

*The National Educational
Landscape and the Design of
Museum-Based Professional
Development Programs*

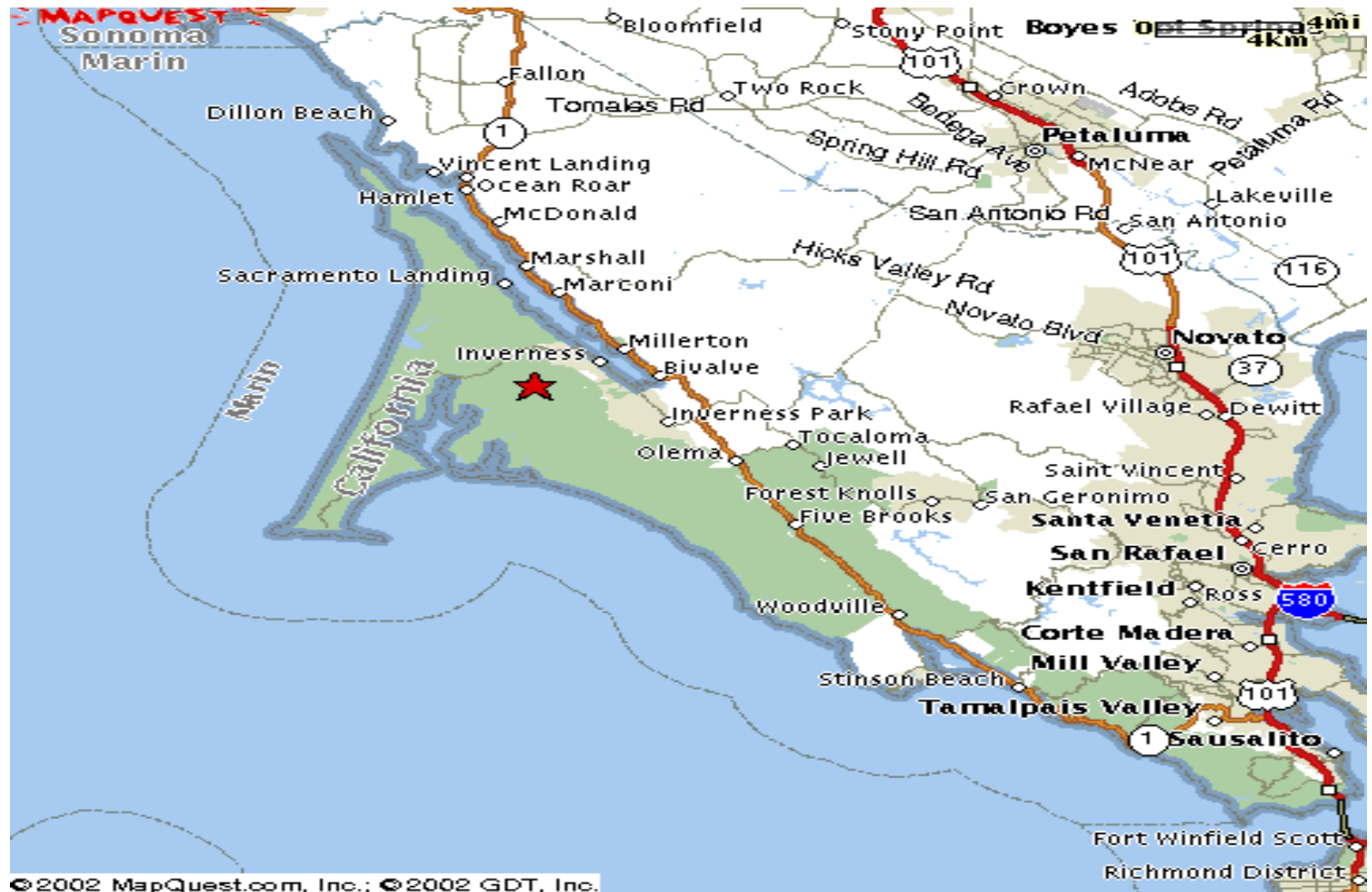
CILS ILC

October 2003

Inverness Research Associates



Inverness, California



The National Landscape

Informal Science
Education
Institutions

**The Formal K-16
Educational System**

How many museums in U.S.?

- ~16,000 museums (of all types)
 - History 25% (4,016)
 - Art museums 23% (3,680)
 - Historic Home/Site 12% (1,872)
 - Natural History/Anthropology 4% (672)
 - Science Centers 4% (608)
 - Children's/Youth museums 3% (560)
 - Zoos and Aquaria 3% (496)
 - Etc...

Subset of US Museums: Science-rich Informal Institutions

- Science Centers
- Planetariums
- Aquariums and Zoos
- Children's Museums
- Nature Centers
- Natural History Museums
- Arboretums and Botanical Gardens

Science-Rich Institutions

Scale

- ~ 2000 institutions
(Science Centers, Planetariums, Zoos, Aquaria, Natural History Museums, Children Museums, Nature Centers, Arboretums and Botanical Gardens ...)
- 25.8 million schoolchildren served annually
(~40% of all U.S. children...)
- Institutions are highly skewed in terms of size and capacity

Geographic distribution

- Museums (all types)
 - Urban 45.6%
 - Suburban 31.1%
 - Rural 22.2%

- Science Centers
 - Urban 71%
 - Suburban 26%
 - Rural 3%

Science Rich Institutions

Assets

- Staff
 - Scientists
 - Design Expertise (Inquiry)
 - Professional Development
- Stuff
 - Artifacts
 - Exhibits (Phenomenon)
- Culture of Inquiry
- Community Base and Connections

Informals' Service to Schools

- Student Services (Field Trips; Outreach; Classes)
- Teacher Professional Development
 - Short-term workshops
 - Institutes
 - Networks
- Curricular Support
- Science Kits
- Pre-Service
- Websites – virtual visits, science education resources
- Travel programs



The U.S. Education System

Structure, Scale and Issues

THE U.S. EDUCATION SYSTEM

- 50 states
- 16,850 school districts
- 80,000 schools
- 3 million teachers (FTE)
- 46 million students (K-12)

The System's 3 levels

	Elementary (grades K-5)	Middle School (generally grades 6-8)	High School (grades 9-12)
Schools	52,000	15,000	14,000
Teachers	1,330,000	1,230,000	
Science teachers	~1,300,000 (?specialists)	~120,000	
Students	22 million	11 million	13 million

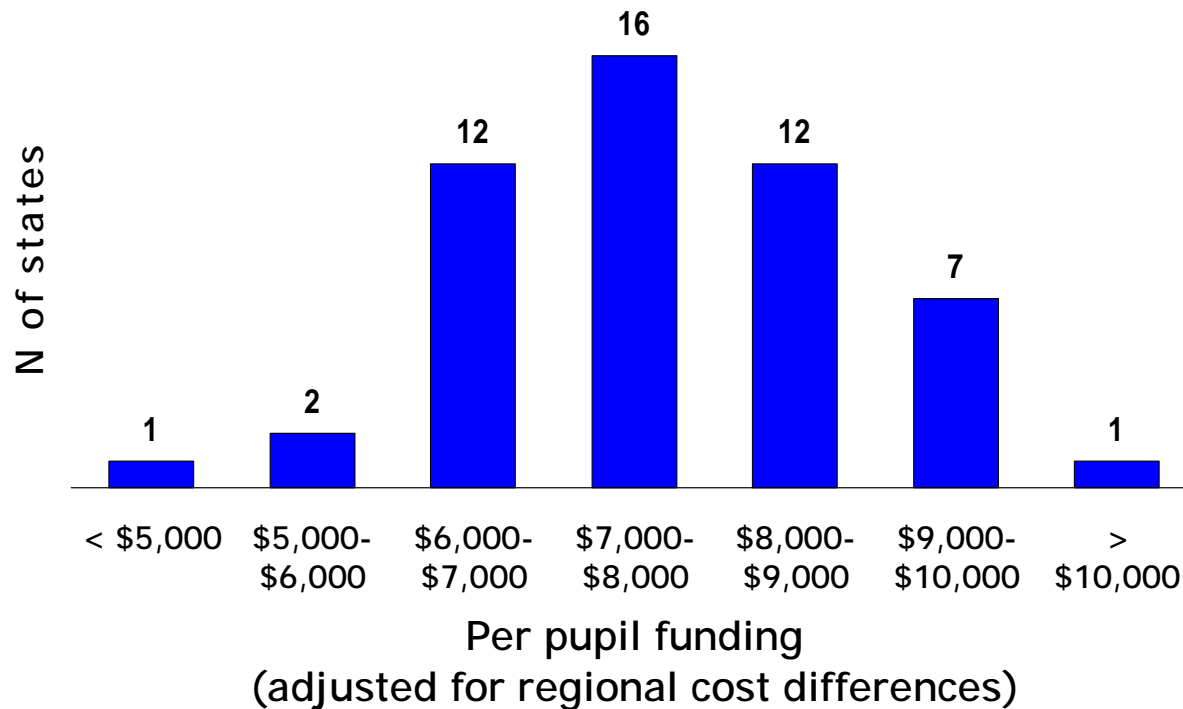
Science Center Ratio to Teachers

- There is approximately one informal science education institution for every 1,000 elementary school teachers in the United States.
- One institution for every 100 secondary science teachers

