

# Teaching Physics in the US

## Alliance for Physics Excellence (APEX) Physics Teaching Research Program (PTR)

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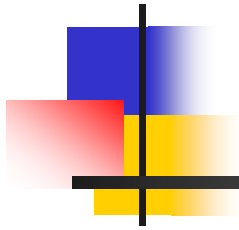


# Teacher Action Research

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**Action Research is a strategy for  
extending APEX professional  
development and facilitating change in  
your physics teaching**

# Who are Science Teachers and Teachers of Physics in the US?



**What do the results mean to you as a member of  
a collaborative group of physics teachers?**

# Results from Two National Studies



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**1. National Center for Education Statistics**  
at the Institute of Education Sciences (IES),  
part of the U.S. Department of Education.

<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014051>

**2. Horizon Research Study, Released 2013  
& 2014**

<http://www.horizonresearch.com/2012nssme/>

# 1. IES Education Projections to 2022



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- The number of high school graduates increased by 27 percent between 1997-98 and 2009-10, and a decrease of 2 percent is projected by 2022-23.
- Postsecondary enrollment rose by 45 percent between 1997 and 2011, and is projected to increase another 14 percent by 2022.
- After adjusting for inflation, current expenditure per pupil increased by 28 percent between 1997-98 and 2009-10, and a further increase of 18 percent is projected by 2022-23.

This report is a product of the National Center for Education Statistics at the Institute of Education Sciences, part of the U.S. Department of Education. <http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=2014051>

## 2. 2012 National Survey of Science and Mathematics Education

Horizon Research, Inc.

Chapel Hill, NC

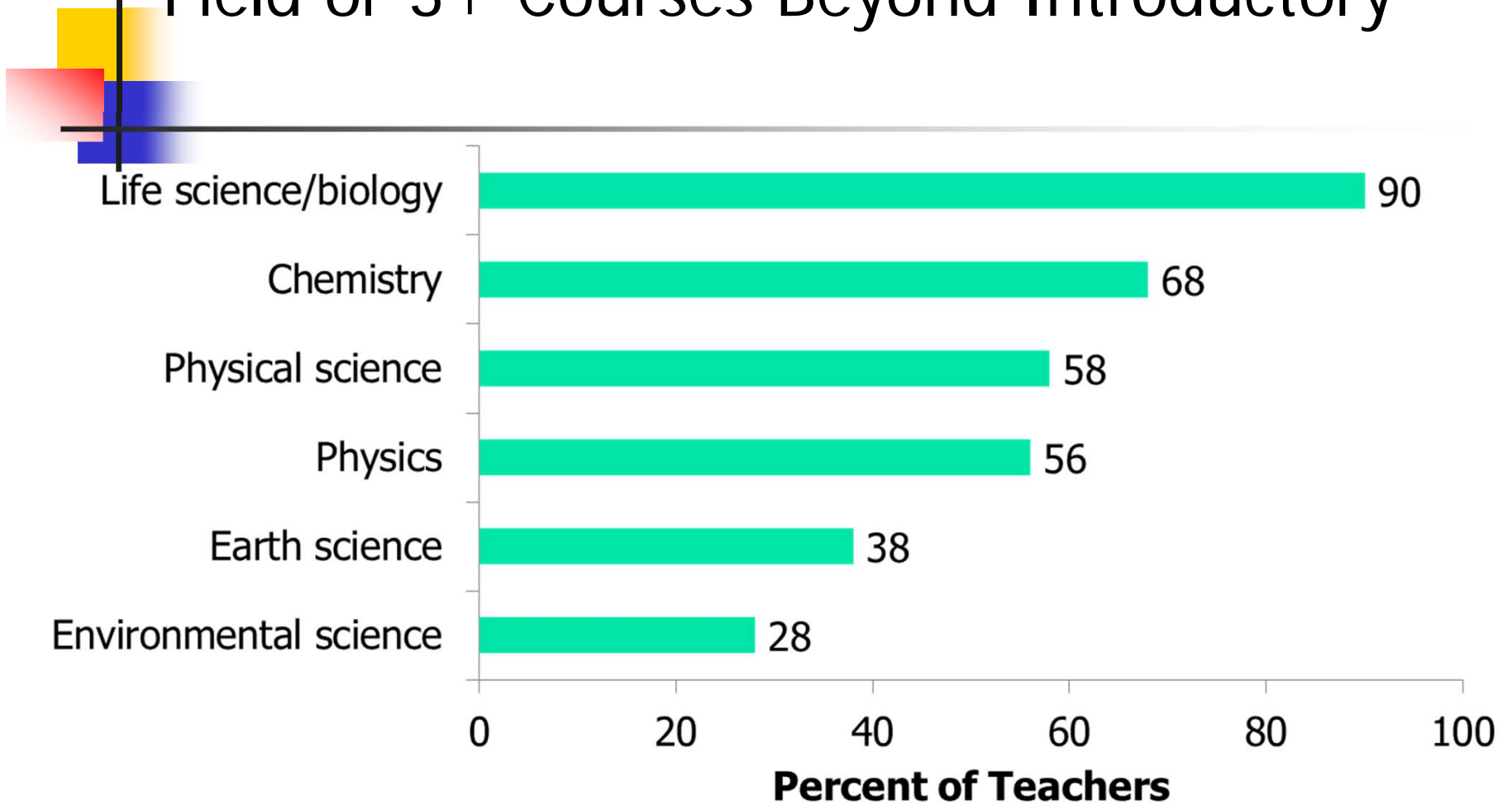
January 2014

<http://www.horizon-research.com/2012nssme/>

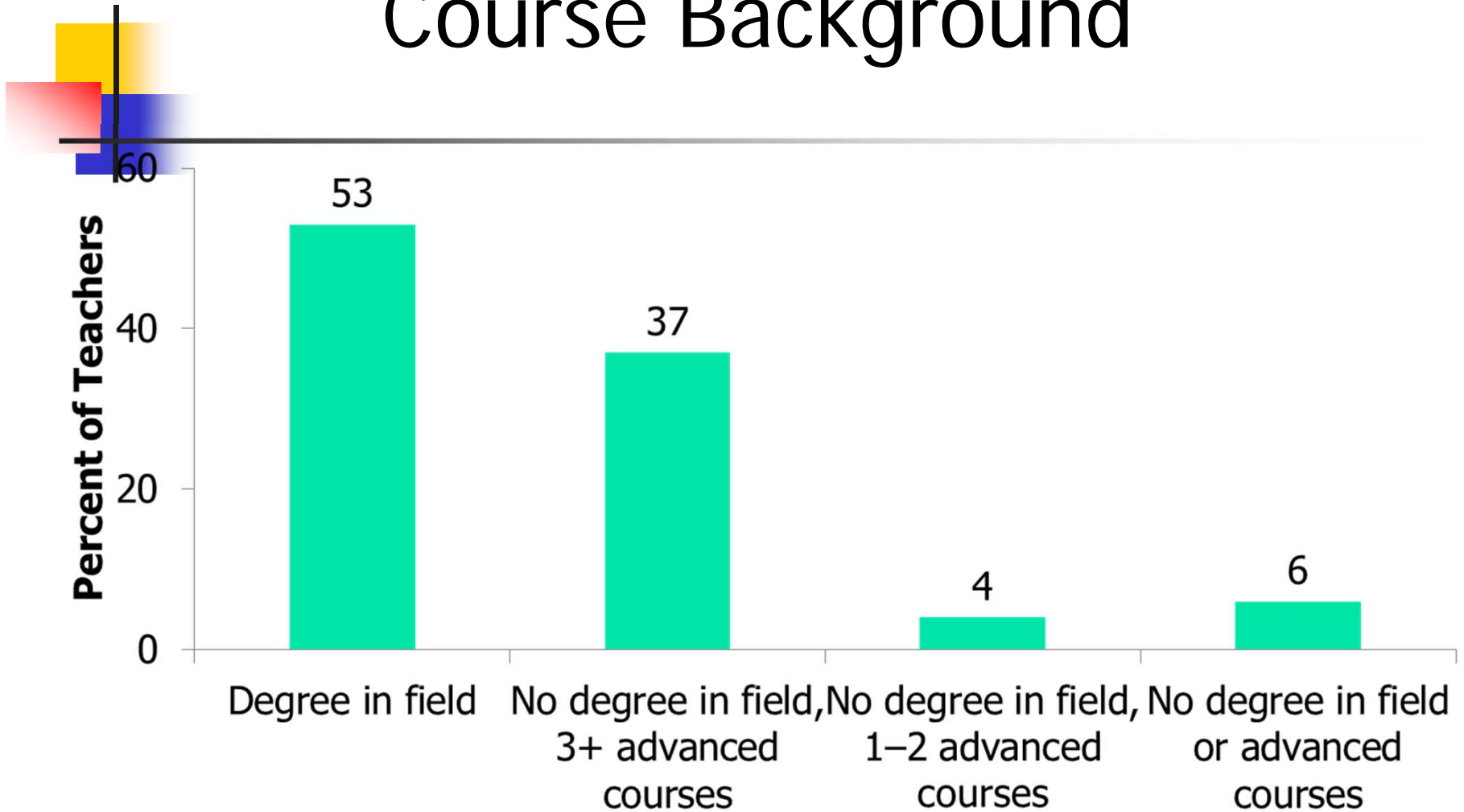
Two-stage sample that targeted:

- 2,000 schools (public and private)
- Over 10,000 teachers of science
- 472 high school physics teachers
- Purposefully oversampled teachers of advanced mathematics, chemistry, and physics to allow for disaggregated results for each group

