NSSME | THE NATIONAL SURVEY OF SCIENCE & MATHEMATICS EDUCATION

The 2018 NSSME+: Findings and Implications for STEM Education

NATIONAL STEM EDUCATION RESEARCH SUMMIT

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Session Overview

- Framing Thoughts
- About the 2018 NSSME+
- Science Instruction
- Resources for Instruction
- Teacher Preparation

Framing Thoughts

What's needed for high-quality STEM Instruction?

- Teachers with:
  - Strong content knowledge
  - Disposition toward this mode of instruction
  - Knowledge and skills to implement it
- Schools that provide:
  - Sufficient instructional time
  - Quality instructional materials
  - Necessary resources

How can it be done at scale and equitably for all?

About the 2018 NSSME+

- The 2018 NSSME+ is the sixth in a series of surveys dating back to 1977.

- It is the only survey specific to STEM education that provides nationally representative results.

The 2018 NSSME+, and this presentation, is based upon work supported by the National Science Foundation under Grant No. DGE-1642413. Any opinions, findings, and conclusions or recommendations expressed are those of the authors and do not necessarily reflect the views of the National Science Foundation.

Sample

Two-stage random sample that targeted:

- 2,000 schools (public and private)
- Over 10,000 K–12 teachers

Very good response rate:

- 1,273 schools participated
- 86 percent of program representatives
- 78 percent of sampled teachers

Topics Addressed

- Characteristics of the science/mathematics/ computer science teaching force
- Instructional practices
- Factors that shape teachers' decisions about content and pedagogy
- Use of instructional materials
- Opportunities teachers have for professional growth

Interpreting Results

After data collection, design weights were computed, adjusted for nonresponse, and applied to the data.

The sampling and weighting processes mean that the results are national estimates of schools, teachers, and classes—not characteristics of the respondents.

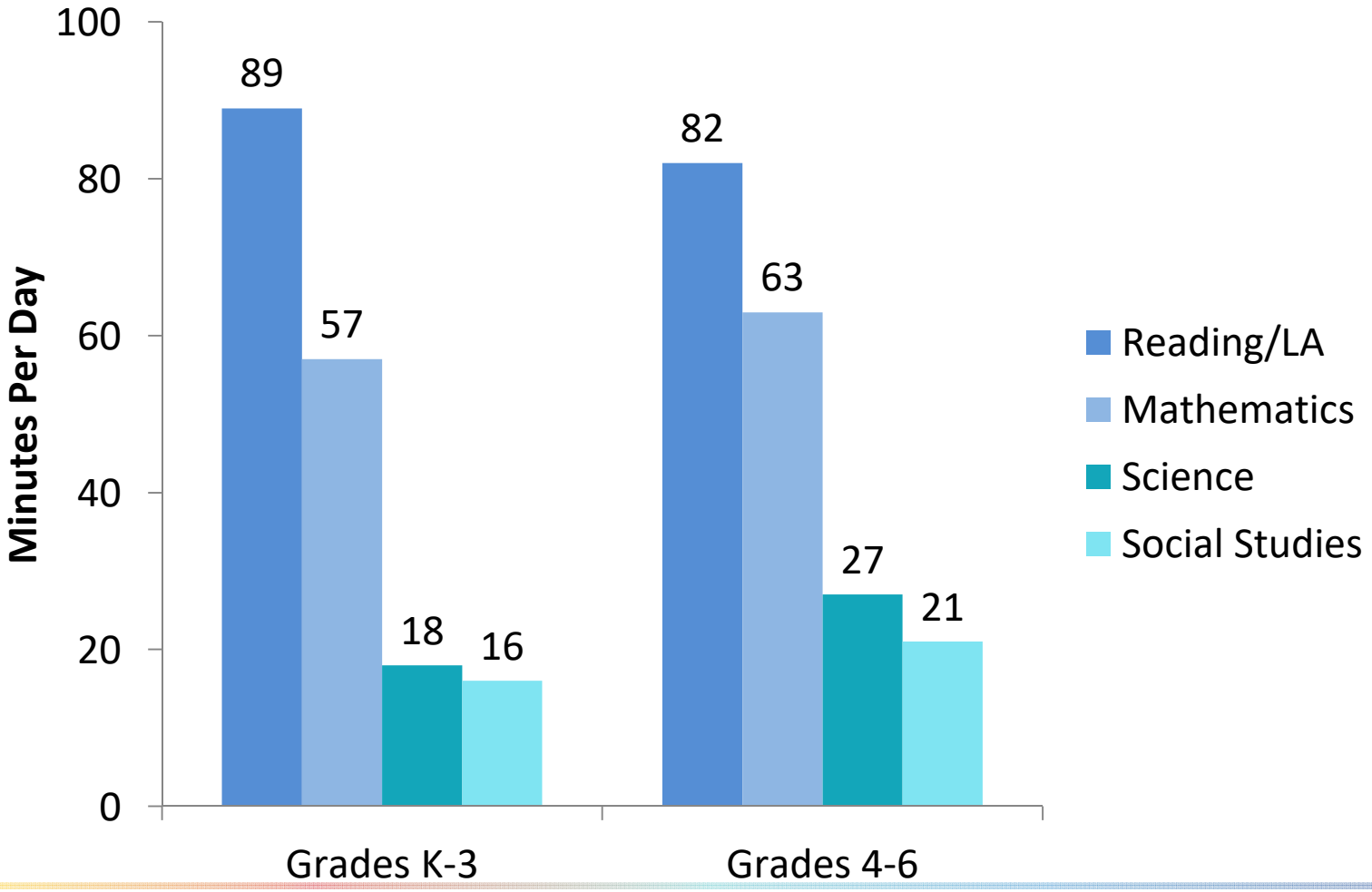
Equity

We also disaggregate data by factors historically associated with differences in students' educational opportunities:

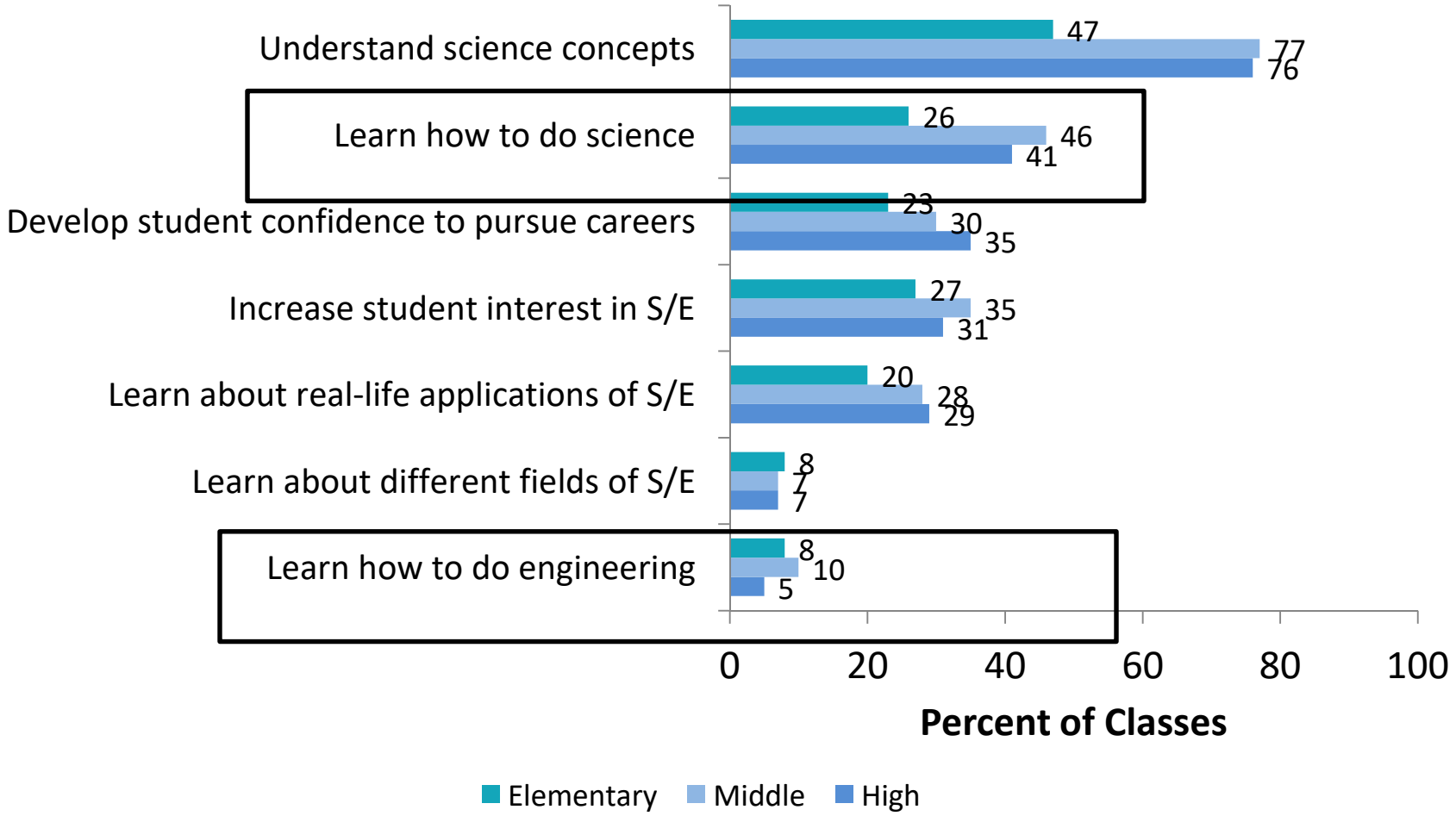
- **School-level Factors**
  - Percentage of students in the school eligible for free or reduced-price lunch (FRL)
  - School size
  - School community type (rural, urban, suburban)
- **Class-level Factors**
  - Percentage students in the class from race/ethnicity groups historically underrepresented in STEM (HU)
  - Prior achievement level of students in the class

