

# The Supply of New Science Teachers in Florida

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# Science Certification Areas in Florida

- Middle School
  - Middle Grades General Science (Grades 5-9)
- High School
  - Biology (Grades 6-12)
  - Chemistry (Grades 6-12)
  - Earth-Space Science (Grades 6-12)
  - Physics (Grades 6-12)

# Science Curriculum in Florida

- Middle School
  - Life Science
  - Earth/Space Science
  - Comprehensive Science
  - Physical Science

# Science Curriculum in Florida

- High School
  - Biological Sciences
    - Biology, Physiology, Botany, Ecology and Genetics
  - Earth/Space Sciences
    - Earth/Space Science, Astronomy
  - General Science
  - Physical Science
  - Integrated Sciences
    - Environmental Science, Integrated Science, Marine Science
  - Physical Sciences
    - Chemistry, Physics

# Pathways to Teaching in Florida

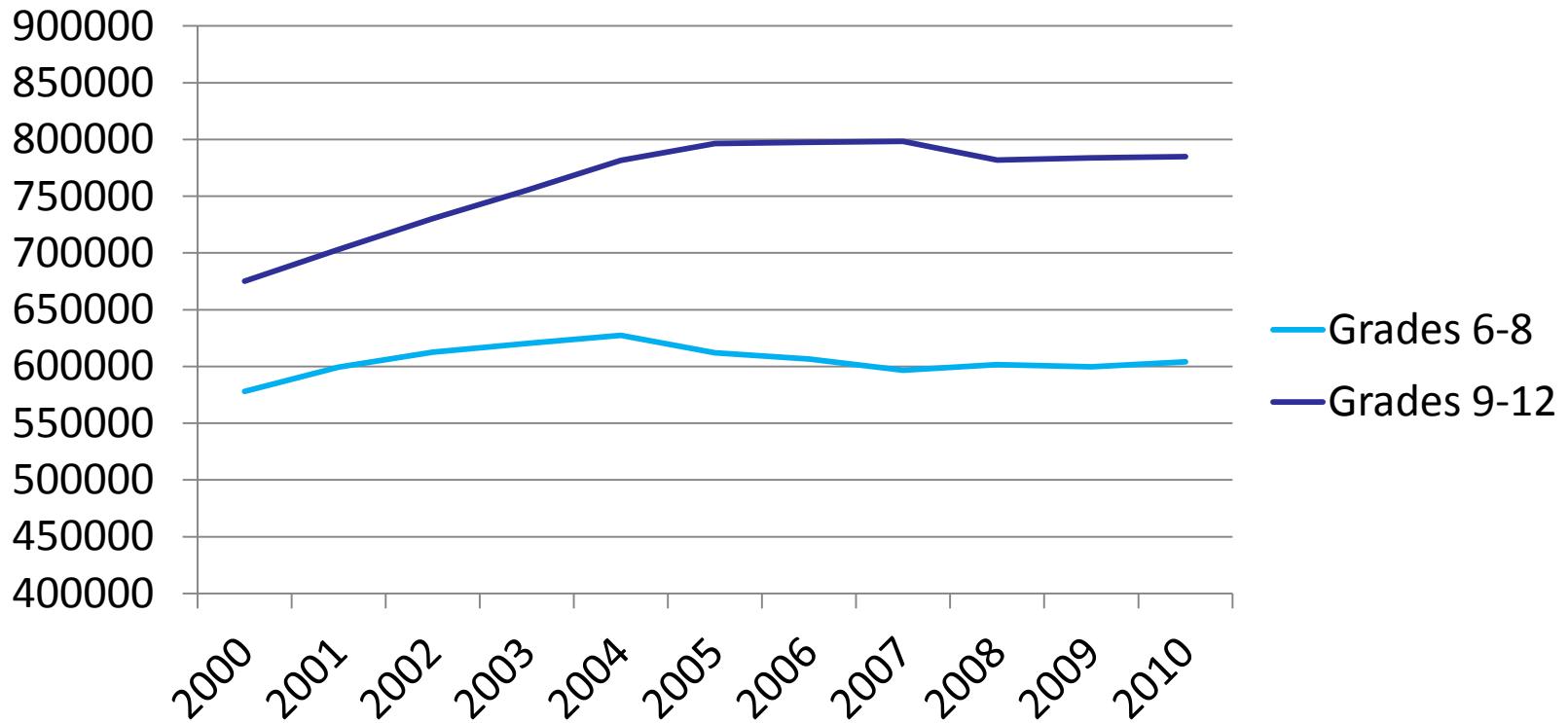
- Florida Teacher Preparation Program Graduate
- Course Analysis
  - Requires handful of core education courses
    - May be an education minor or not part of any formal program
  - Default category for meeting certification requirements
- Out-of-state
  - Teacher Preparation Program Graduate
  - Certified in Another State
- Alternate
  - District Alternative Certification Program
    - No special recruitment procedures
    - No formal education coursework required
    - Must complete competency-based alternative certification program and pass certification exams
  - ABCTE Passport
  - Educator Preparation Institutes
    - Two-semester program at community colleges
  - College Teaching Experience



# Trends in Demand for Science Teachers in Florida

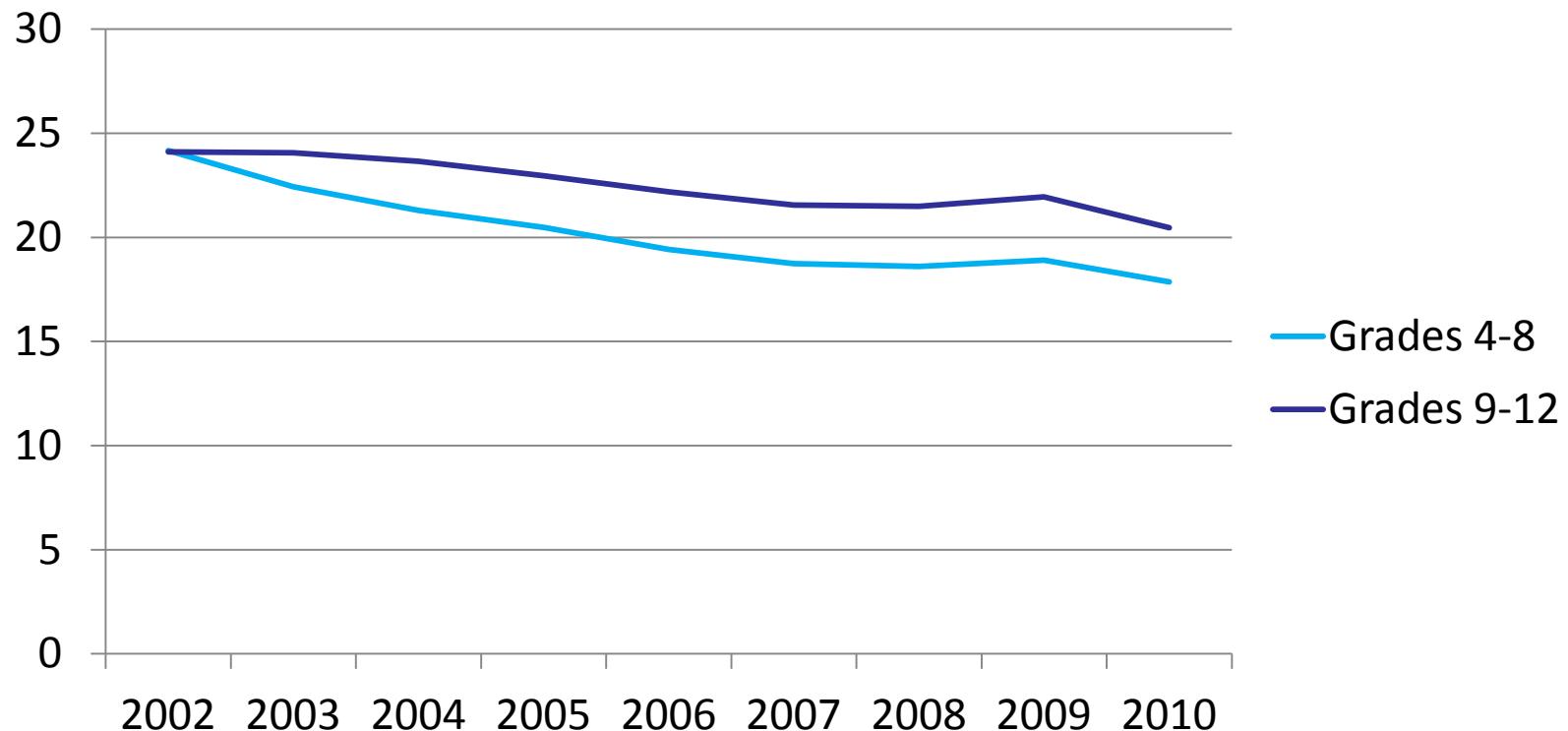
- Membership in Florida Schools
  - Recent reduction in growth of school aged population
- Class Size
  - Constitutional class size initiative leading to smaller class sizes over time