# High School Science Teachers with Degree in Field or 3+ Courses Beyond Introductory

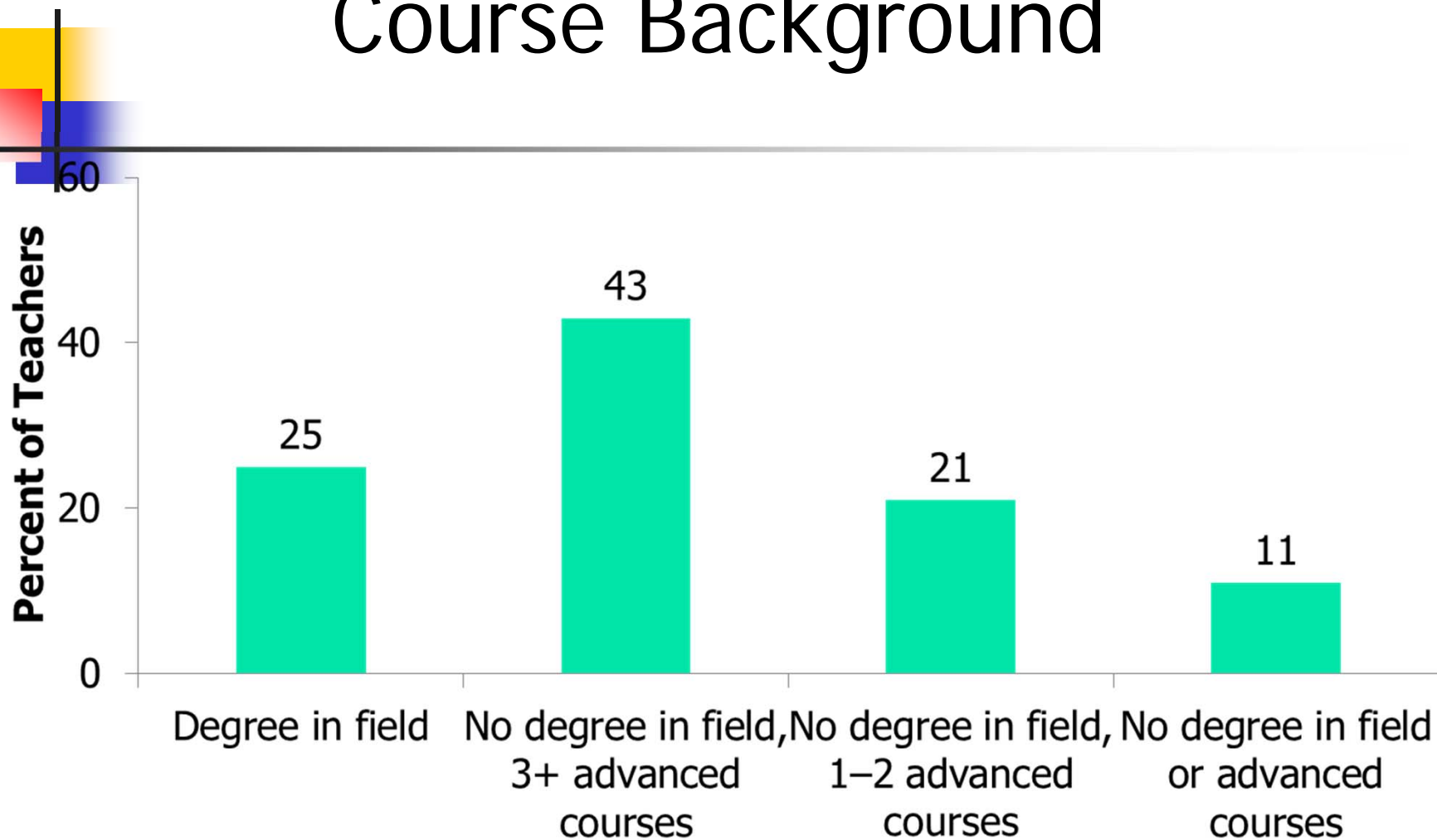


# High School Biology Teachers' Course Background

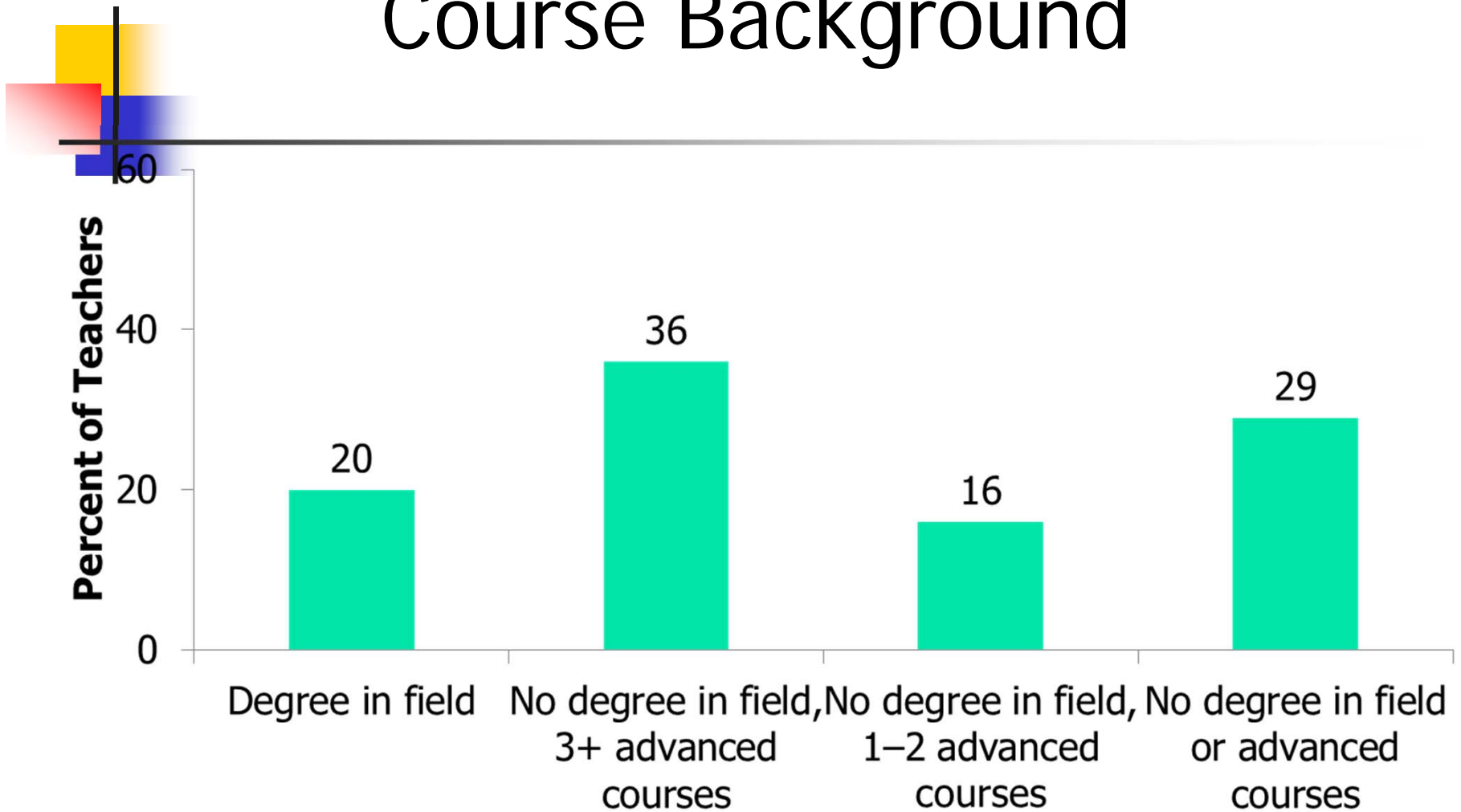




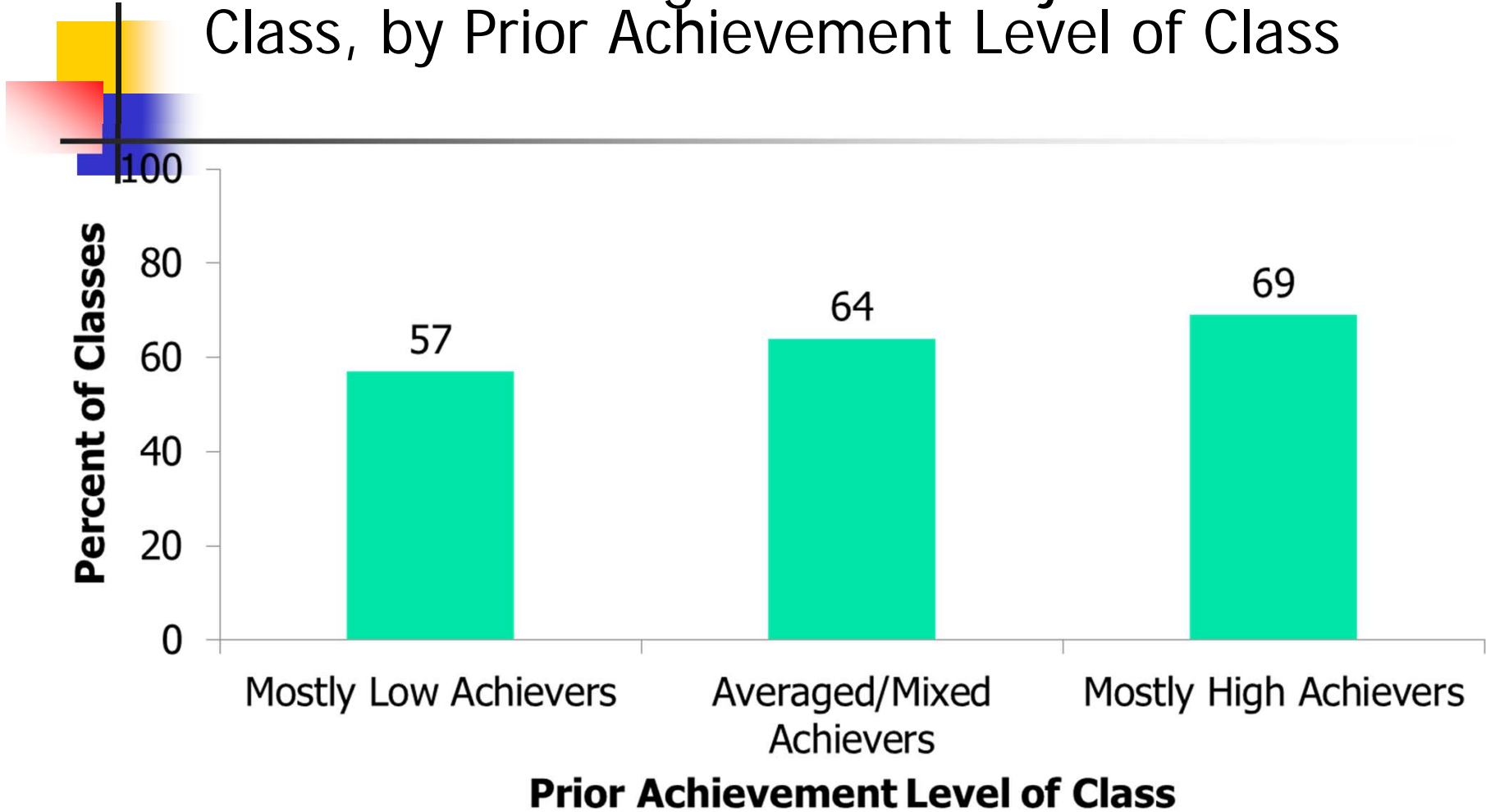
# High School Chemistry Teachers' Course Background



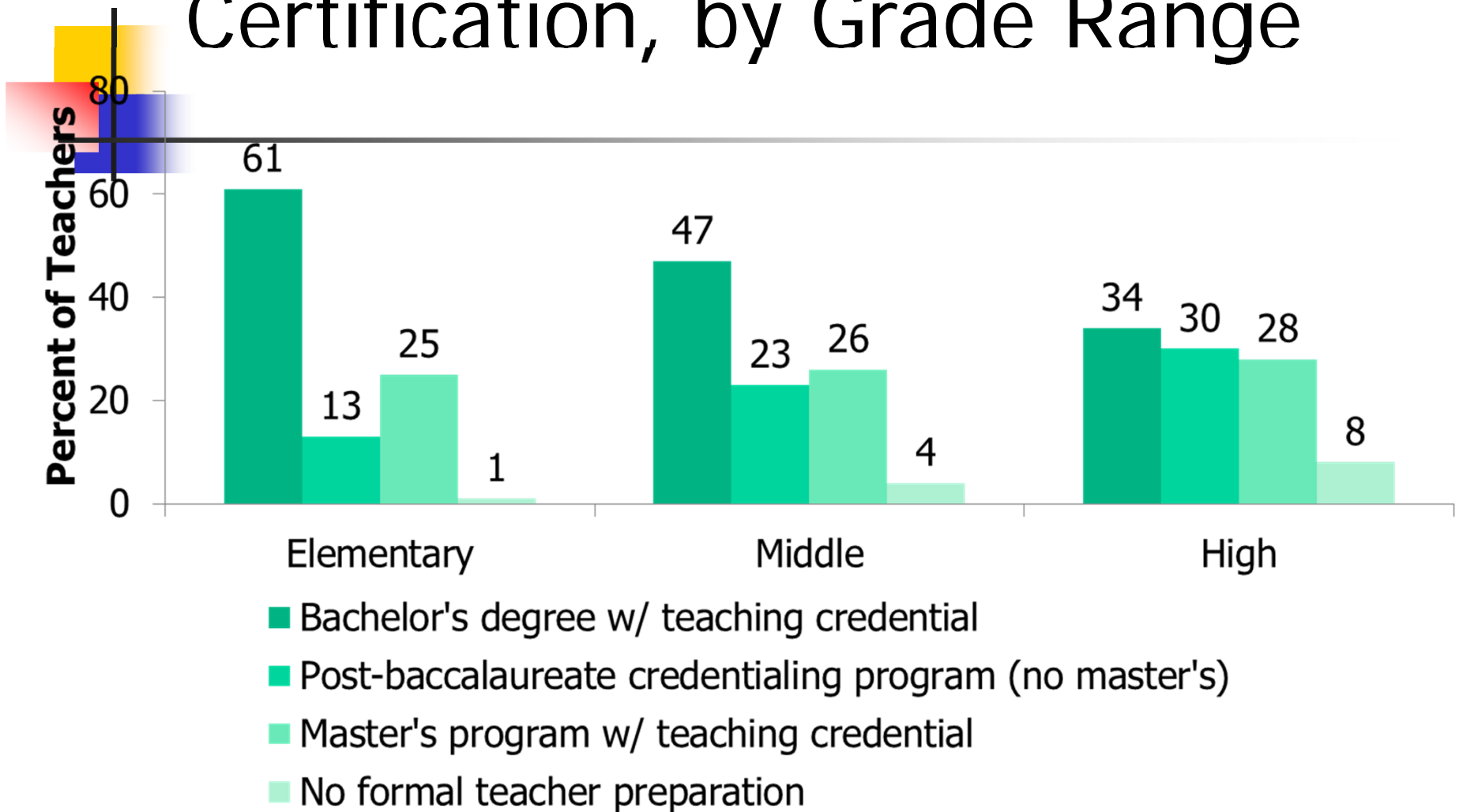
# High School Physics Teachers' Course Background



