NSSME | THE NATIONAL SURVEY OF SCIENCE & MATHEMATICS EDUCATION

The Status of Elementary Science Instruction

MAY 6, 2020

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horizon RESEARCH, INC.

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.**
- **Reports are available at:**

  horizon-research.com/NSSME/2018-nssme

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.

NGSS and the NSSME

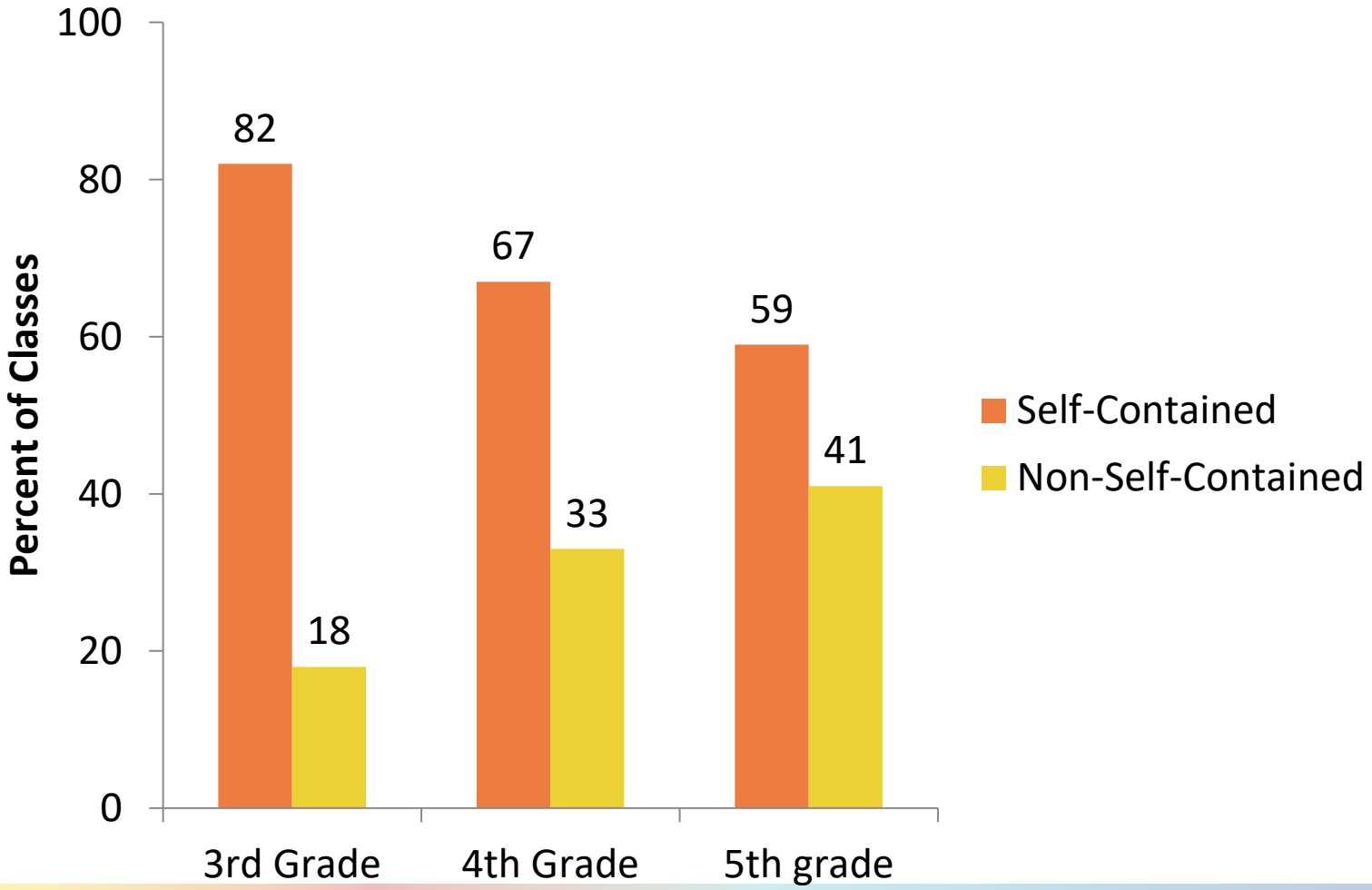
Who's In the Sample

- **1,273 schools participated**
- **~7,600 K-12 teachers**
- **~900 elementary teachers of science**

Terms

- **Self-contained classroom: a classroom in which one teacher teaches all core subjects to one group of students**
- **Elementary teacher: someone who teaches in grades K-5, plus those who teach in self-contained 6th grade classrooms.**
- **Primary grades: K-2**
- **Intermediate grades: 3-5, plus 6th grade self-contained**

Science Class Structure: Grades 3-5

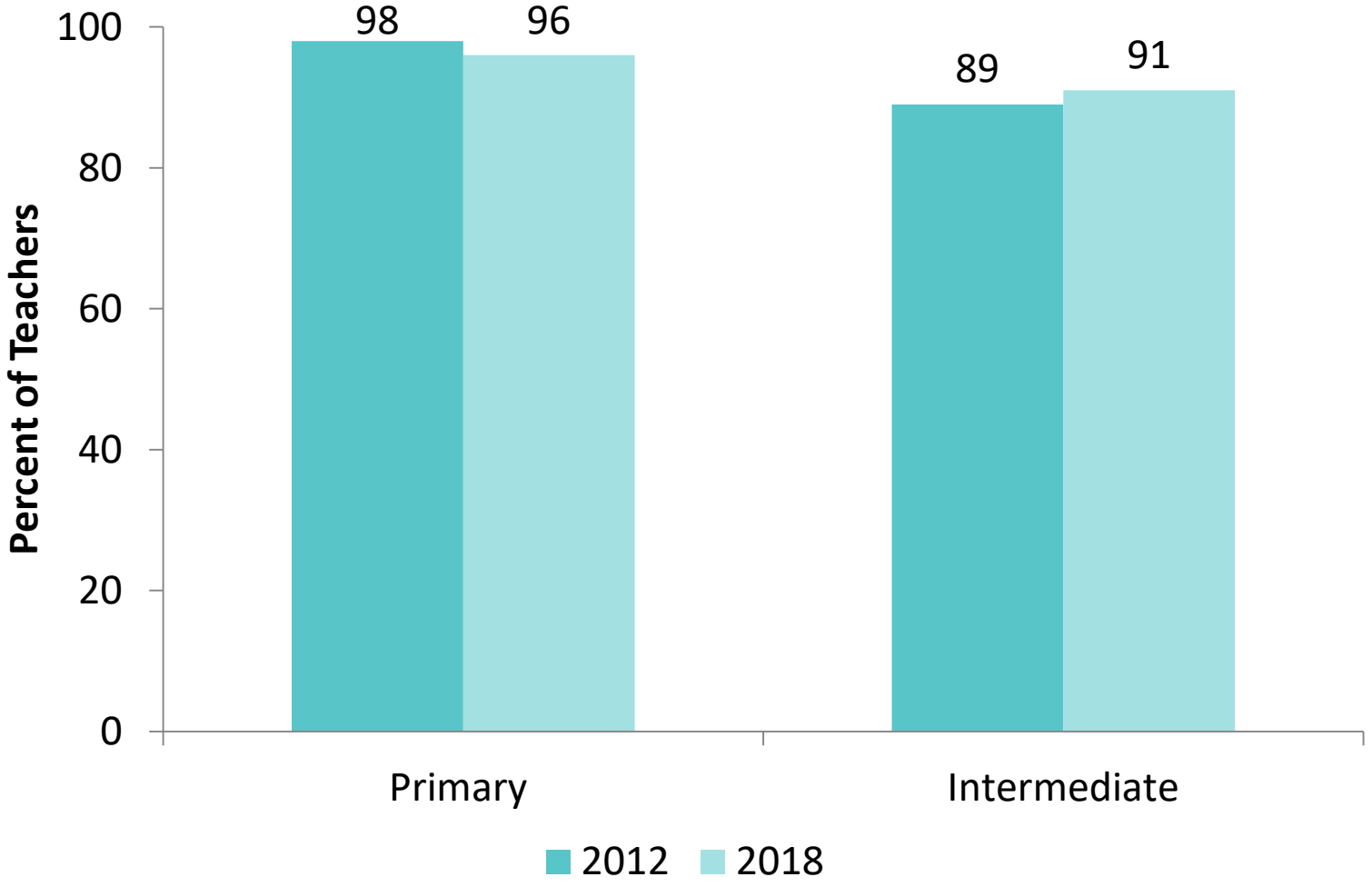


Organization of This Talk

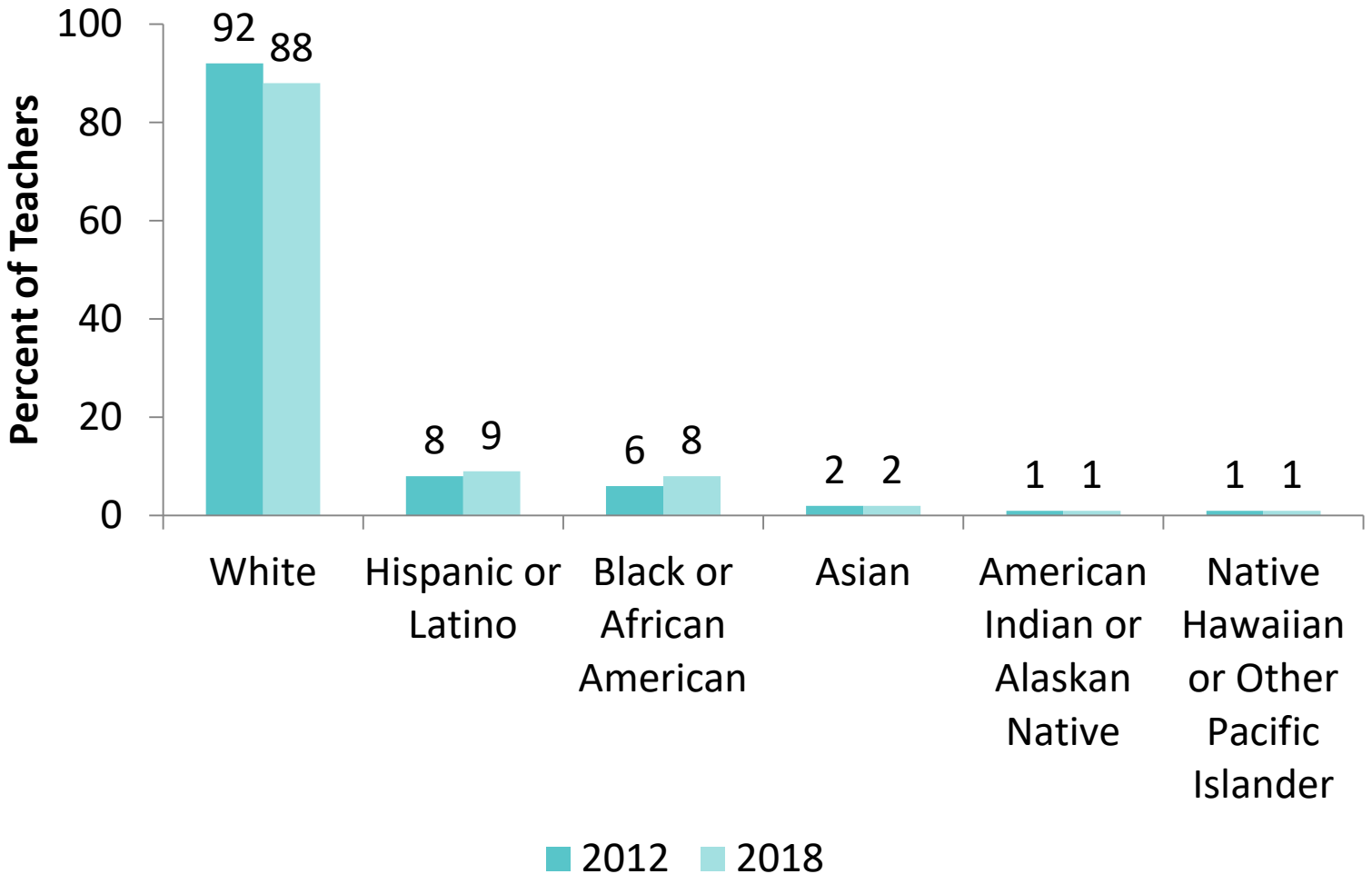
- **Snapshot of elementary teaching force**
- **Science instruction in elementary classrooms**
- **Factors that shape instruction**
  - Teacher background and beliefs
  - Teacher professional learning
  - Instructional resources
  - School and policy context