Science Instruction

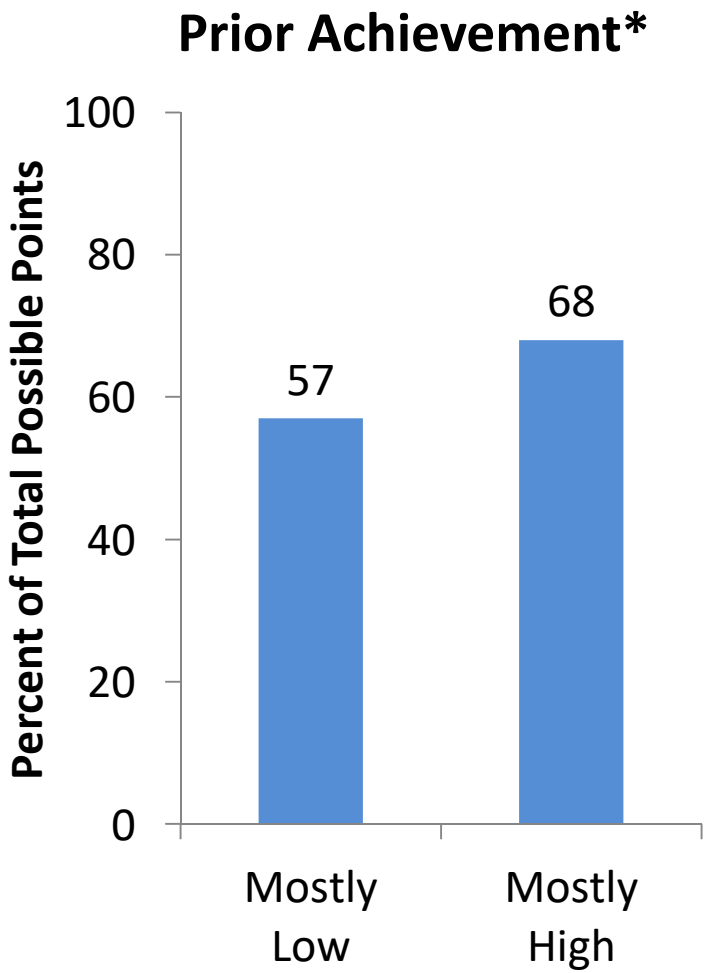
Instructional Time: Elementary



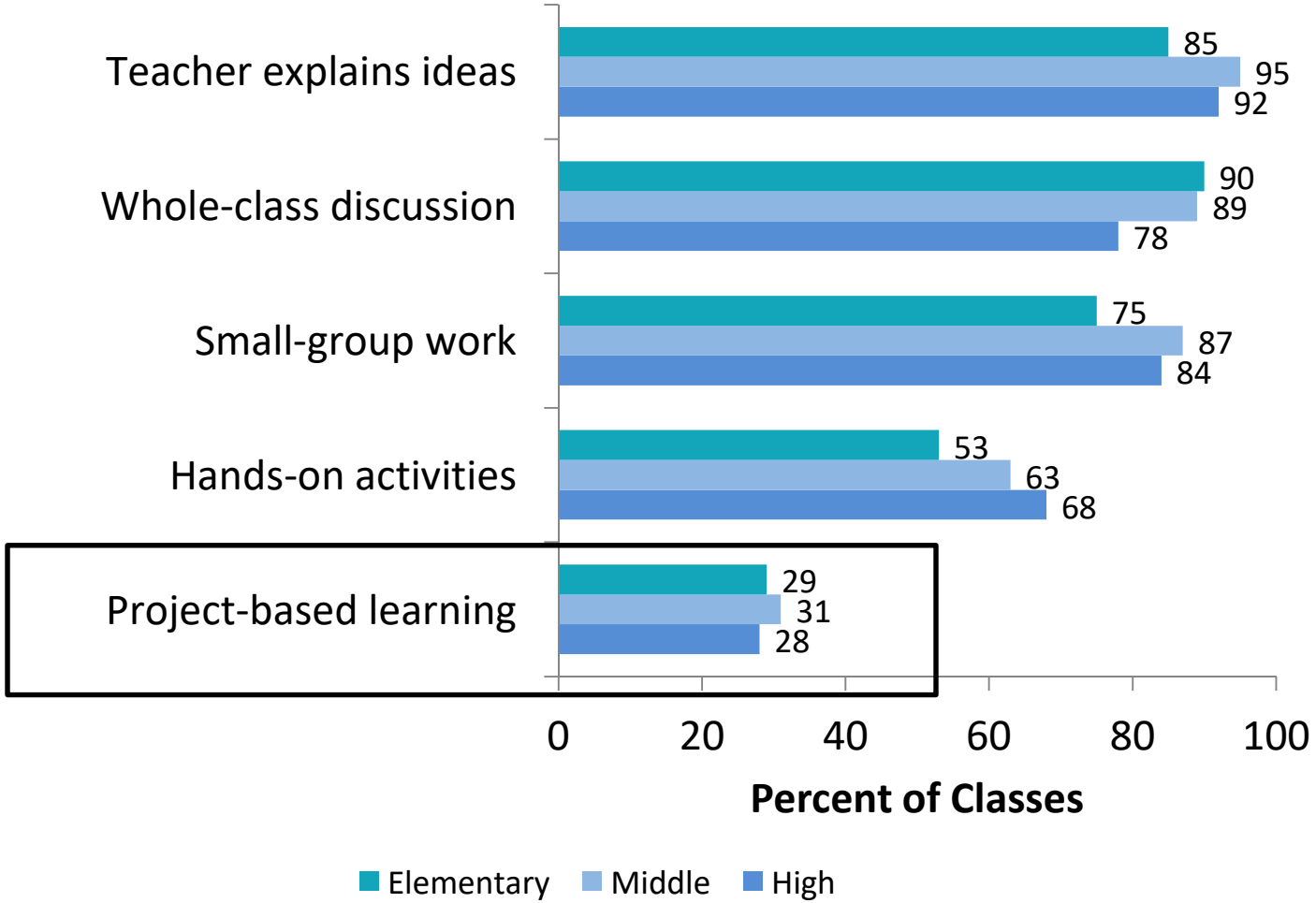
Instructional Objectives Receiving Heavy Emphasis



Equity Analysis: Reform-Oriented Objectives



Instructional Activities (Weekly)



Equity Analyses: Instructional Activities

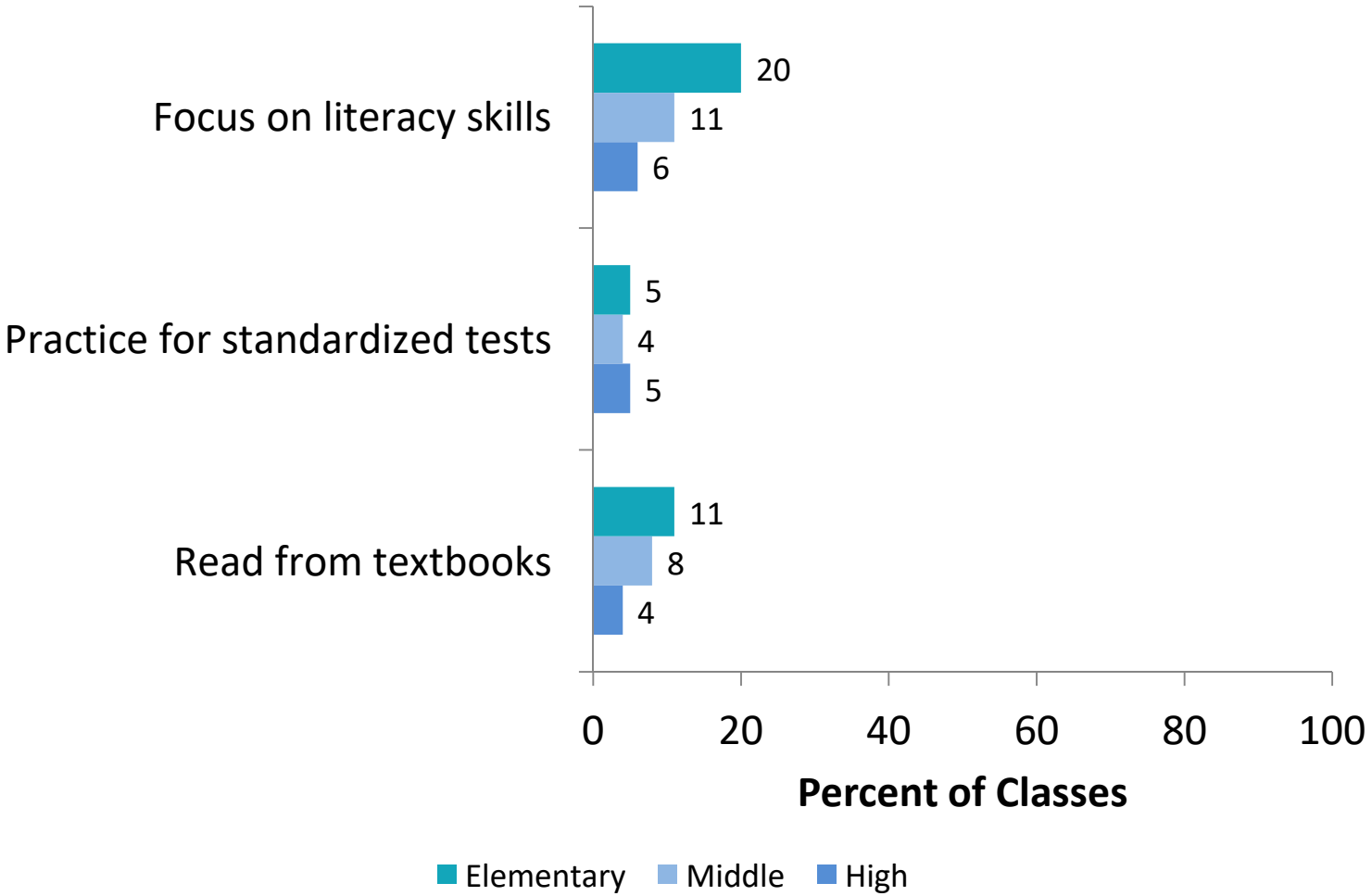
Hands-on/laboratory activities are more likely in:

- classes of high prior achieving students,
- classes with low %HU, and
- most affluent schools

Project-based learning is more likely in:

- classes of high prior achieving students

Instructional Activities (Weekly)