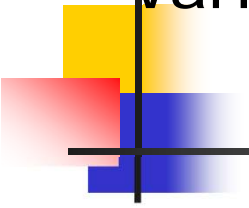
# Secondary Science Classes Taught by Teachers with Substantial Background in Subject of Selected Class, by Prior Achievement Level of Class



# Science Teachers' Path to Certification, by Grade Range



# High School Science Teachers Agreeing with Various Statements about Teaching and Learning



Provide definitions for new vocabulary at beginning of instruction on an idea

70

Students learn best with those of similar abilities

65

Hands-on should reinforce ideas already learned

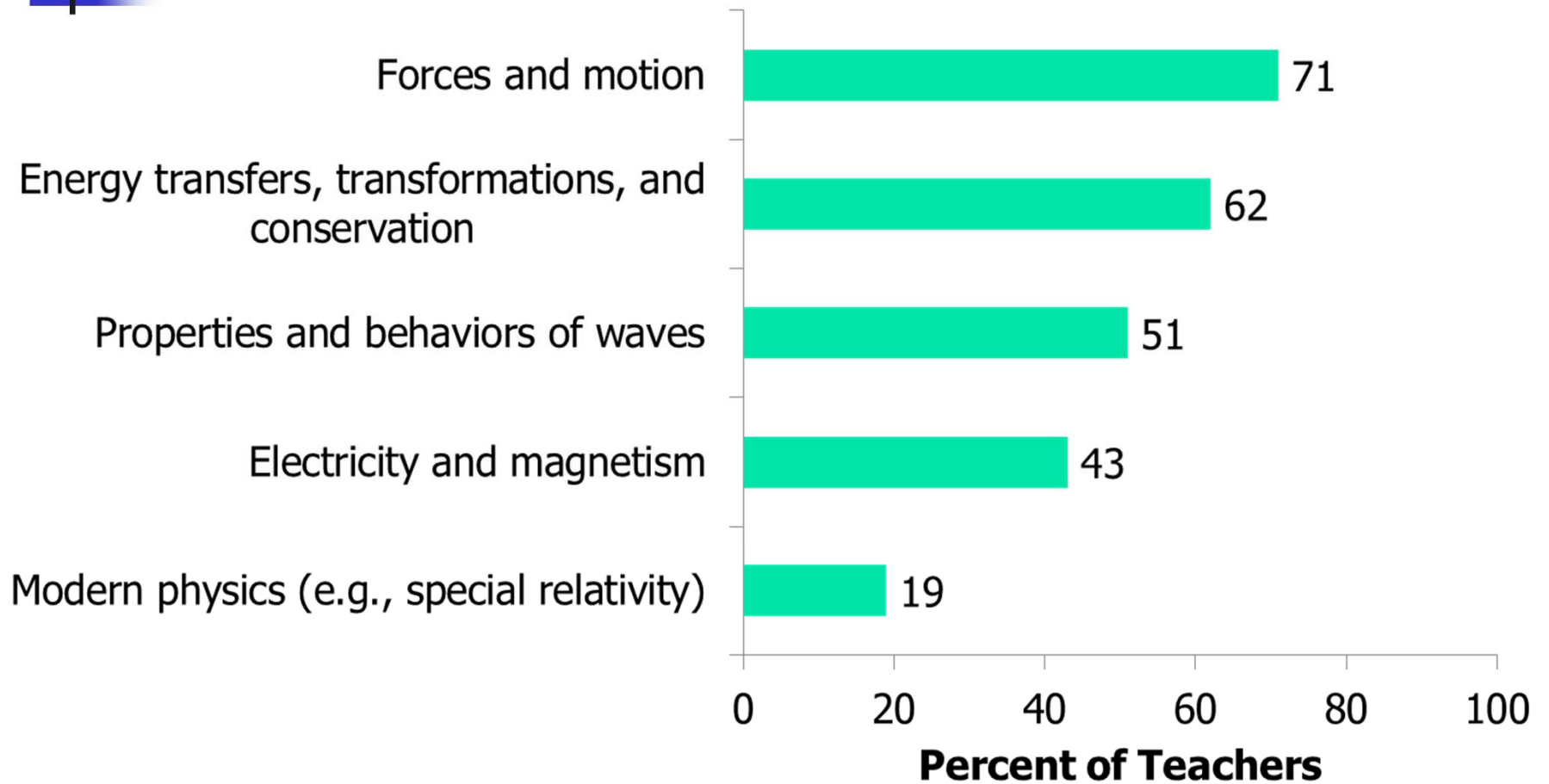
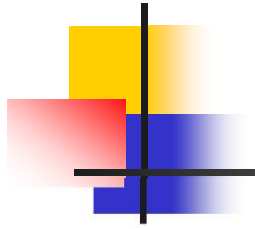
56

Teachers should explain ideas before having students consider evidence for them

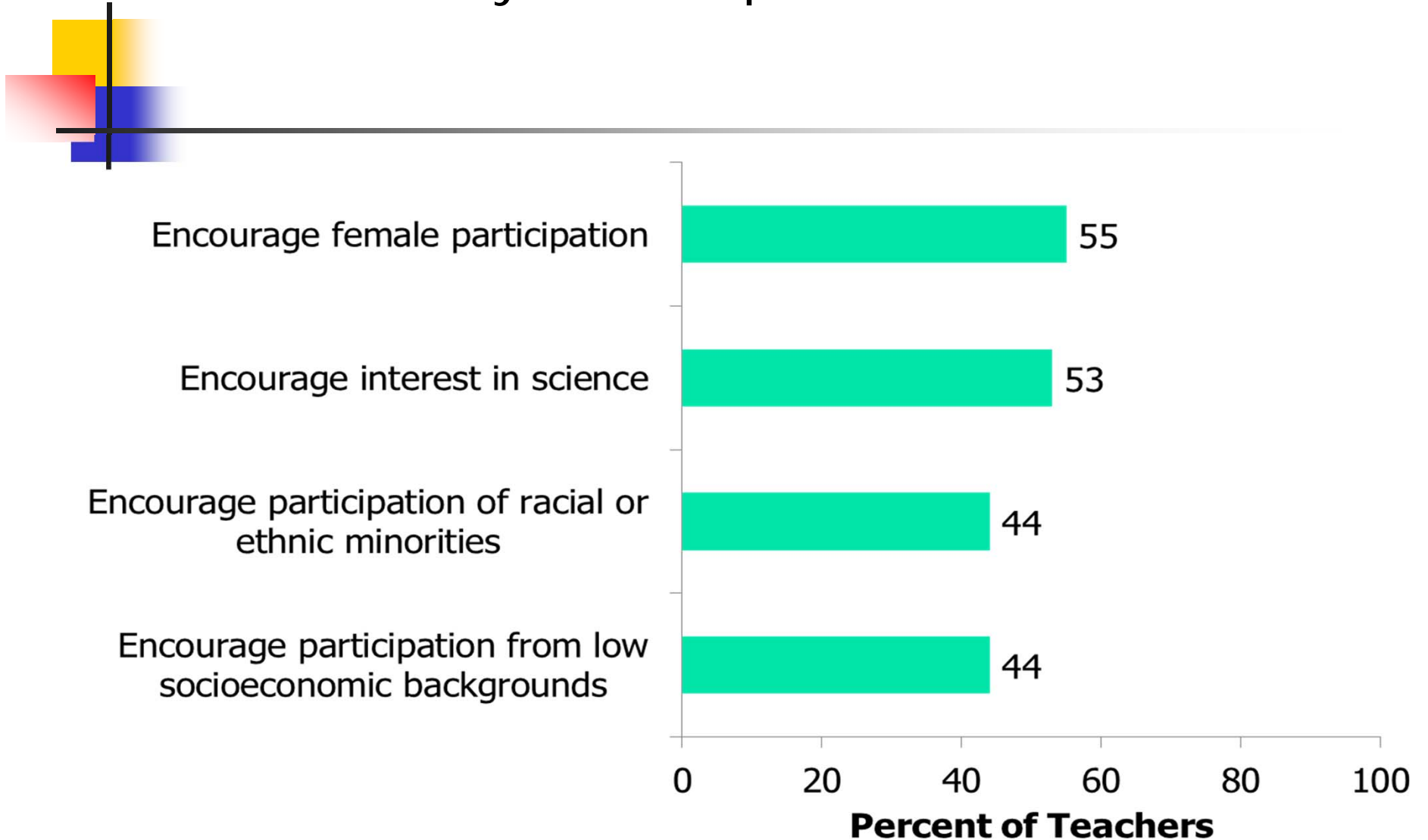
39

0 20 40 60 80 100  
**Percent of Teachers**

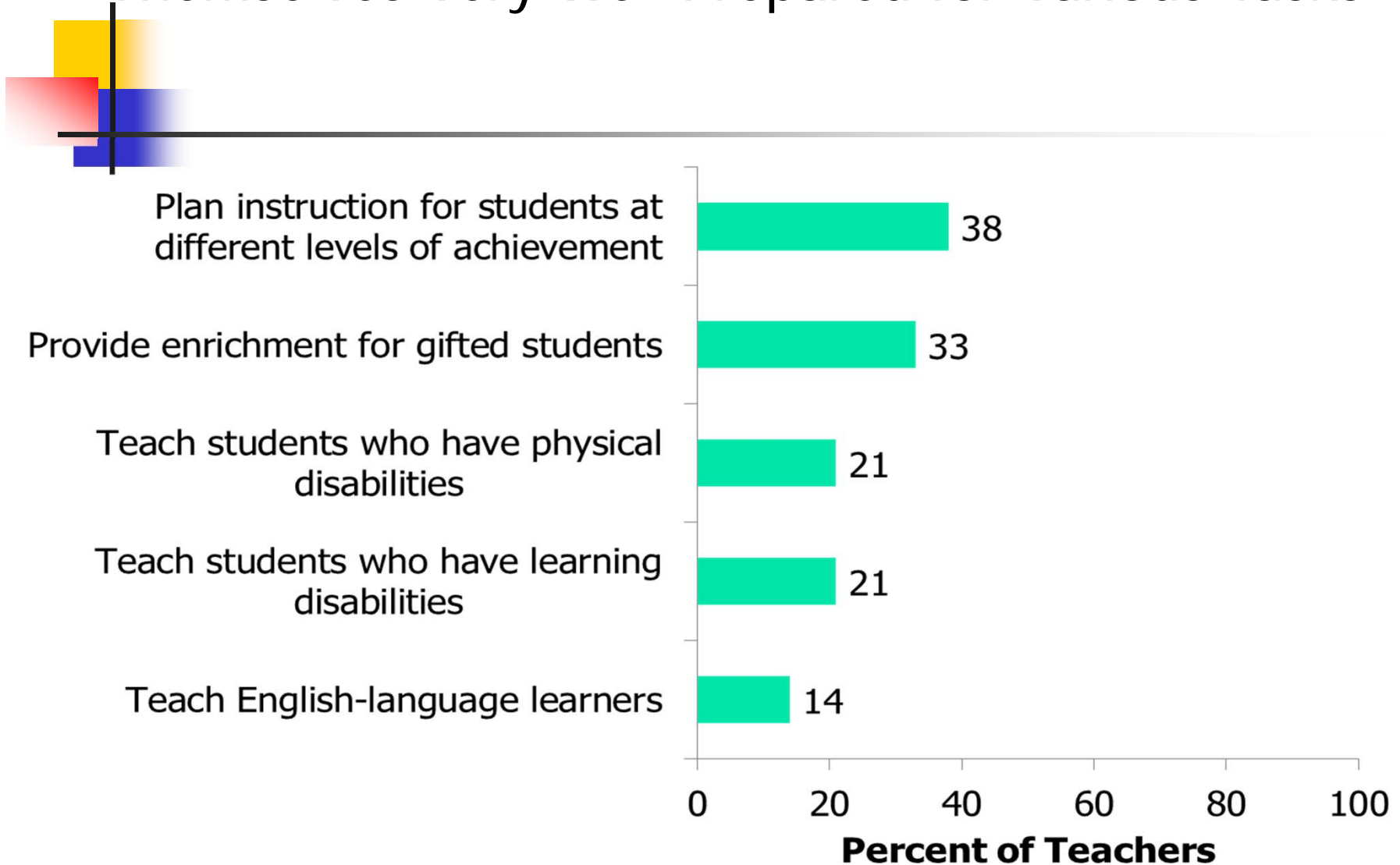
# High School Science Teachers Considering Themselves Very Well Prepared to Teach Physics Topics



