginia has typically had teacher shortages for elementary grades (rural areas) and mathematics teachers (Grades 6-12)

• Induction
  – School districts are required to provide mentor teacher support programs for new teachers.
  – All new teachers are expected to work with their mentor on an individualized formative assessment and professional development plan.

• Great Beginnings Program
Curriculum and Standards: Virginia

• Has not adopted the Common Core State Standards

• Current standards with assessments: Virginia Standards of Learning (SOLs) (reading, language arts/writing, math, science, history/social science)

• Mathematics assessments
  – Grades 3-8
  – Algebra, Geometry, Algebra II

• Adopted textbooks tend to be “traditional” in nature, particularly at the high school grades
Opportunities to Learn Math: Virginia

• Renew teaching certificates every 5 years by earning 6 graduate/undergraduate credits or by professional activity summing to 180 hours (3 credits = 90 hours)

• Professional development offered by districts

• Master’s Programs
  – K-8 Mathematics Specialists
  – Advanced Studies of Teaching and Learning

• Collaborative math and science partnerships between local universities and school districts (state funding via Title II federal funds); active Virginia Math and Science Coalition (business/higher ed/school districts → state)
  – COMPLETE and ESTEEM