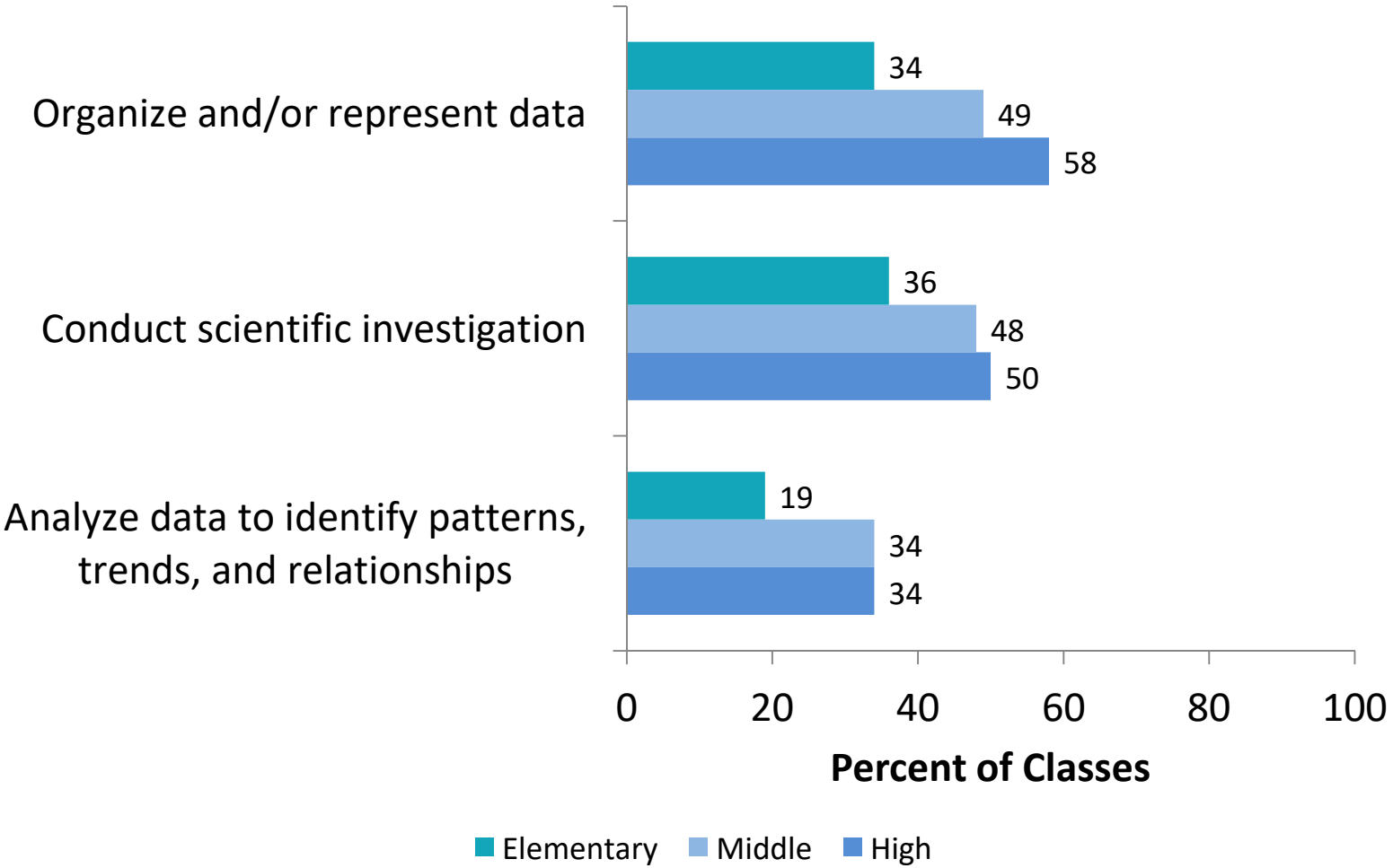


Equity Analyses: Instructional Activities

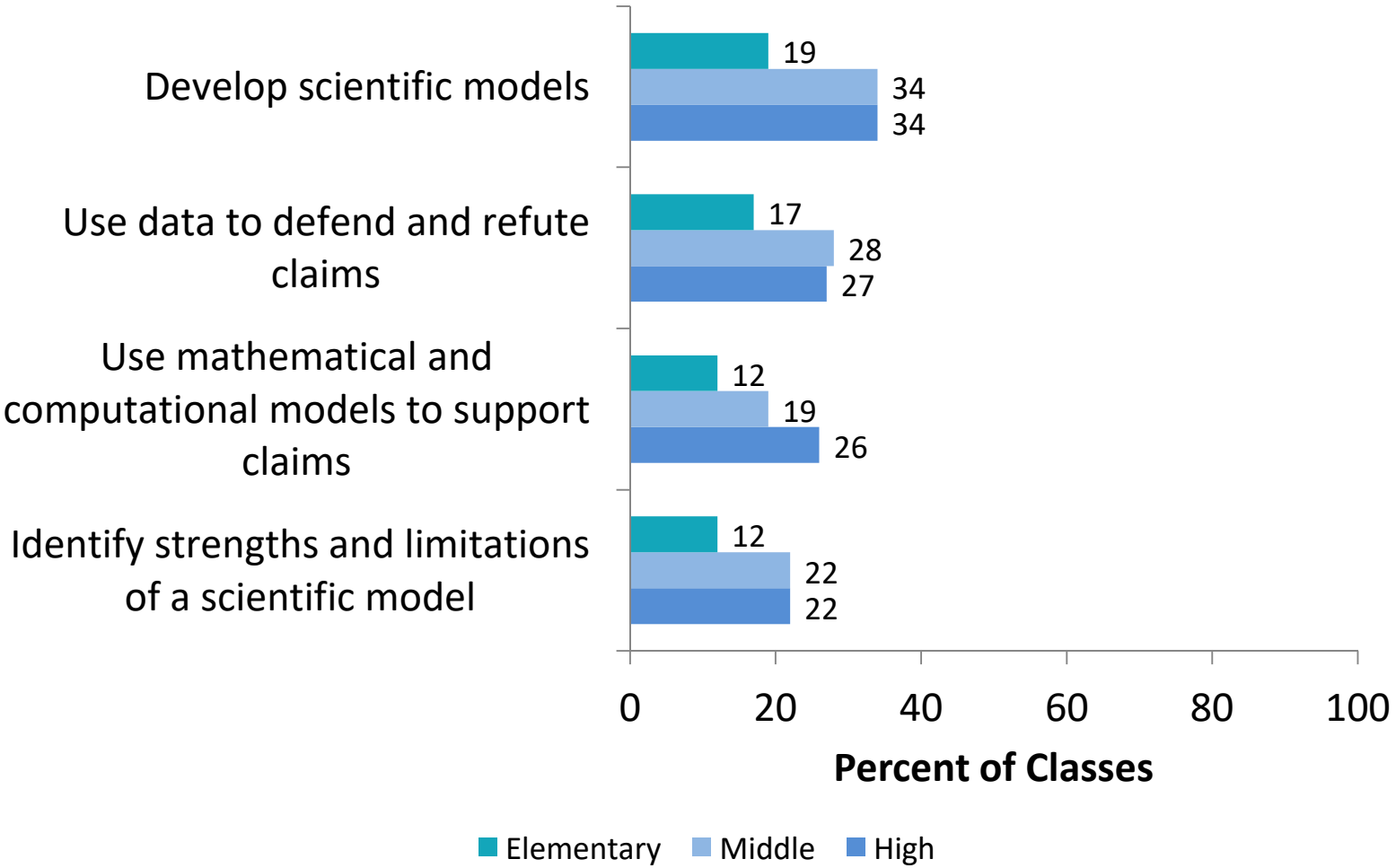
Traditional instructional practices are more likely in:

- least affluent schools
- classes with high %HU

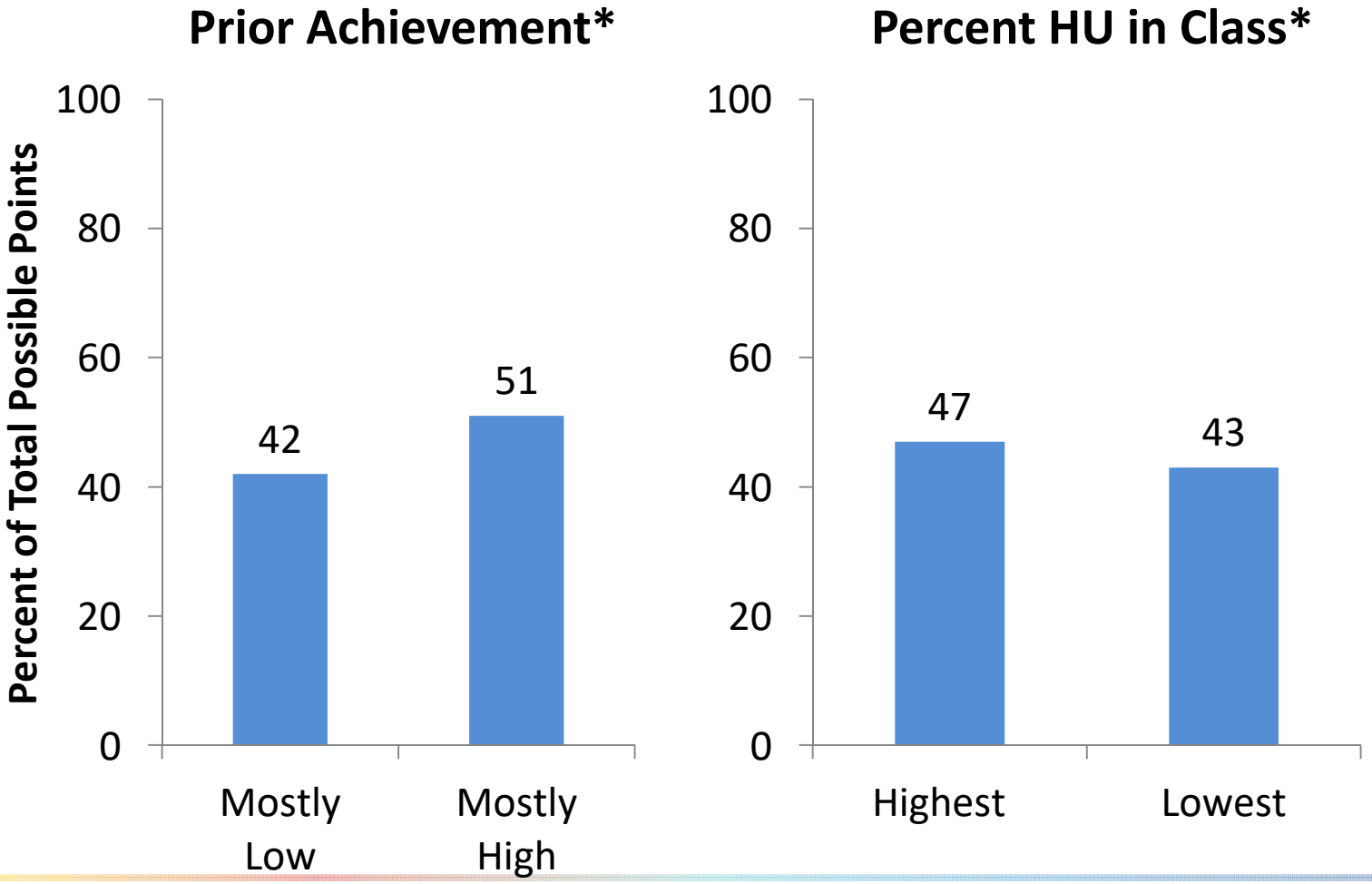
Engagement in Science Practices (Weekly)