Elementary Teachers

Female Teachers

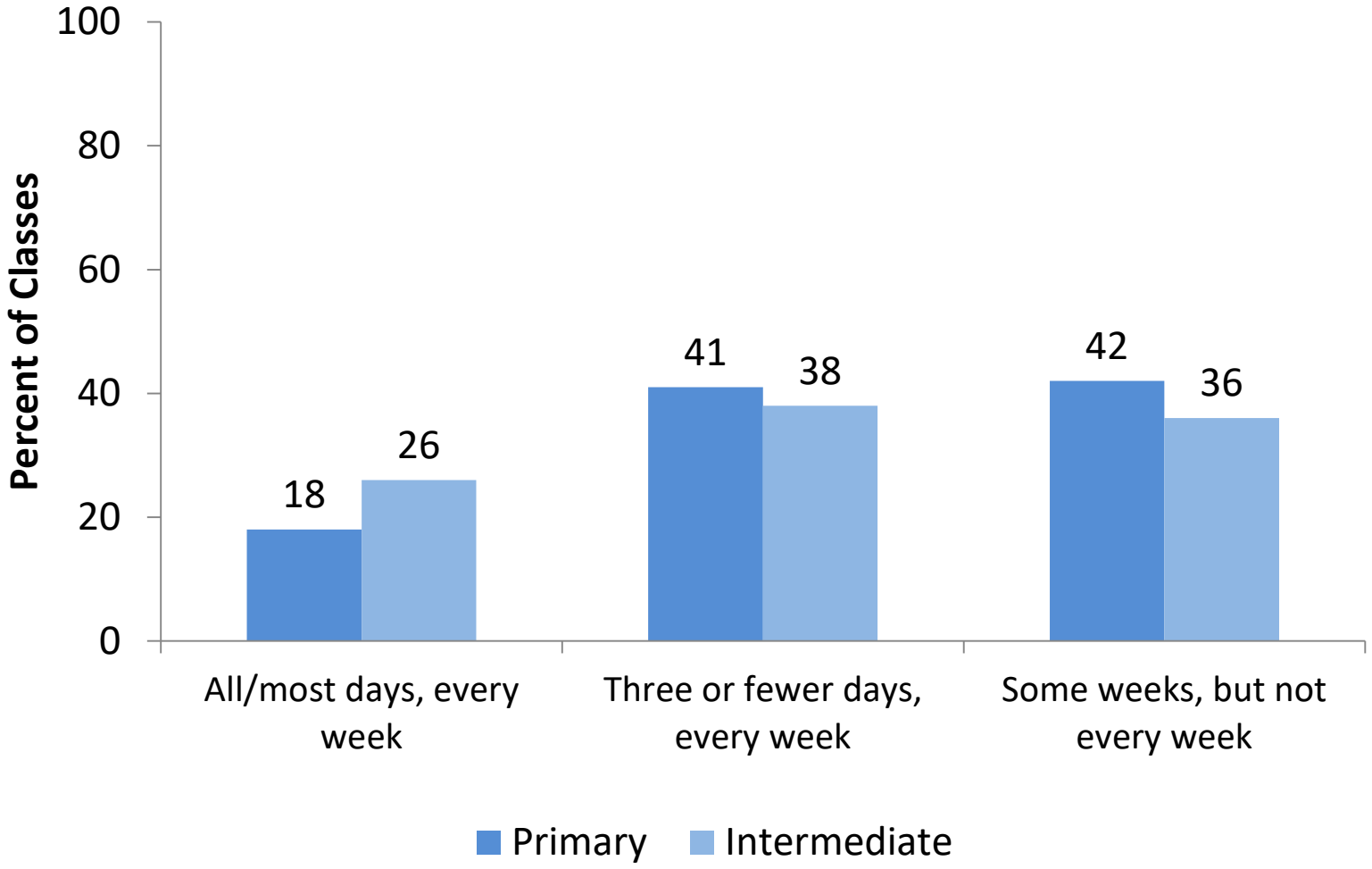


Race/Ethnicity

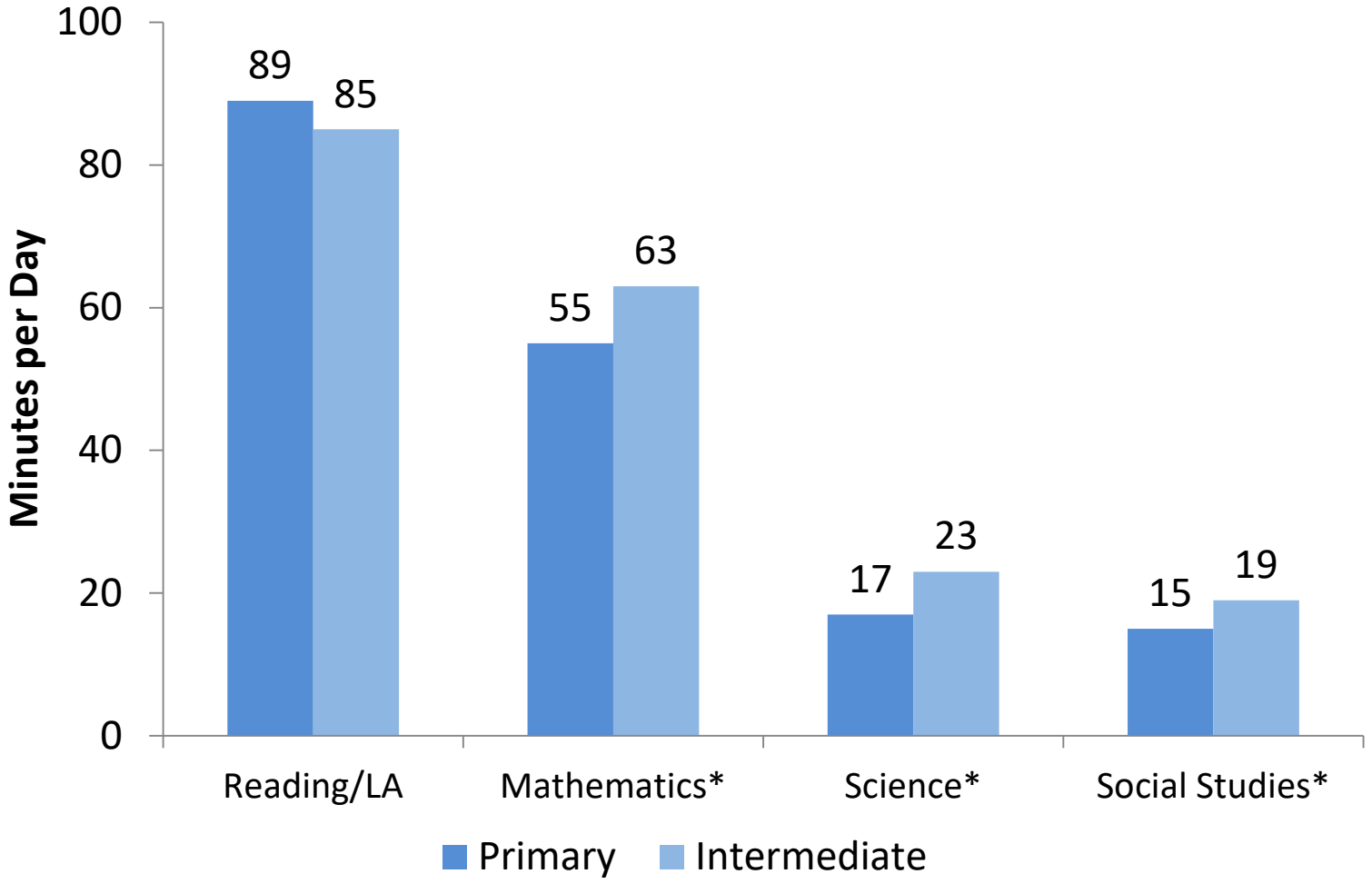


Amount of Science Instruction

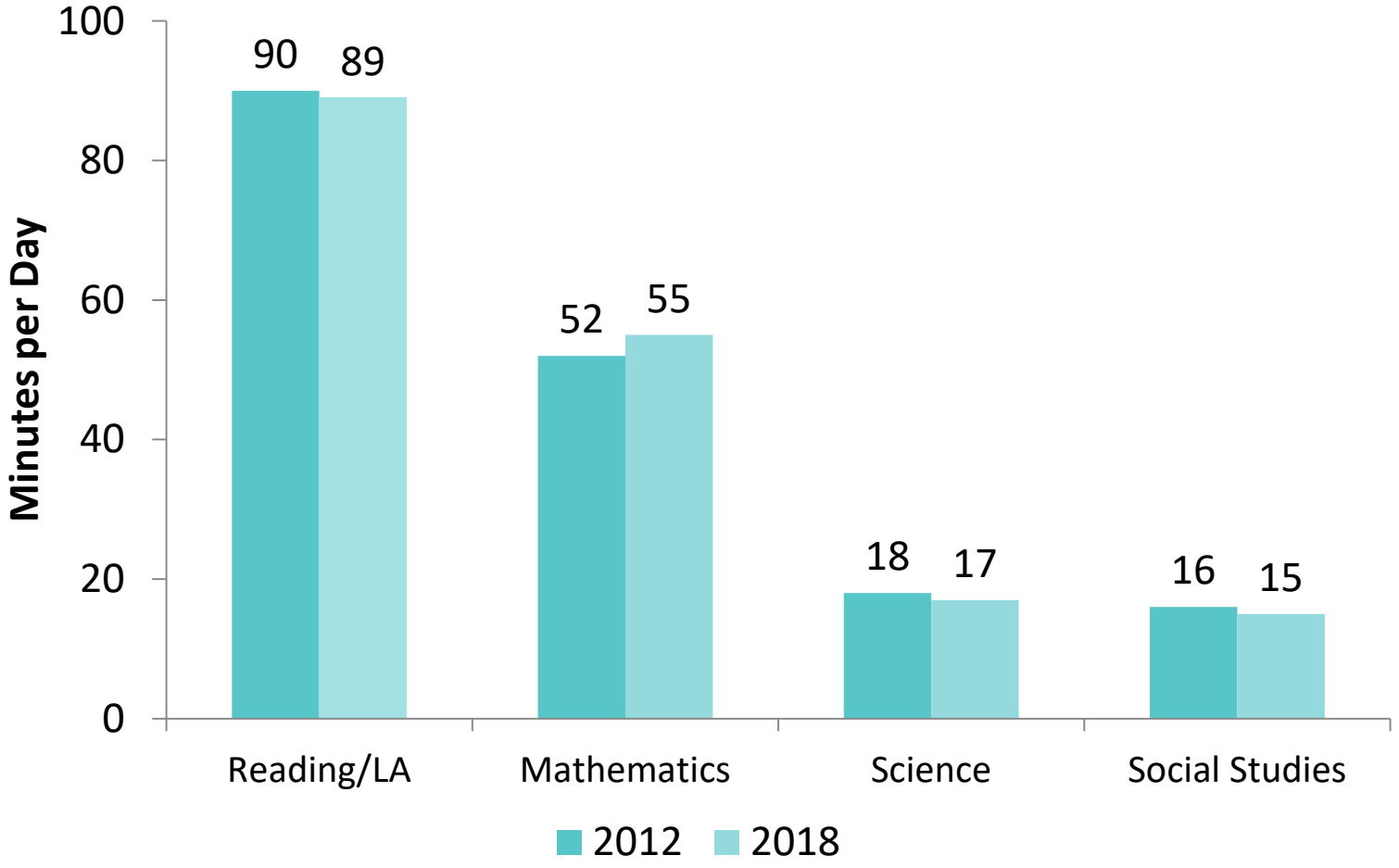
Frequency of Science Instruction: Self-Contained Classrooms*