# School Membership by Grade in Florida



Source: Florida Dept. of Education, "School Membership by Grade"

# Average Class Size by Grade in Florida



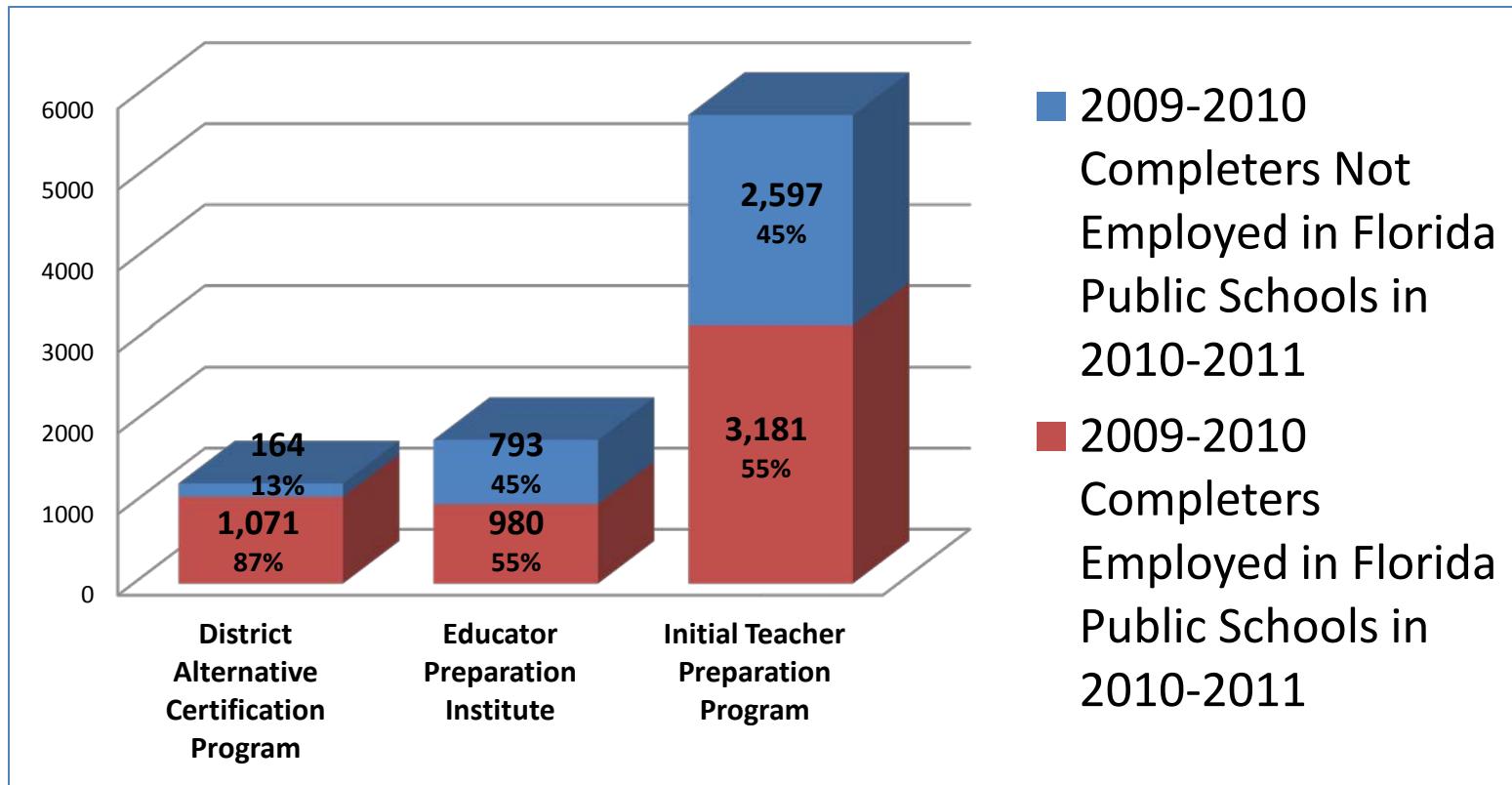
Source: Florida Dept. of Education, "District Class Size Averages"

# Main Research Questions

- Number of first-year secondary science teachers produced through traditional and alternative routes
  - Many alternative routes do not involve a set program of study
  - Only aggregate data on initial preparation program completers is available



# 2009-2010 Completers Employed in Florida Public Schools 2010-2011

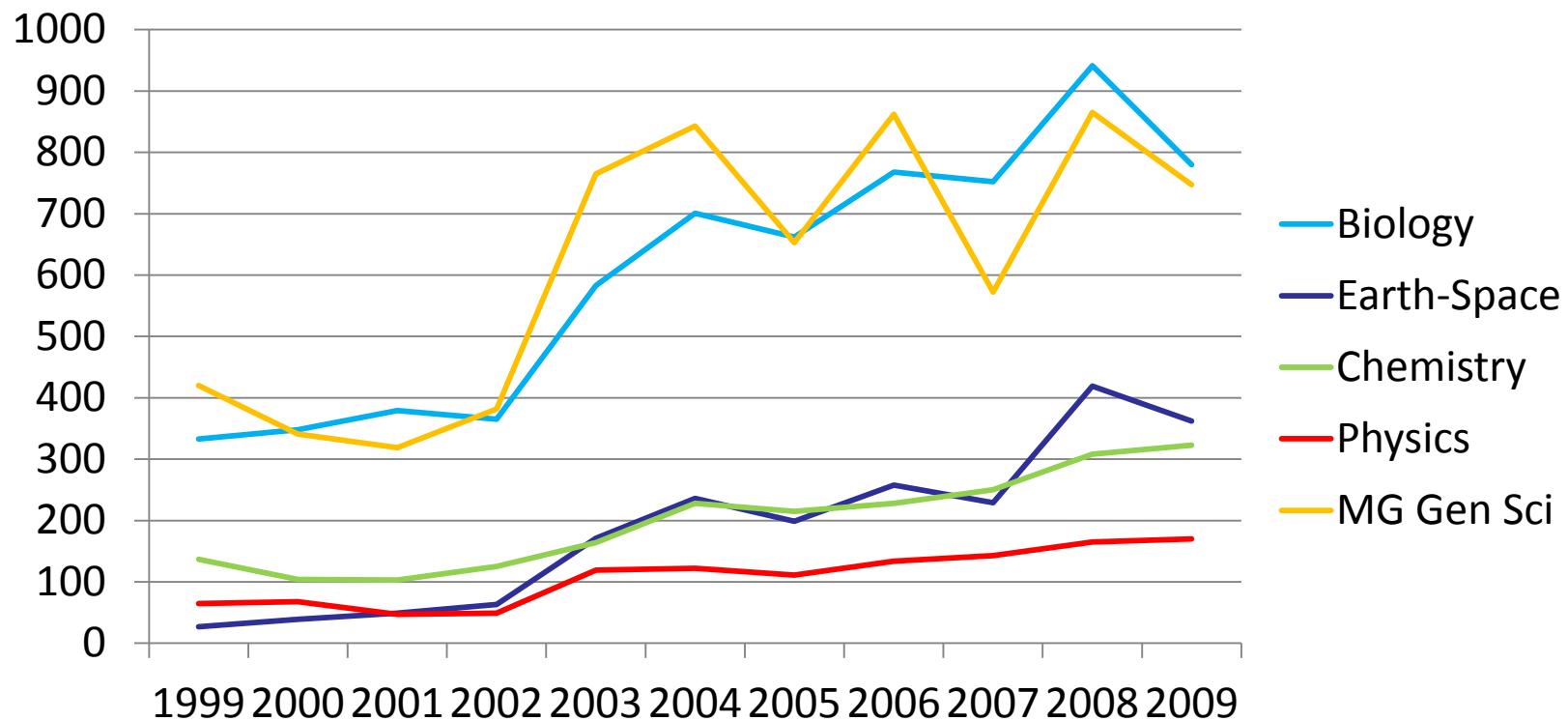


Source: Florida Department of Education, "Teacher Preparation" Presentation

# Main Research Questions

- Number of people seeking certificates and certified to teach science
  - No data on applicants available; only on certificates issued
  - From certification exam data can determine number of individuals taking a subject area exam for the first time