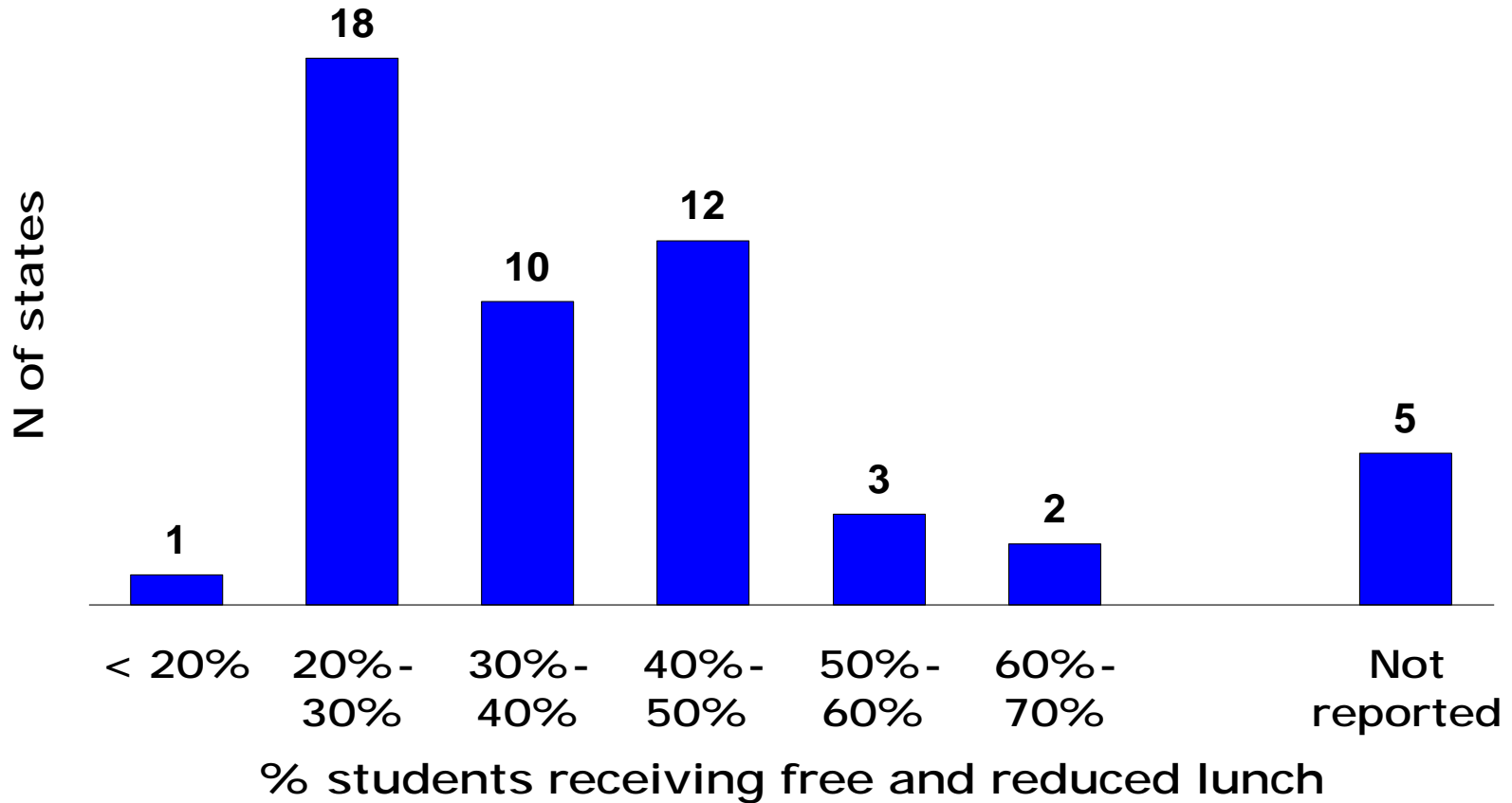
50 states



States spend between
\$4,995 and \$10,251 per pupil
(national average = \$7,524)



In about 1 in 3 states, 40% or more students receive free and reduced lunch

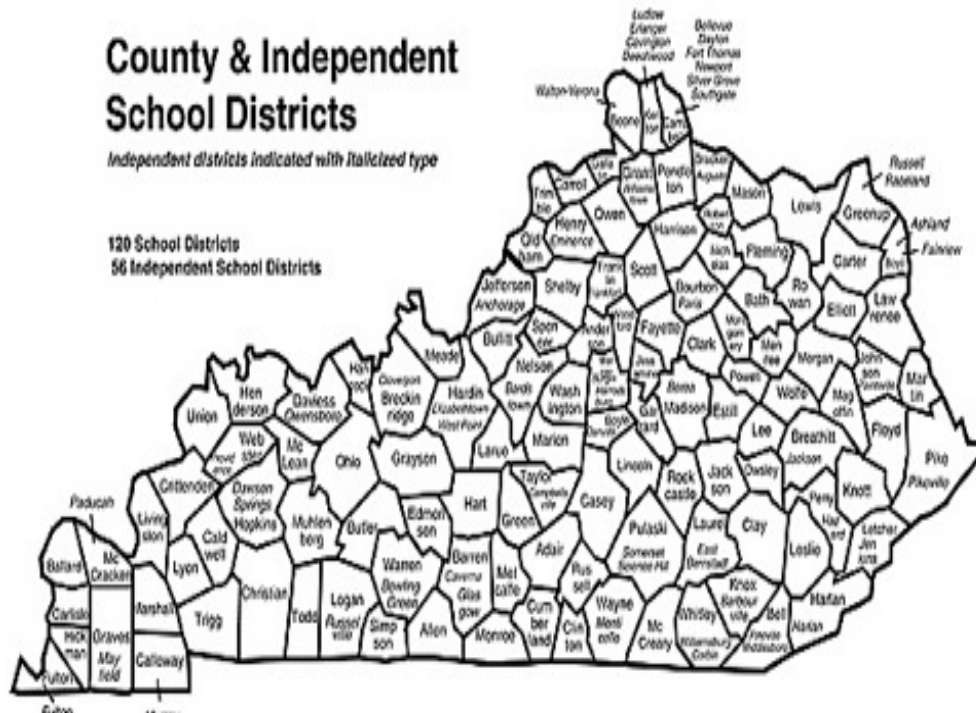


States as the Key Actor in the No Child Left Behind Legislation

- Requires state testing in math and reading in grades 3-8 and at least once in high school by the 2005-06 school year.
- Science coming on board in next few years.
- Schools must make "adequate yearly progress".
- Requires states to certify that all teachers are "highly qualified".