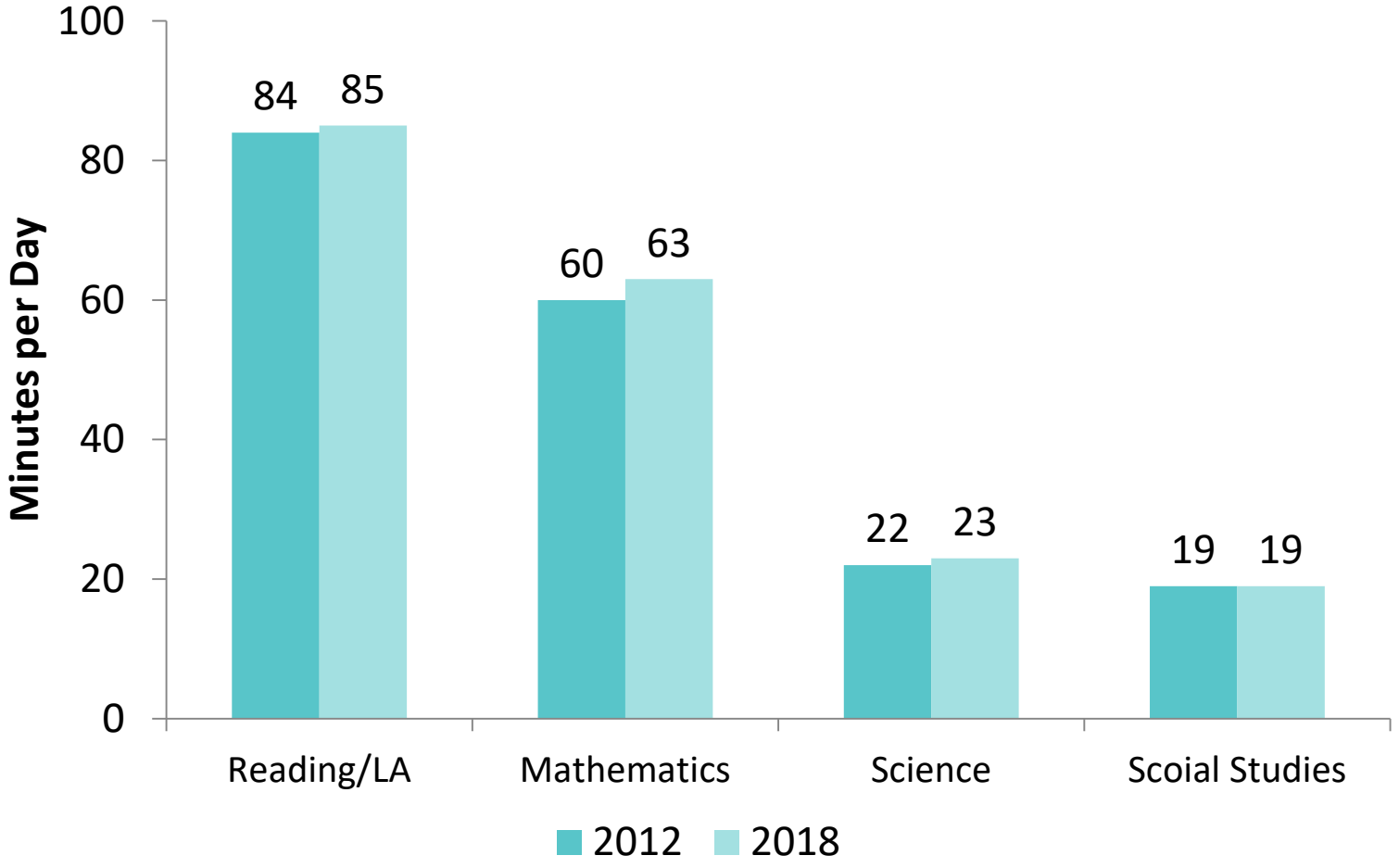
Instructional Time: Self-Contained Classrooms



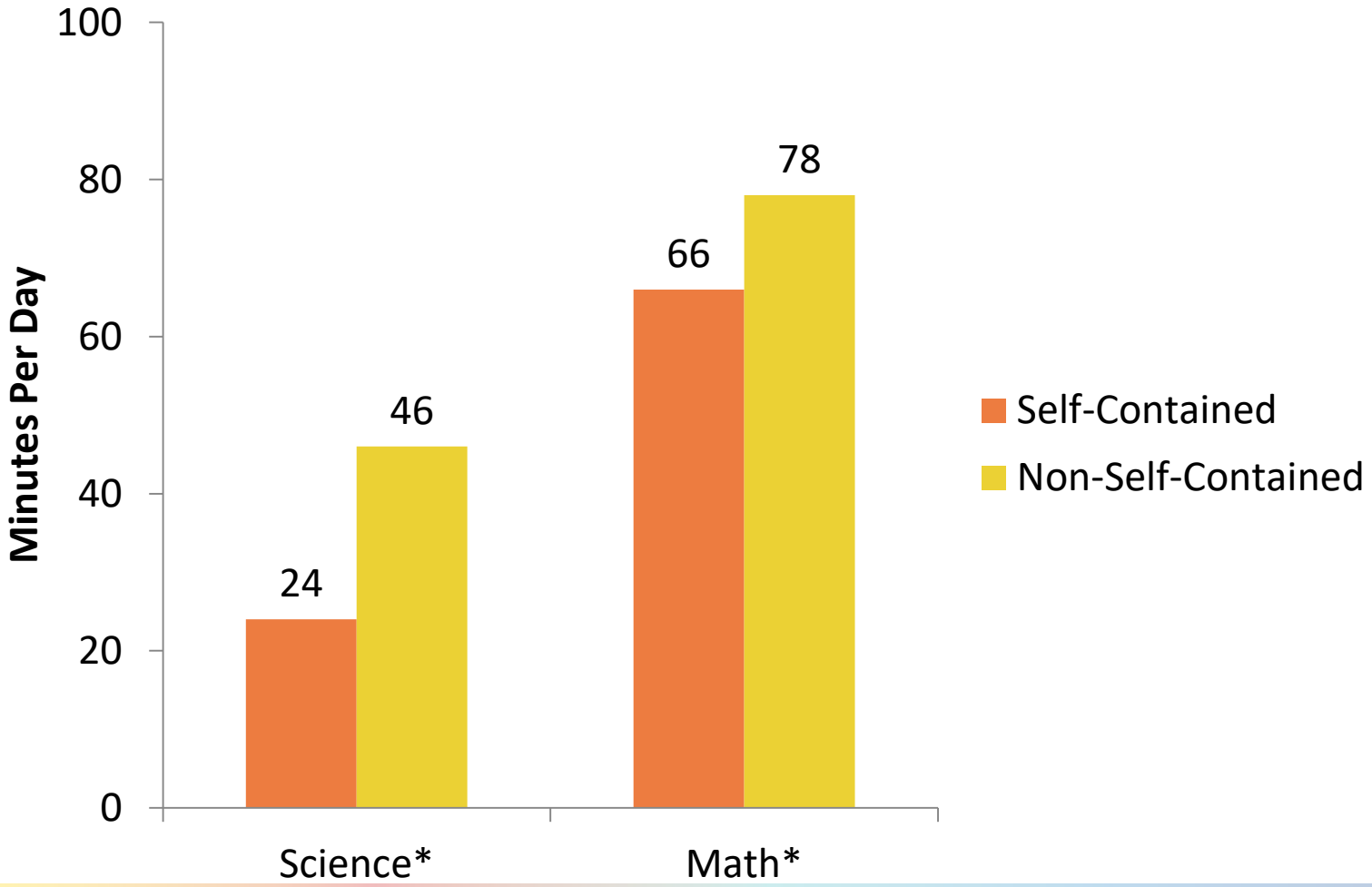
Instructional Time: Self-Contained Classrooms (Primary)



Instructional Time: Self-Contained Classrooms (Intermediate)