# Number of First-Time Exam Takers by Science Certification Subject Area

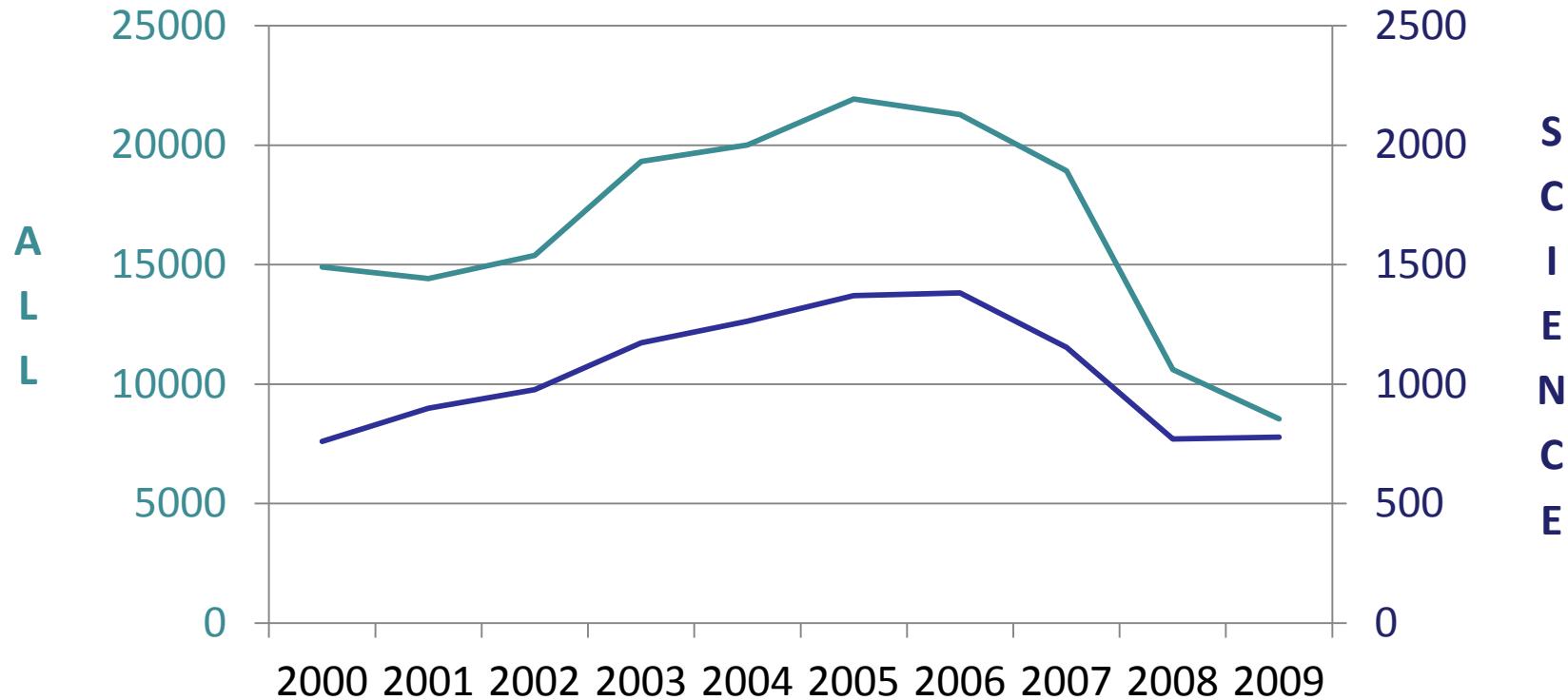


Source: Computations based on individual-level records from the Florida Dept. of Education Office of Teacher Certification

# Main Research Questions

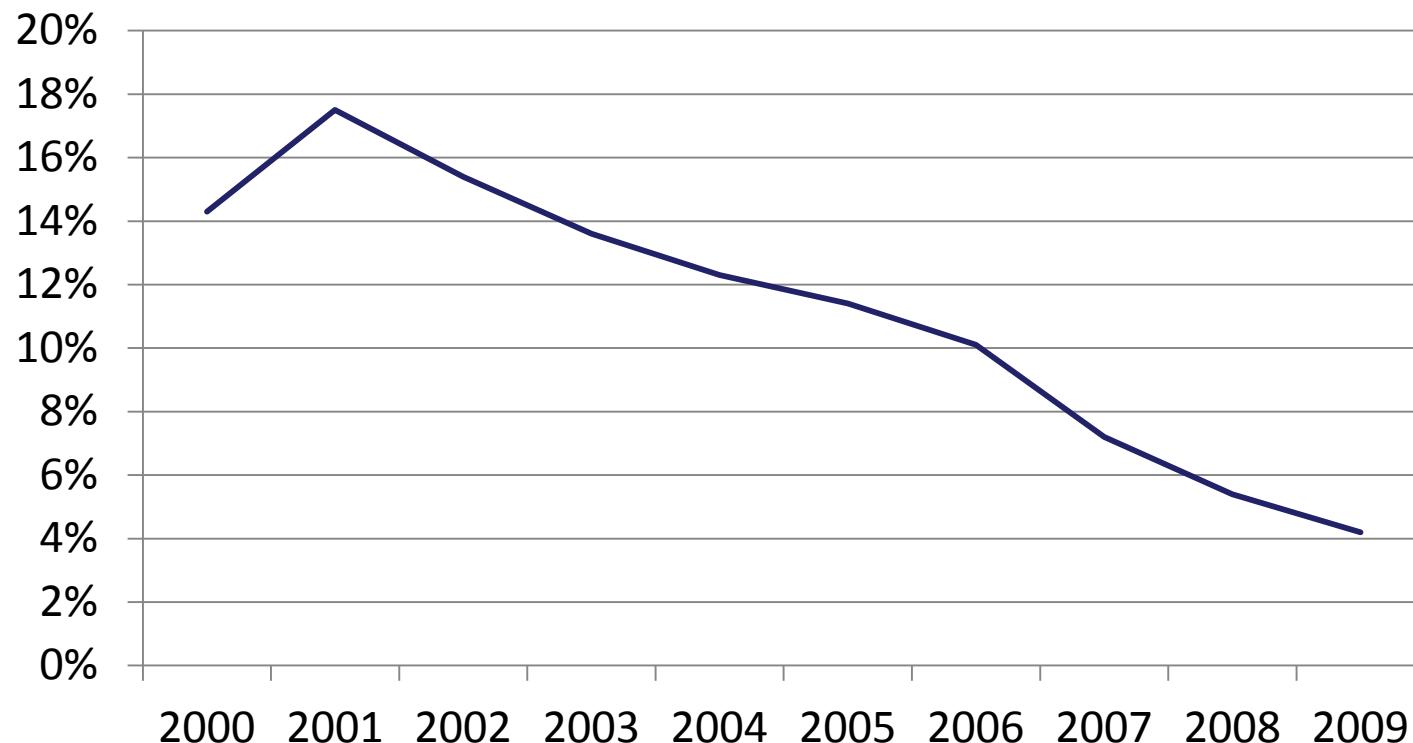
- Number of people taking jobs teaching science
  - Number of New Hires in Fall
  - Number of First-Year Teachers (0 Years of Experience in Florida) by Science Certification Area
  - Number of First-Year Science Teachers by Pathway
  - Number of First-Year Teachers by Science Courses Taught
  - Number of First-Year Teachers Teaching Science Courses by Pathway

# Number of New Hires in Fall



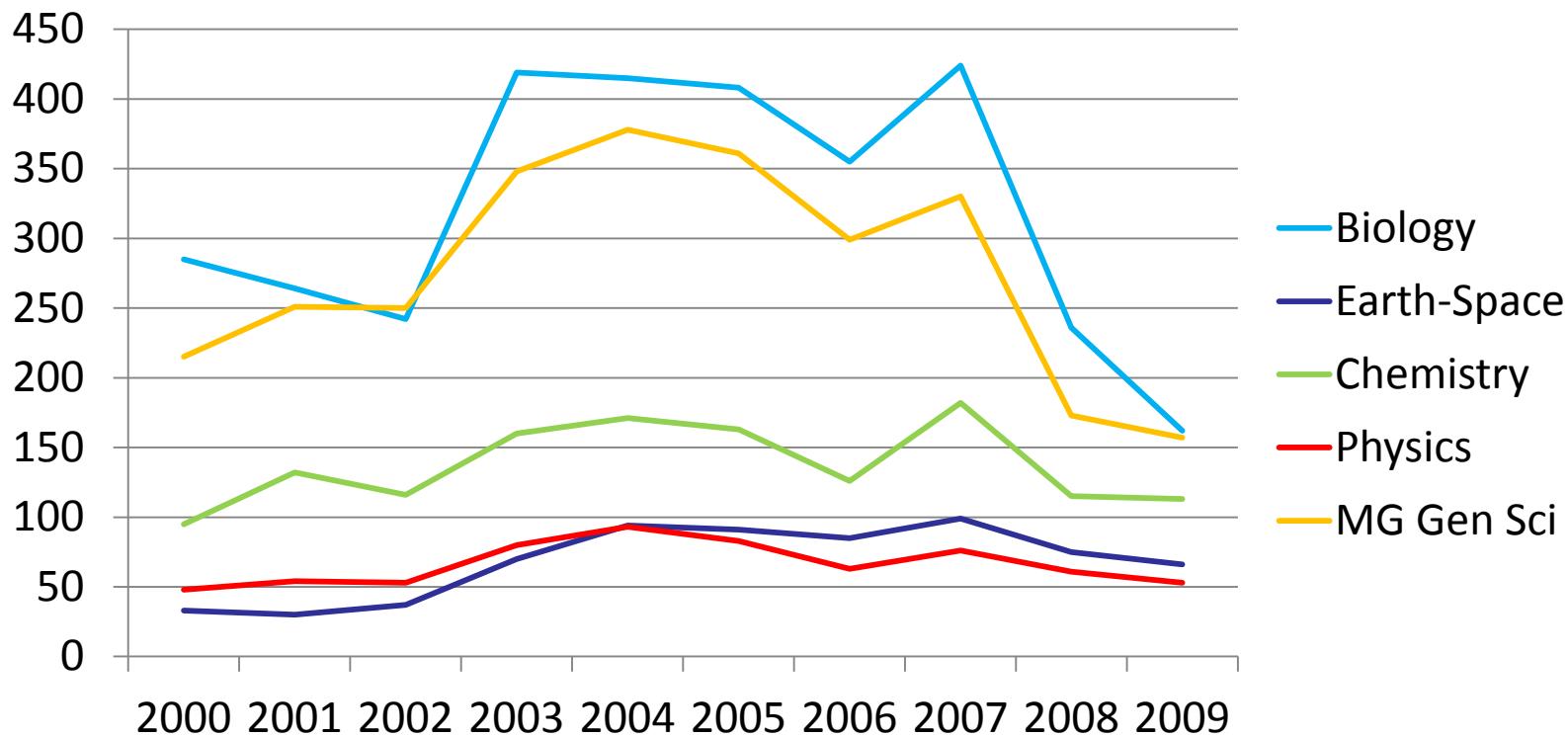
Source: Florida Dept. of Education, "New Hires in Florida Public Schools"