DISTRICTS AND SCHOOLS

In the United States
16,850 districts
house 80,000 schools

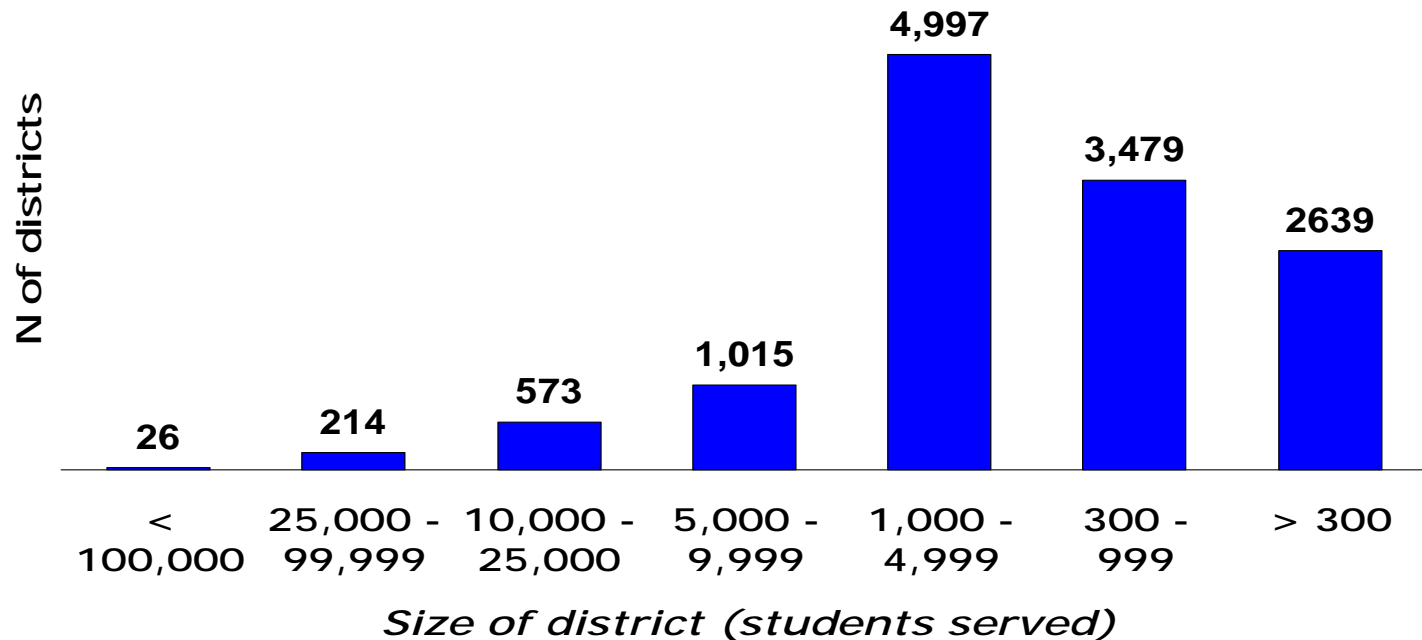


**Nationally, 4 in 5
districts are unified
K-12 districts**

- 78% Unified
- 19% Elementary
- 3% High school

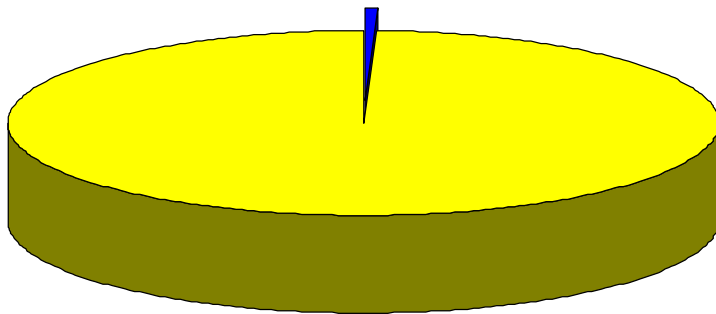
**Districts in just one small state,
Kentucky**

There are a few very large districts -- and many very small districts



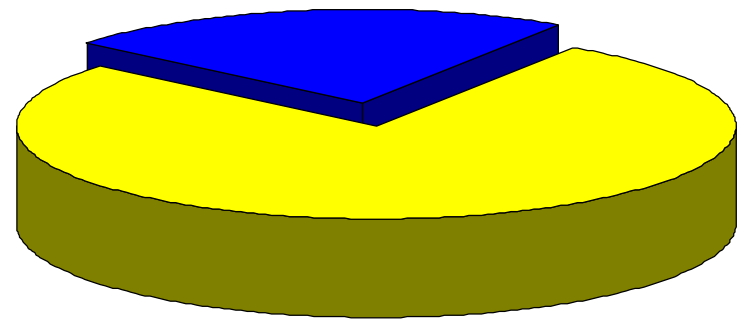
1 in 4 students is served by the 100 largest districts

100 largest districts make up <1% of all U.S. districts



Total U.S. districts

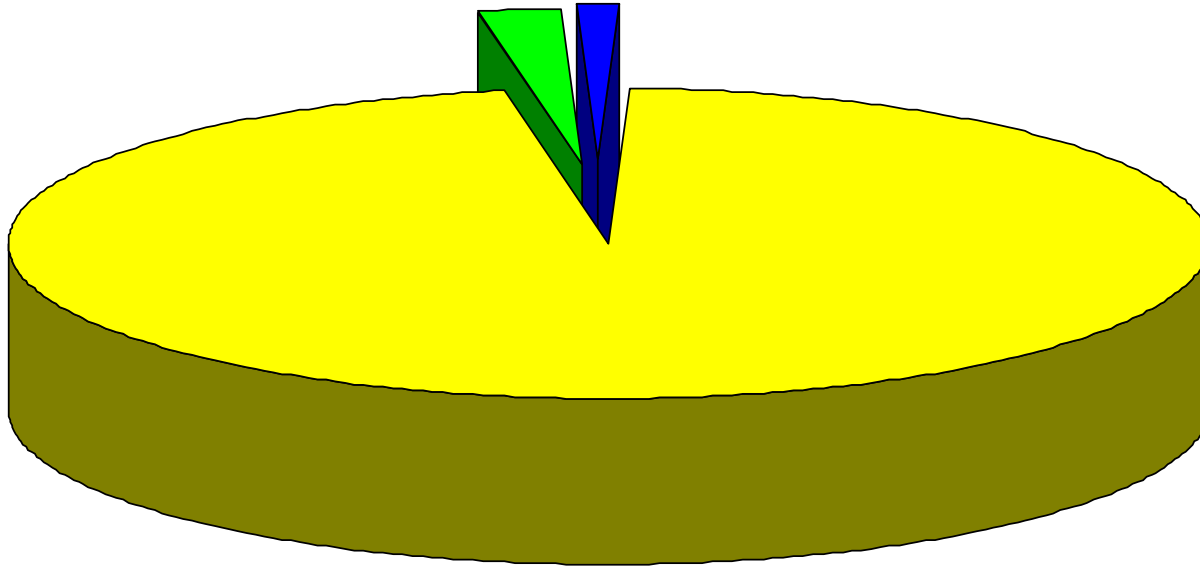
11 million students (23%) are served by these 100 districts