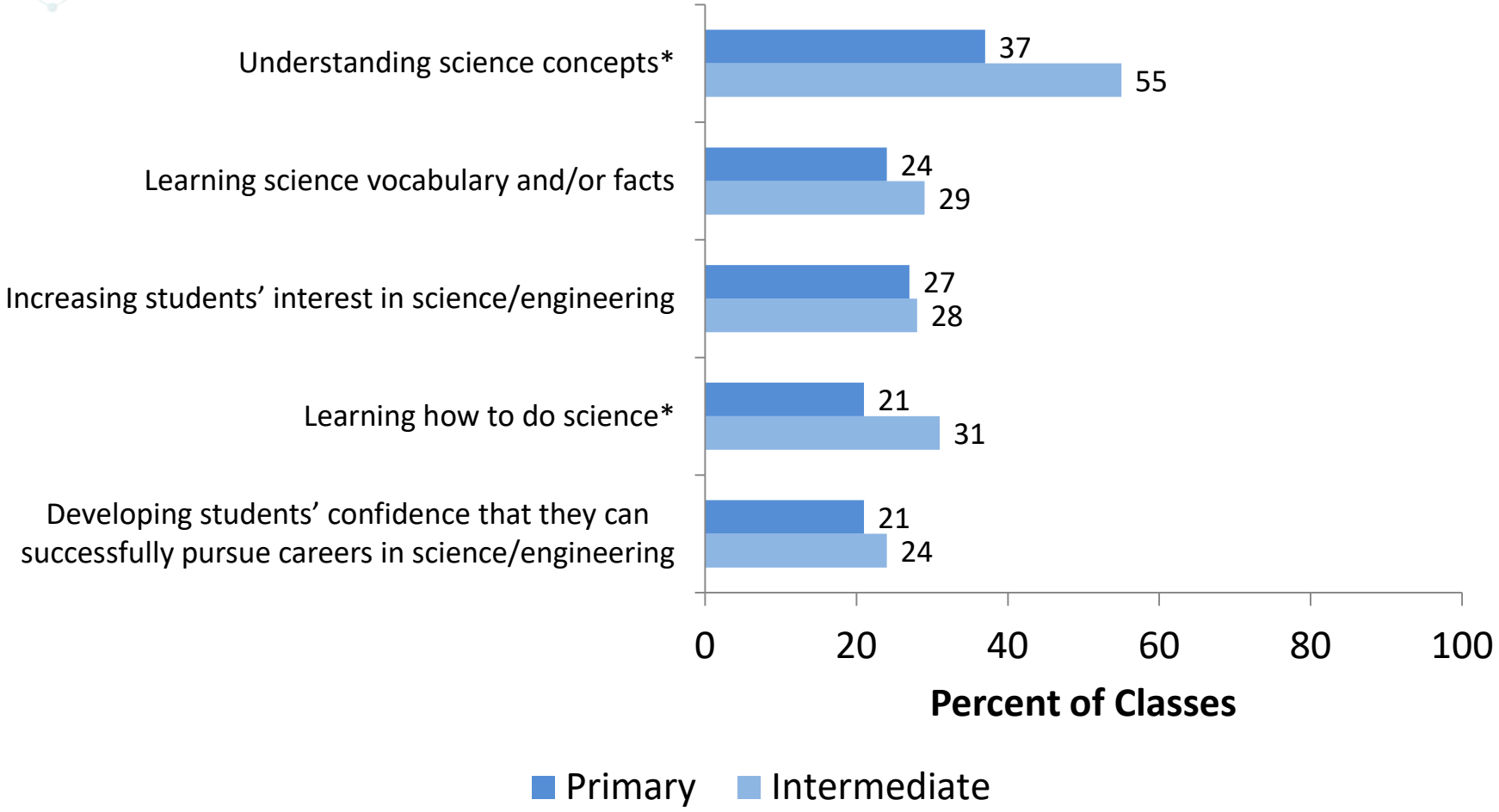


Science and Math Instructional Time: Grades 3-5

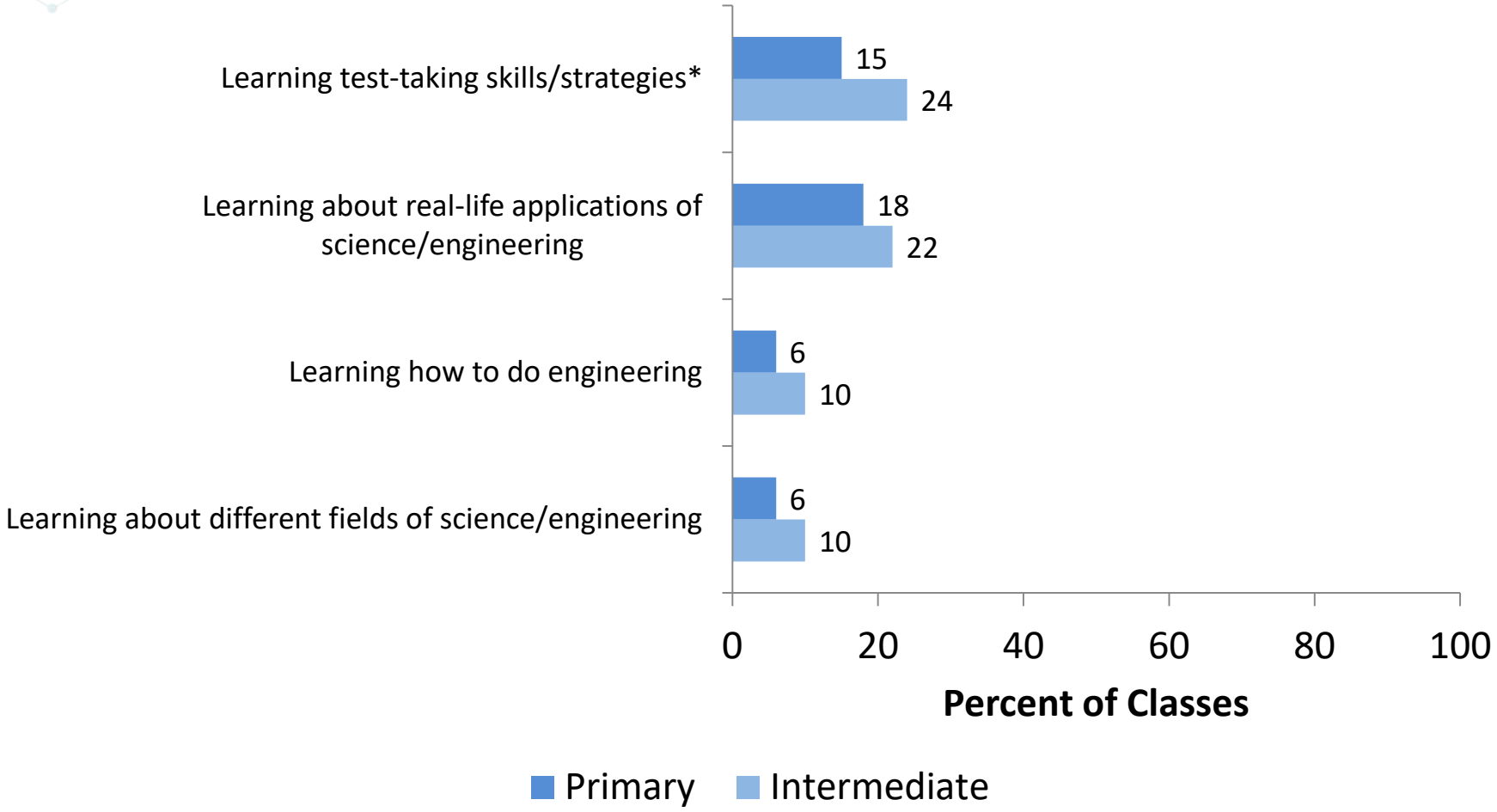


Instructional Objectives

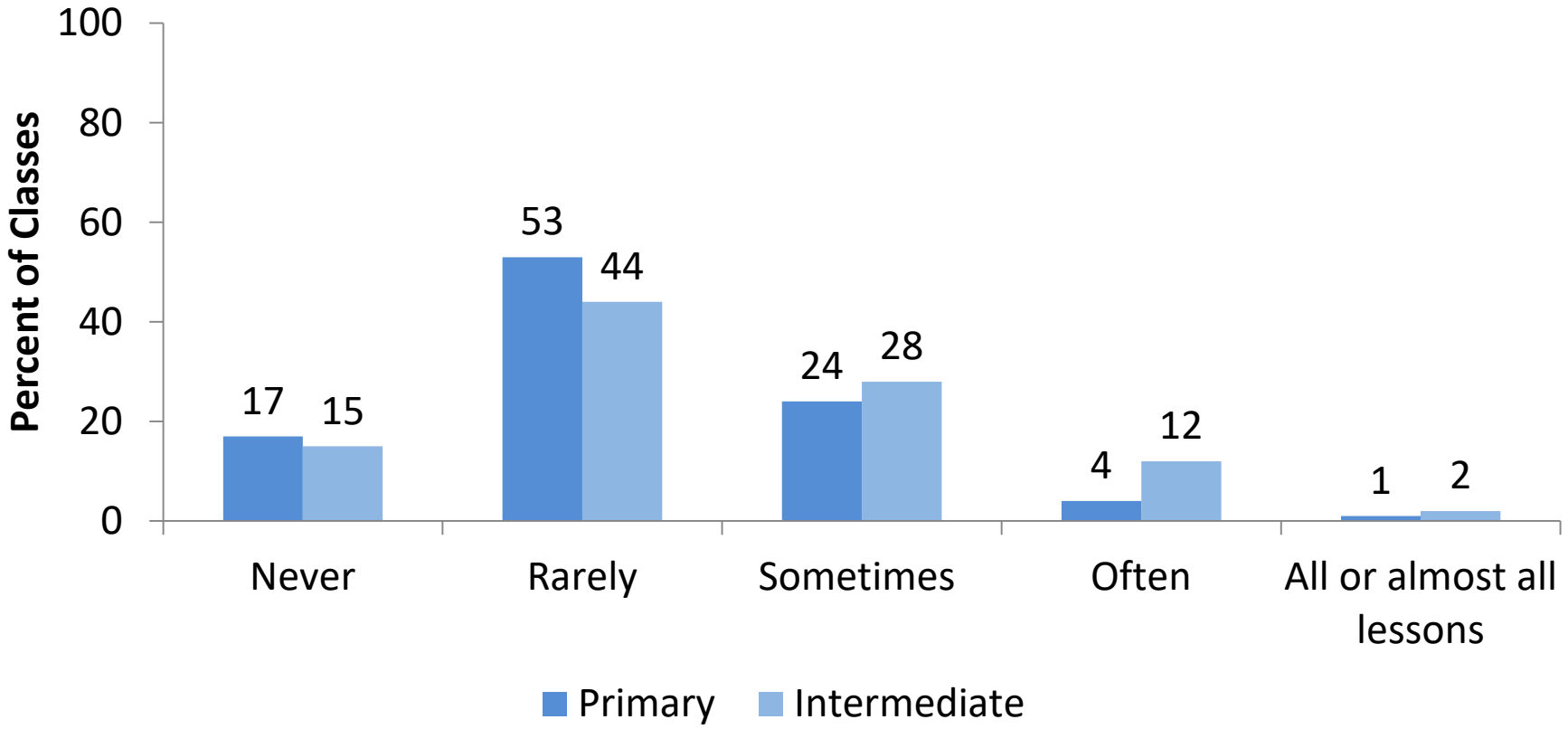
Objectives Receiving a Heavy Emphasis



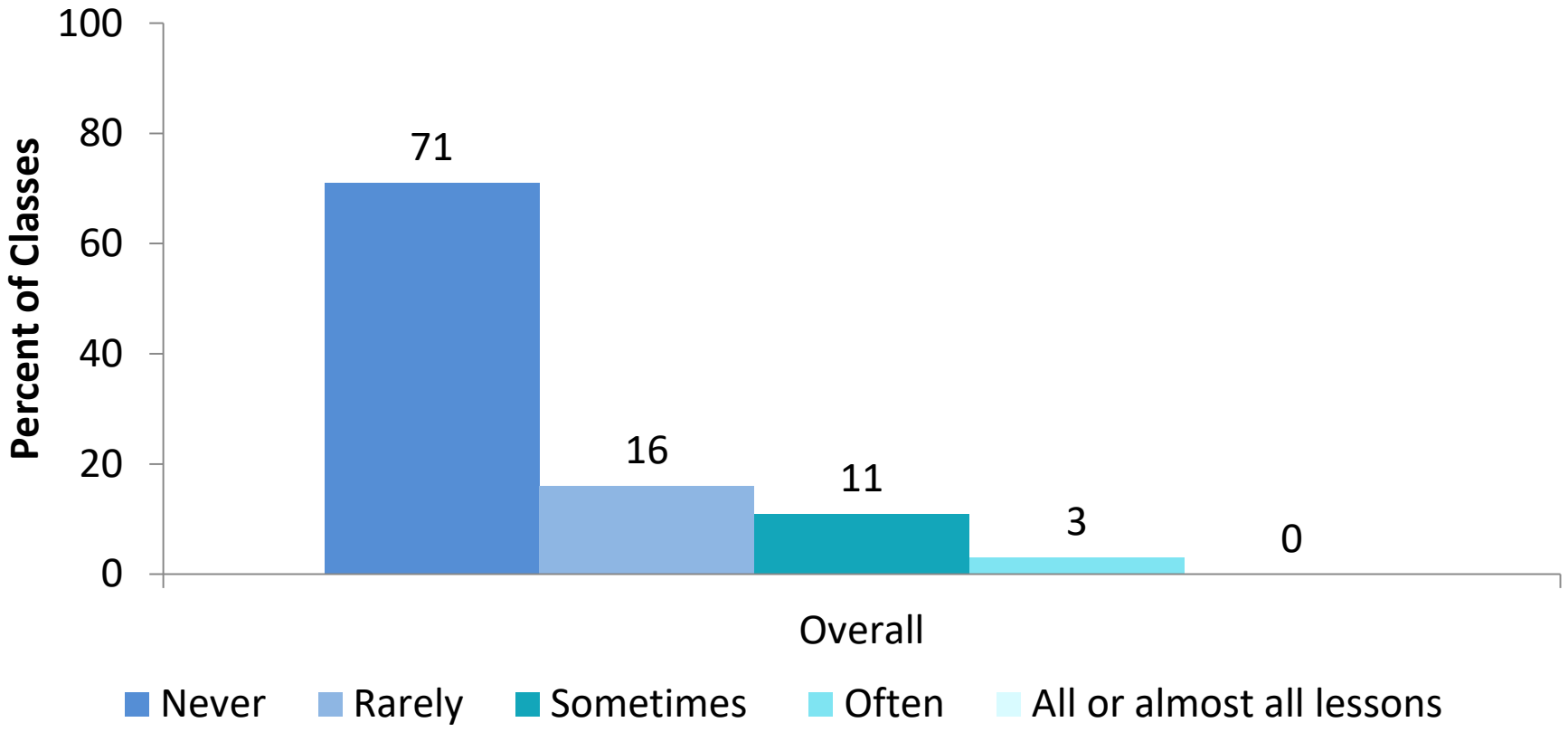
Objectives Receiving a Heavy Emphasis



Incorporating Engineering Into Science Instruction

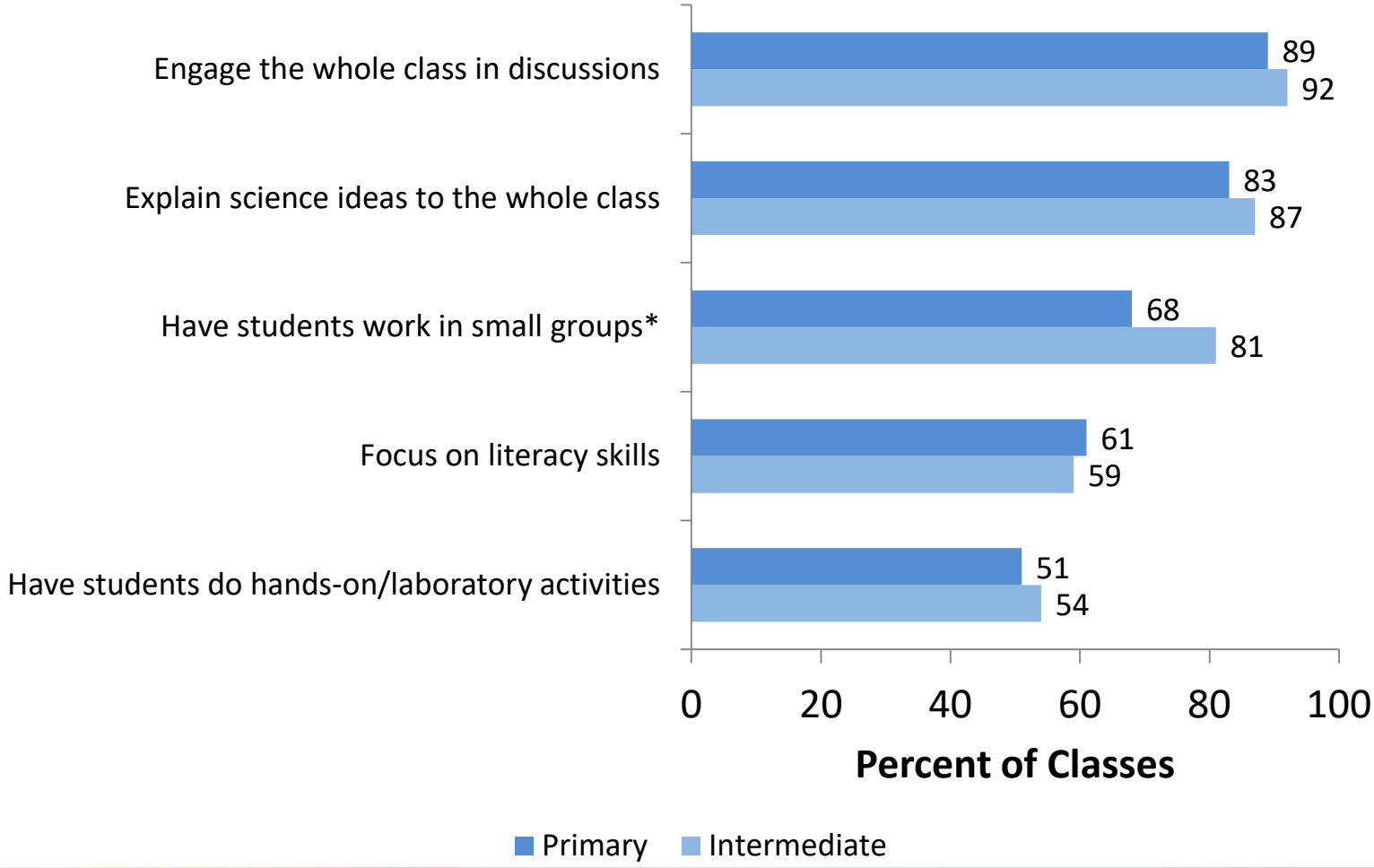


Incorporating Coding Into Science Instruction