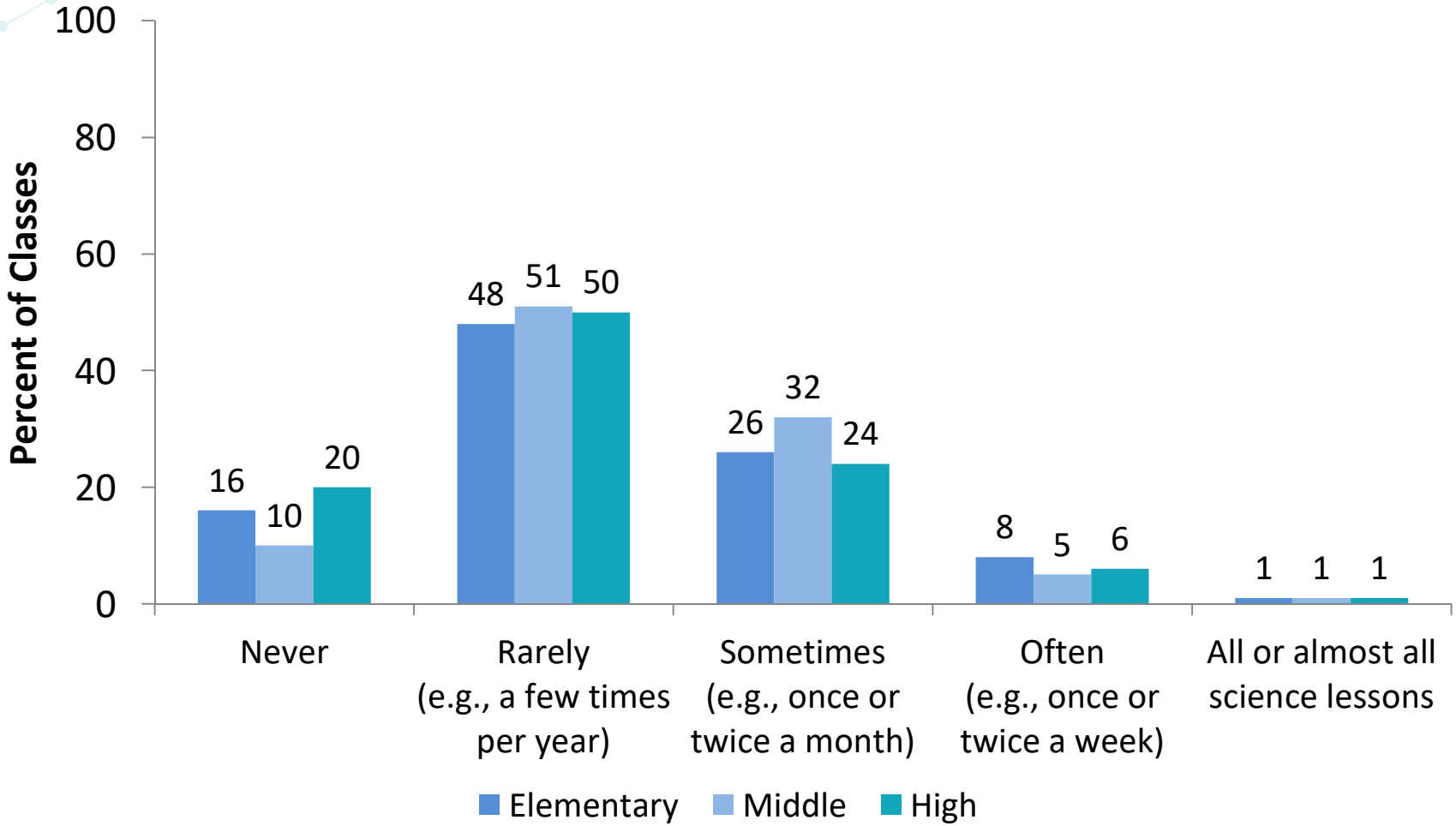
Engagement in Science Practices (Weekly)



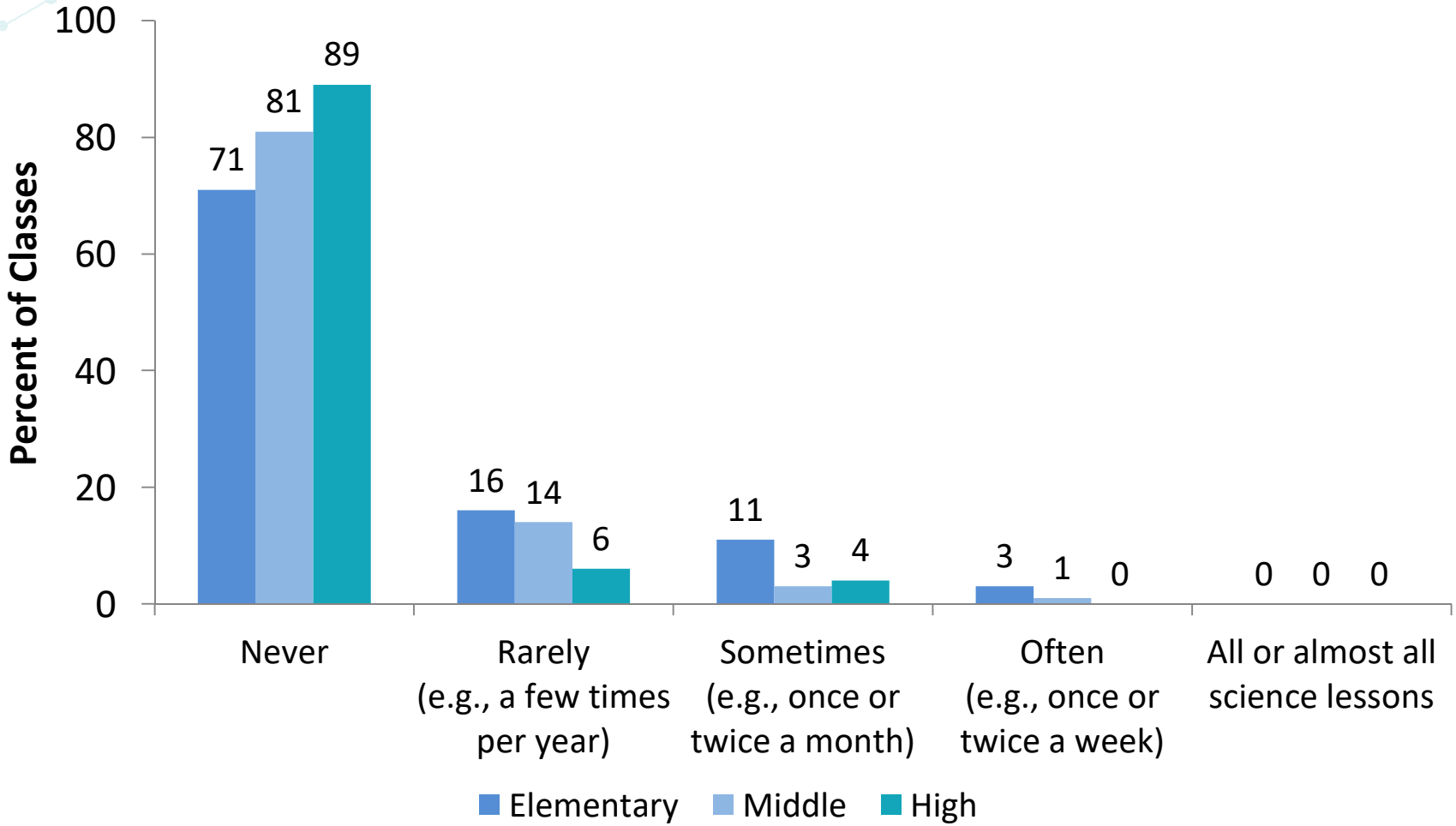
Equity Analyses: Engagement in Science Practices



Integrating Engineering into Science Instruction



Integrating Coding into Science Instruction



Resources for Science Instruction

Science Instructional Materials

Pre-packaged units or curricula

- Commercially published textbooks
- Commercially published kits/modules
- State, county, or district-developed units or lessons

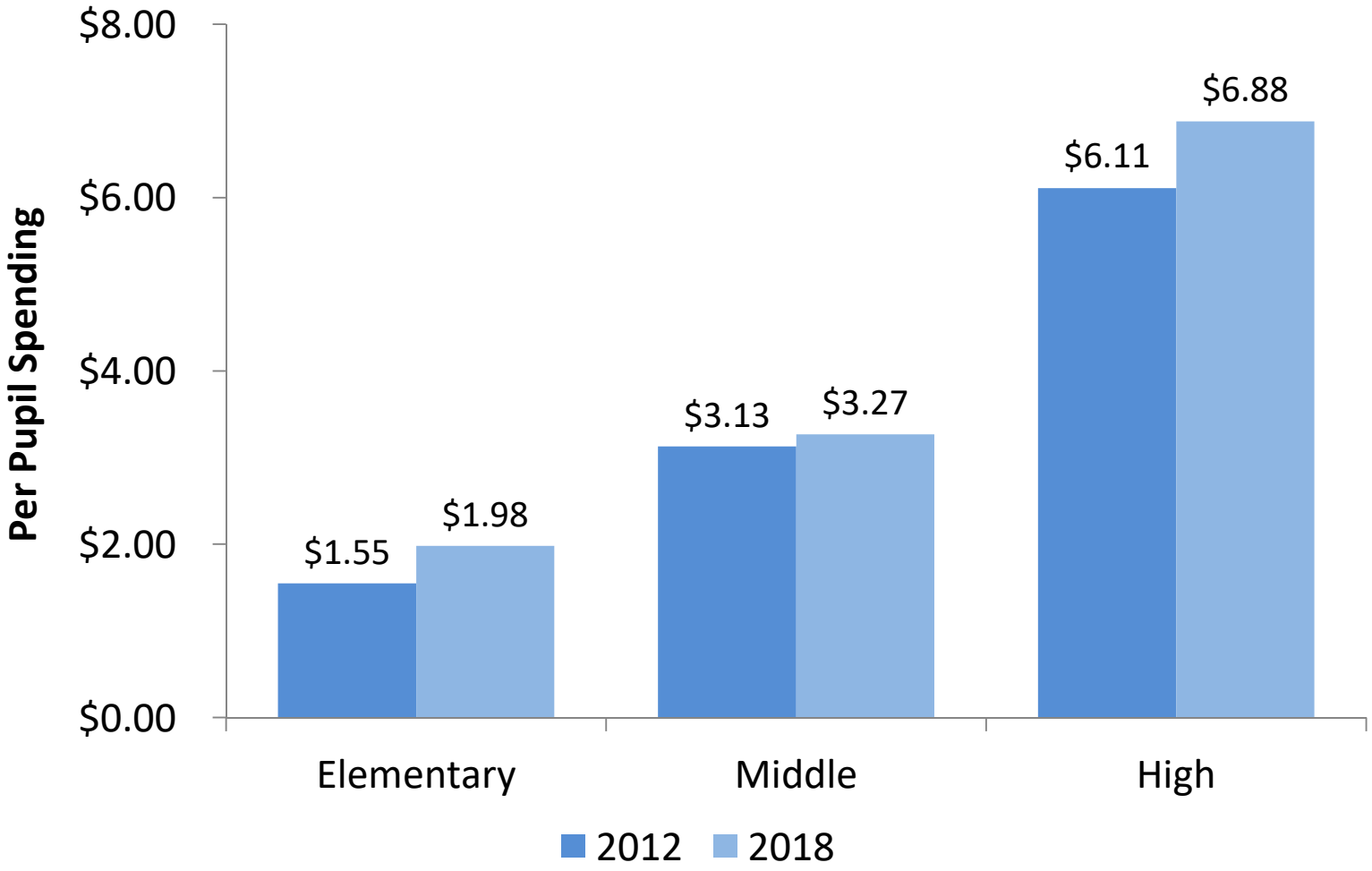
Activities/resources teachers pull together on own