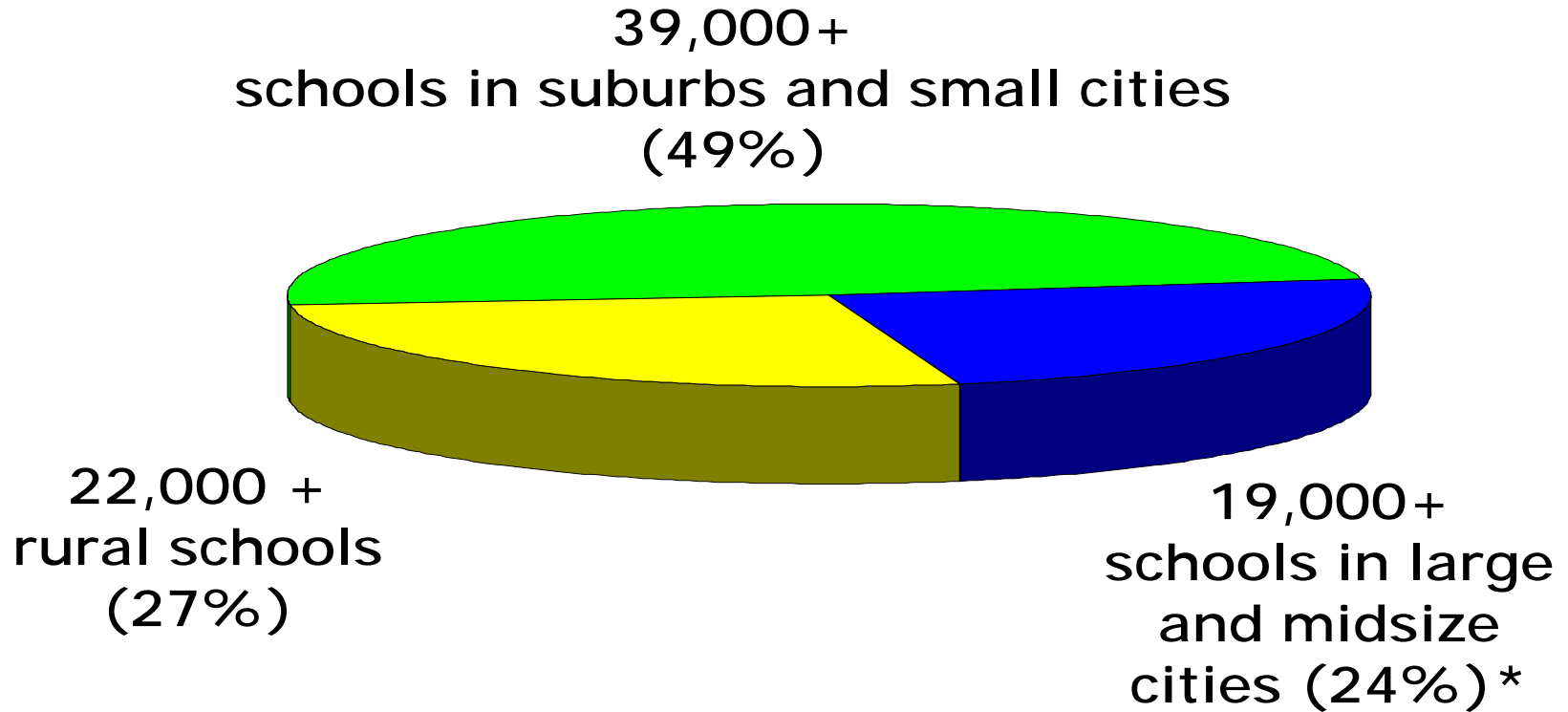
Total students

1 in 30 teachers in the U.S. teaches in New York City or Los Angeles

- New York teachers
- Los Angeles teachers
- Other U.S. teachers

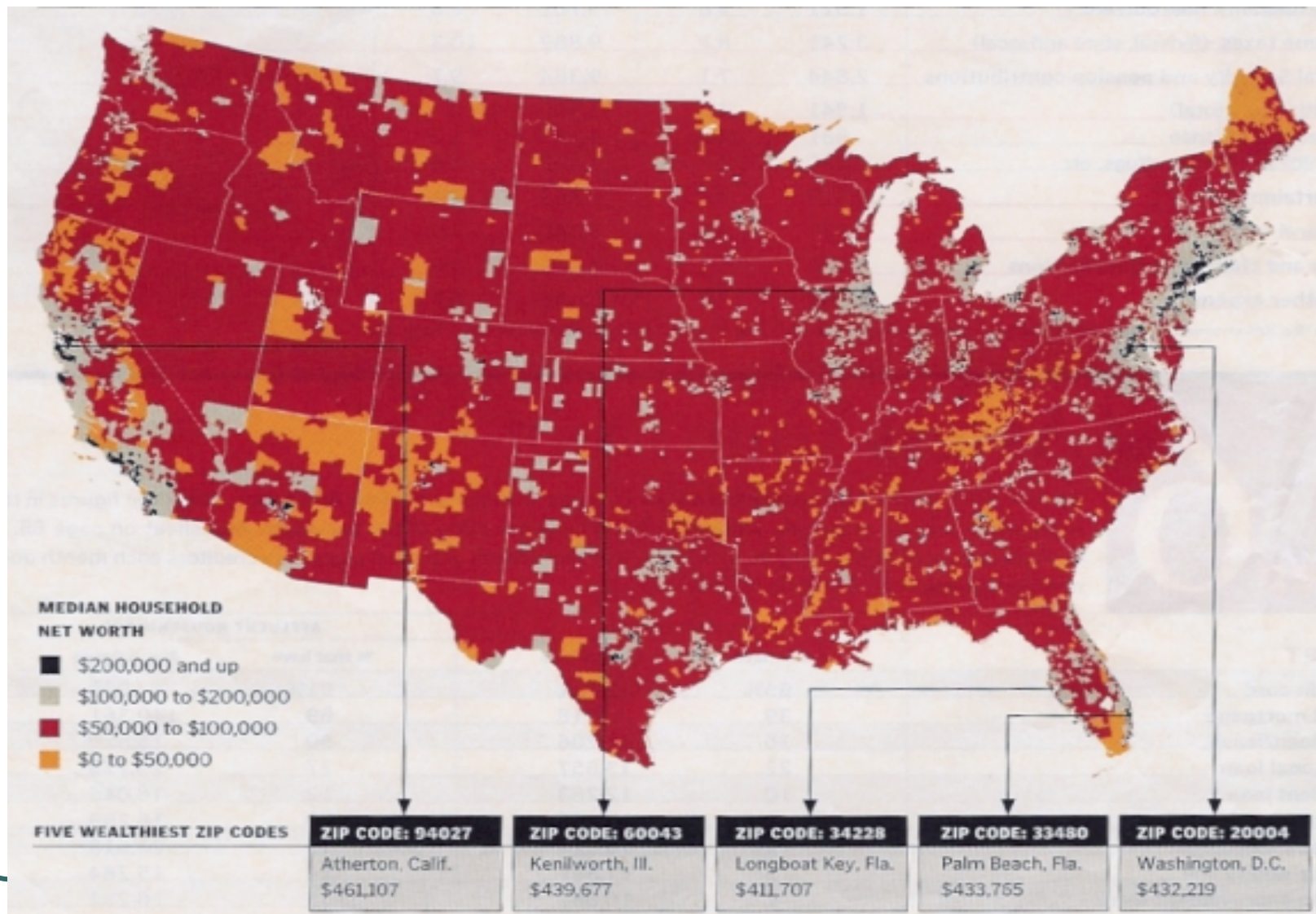


About ½ of all schools are in urban or rural settings



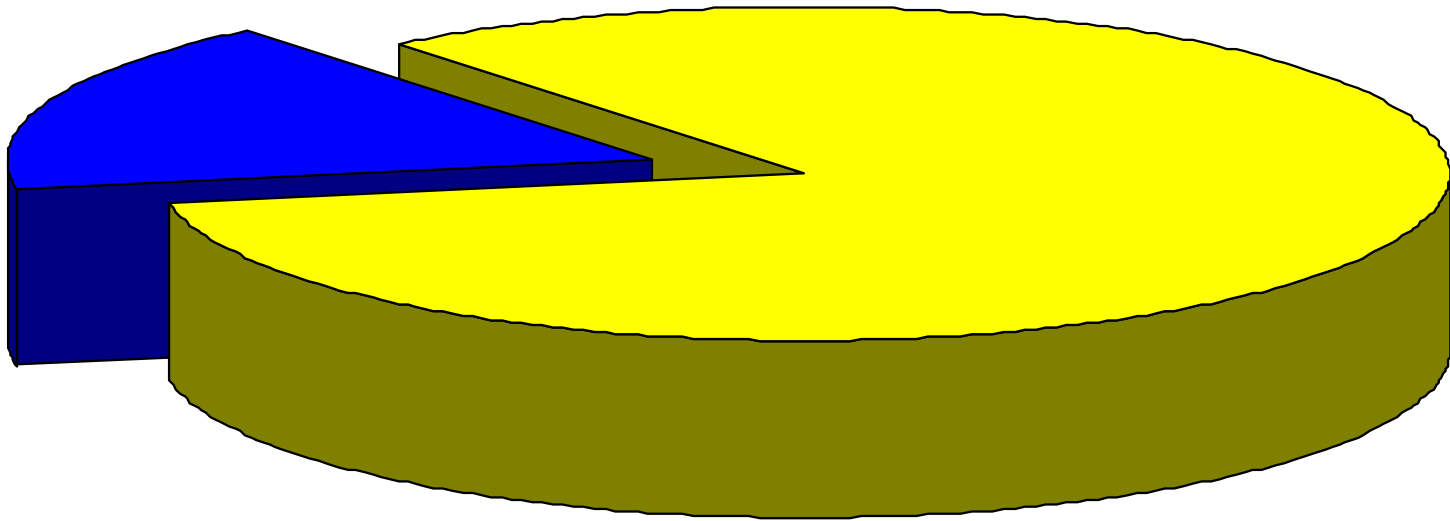
95% of major urban districts have an urgent need for math and science teachers

Pockets of wealth and poverty (Median household net worth, by ZIP CODE)