# High School Science Teachers Considering Themselves Very Well Prepared for Various Tasks

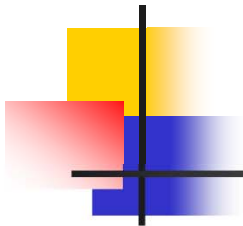


# High School Science Teachers Considering Themselves Very Well Prepared for Various Tasks

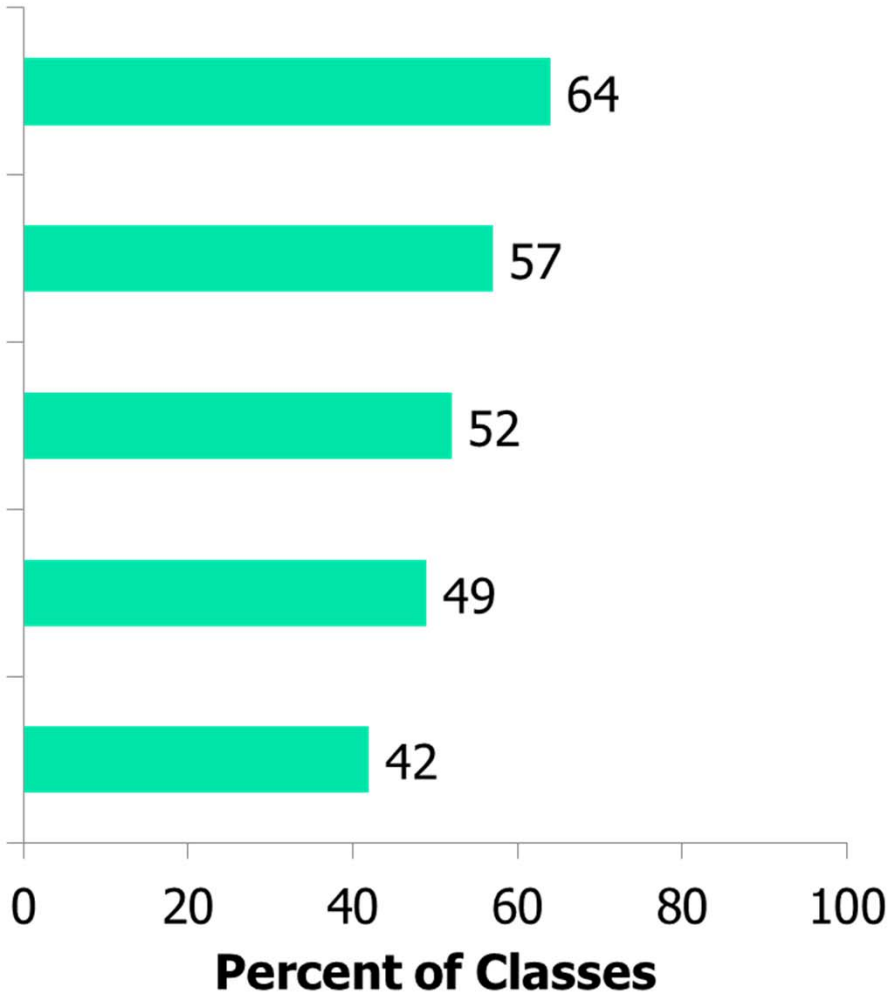




# High School Science Classes in Which Teachers Feel Very Well Prepared for Various Tasks in the Most Recent Unit



Assess student understanding at end of unit



Monitor student understanding

Implement science textbook/module

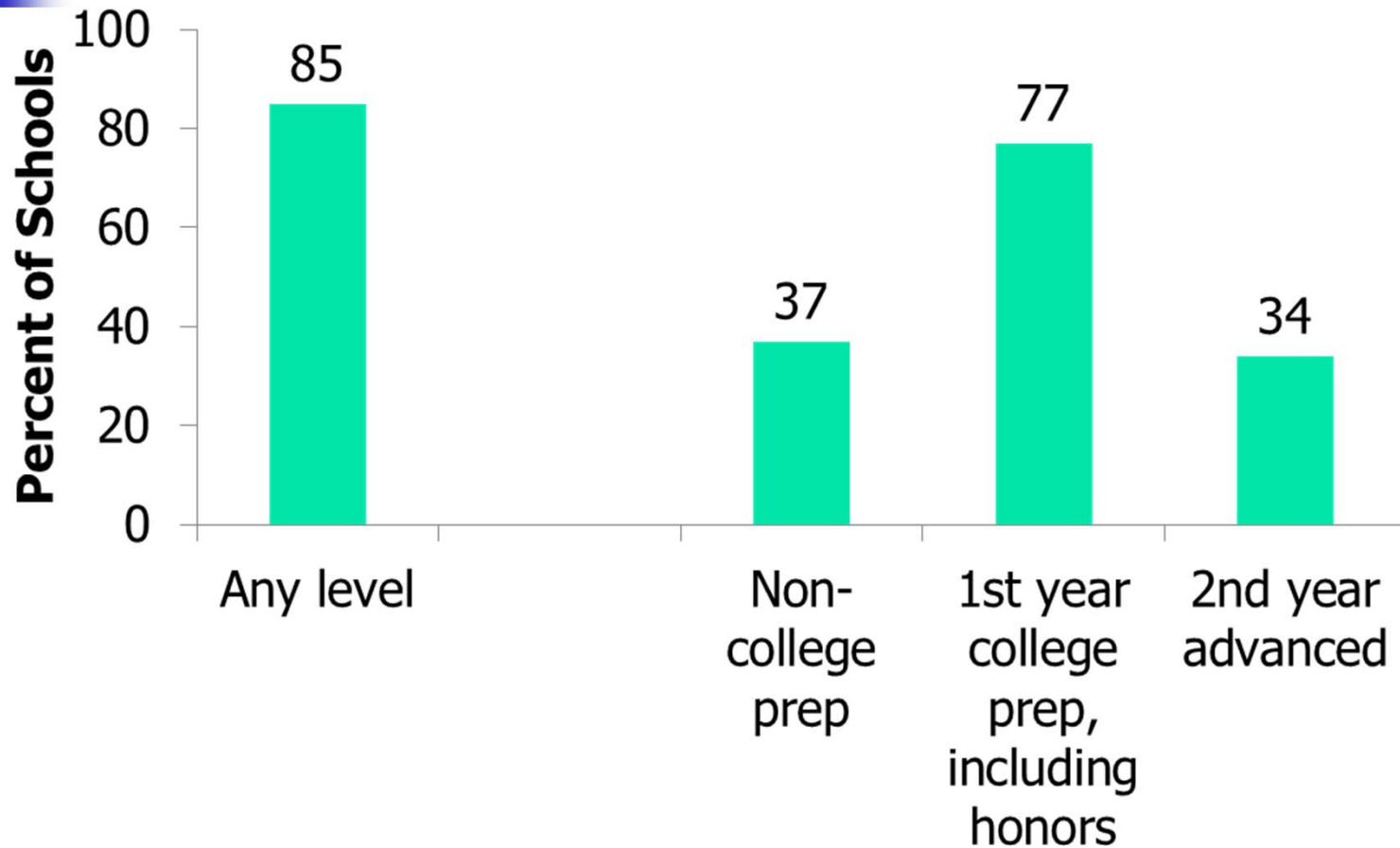
Anticipate student difficulties with science ideas/procedures

Discover student thinking about science ideas

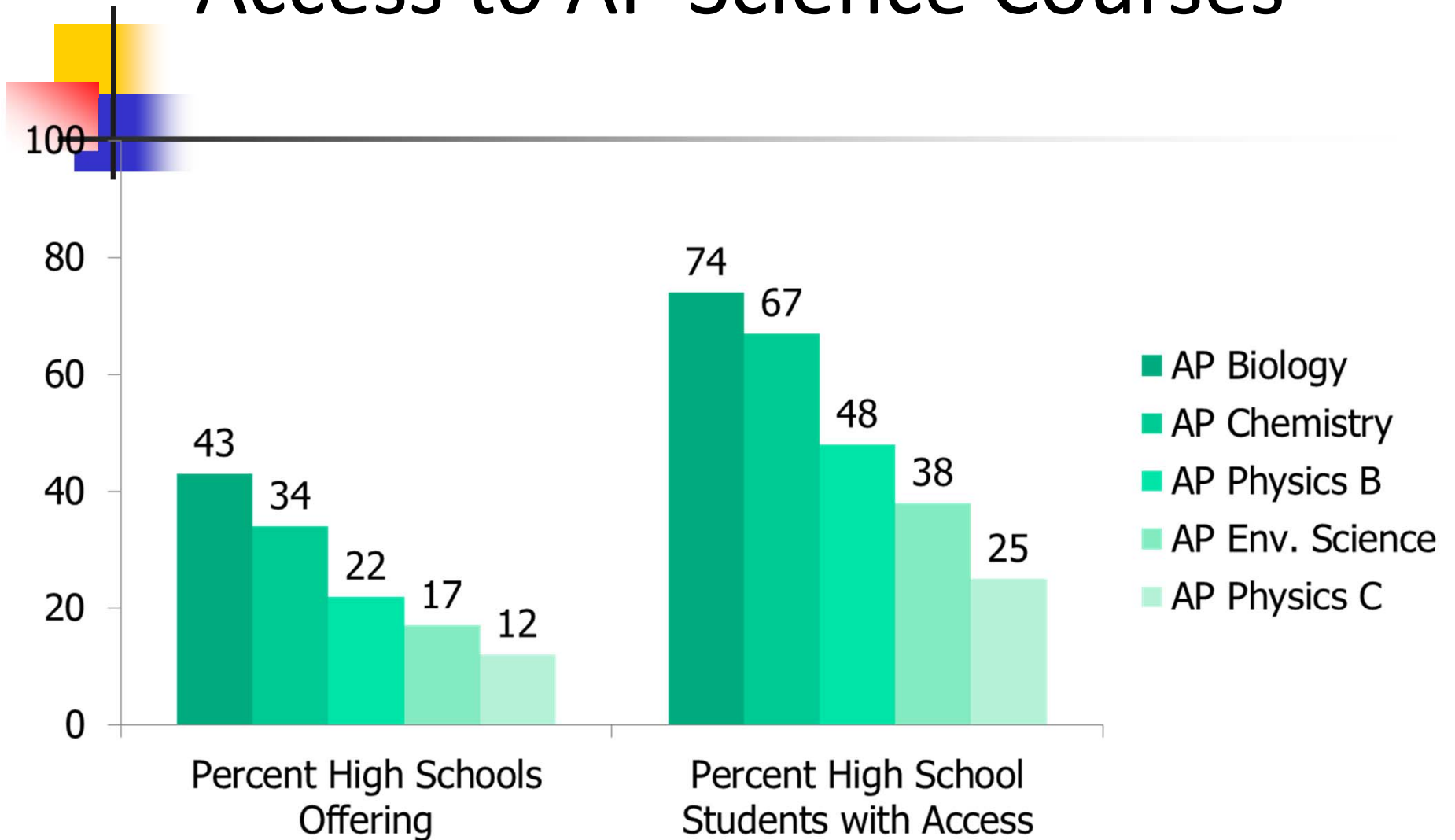
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**Percent of Classes**