# Percent of Fall New Science Hires Not Certified in Appropriate Field



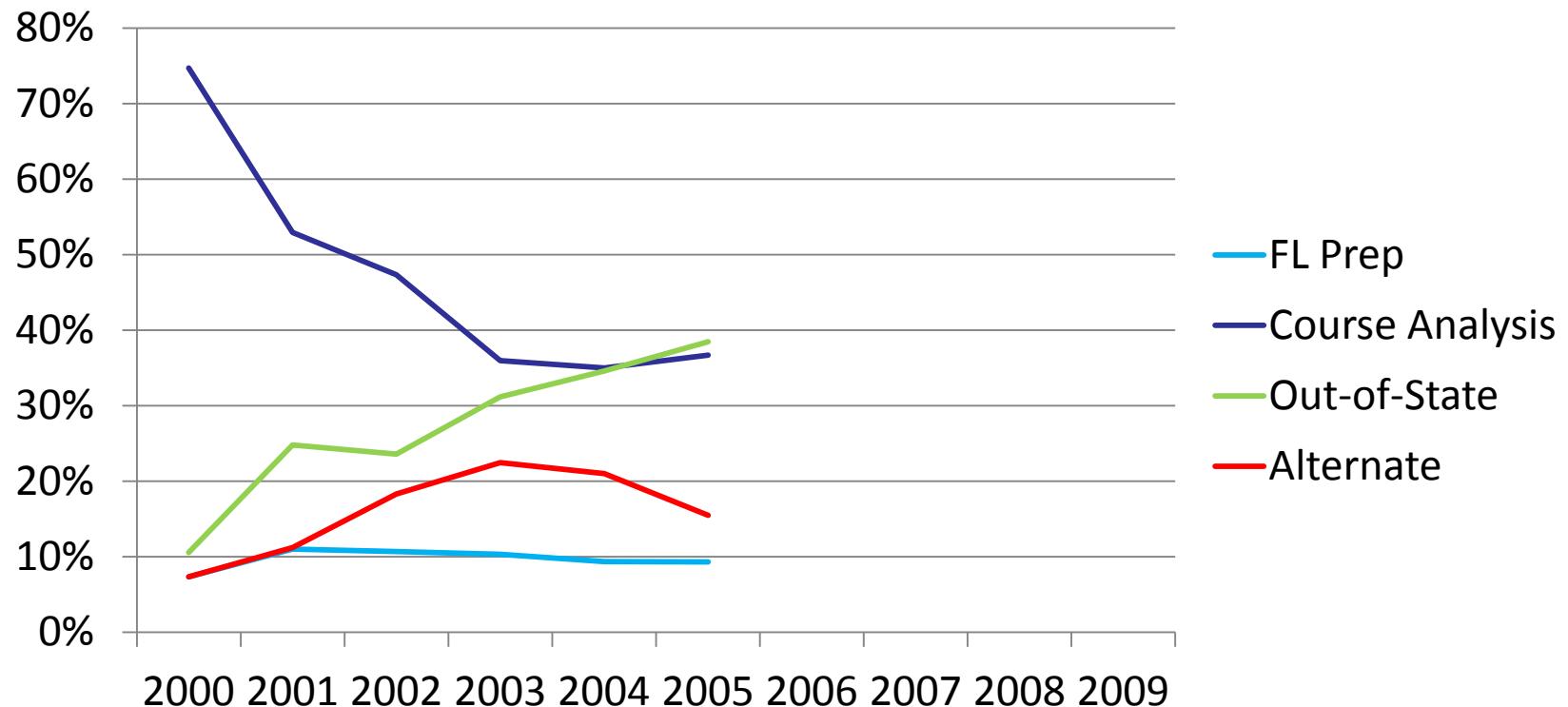
Source: Florida Dept. of Education, "New Hires in Florida Public Schools"

# Number of First-Year Teachers by Science Certification Subject Area



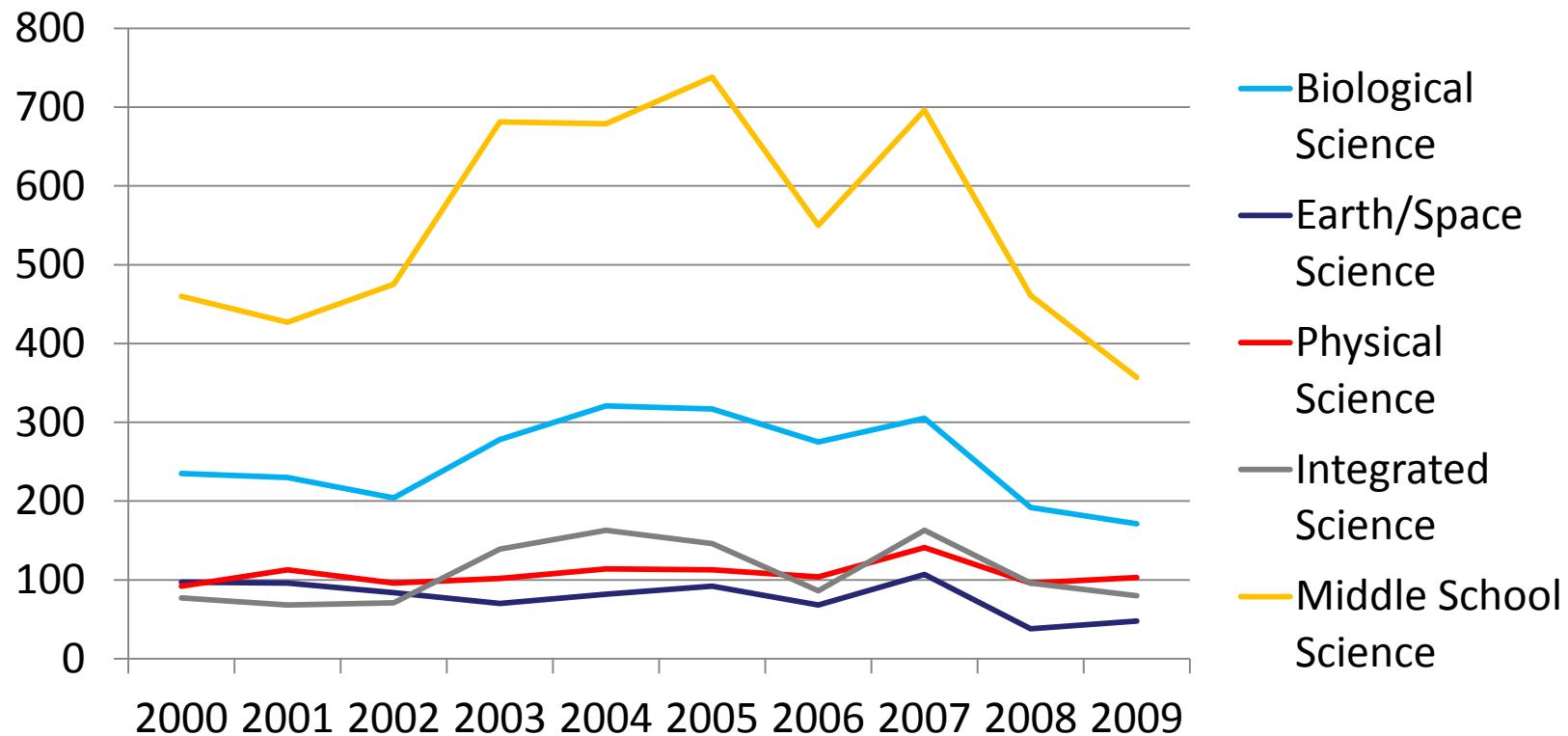
Source: Computations from individual-level records on certification and experience in the Florida Education Data Warehouse