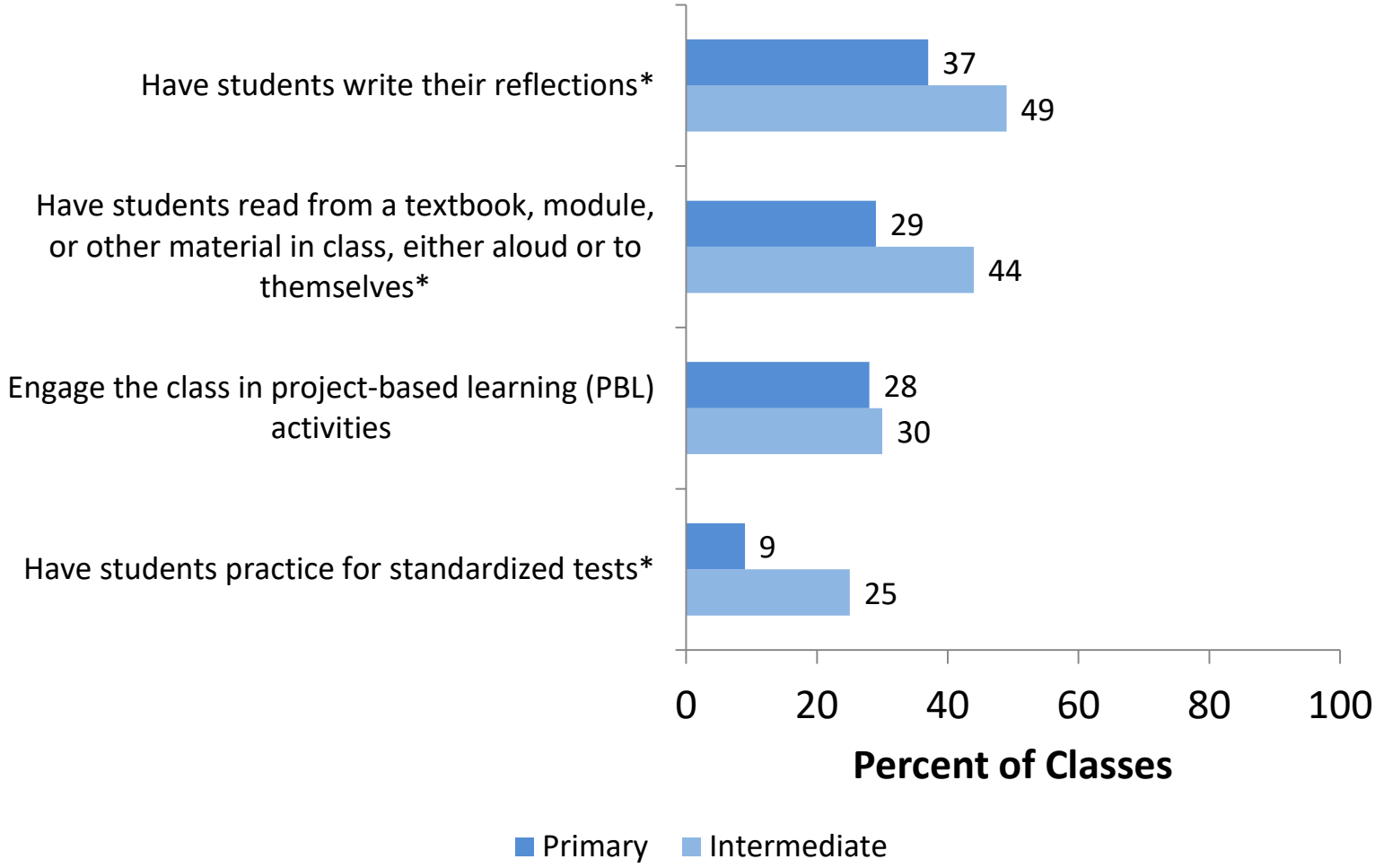


Class Activities

Class Activities: At Least Once a Week



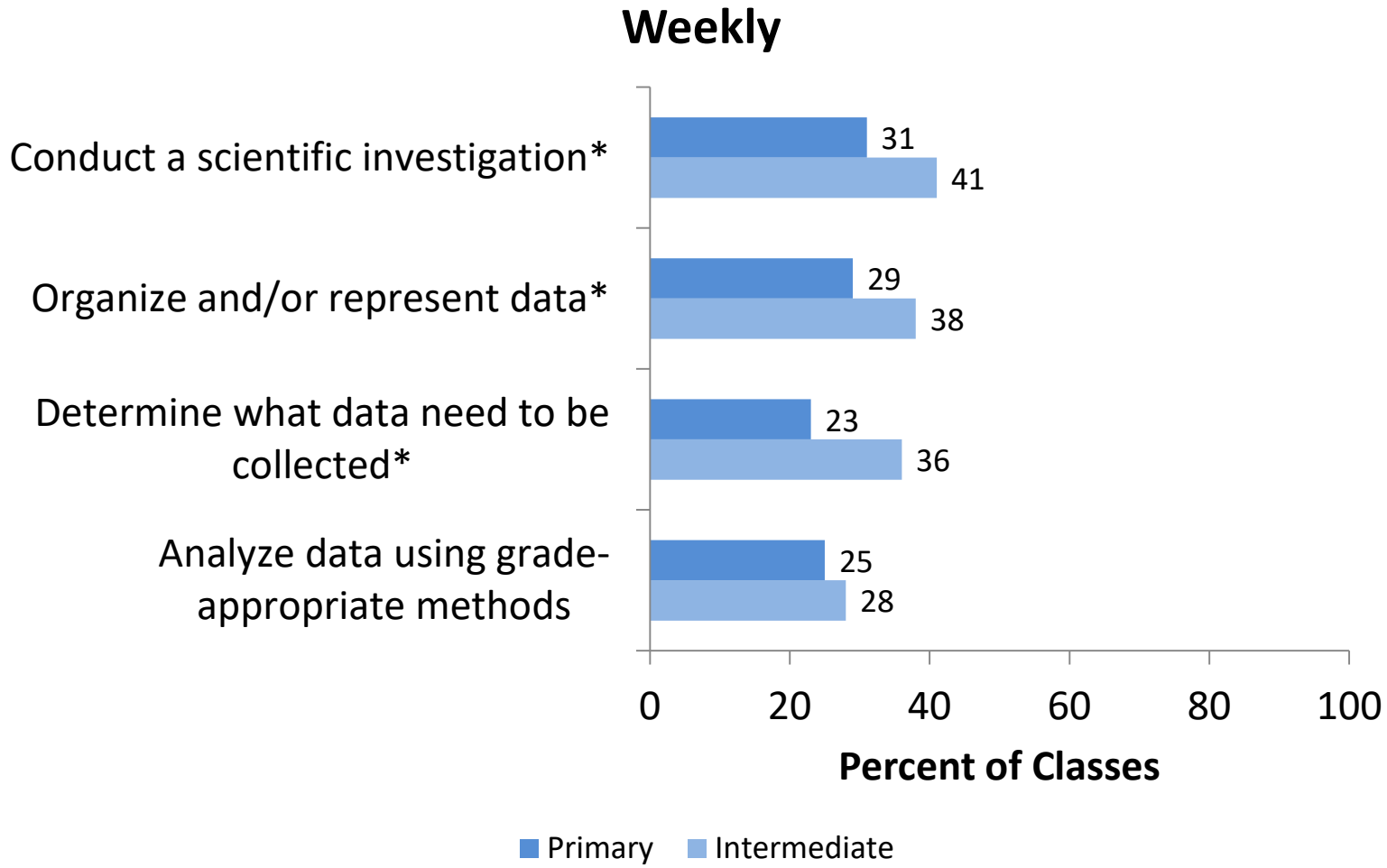
Class Activities: At Least Once a Week



Engagement in Science Practices

Elementary students are most often engaged in aspects of science related to conducting investigations and analyzing data

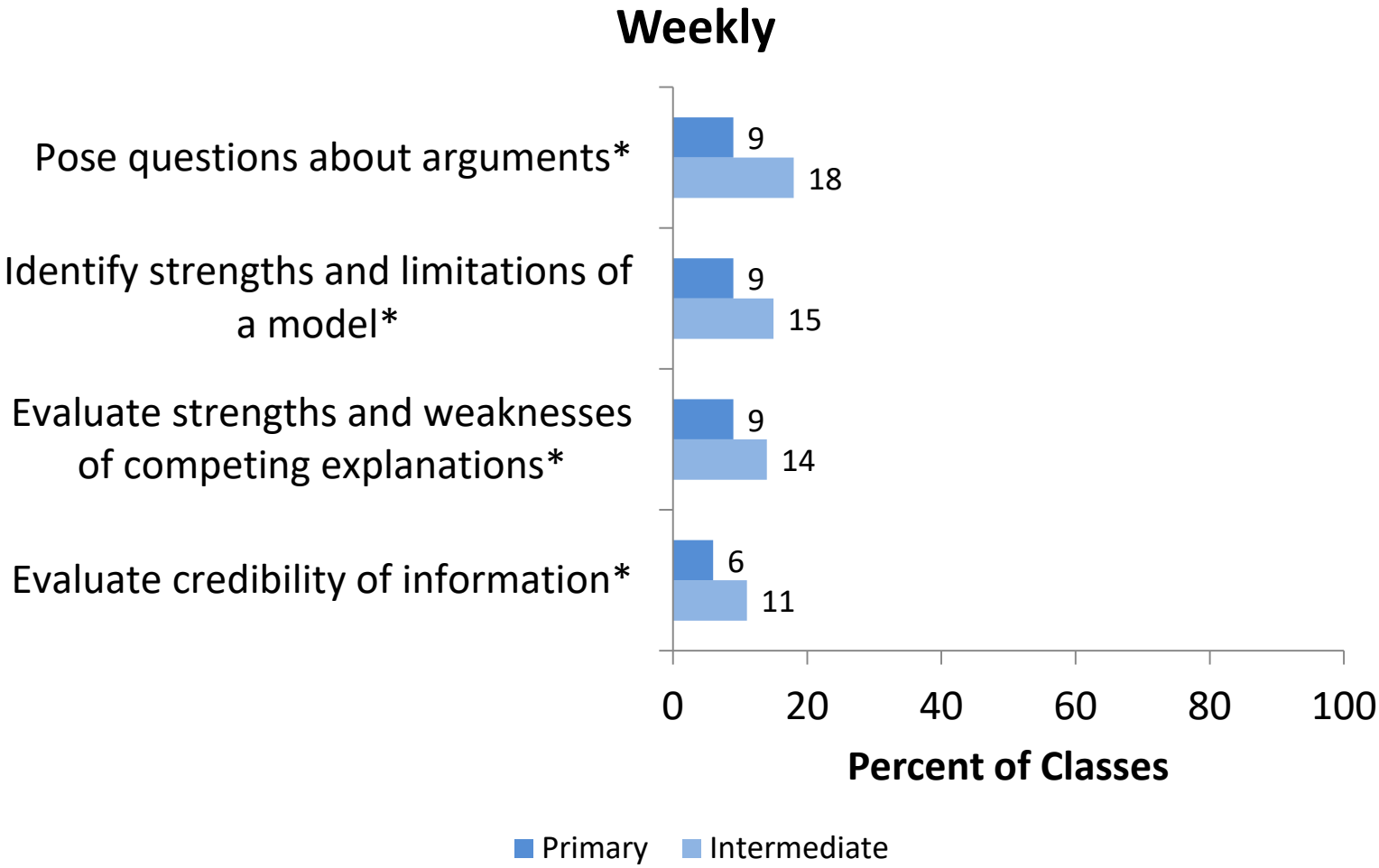
Conducting Investigations and Analyzing Data