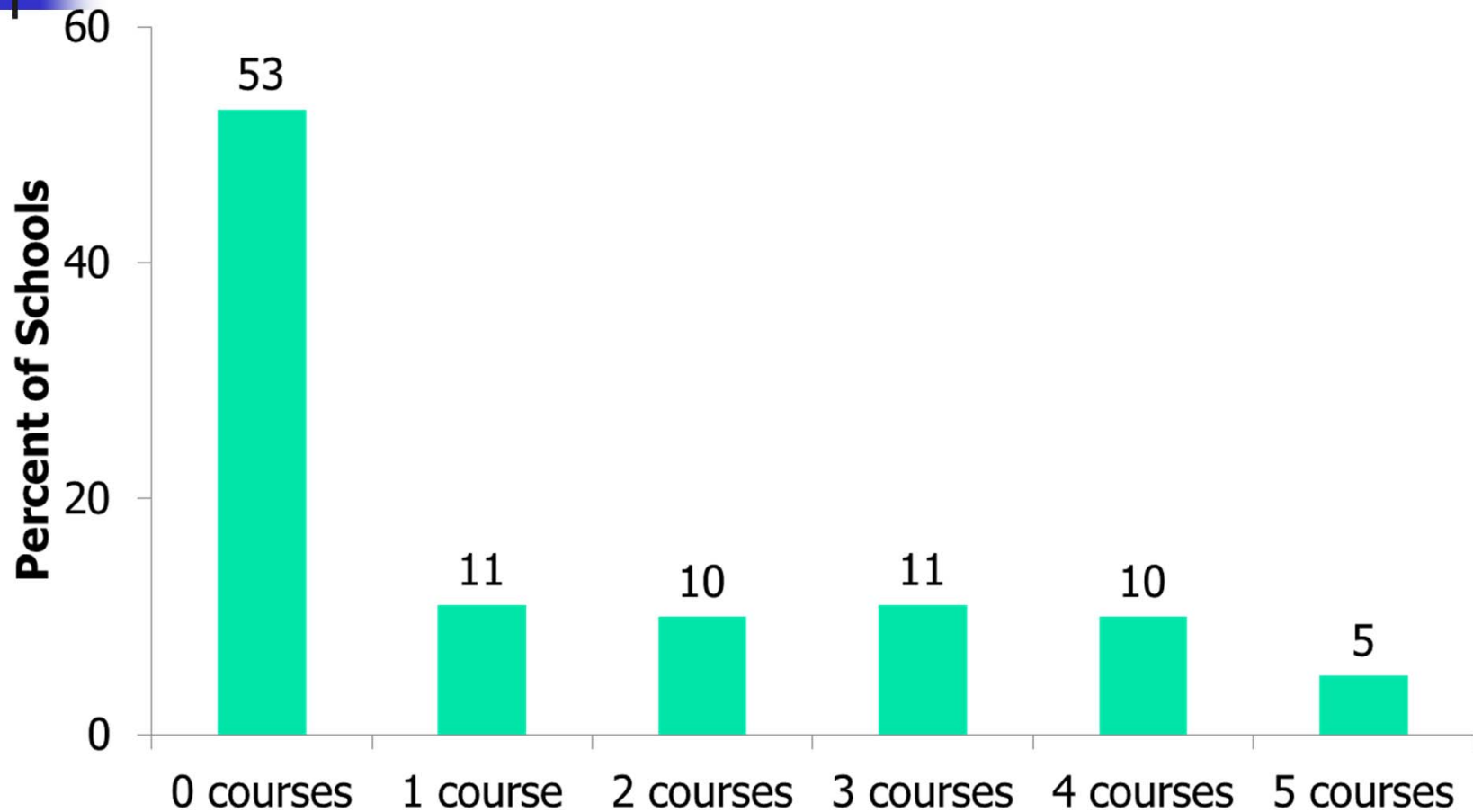
# High Schools Offering Various Physics Courses



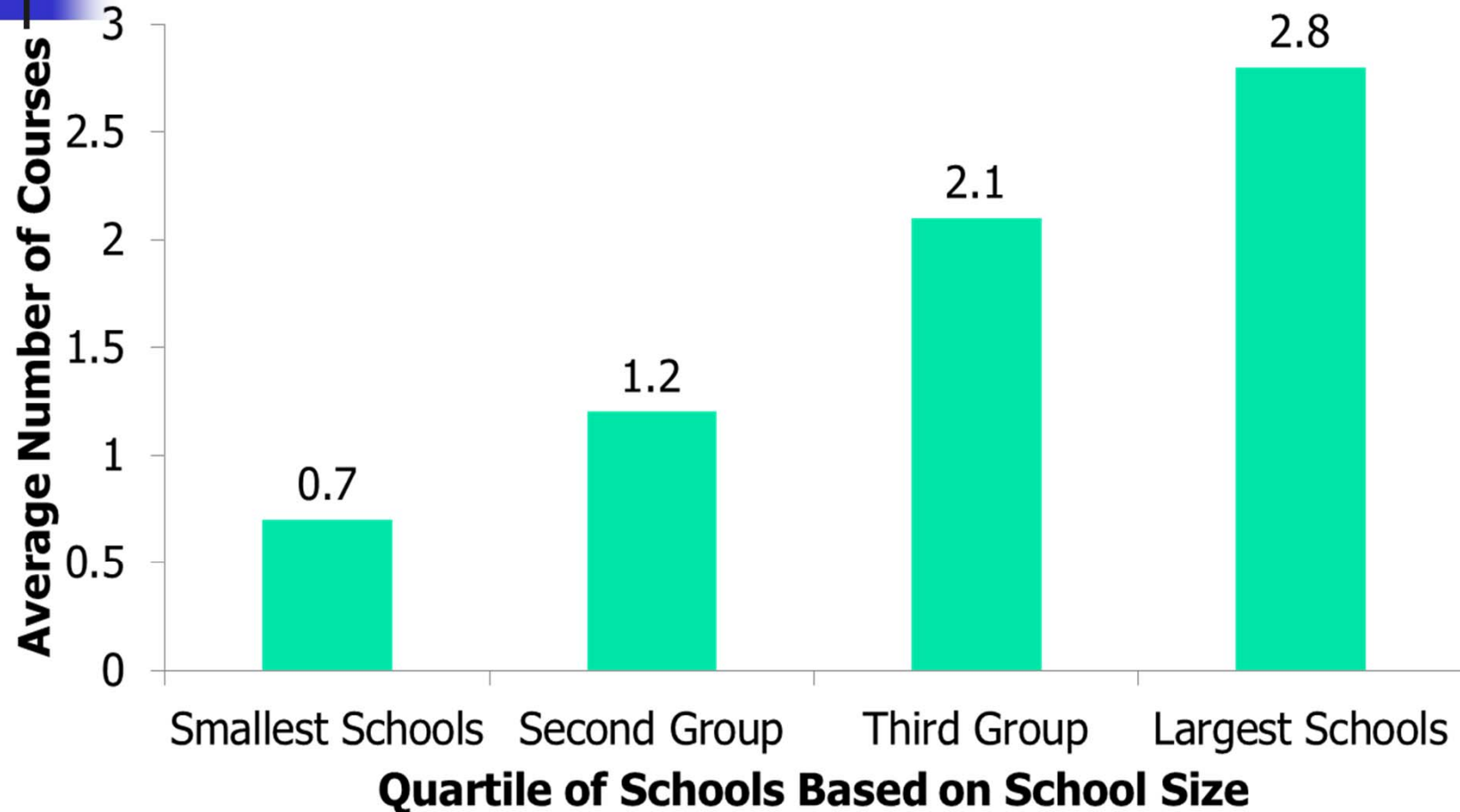
# Access to AP Science Courses



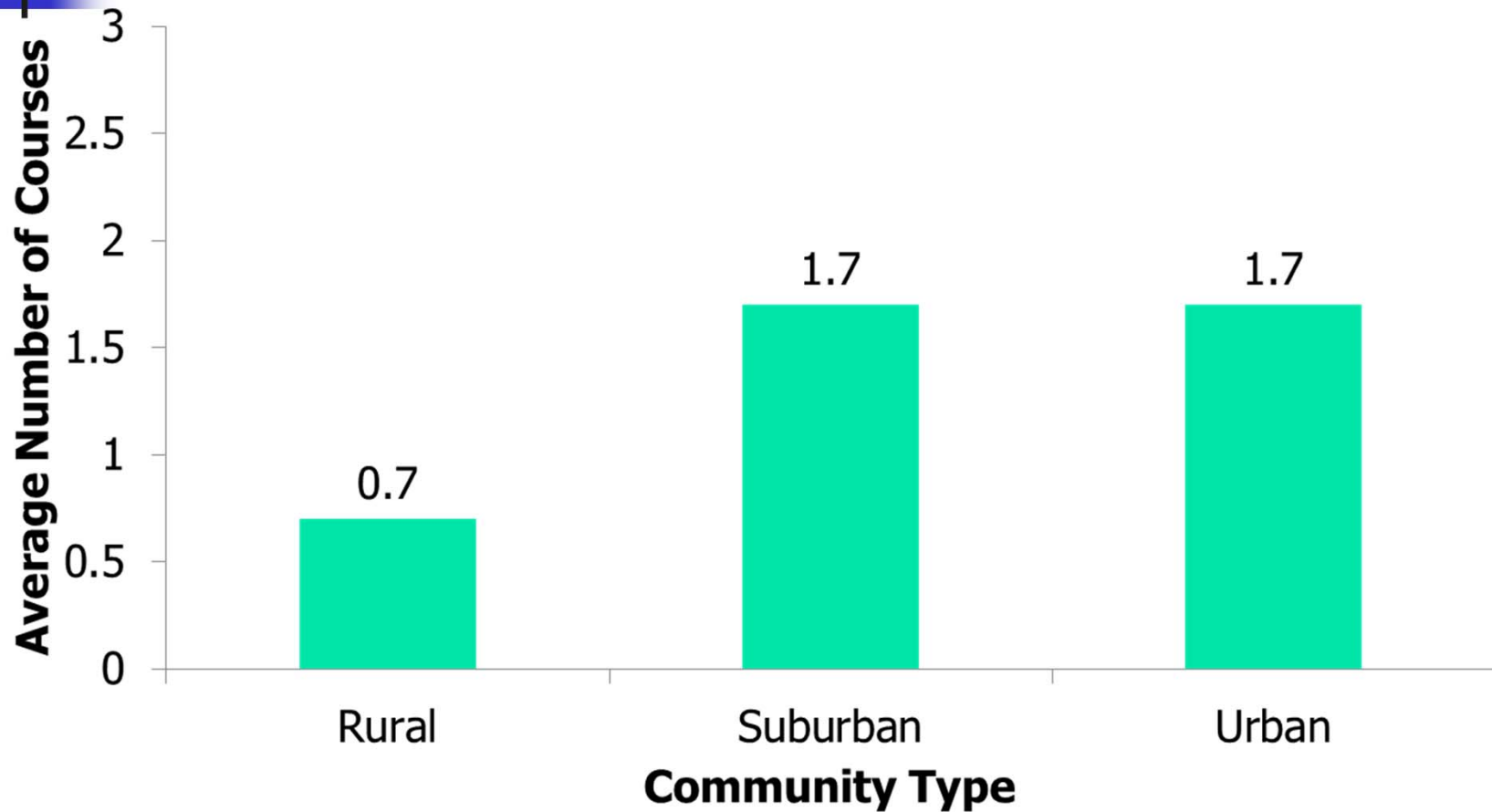
# Number of AP Science Courses Offered at High Schools