- Teacher-developed units or lessons
- Units or lessons from other sources (e.g., conferences, colleagues)
- Lessons or resources from websites that are free
- Lessons or resources from websites that have a subscription fee or cost (e.g., BrainPop, TpT)

Science Instructional Materials Used (Weekly)

	Percent of Classes		
	Elementary	Middle	High
Teacher-developed units or lessons	**47**	**76**	**86**
Commercially published textbooks	38	45	50
Units or lessons from other sources	**28**	**43**	**49**
Lessons or resources from websites that are free	**23**	**31**	**31**
Commercially published kits/modules	29	21	21
Lessons or resources from websites that have a subscription fee or cost	**49**	**34**	**16**
State, county, or district-developed units or lessons	32	21	14

Median School Spending Per Pupil for Science



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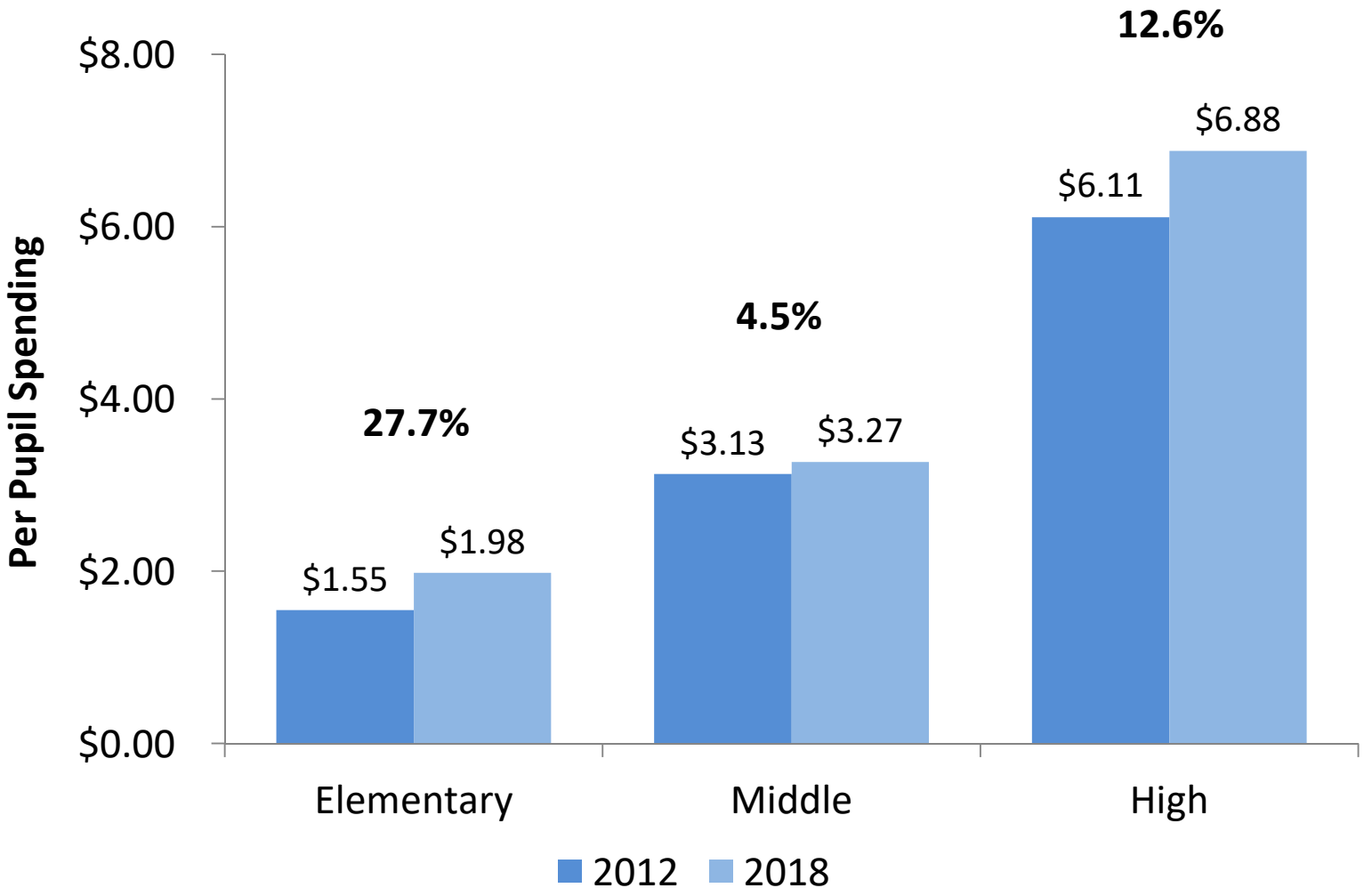
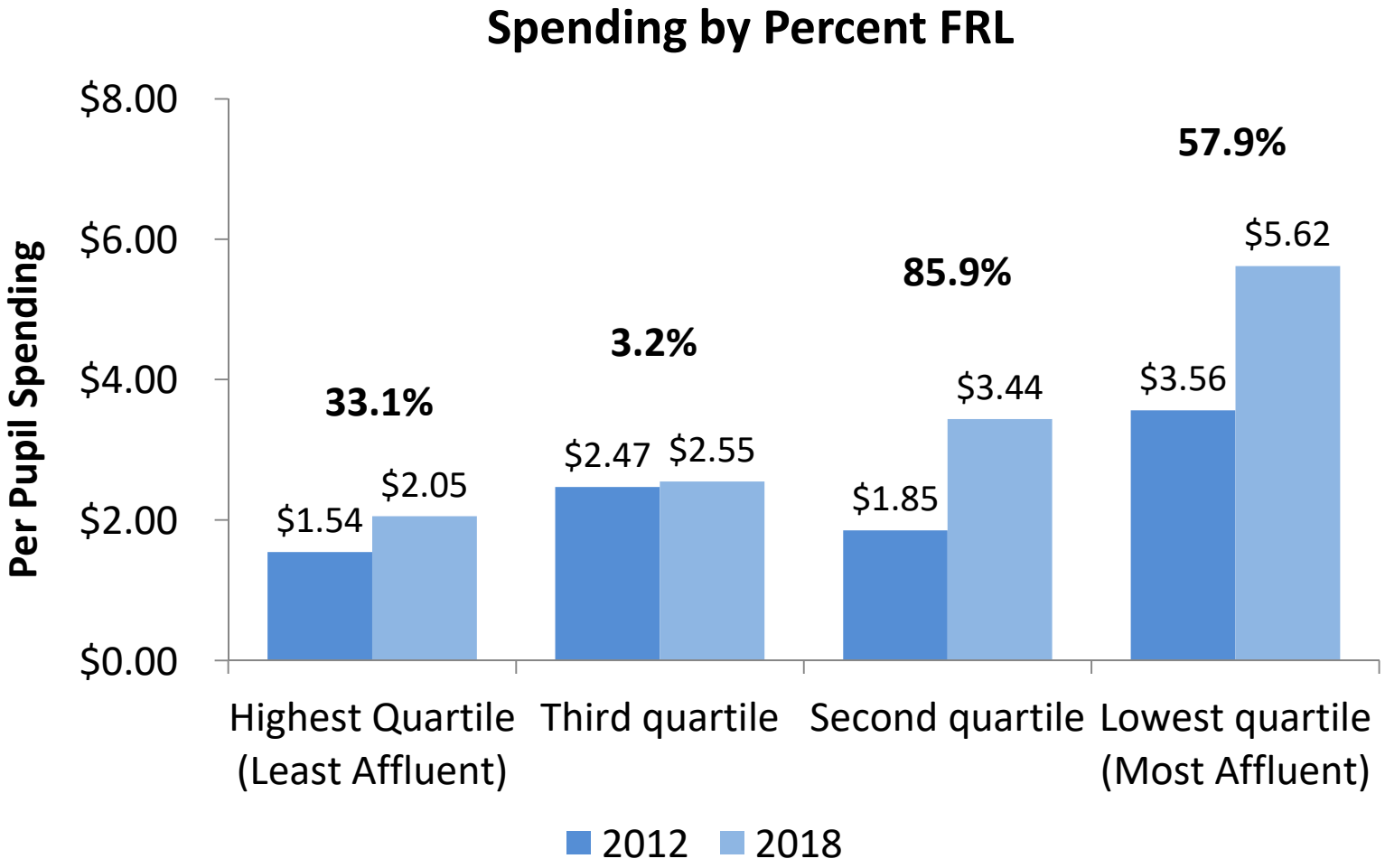
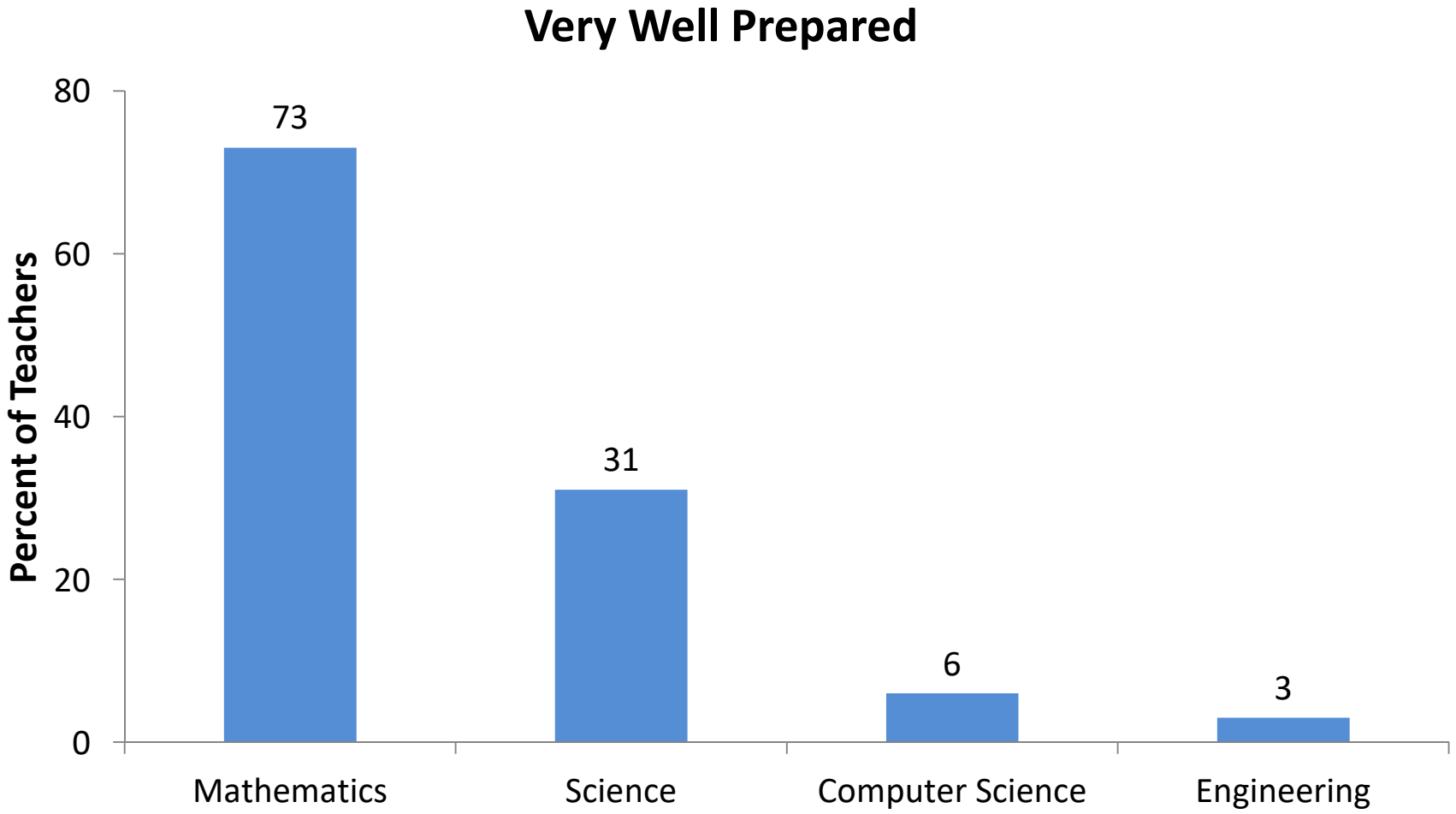