# Pathway of First-Year Teachers Certified in Science as a Percentage of Those with Known Pathway



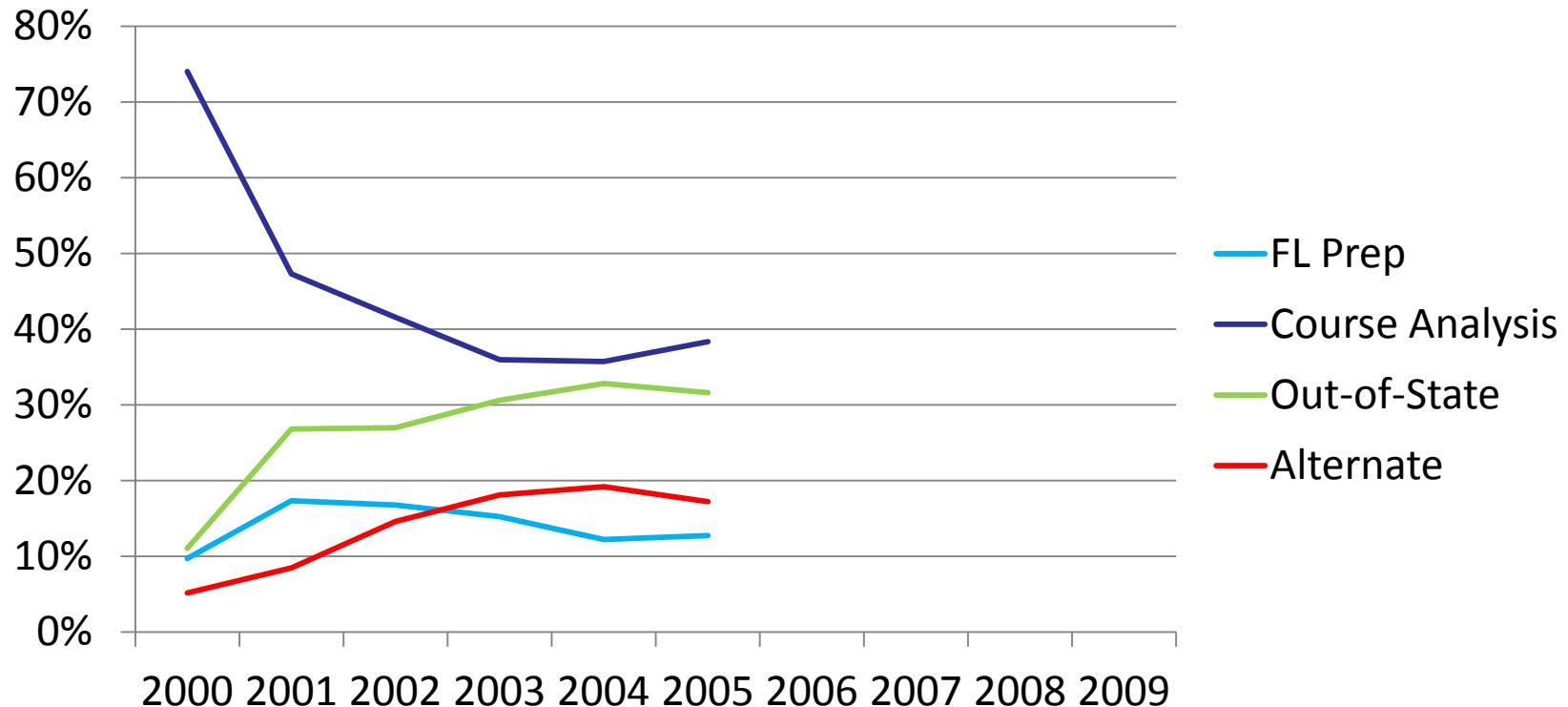
Source: Computations from individual-level records on certification and experience in the Florida Education Data Warehouse plus data from the Bureau of Teacher Certification

# Number of First-Year Teachers by Science Courses Taught



Source: Computations from individual-level records on teaching activity, courses and experience in the Florida Education Data Warehouse

# Pathway of First-Year Teachers Teaching Science Courses as a Percentage of Those with Known Pathway

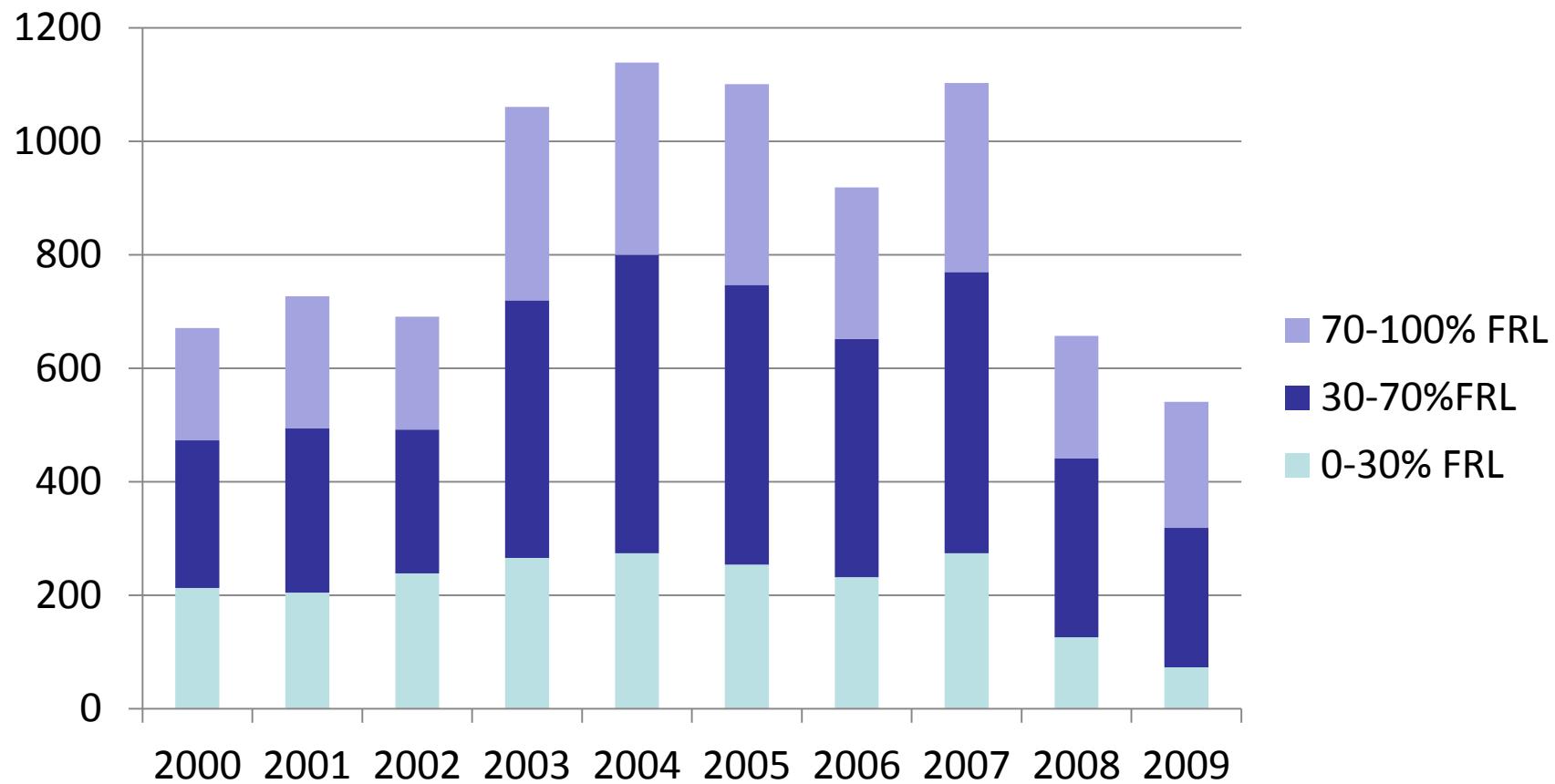


Source: Computations from individual-level records on teaching activity, courses and experience in the Florida Education Data Warehouse