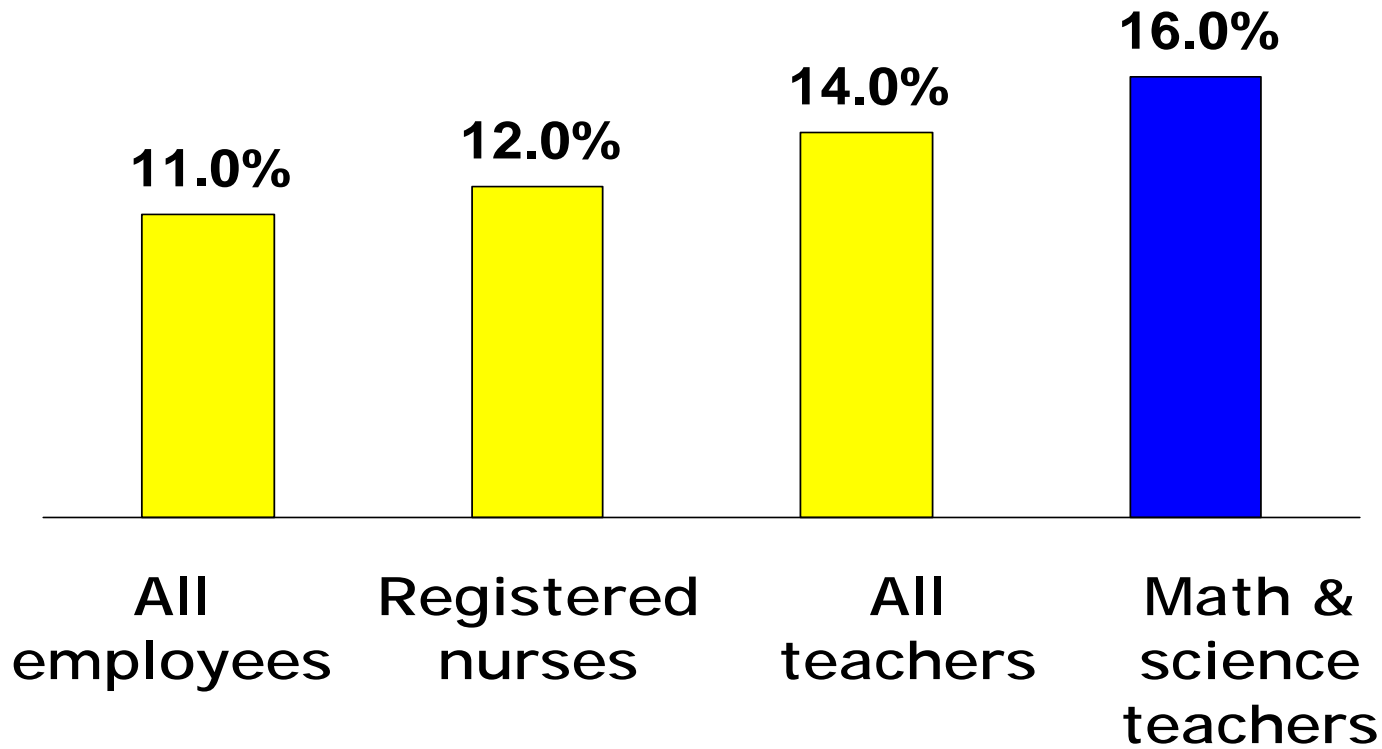


TEACHERS

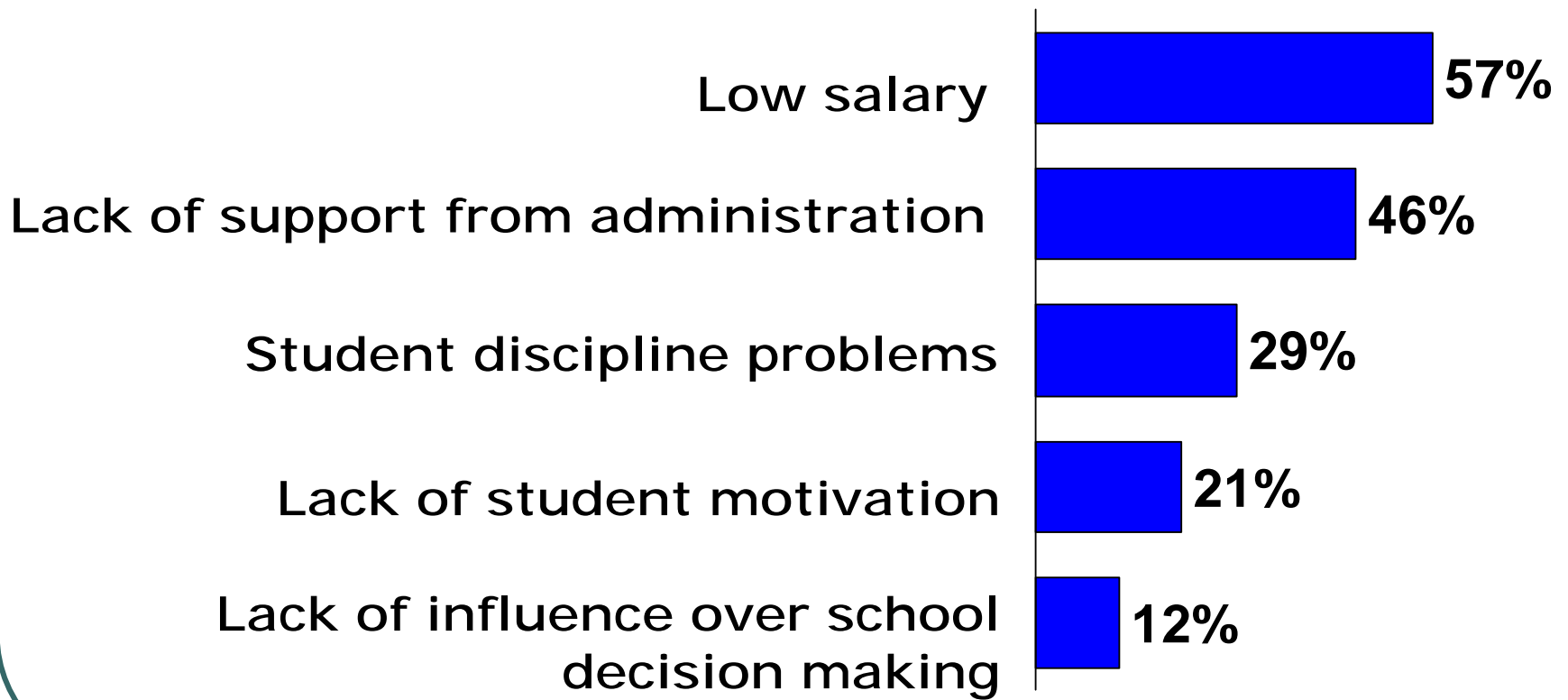
1 in 6 teachers in the U. S. is a “new teacher” (i.e. has taught for 3 years or less)



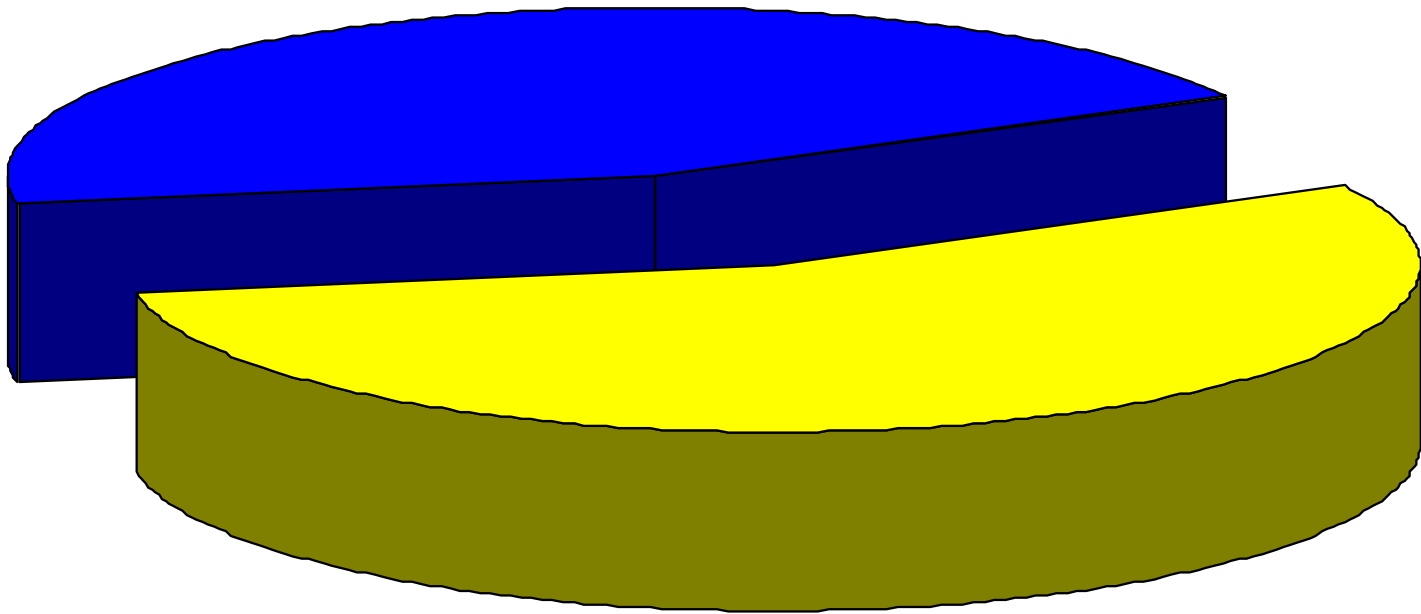
Annual teacher turnover is relatively high compared to other professions (% annual turnover)