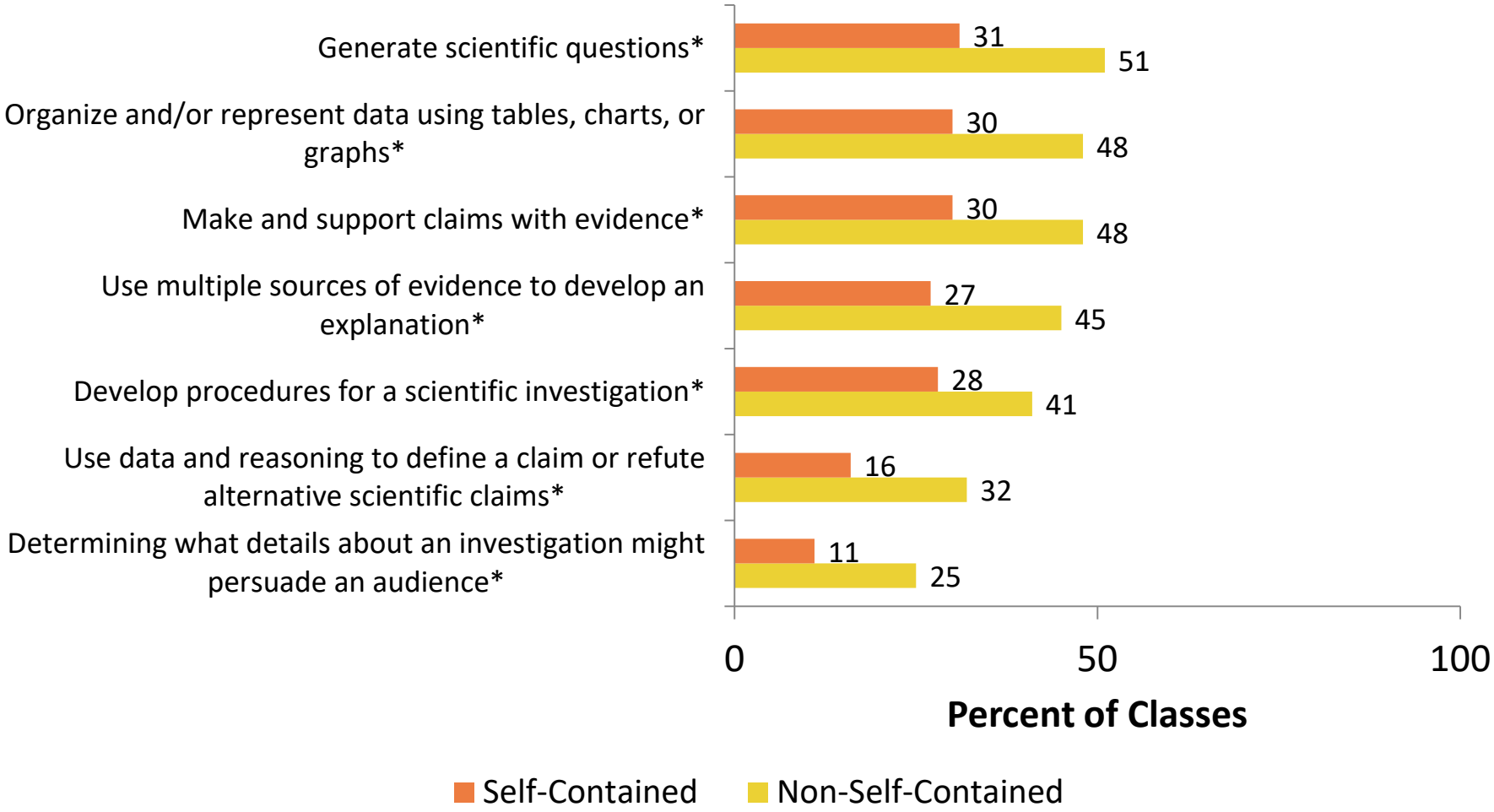
Engagement in Science Practices

Students tend to not be engaged very often in aspects of science related to evaluating the strengths/limitations of evidence and the practice of argumentation.

Evaluating Evidence and Arguing



Classes Engaging in Science Practices at Least Once a Week: Grades 3–5



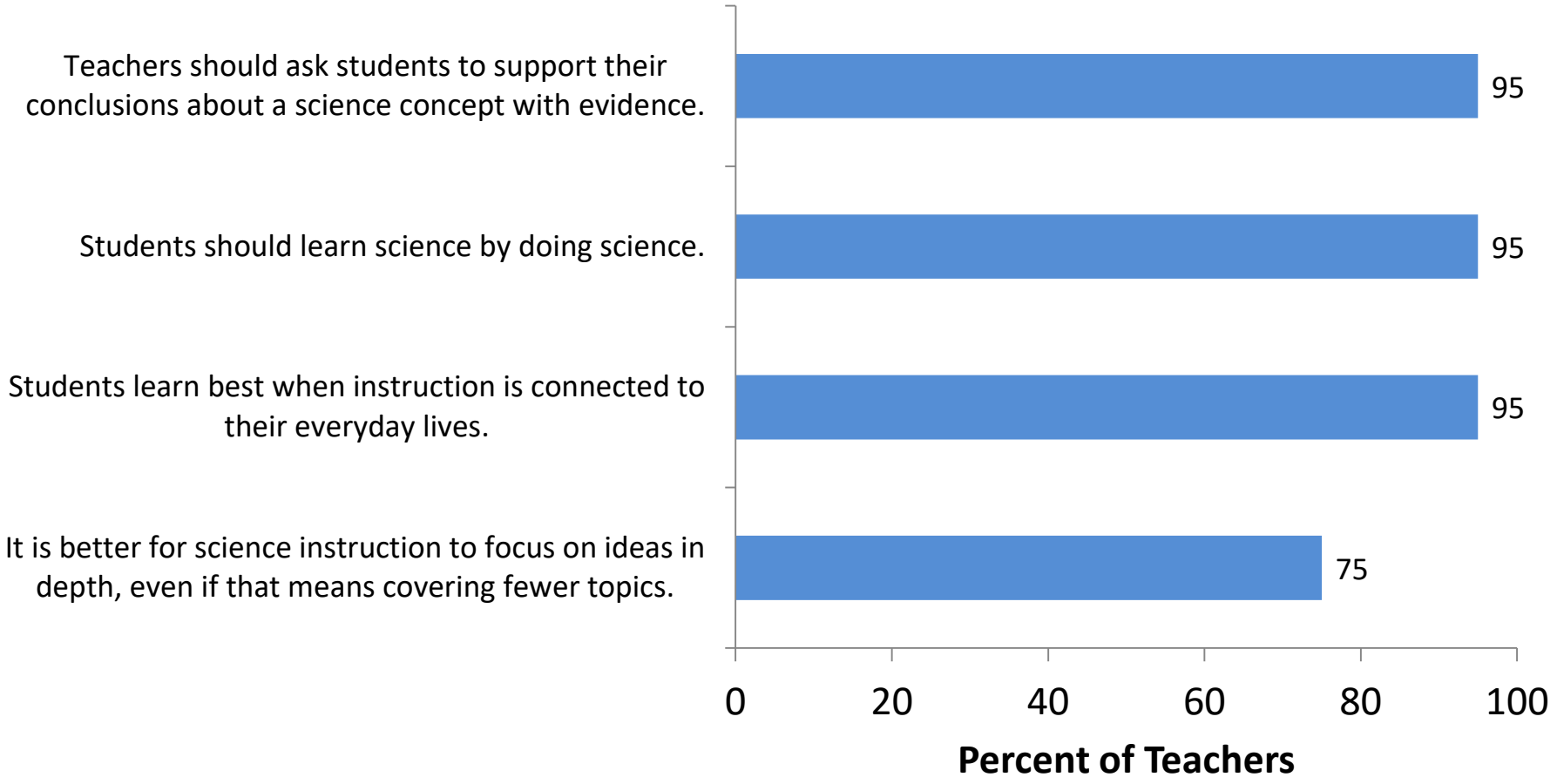
Takeaways

Elementary science instruction:

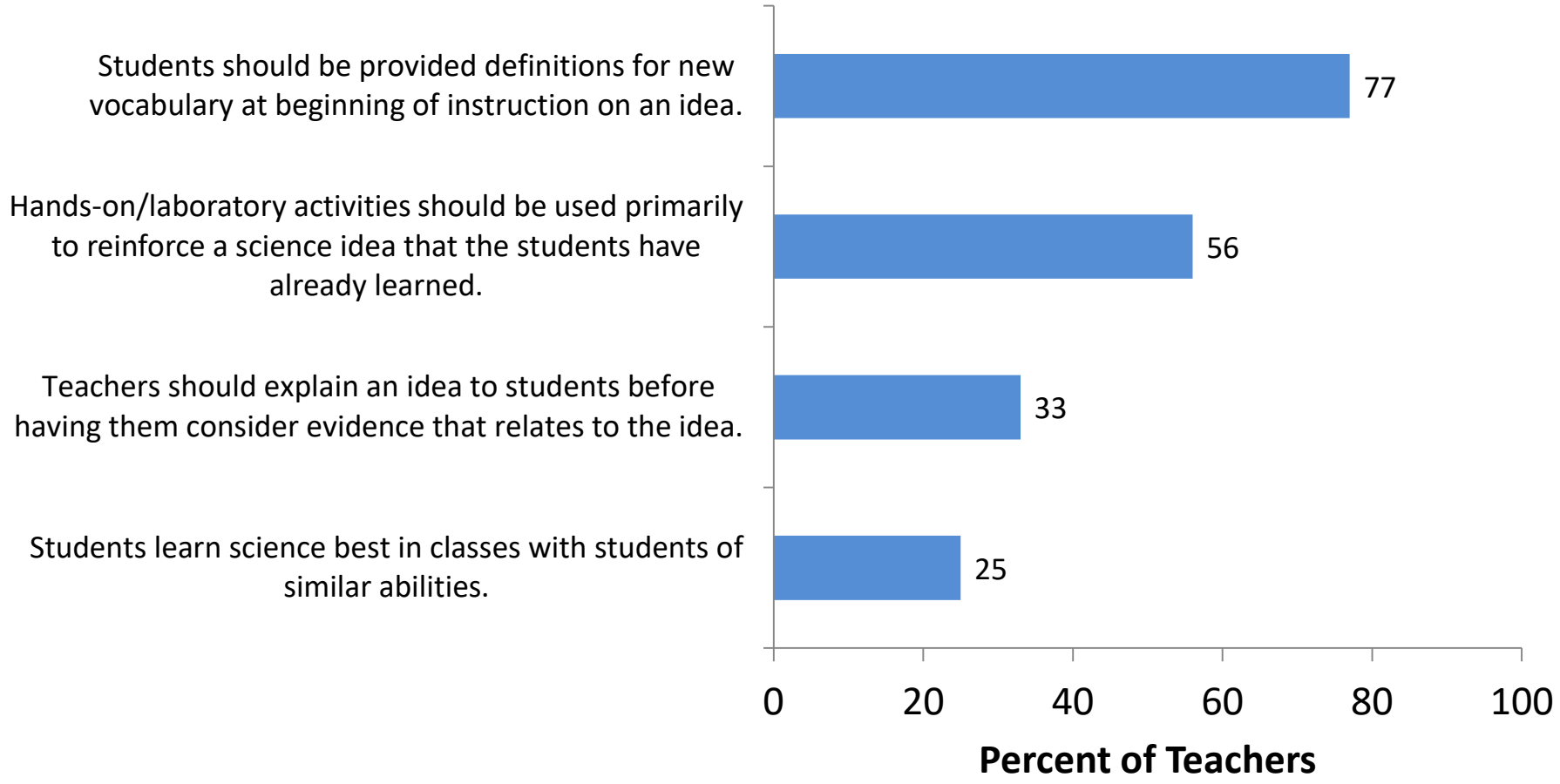
- Happens infrequently relative to reading/ language arts and mathematics
- Emphasizes concepts over practices
- Relies primarily on lecture, discussion, and small group work