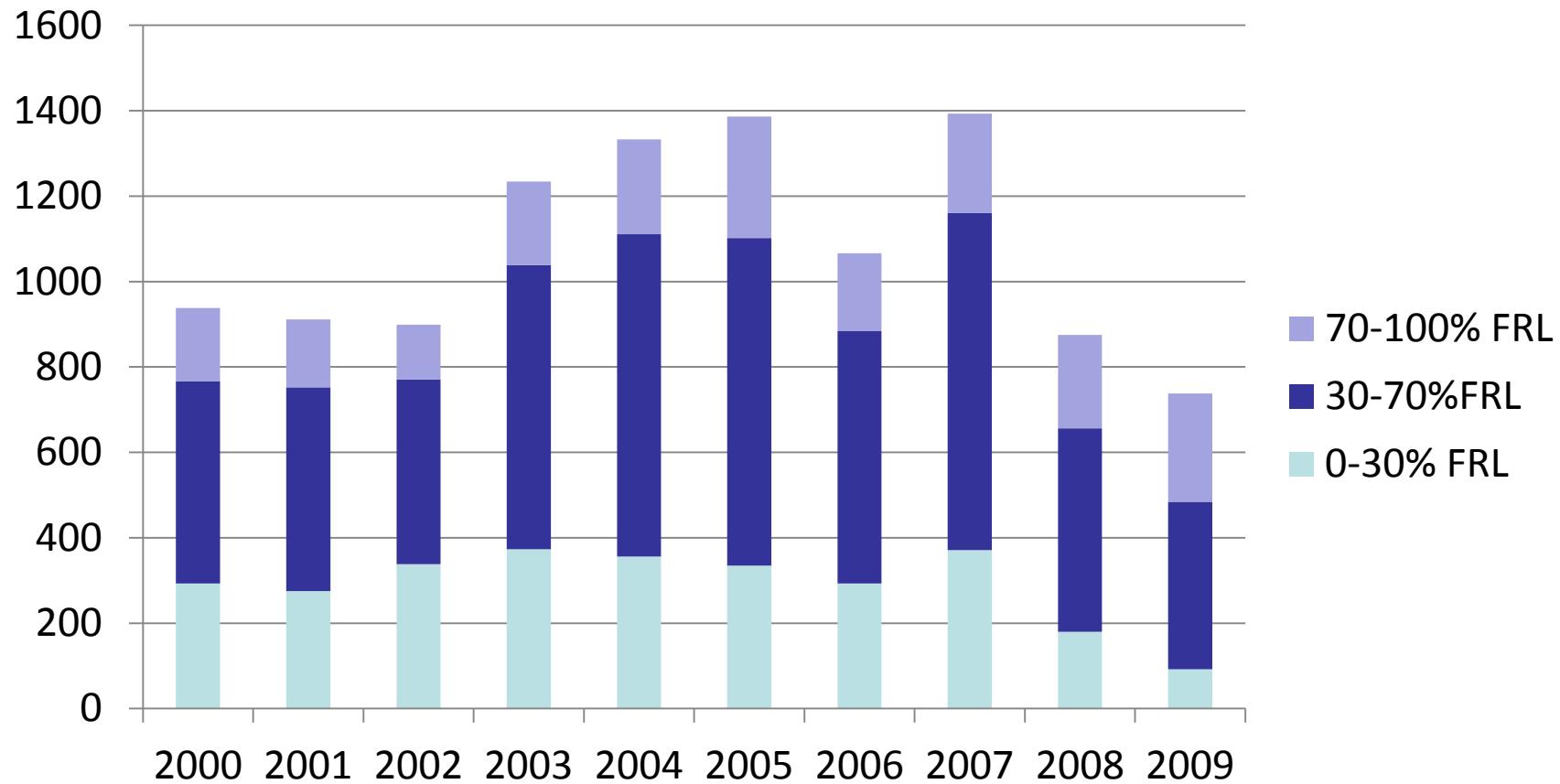
# Main Research Questions

- Types of schools to which teachers are initially assigned
  - Number of First-Year Teachers Certified in Science by School Type
    - Traditional vs. Charter
    - School-level Percent Free/Reduced-Price Lunch
    - School-level Racial/Ethnic Composition
    - School-level Average Achievement Level
  - Number of First-Year Teachers Teaching Science by School Type
    - Traditional vs. Charter
    - School-level Percent Free/Reduced-Price Lunch
    - School-level Racial/Ethnic Composition
    - School-level Average Achievement Level

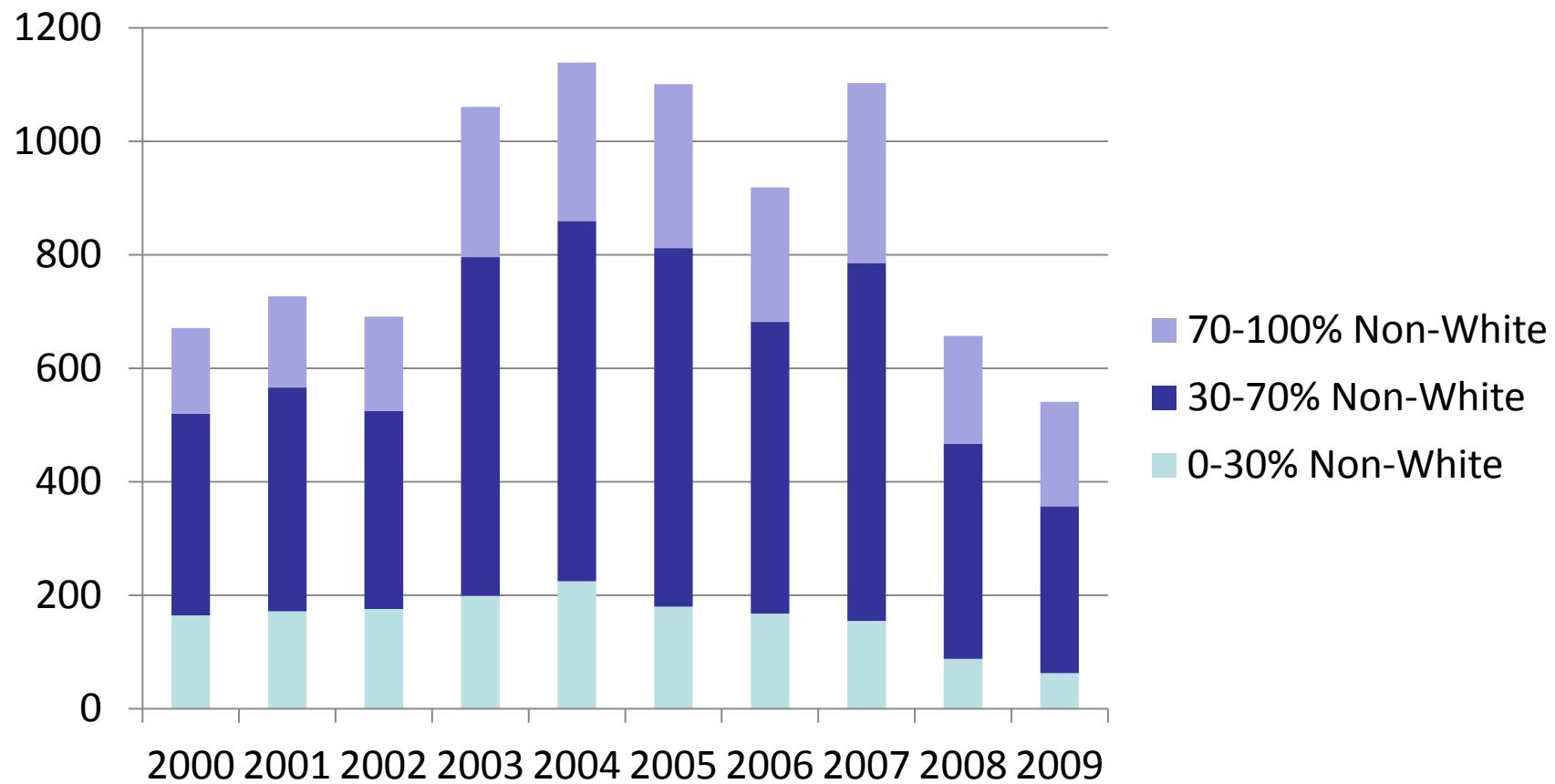
# Number of First-Year Teachers Certified in Science by School Poverty Level