The most common reasons that math and science teachers give for leaving jobs

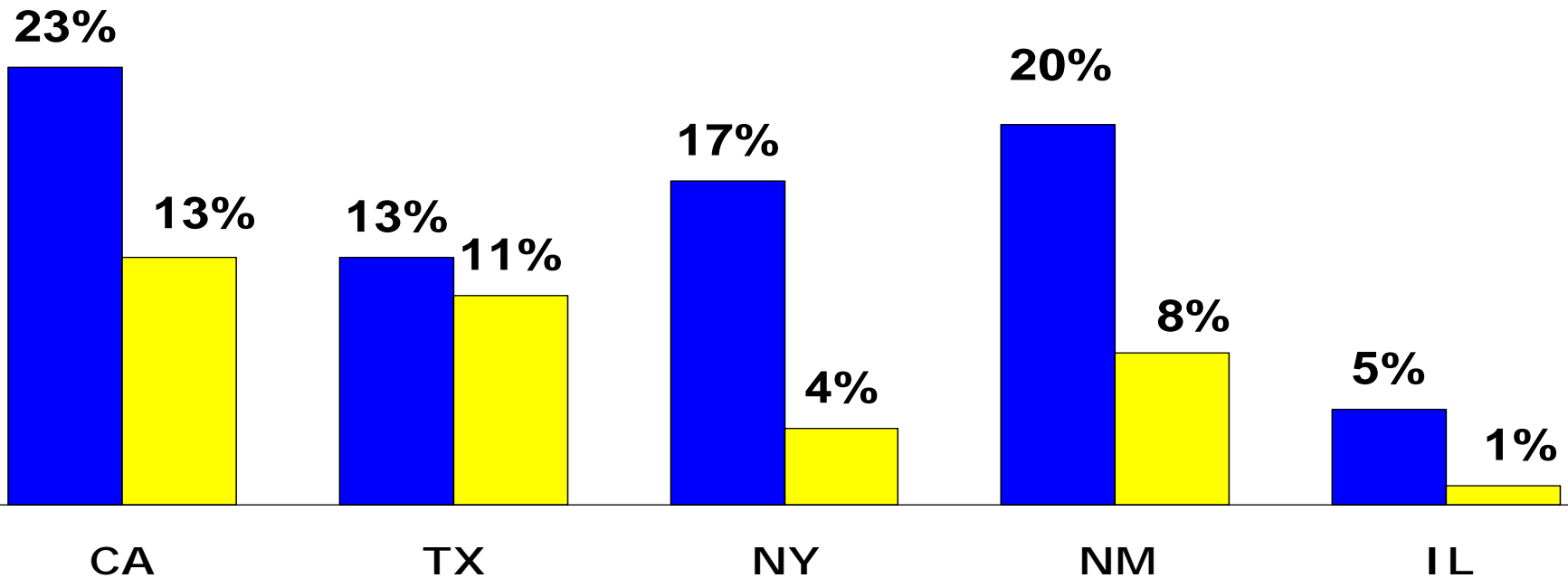


Almost 1 in 2 new teachers in urban districts leaves in their first 5 years

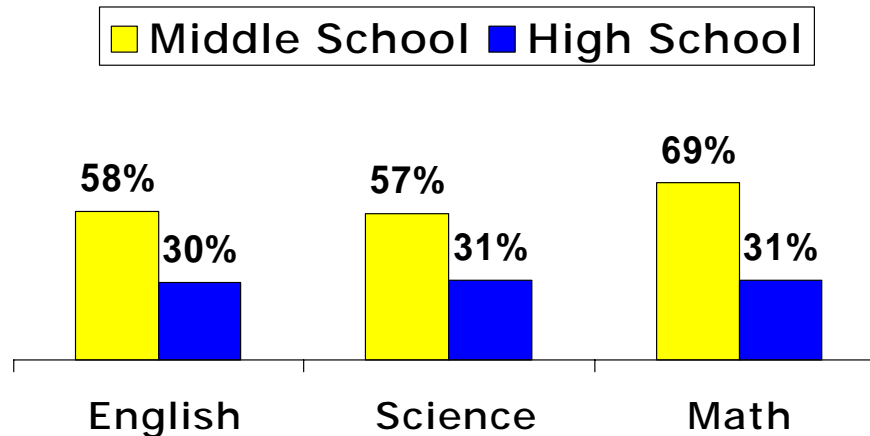


Example of State Variations: % of teachers not certified

■ High poverty districts
■ Other districts



Secondary students are often taught by teachers with no major and no certification in the course subject area

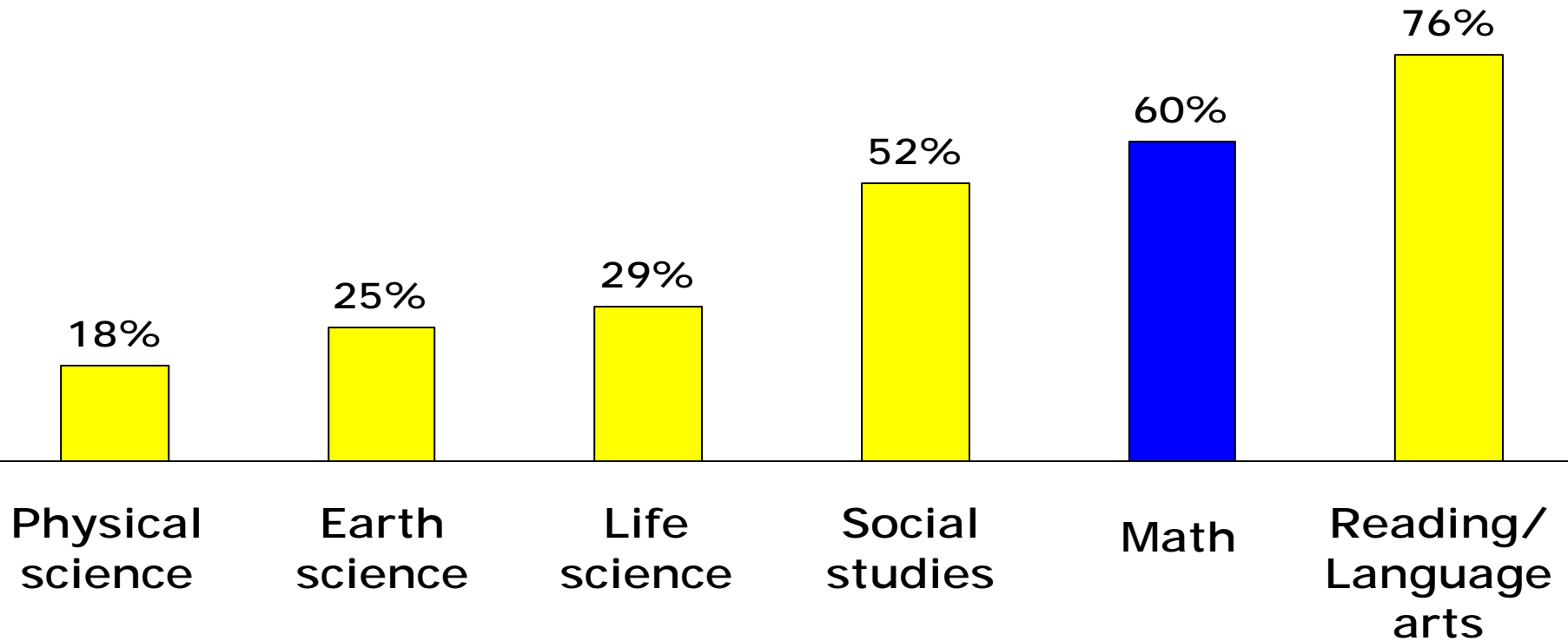


% students taught by teachers with no major or certification in subject area

The situation is worst in high-poverty and high-minority schools

- Students in urban secondary schools have less than a 50% chance of getting a math or science teacher who has at least a college minor in math or science
- 70% of middle-grade math and science classes in high-poverty and high-minority schools are taught by teachers who lack a math or science minor

Few elementary science teachers consider themselves very well qualified to teach the subject