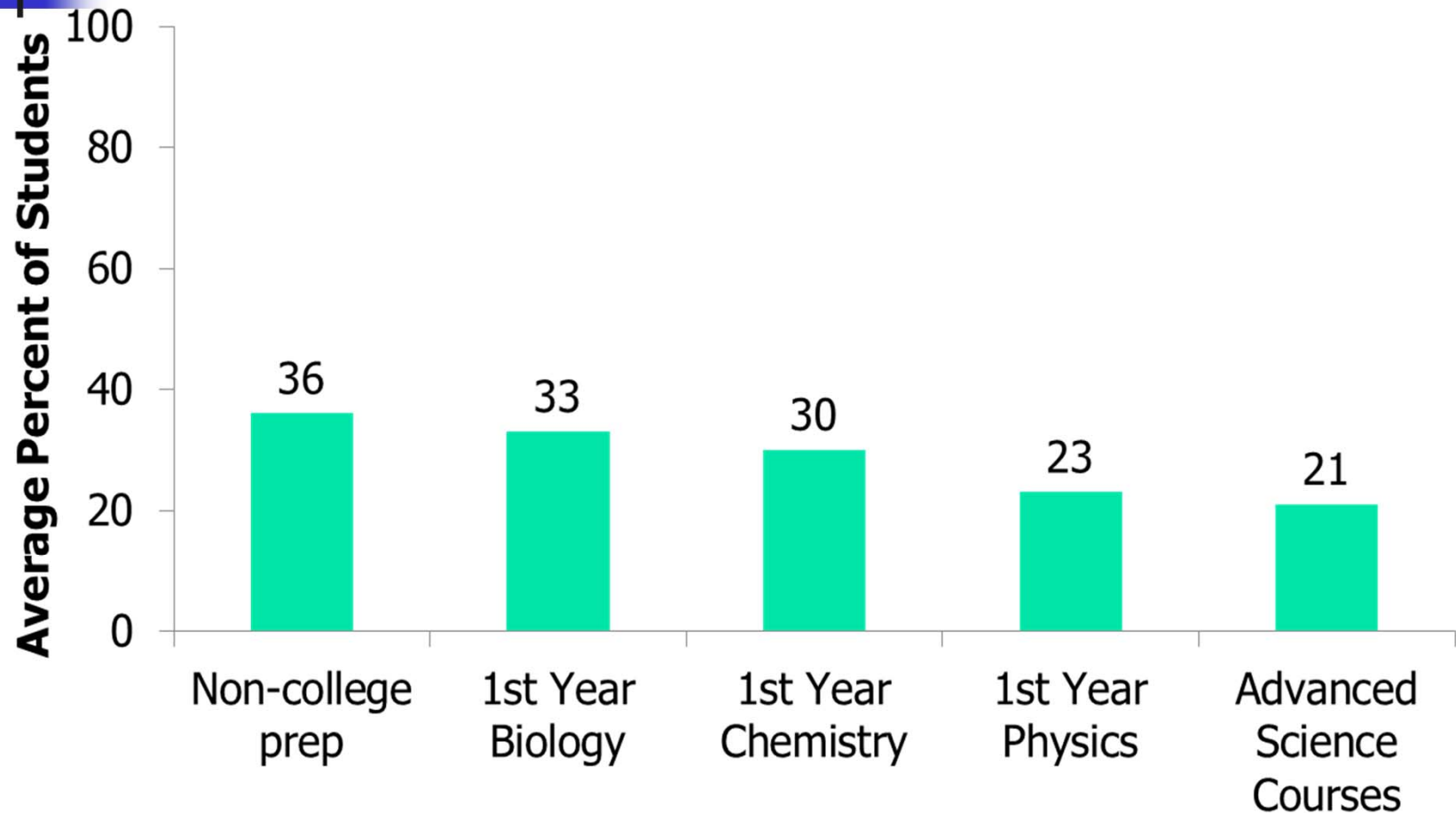
# Average Number of AP Science Courses Offered at High Schools, by School Size



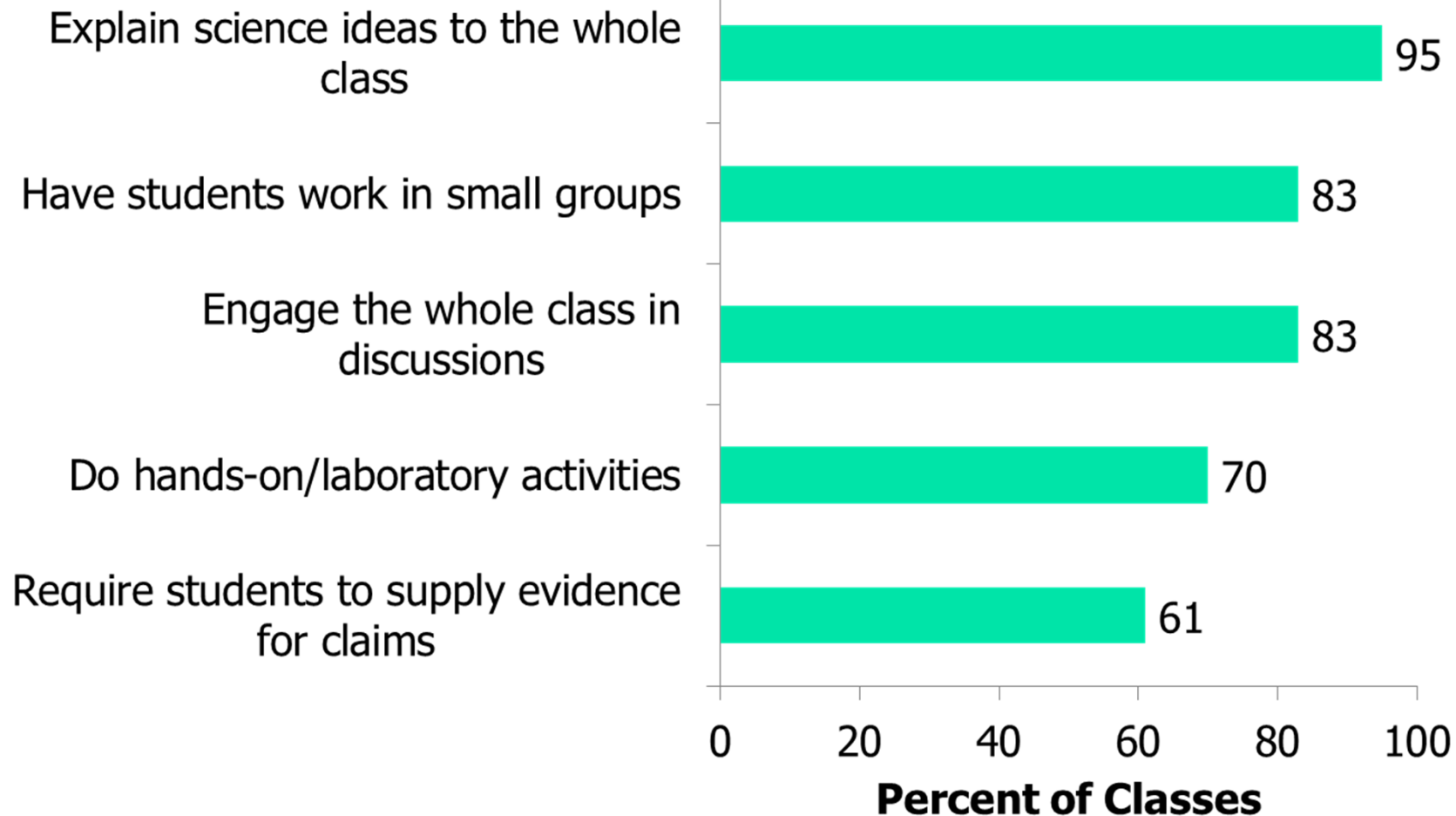
# Average Number of AP Science Courses Offered at High Schools, by Community Type