Equity Analysis: School Science Spending

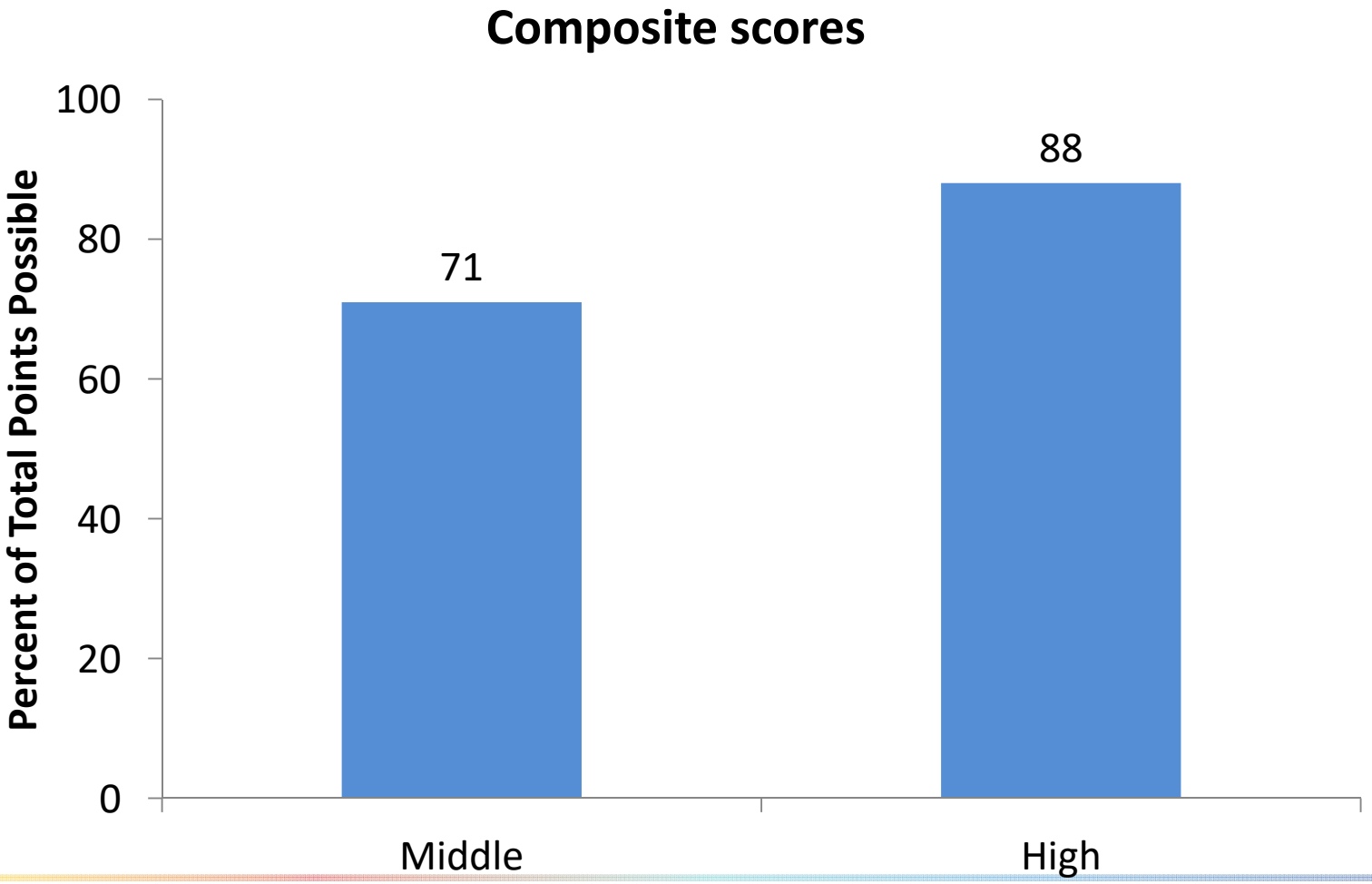


Teacher Preparation

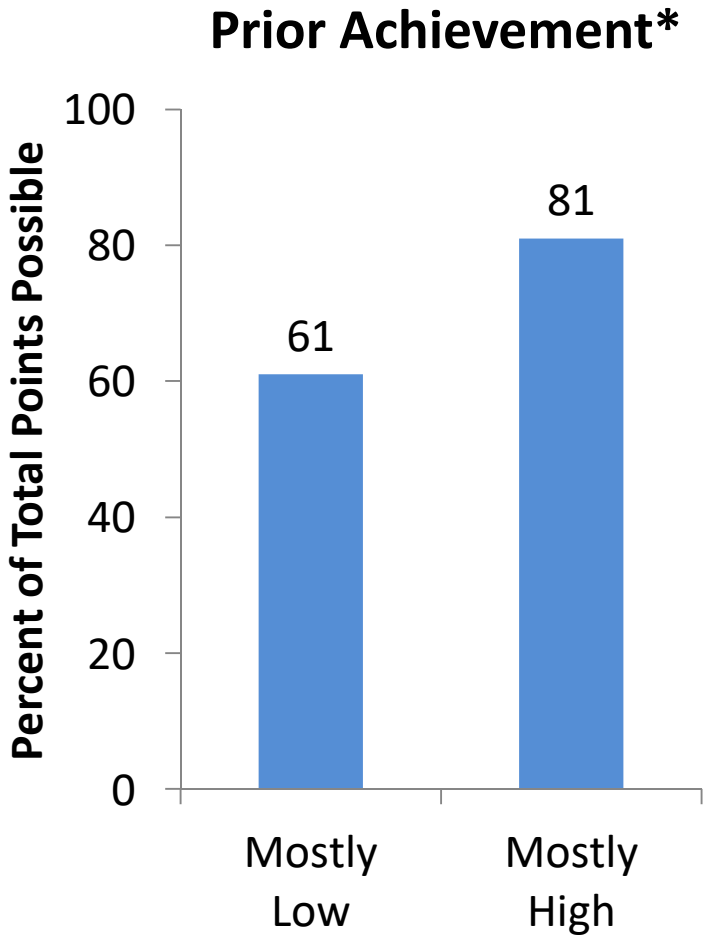
Perceptions of Preparedness: Elementary Teachers