Teachers Beliefs

Teachers Agreeing With Reform-Oriented Beliefs

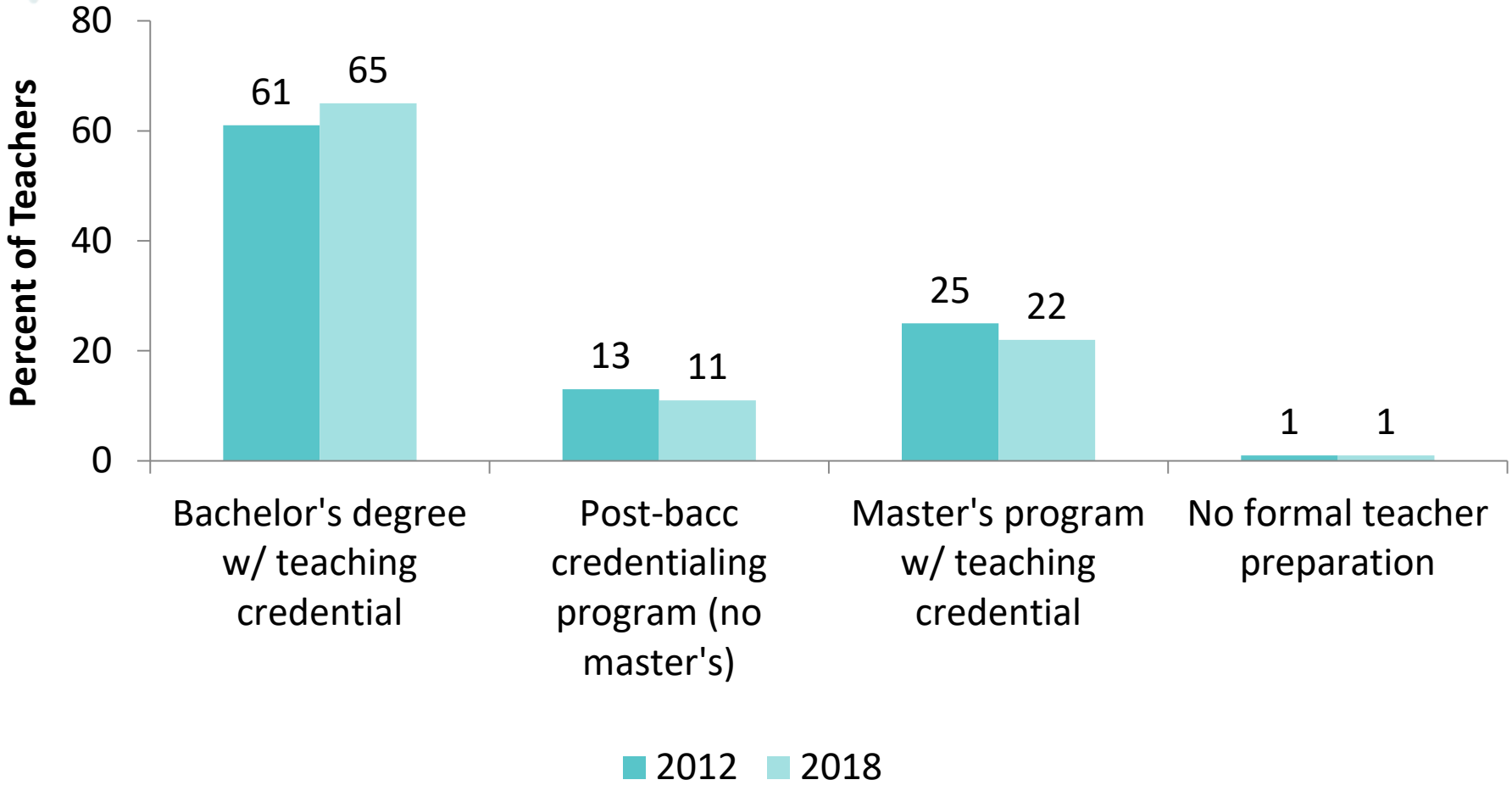


Teachers Agreeing With Traditional Beliefs

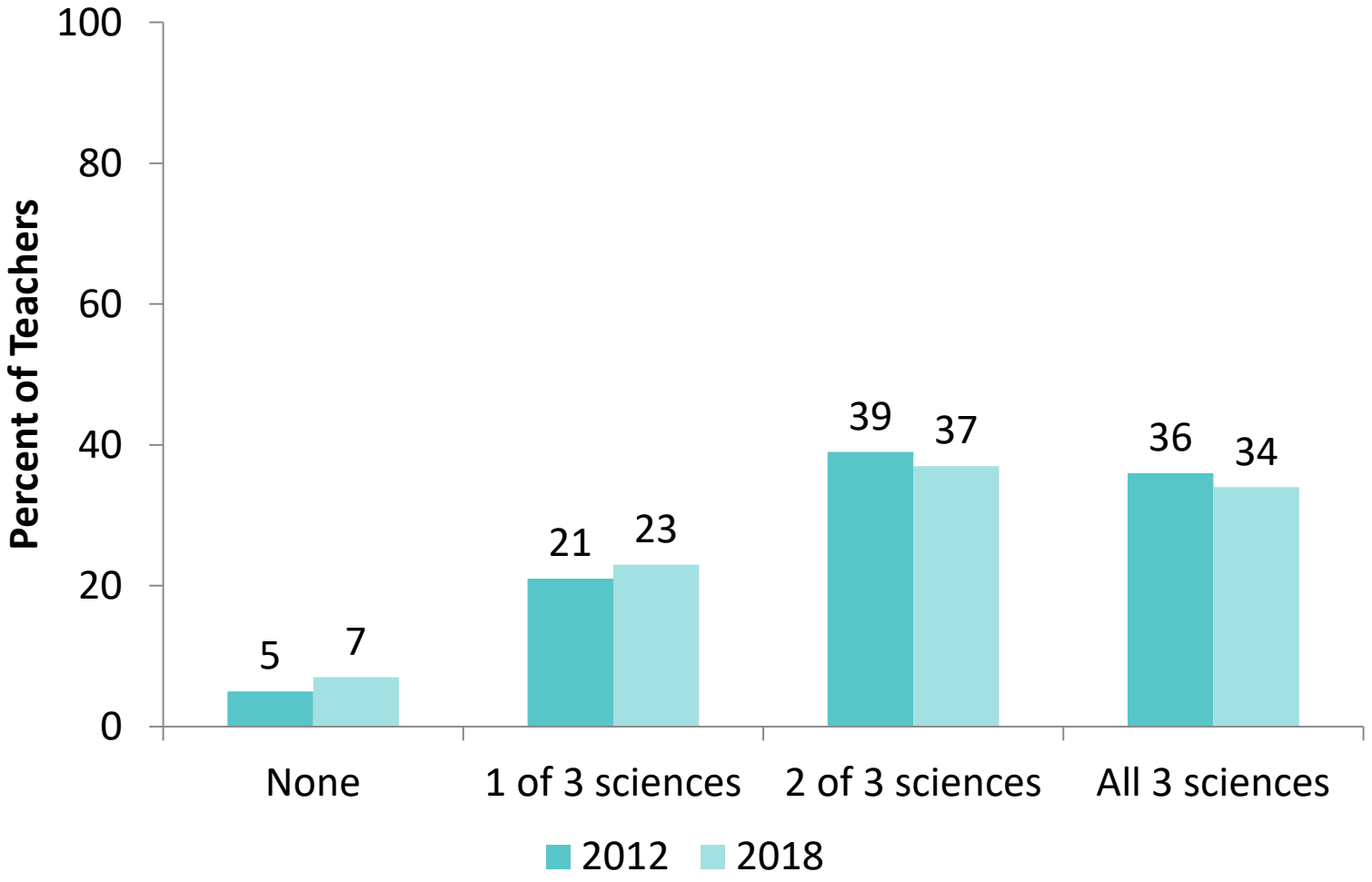


Teacher Preparation

Science Teachers' Path to Certification

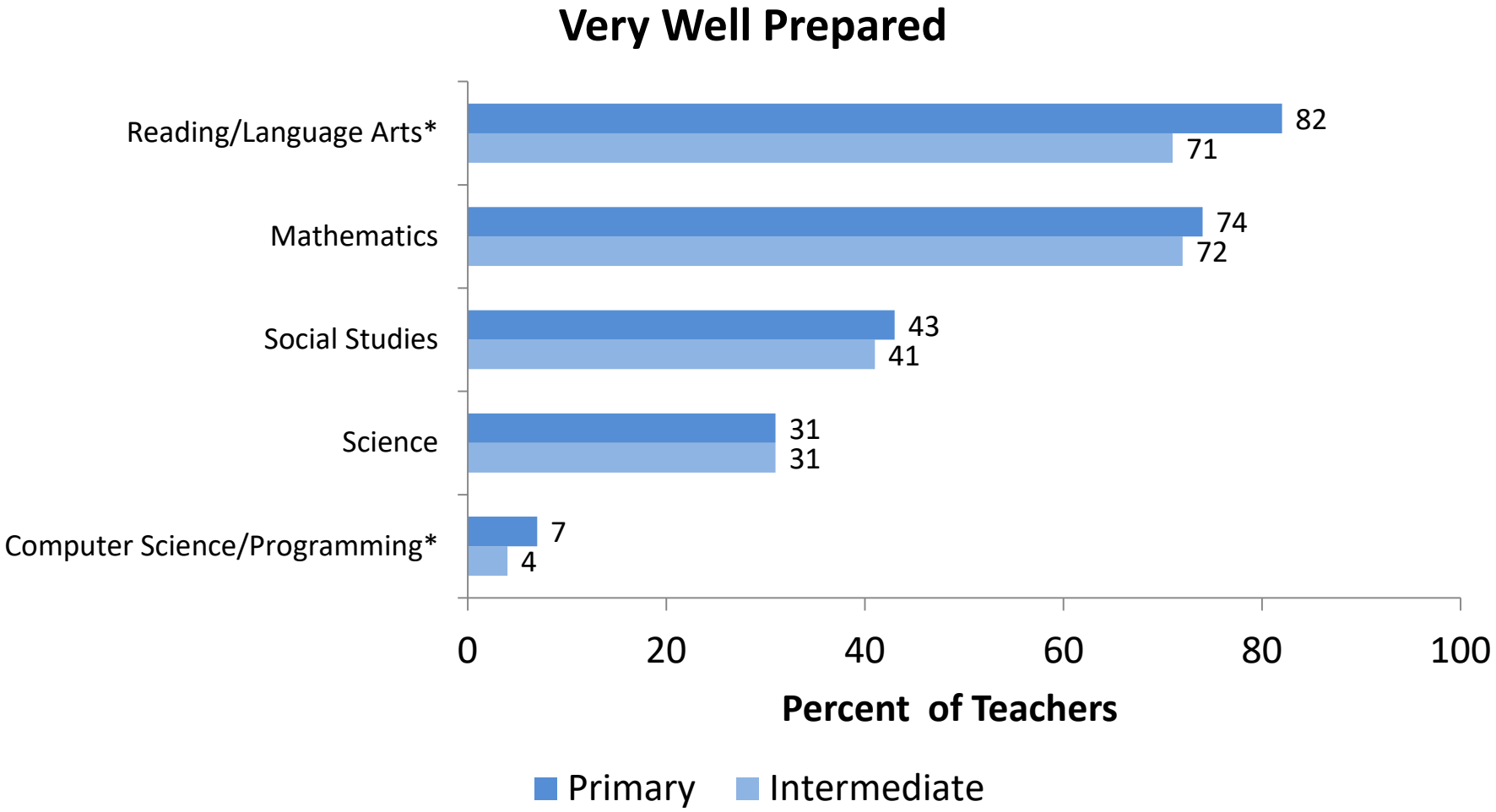


College Coursework Related to NSTA Standards