# Average Percentage of Historically Underrepresented Students in High School Science Courses, by Course Type

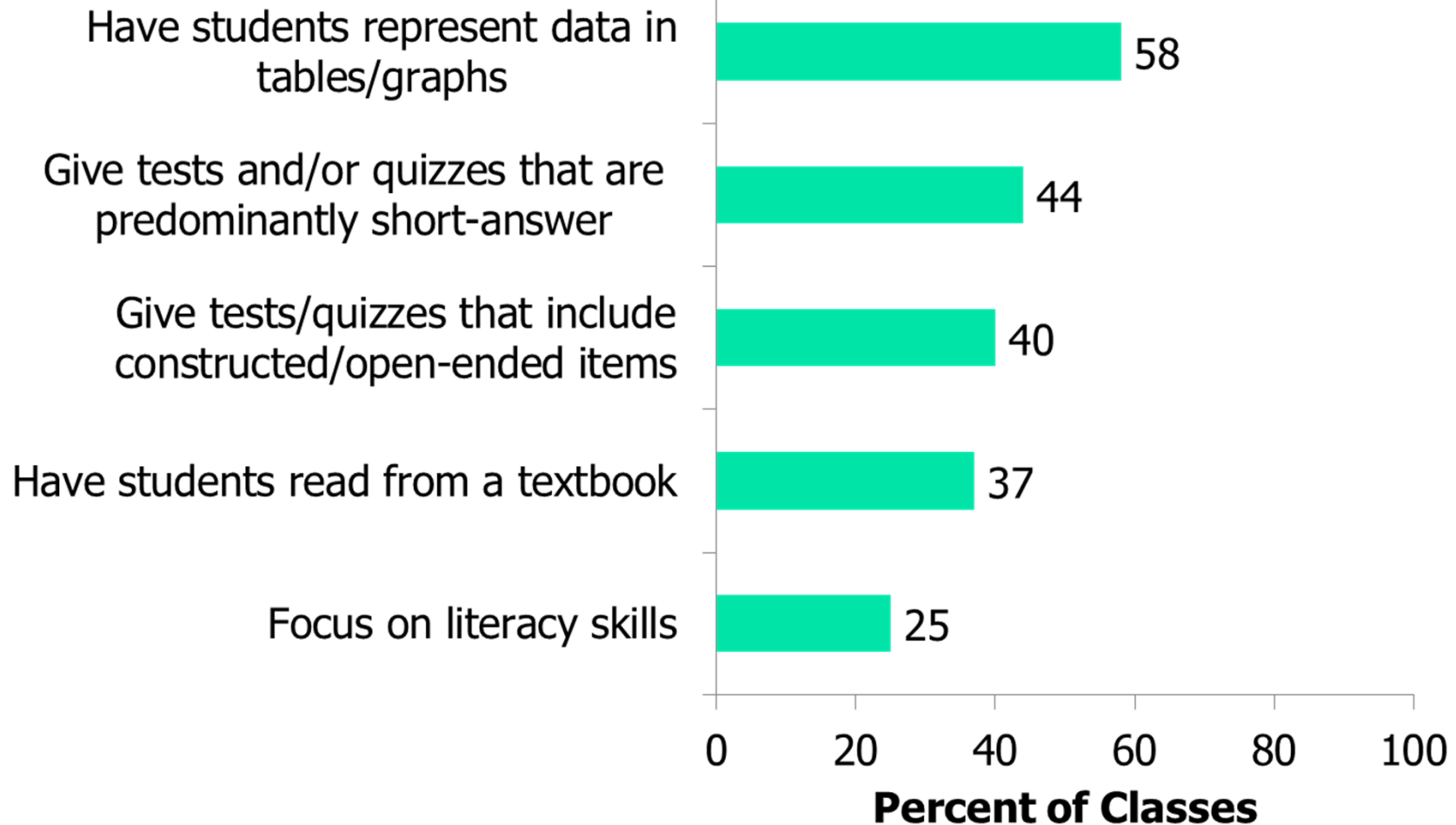


# High School Science Classes Using Various Activities at Least Once a Week





# High School Science Classes Using Various Activities at Least Once a Week



# High School Science Classes Using Various Activities at Least Once a Week

Have students write their reflections

21

Have students practice for standardized tests

20

Engage the class in project-based learning activities

18

Have students make formal presentations to the rest of the class

9

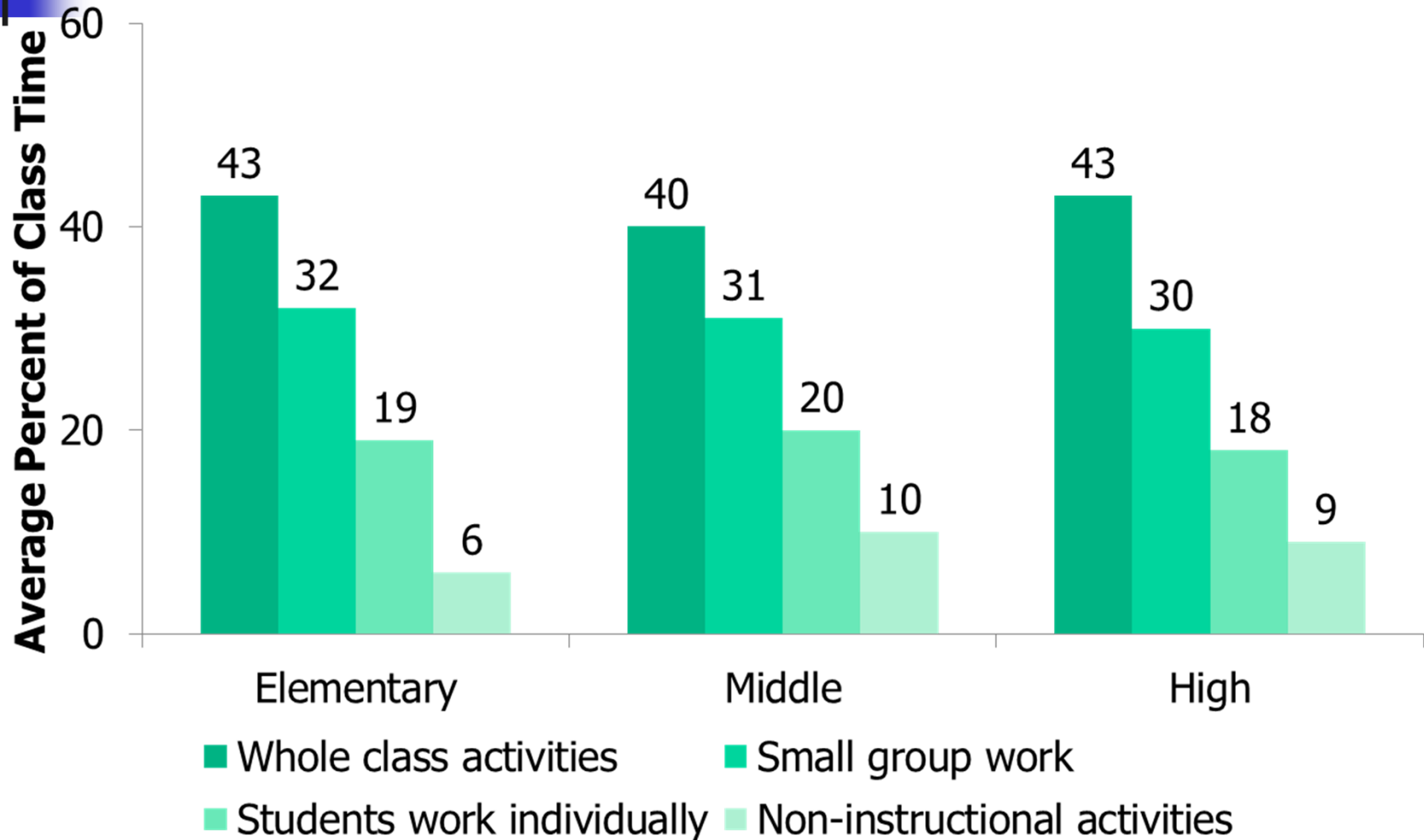
Have students attend presentations by guest speakers

2

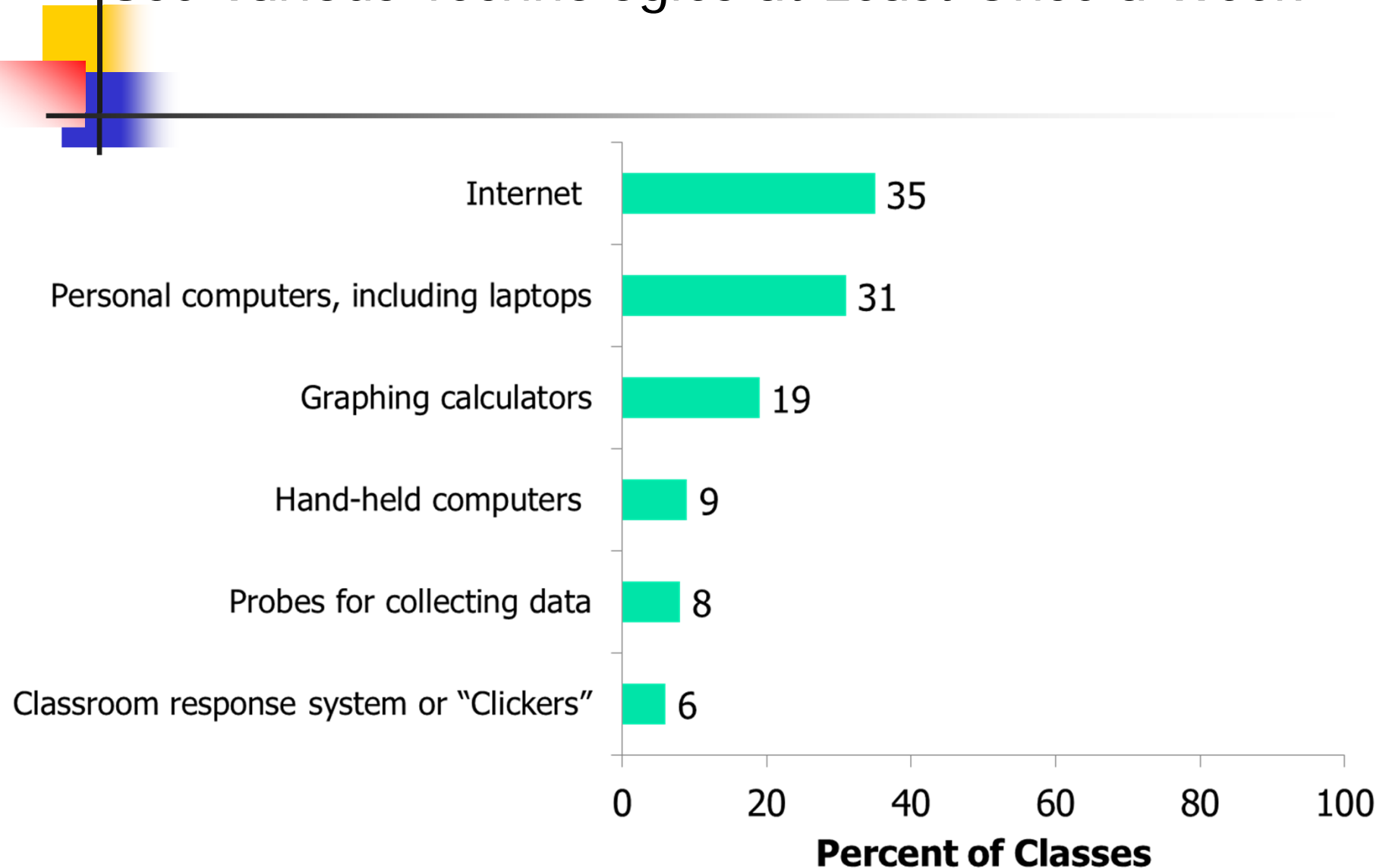
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**Percent of Classes**

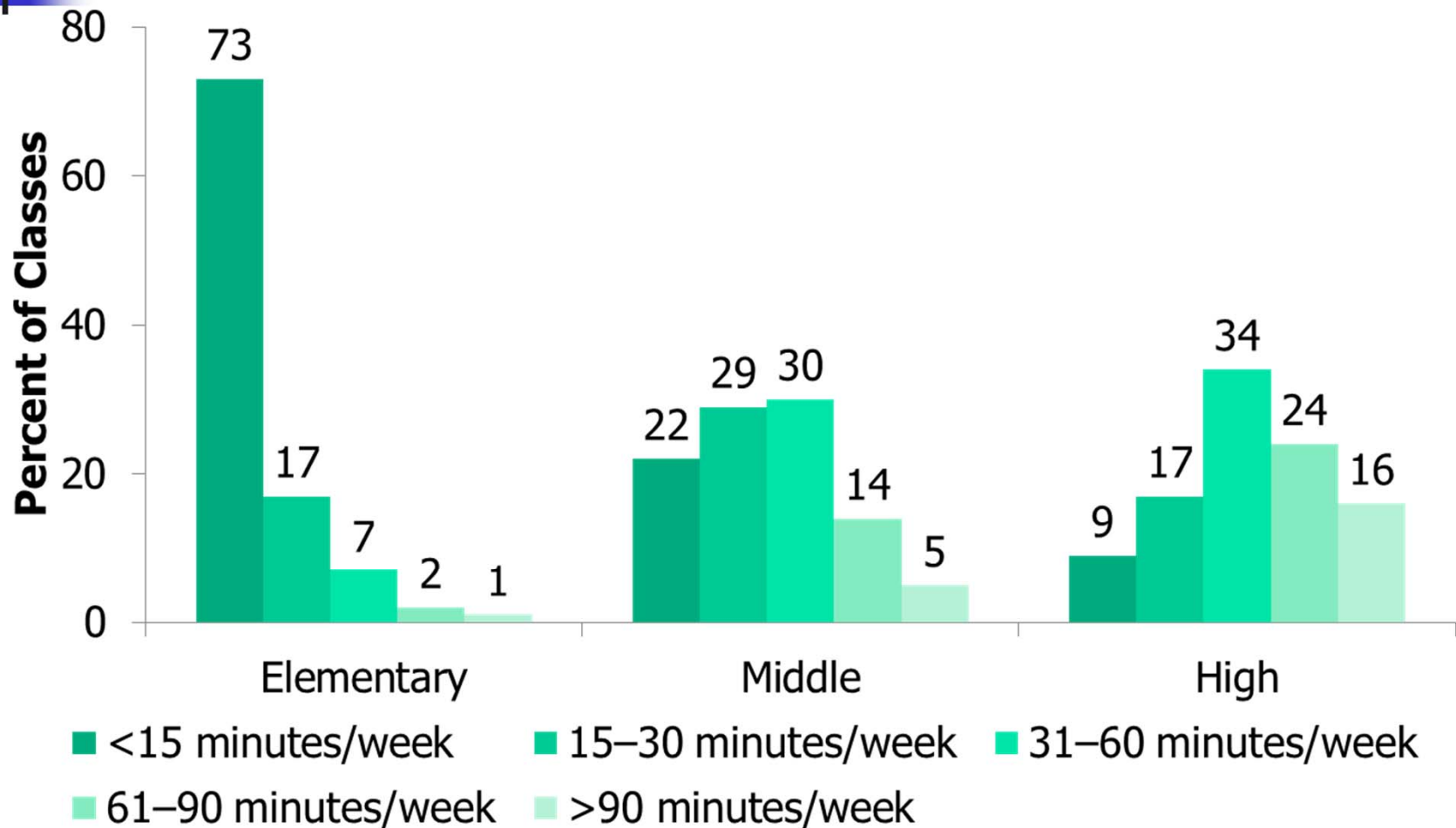
# Percentage of Time Spent on Different Activities in the Most Recent Science Lesson, by Grade Range