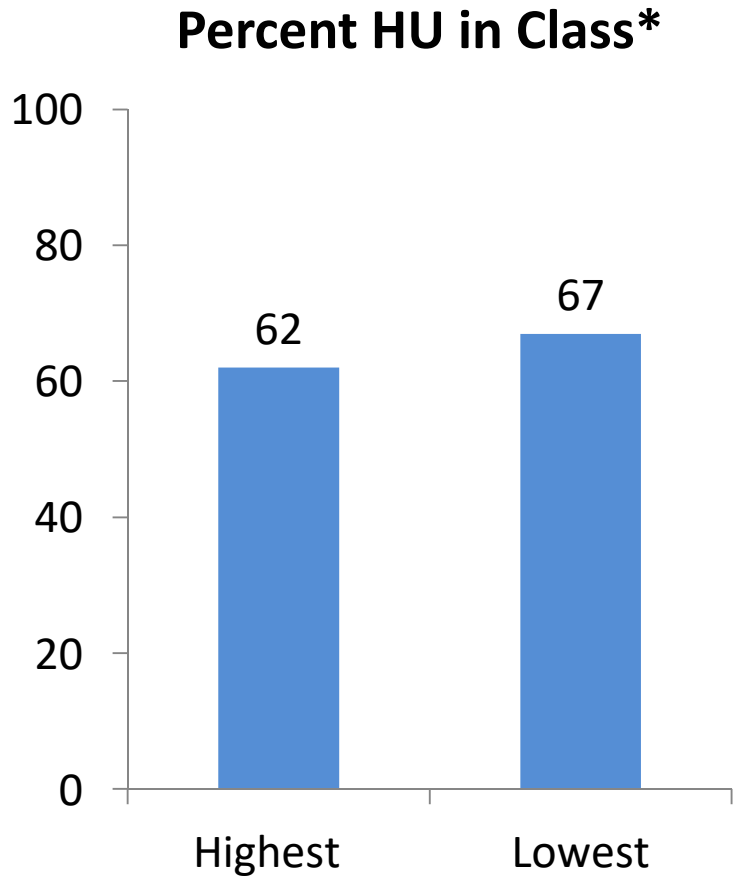


Perceptions of Preparedness to Teach Science Content: Secondary Teachers

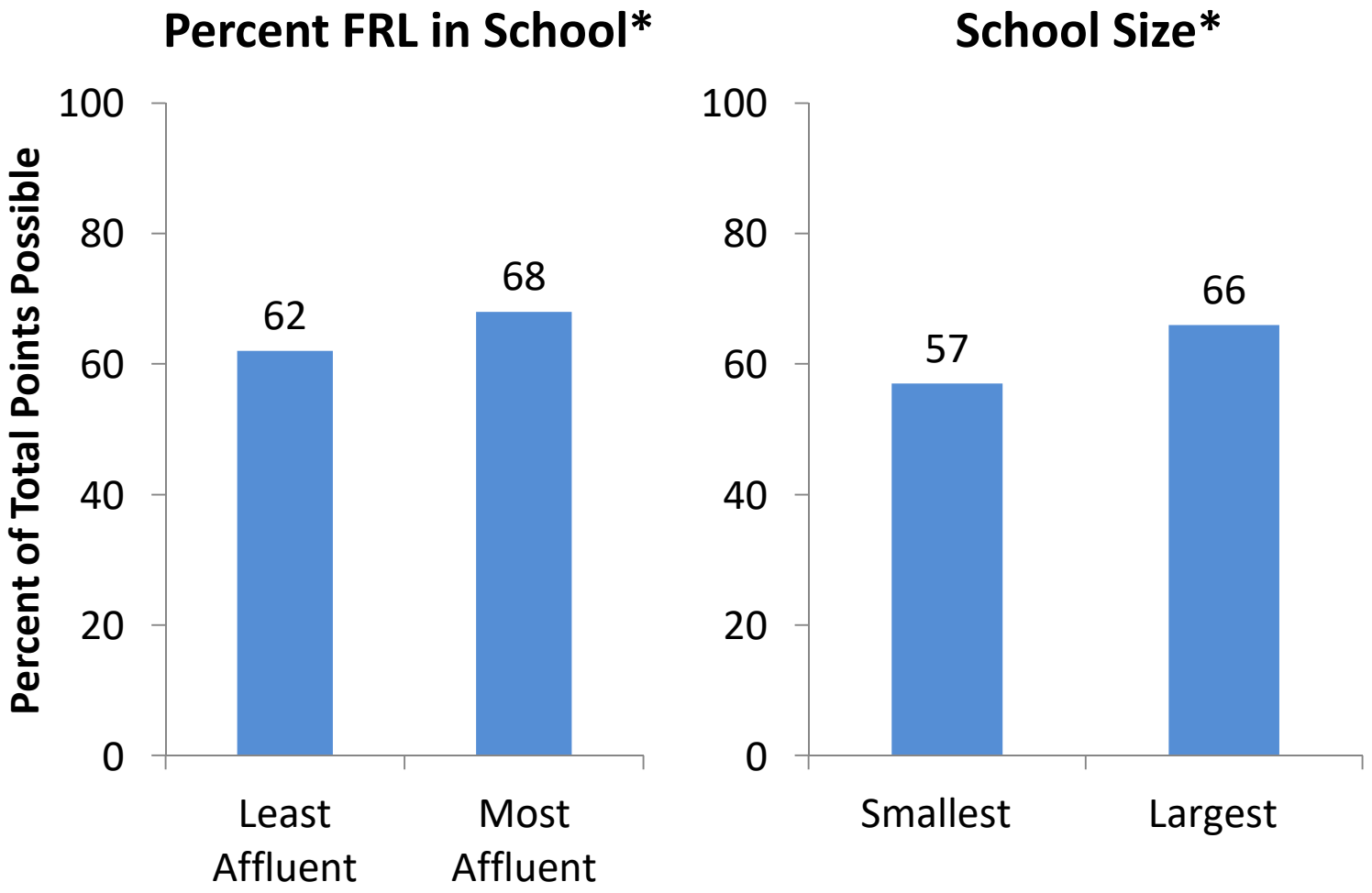


Equity Analyses: Preparedness to Teach Science Content Composite

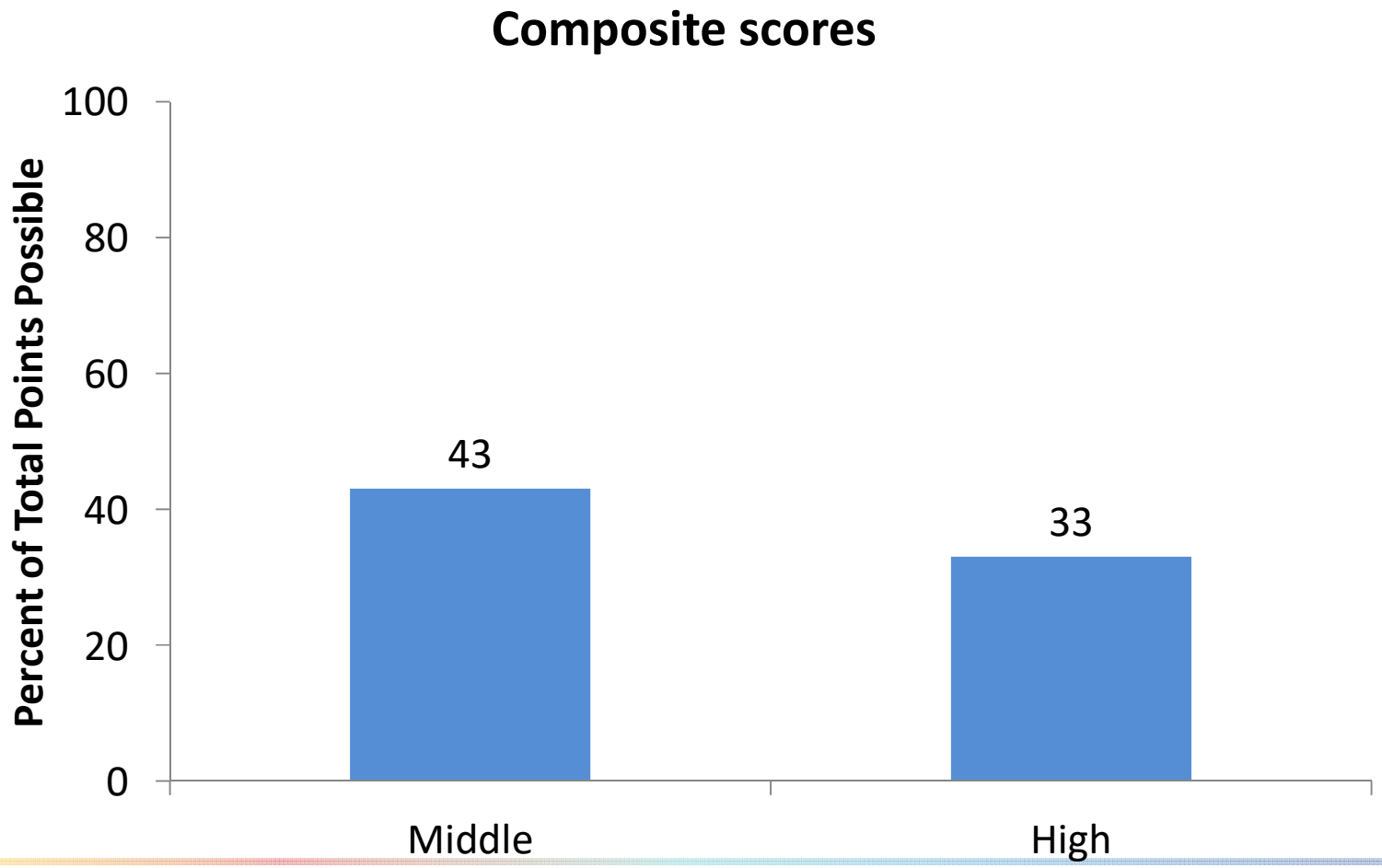




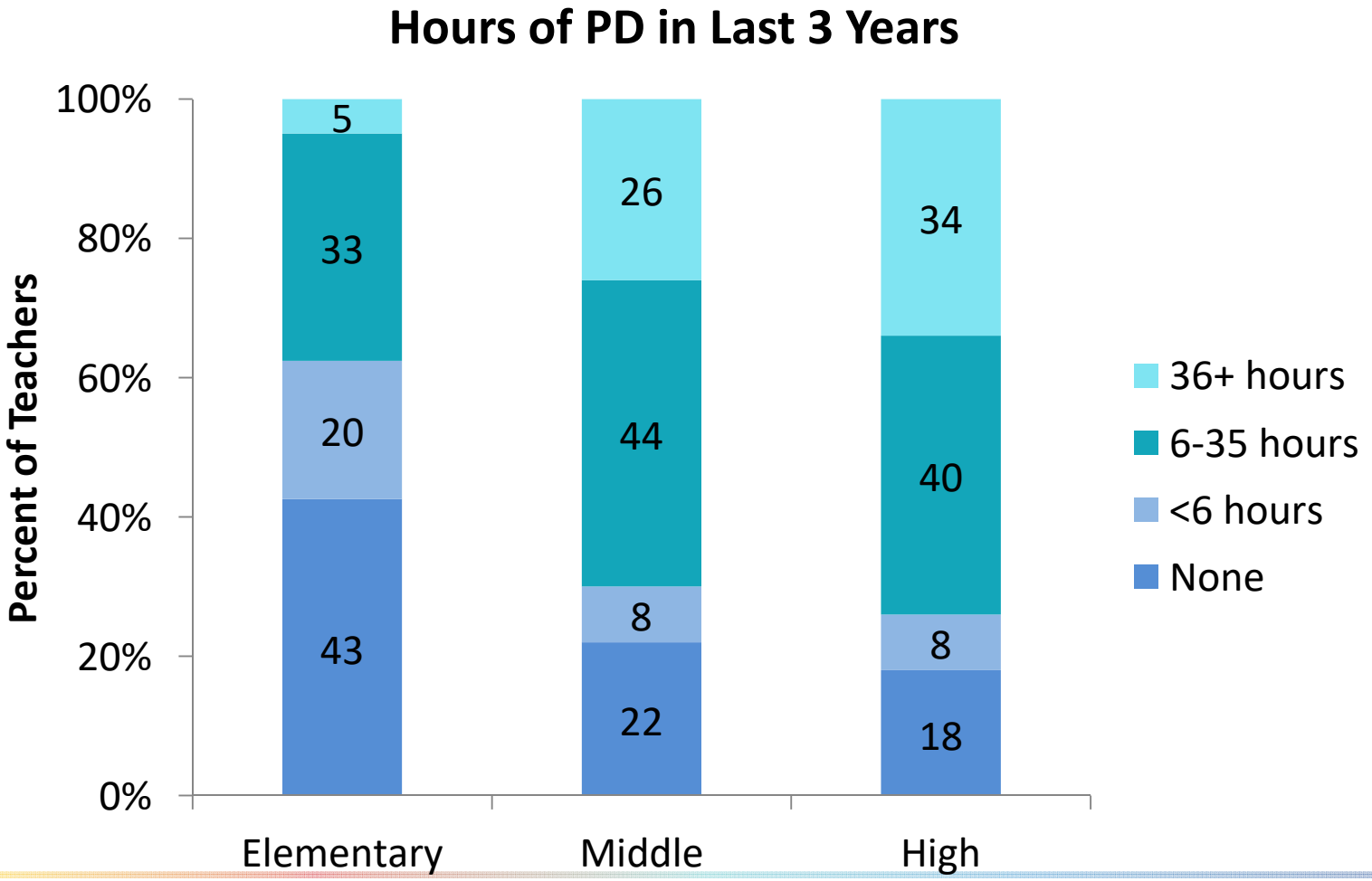
Equity Analyses: Preparedness to Teach Science Content Composite