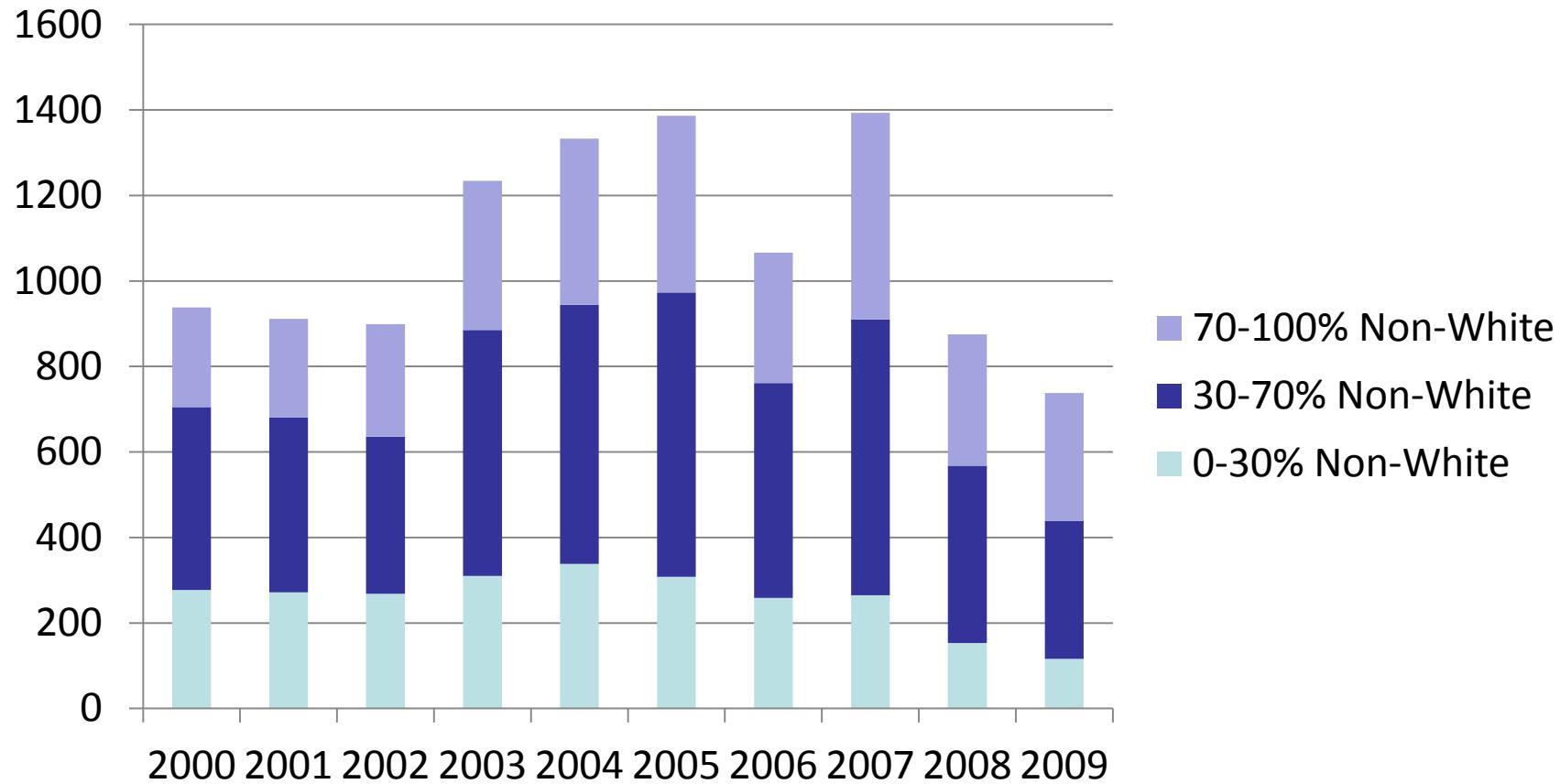
# Number of First-Year Teachers Teaching Science Courses by School Poverty Level



# Number of First-Year Teachers Certified in Science by School Percent Non-White



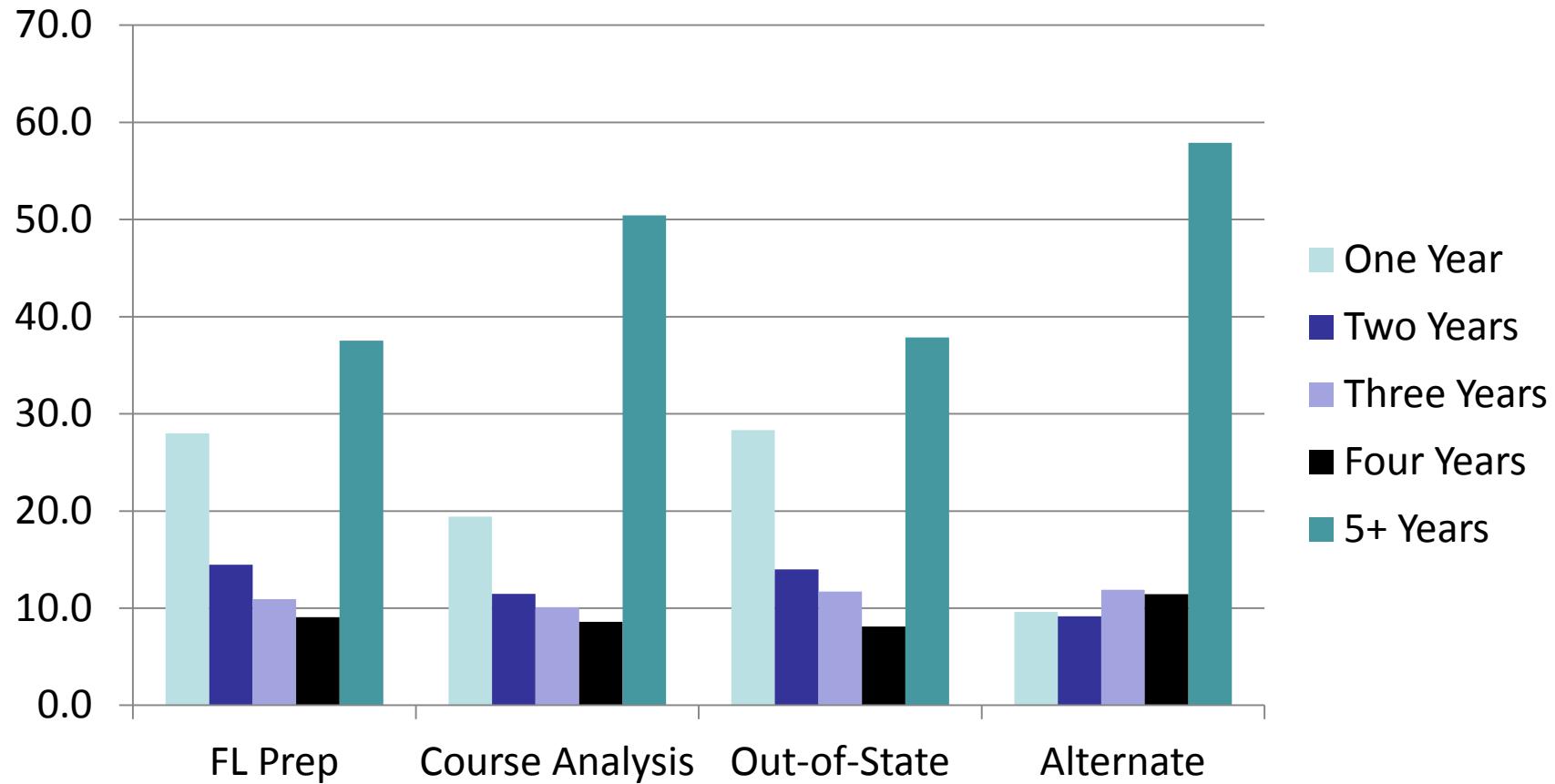
# Number of First-Year Teachers Teaching Science Courses by School Percent Non-White



# Main Research Questions

- Transfer behavior and attrition in the first 5 years
  - Years Until Departure from Florida Public Schools

# Years Until Departure from Florida Public Schools by Pathway (First-Year Science Teachers, 2000-2005)



# Supplemental Analyses

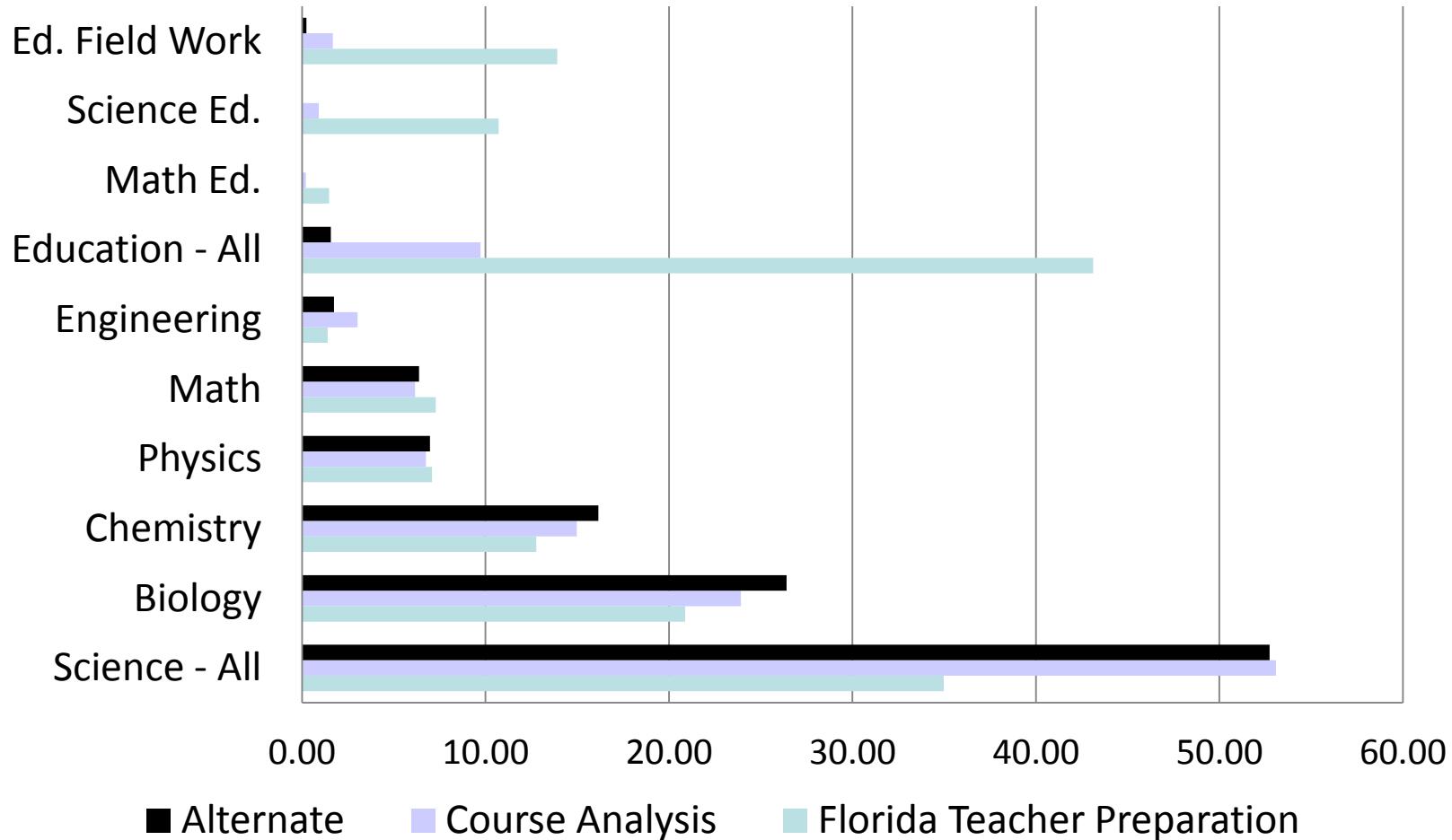
- Modal Major of First-Year Teachers Certified to Teach Science (Only Florida Public University Graduates)
  - By Certification Subject and Pathway
- College Credits in Science Courses of First-Year Teachers Certified to Teach Science (Only Teachers with 100 or more Credits in Florida Public Community Colleges and Universities)
  - By Pathway – All Science Certification Subjects
  - By Pathway – Biology Certification
- Pre-Service Test Scores and Demographics
  - By Pathway – All Science Certification Subjects