Museum's Relationship to the Educational System

**(Museum To Students –
3 Degrees Of Separation)**

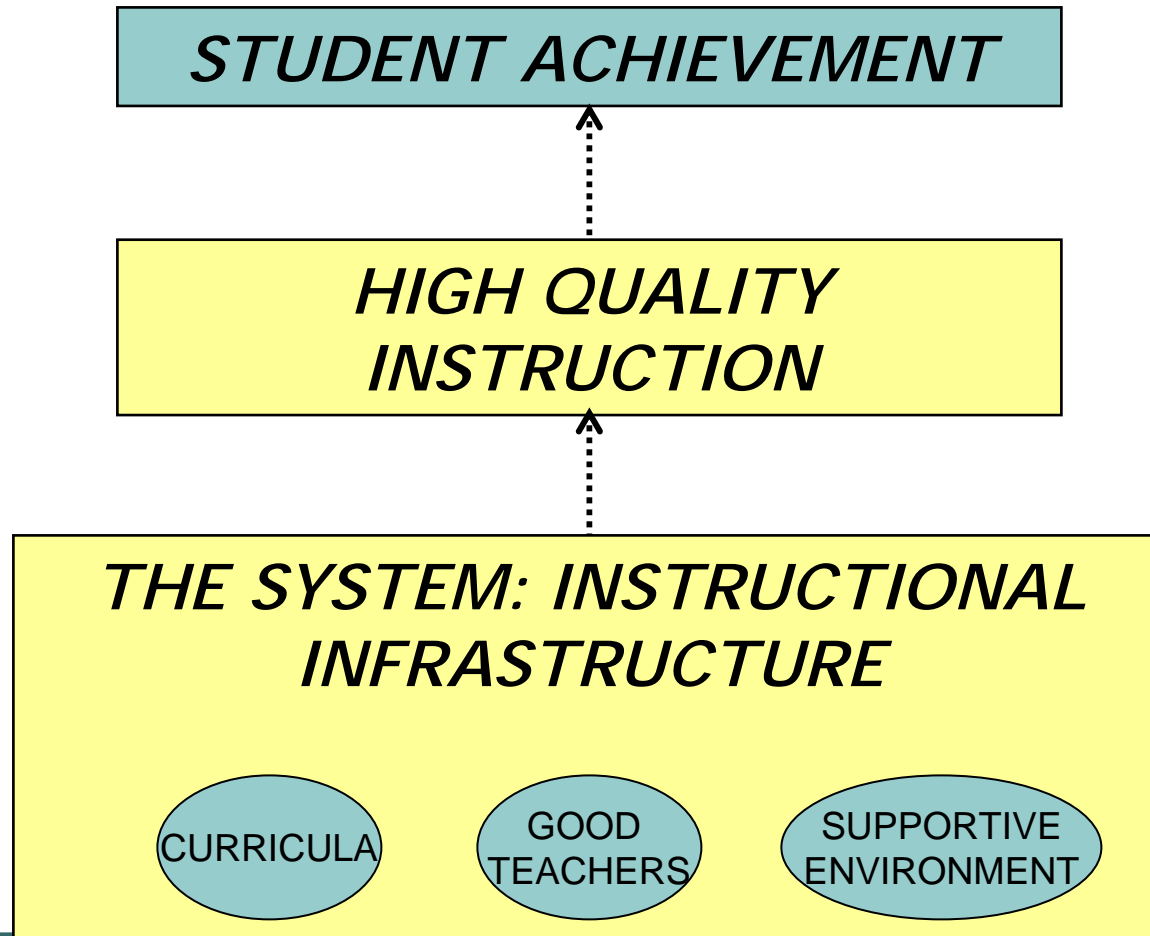
The First Degree

STUDENT ACHIEVEMENT

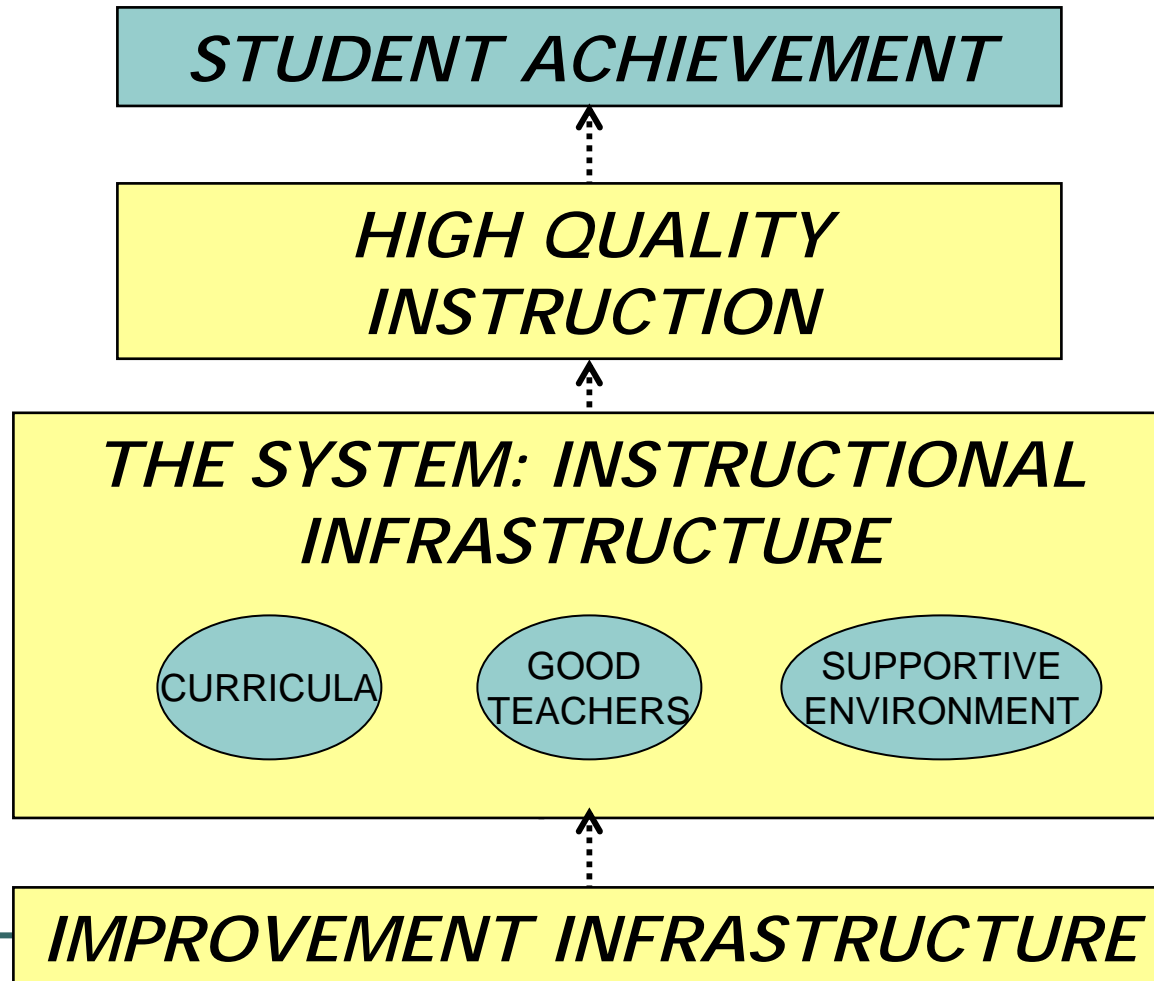


***HIGH QUALITY INSTRUCTION
AND
RICH OPPORTUNITIES TO LEARN
(Formal and Informal)***

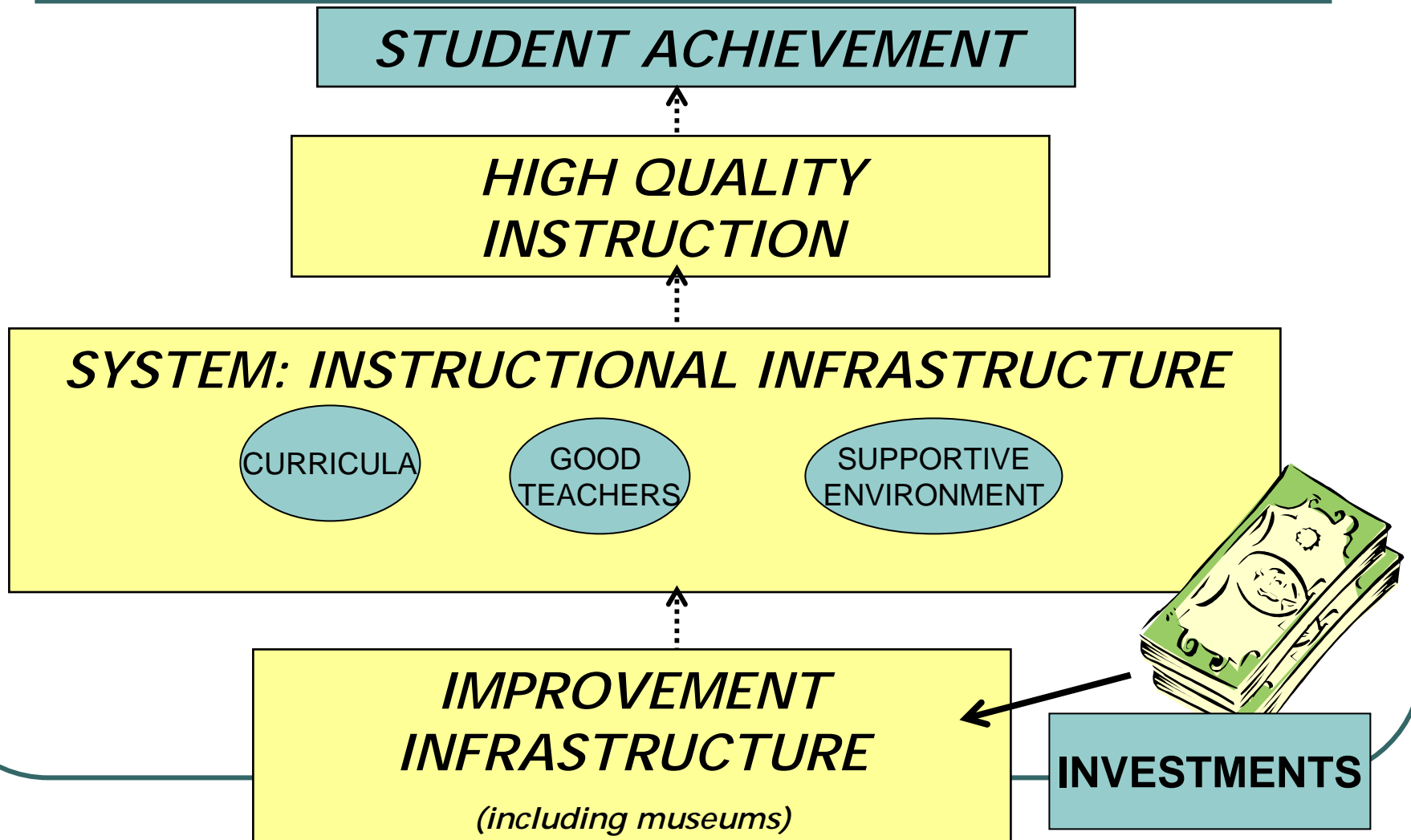
The Second Degree: Instructional Infrastructure