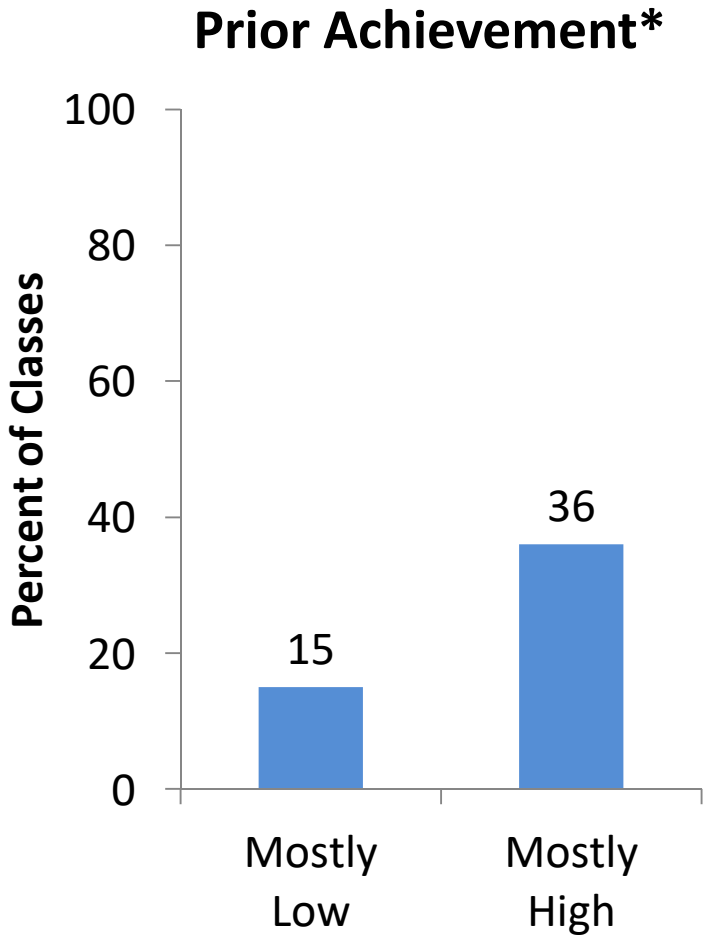
Perceptions of Preparedness to Teach Engineering Content: Secondary Teachers

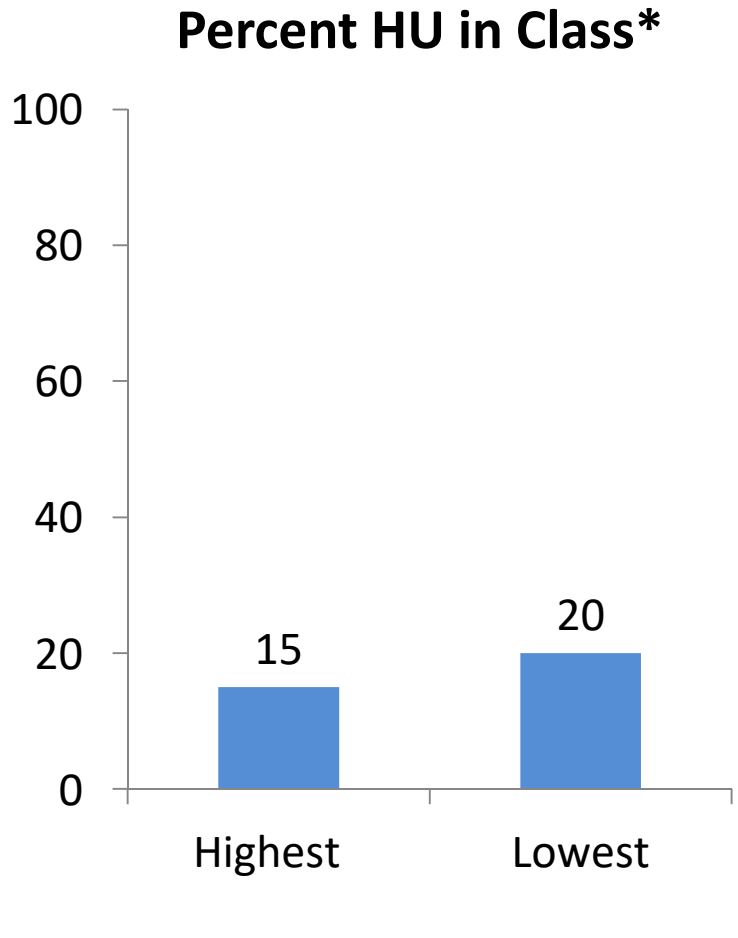


Professional Development

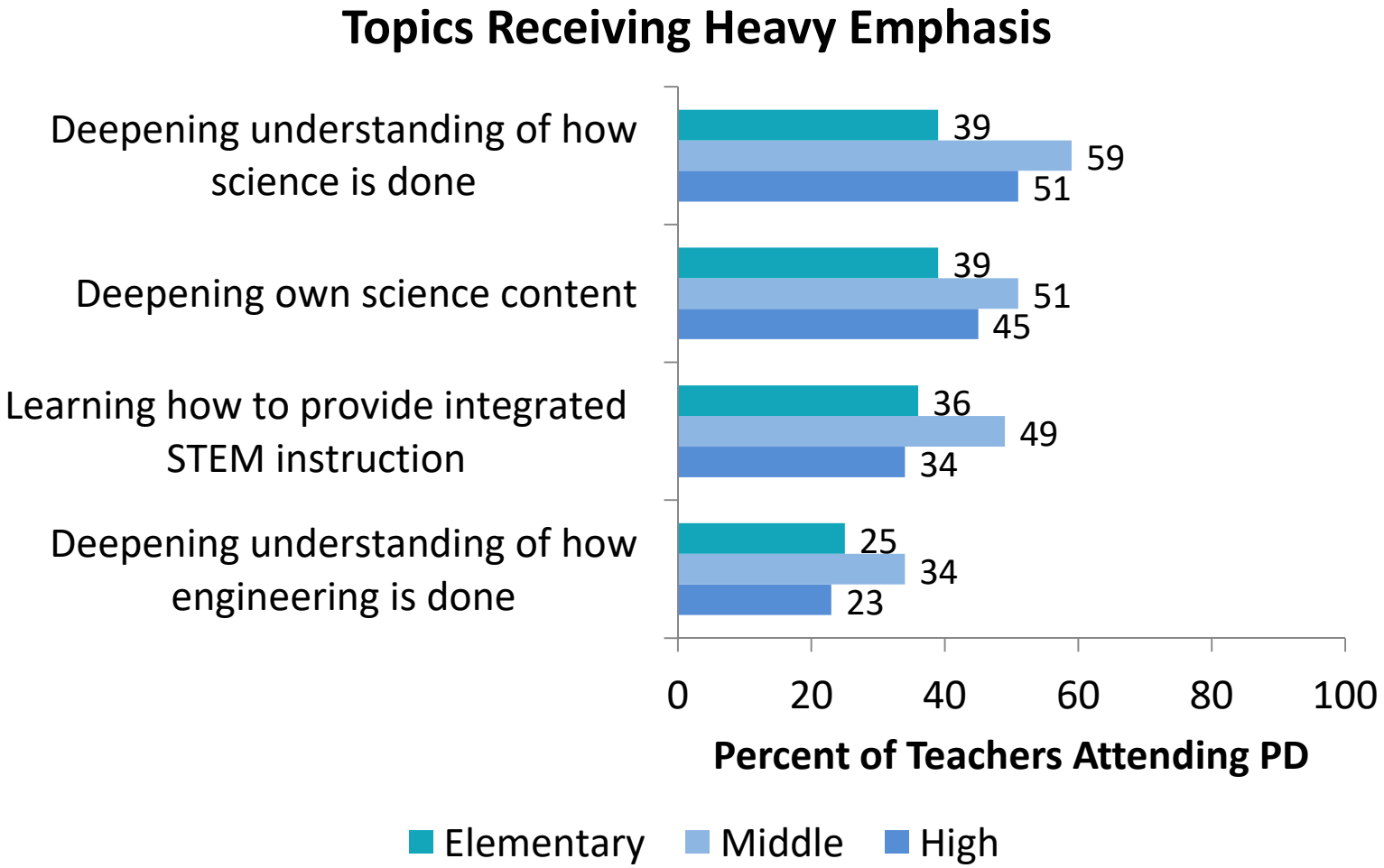


Equity Analyses: Classes Taught by Teachers With More Than 35 Hours of Science PD in the Last Three Years





Emphasis of PD



Implications

There are a number of promising initiatives focused on integrated STEM.

Providing high-quality STEM instruction for ALL still requires a great deal of research and development:

- Preparation of new teachers
- Professional development
- Learning trajectories
- Instructional materials

It also requires adequate school funding and instructional time

http://horizon-research.com/NSSME

Current Reports/Products

- Technical report
- Highlights report
- Compendium of Tables
- Subject/grade-level reports and compendia
- Briefing Book

Coming Soon

- Trend reports
- Equity reports
- Novice Teacher reports
- Out-of-Field Teaching reports
- NGSS report
- De-identified datasets and supports for secondary analyses

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