# Modal Major of First Bachelor's Degree by Pathway and Certification Area - First-Year Teachers, 2000/01-2009/10

Pathway	Science Certification Area			
	Biology Cert.	Chemistry Cert.	Physics Cert.	Earth-Space Cert.
Traditional Teacher Prep. in FL	Science Teacher Ed.	Science Teacher Ed.	Science Teacher Ed.	Science Teacher Ed.
Course Analysis	Biology	Biology	Electrical Engineering	Science Teacher Ed.
Alternative Certification	Biology	Biology	Food Science	Geology

Source: Computations from individual-level records in the Florida Education Data Warehouse plus data from the Bureau of Teacher Certification

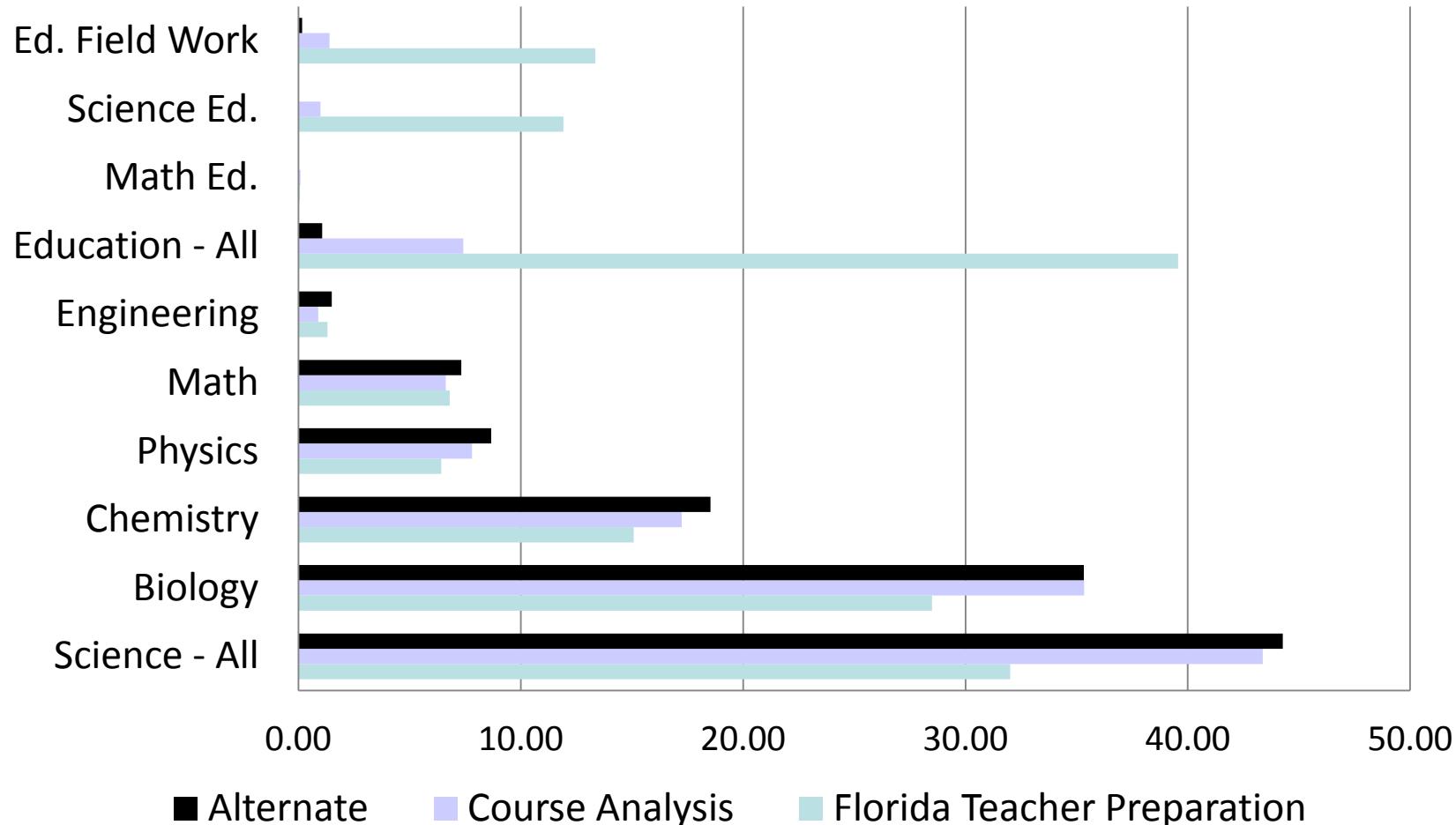
# Coursework Credit Hours by Pathway First-Year Teachers Certified in Science



Source: Computations from individual-level records in the Florida Education Data Warehouse plus data from the Bureau of Teacher Certification

# Coursework Credit Hours by Pathway

## First-Year Teachers Certified in Biology



Source: Computations from individual-level records in the Florida Education Data Warehouse plus data from the Bureau of Teacher Certification

# Characteristics of First-Year Teachers Certified in Science by Pathway

Characteristic	Pathway			
	FL Teacher Prep.	Course Analysis	Out of State	Alternative
% from Most Competitive Colleges	22.3	21.1	9.0	28.9
% from Least Competitive Colleges	5.1	15.3	21.2	8.9
% Pass GK Math 1 <sup>st</sup> Try	90.5	86.6	75.8	90.4
% Non-White	22.0	32.4	20.0	23.6
% Male	30.2	33.7	36.1	36.7
Average Age	29.8	34.0	36.4	33.4
Average SAT Score	1068	1021	980	1065

Source: Computations from individual-level records in the Florida Education Data Warehouse plus data from the Bureau of Teacher Certification

# Summary

- Growing student population and mandated class size reduction lead to increased hiring of teachers (including science teachers) until peak around 2006
- Increased demand for science teachers met by hiring from out of state and expansion of alternative pathways into teaching
  - Supply of graduates from traditional teacher preparation programs fairly constant

# Summary

- Market for middle school science teachers and high school Biology teachers much larger than physical sciences and hiring trends follow those of general teacher labor market
  - Peak in 2006 and sharp decline thereafter
- Market for teachers in the physical sciences (Chemistry, Earth/Space, Physics) are smaller and exhibit less volatility
  - Take about equal amount of math as traditionally prepared teachers, but many more science, social studies and business courses

# Summary

- As hiring diminished in late 2000s, proportion of new science teachers going to schools serving disadvantaged students increased
  - Likely due to lower turnover in schools serving more advantaged students
- Lower attrition among alternatively certified science teachers than traditionally prepared teachers
  - May reflect the fact that alternatively prepared teachers are older and many are career changers

# Summary

- Alternatively prepared teachers more likely to major in science, whereas traditionally prepared teachers major in science education
  - Also take more science courses
- Even among alternatively prepared teachers, few with majors in physical sciences
- Alternatively prepared and traditionally prepared science teachers have similar test scores
  - Alternatively prepared older and more likely to be male