The Third Degree: The Improvement Infrastructure



The Nature of Investments Made in Educational Improvement



The Scale of the investments made in educational improvement



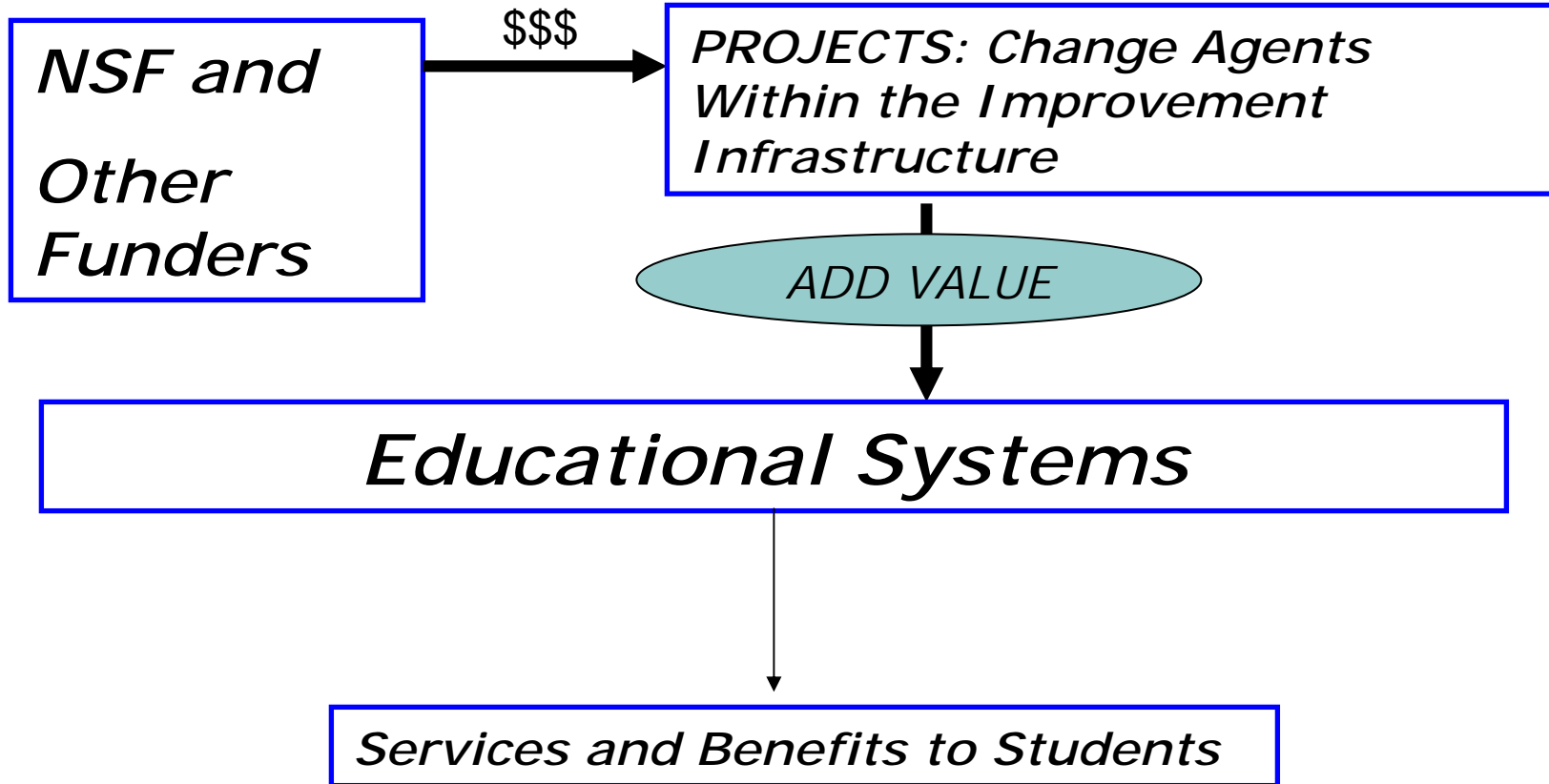
NSF

Museum Education Programs

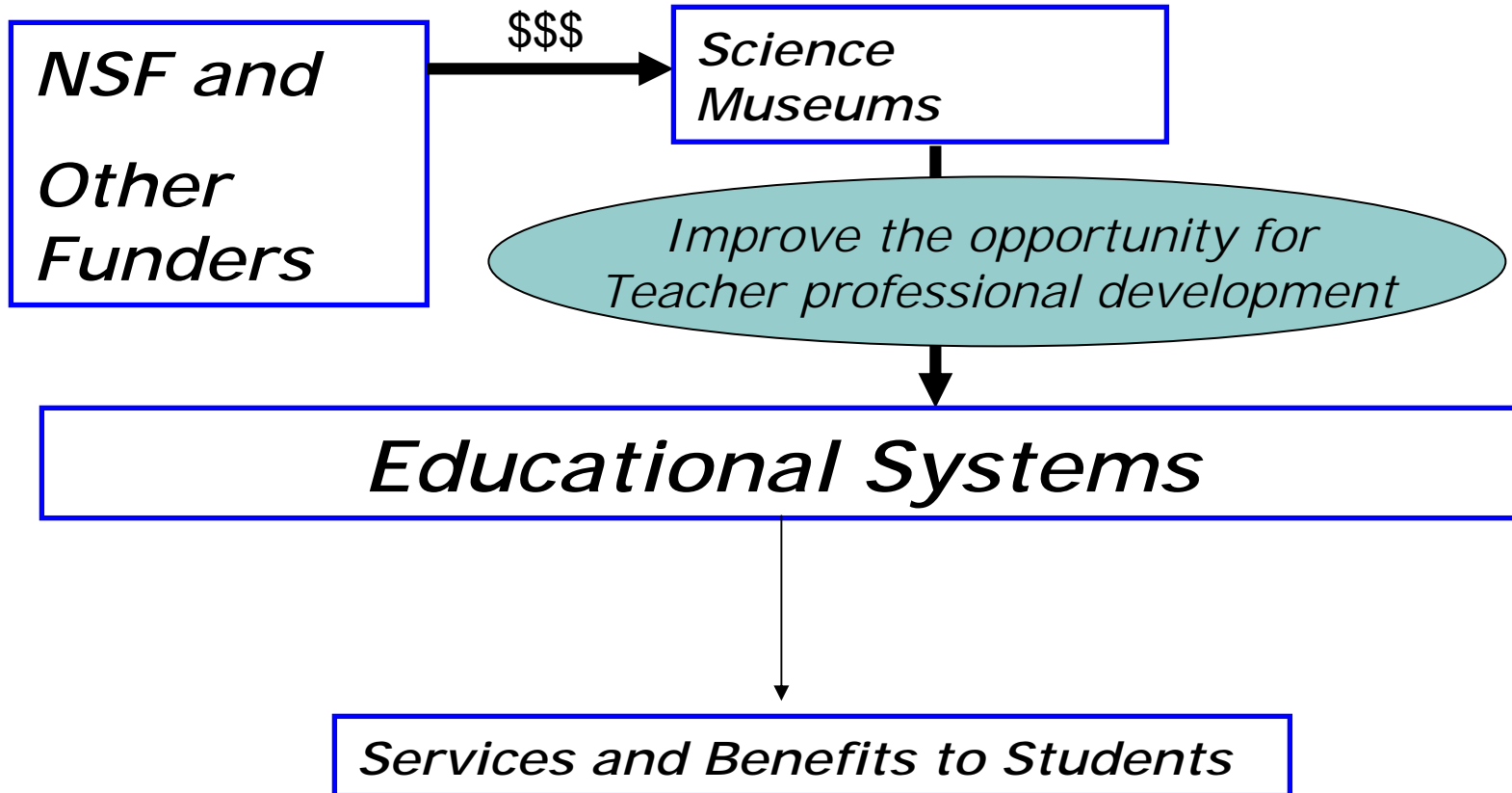
- All U.S. museums spend \$200 million to \$1B annually on K-12 programs
 - (~\$12,000 to \$60,000 per museum)
 - (~\$4 to \$20 per US student)

The Design of Professional Development Programs

Investments in Educational Improvement



Investments in Educational Improvement



The Design of Professional Development