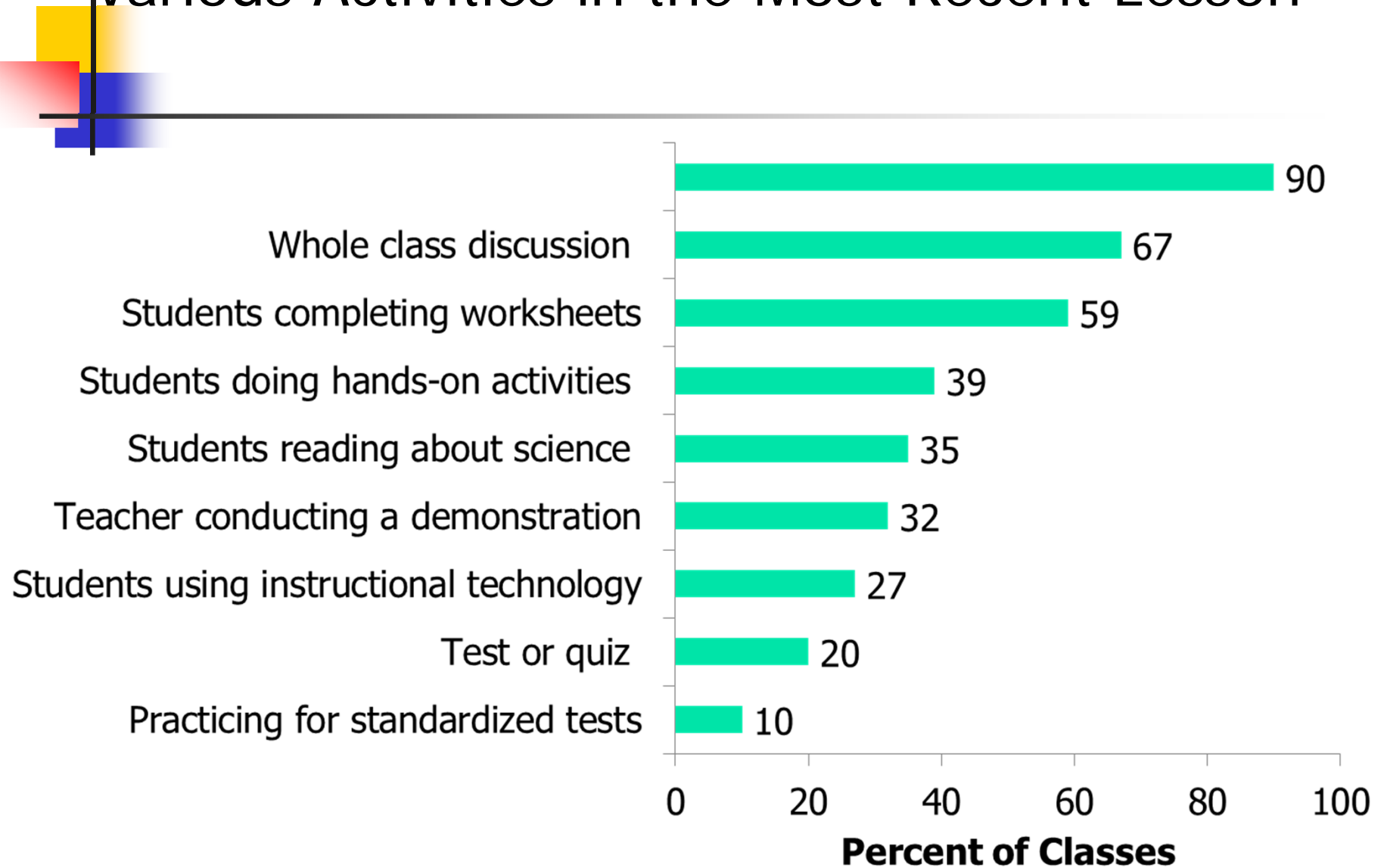
# High School Science Classes in Which Students Use Various Technologies at Least Once a Week



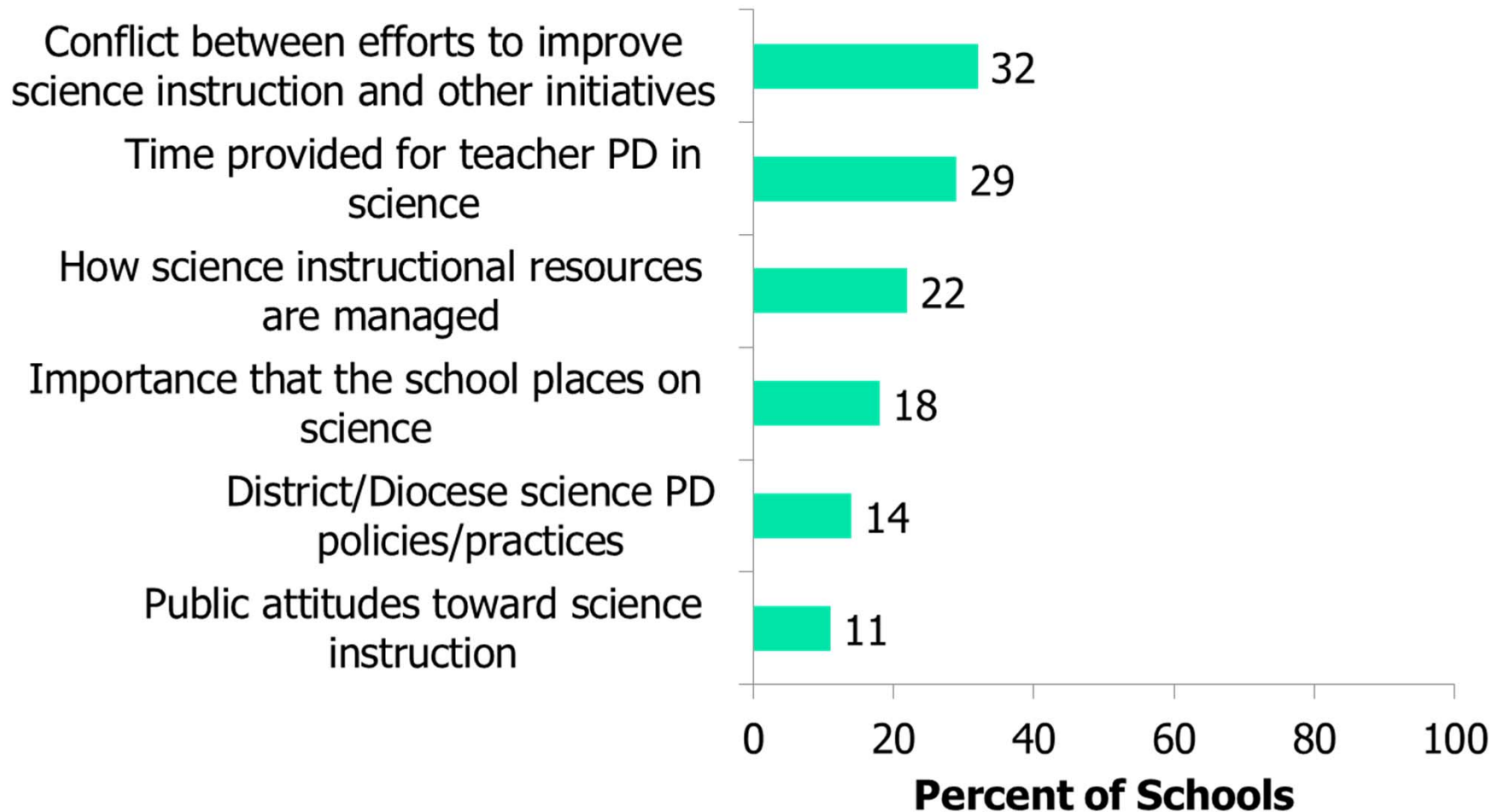
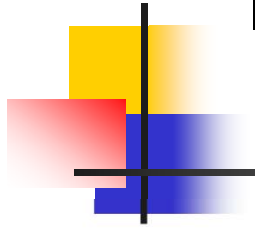
# Amount of Homework Assigned in Science Classes per Week, by Grade Range



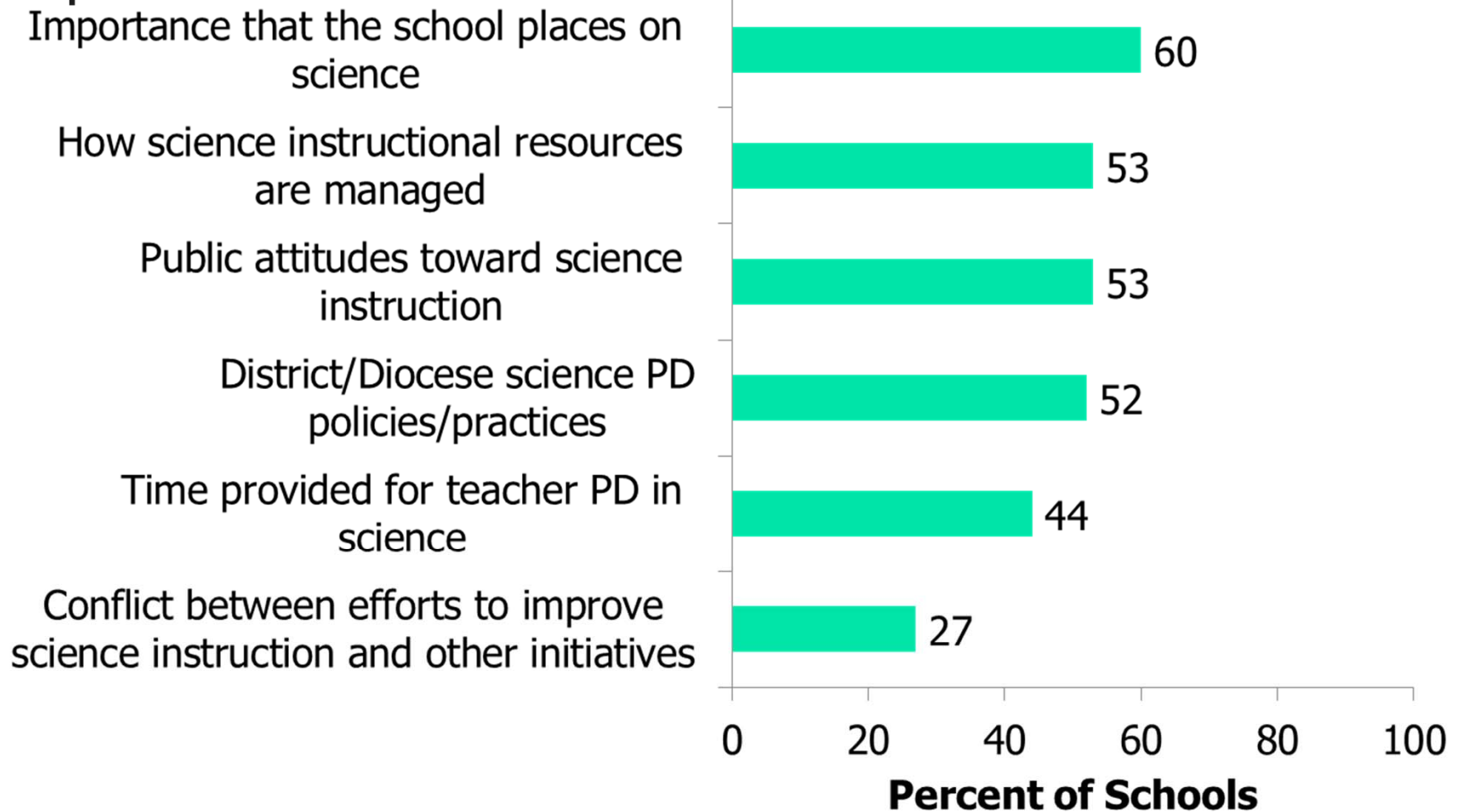
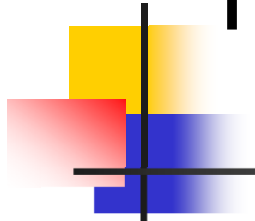
# High School Science Classes Participating in Various Activities in the Most Recent Lesson



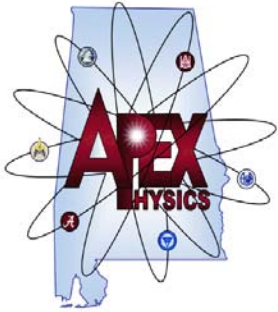
# Schools Viewing Various Factors as Inhibiting Science Instruction



# Schools Viewing Various Factors as Promoting Science Instruction







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