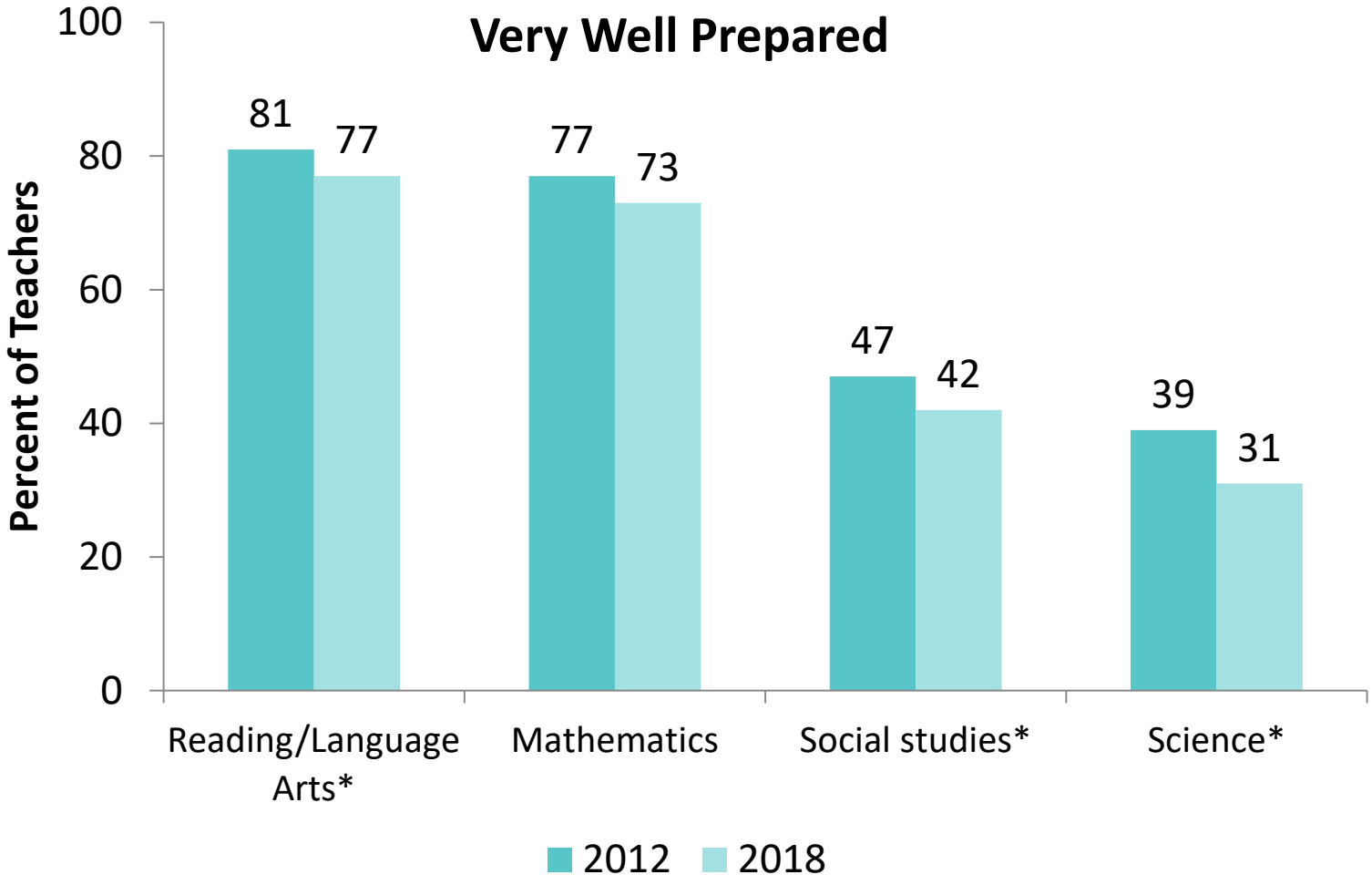


Perceptions of Preparedness

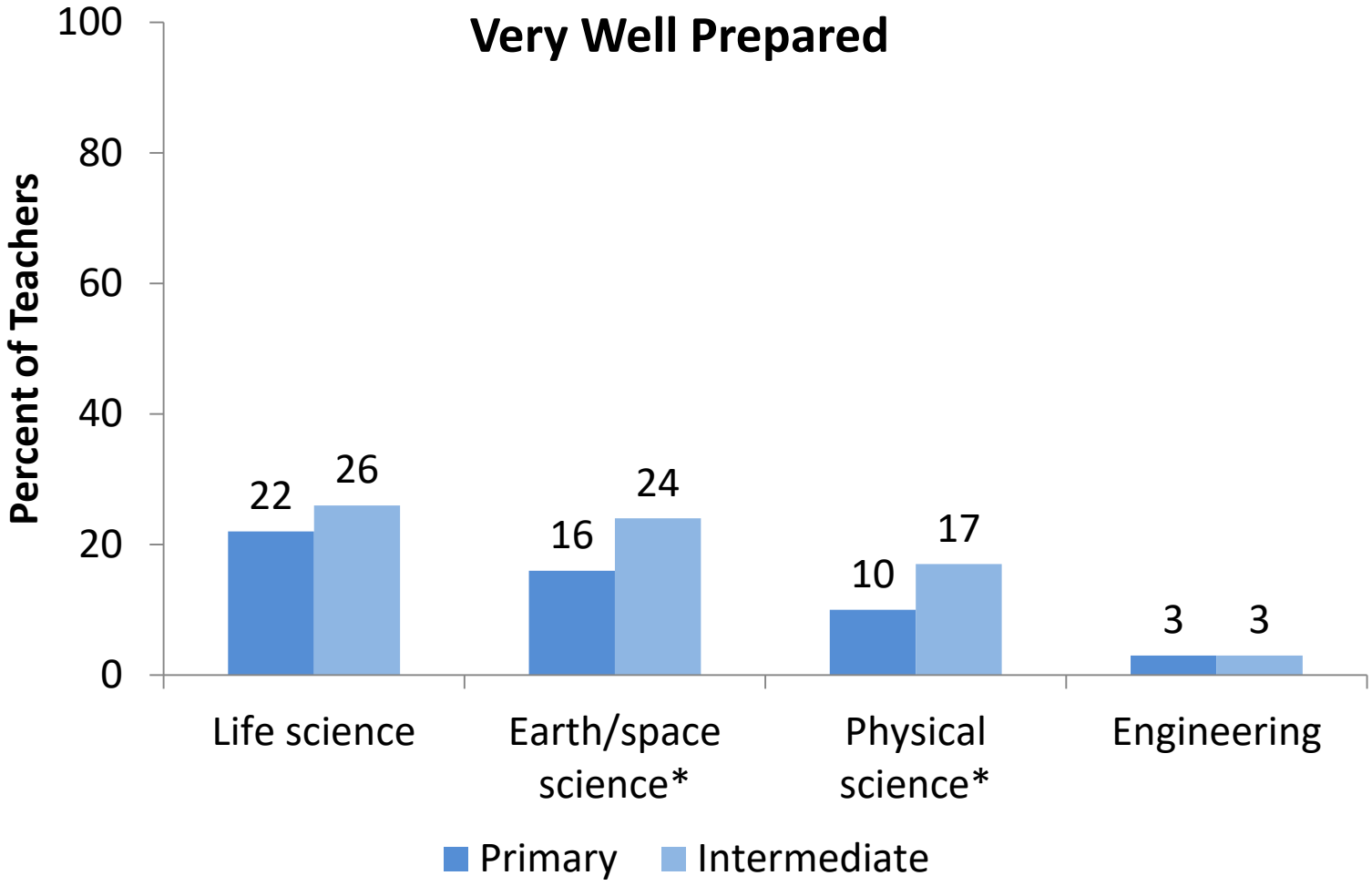
Perceptions of Content Preparedness



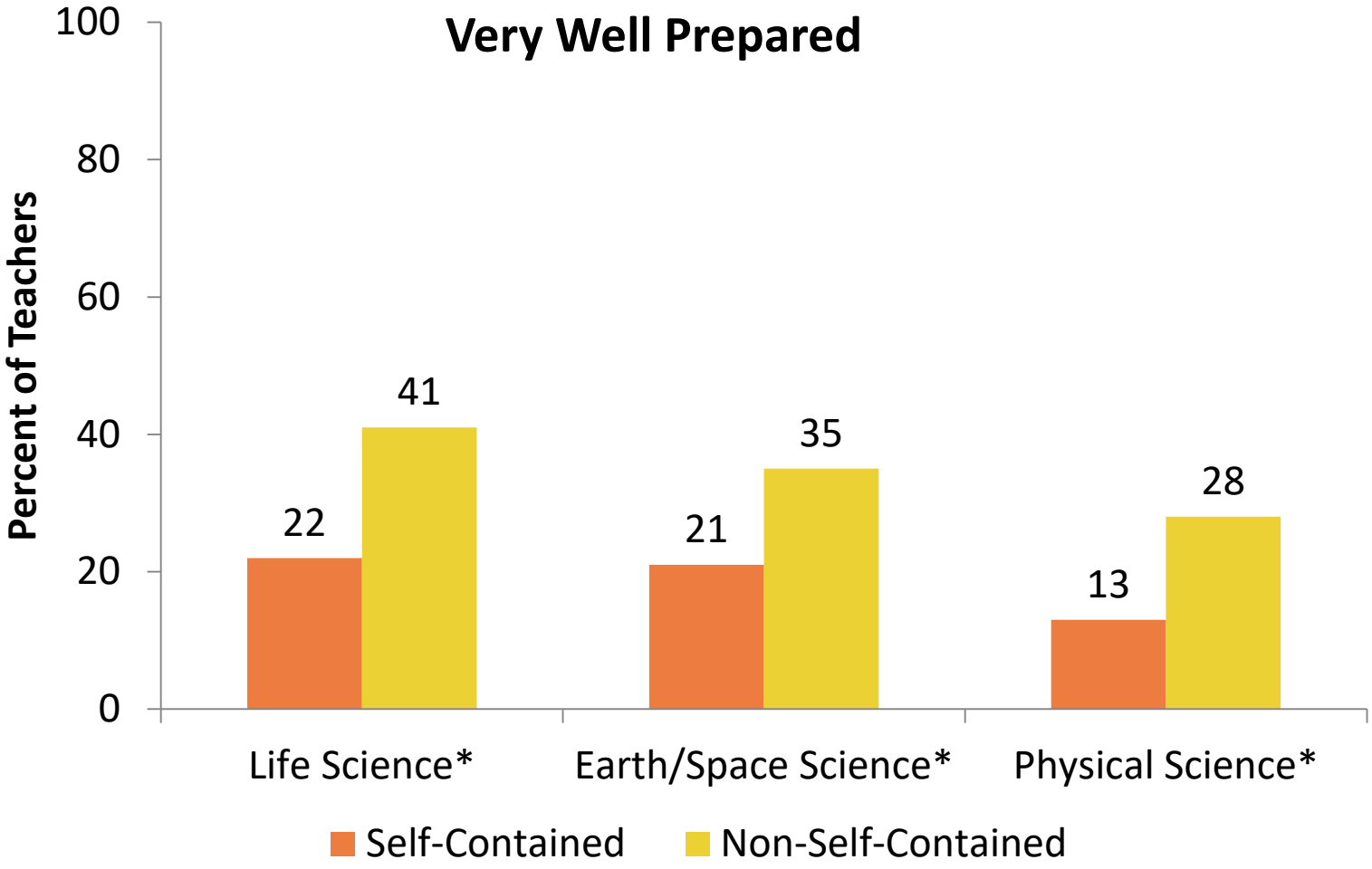
Perceptions of Content Preparedness



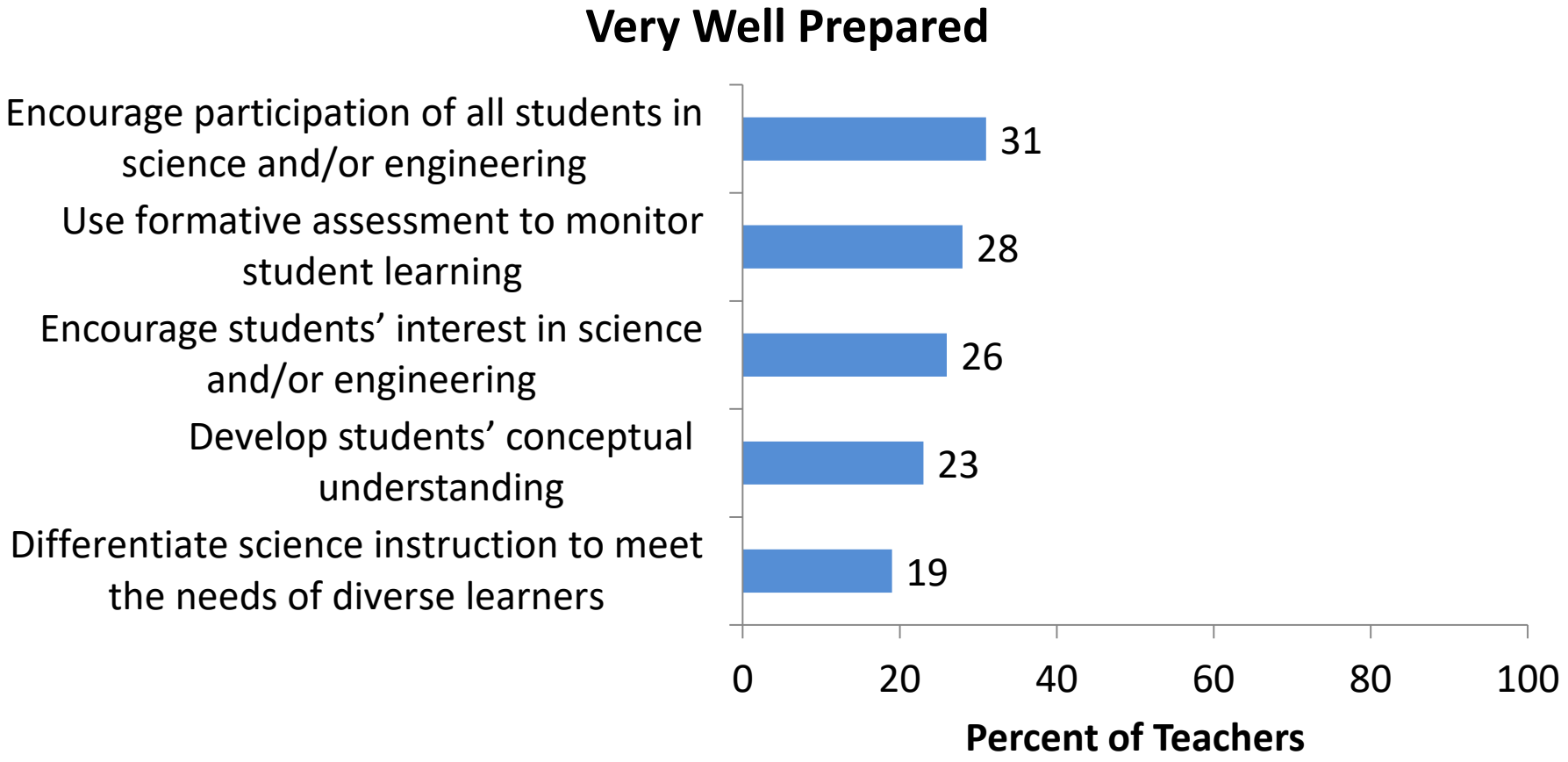
Perceptions of Content Preparedness



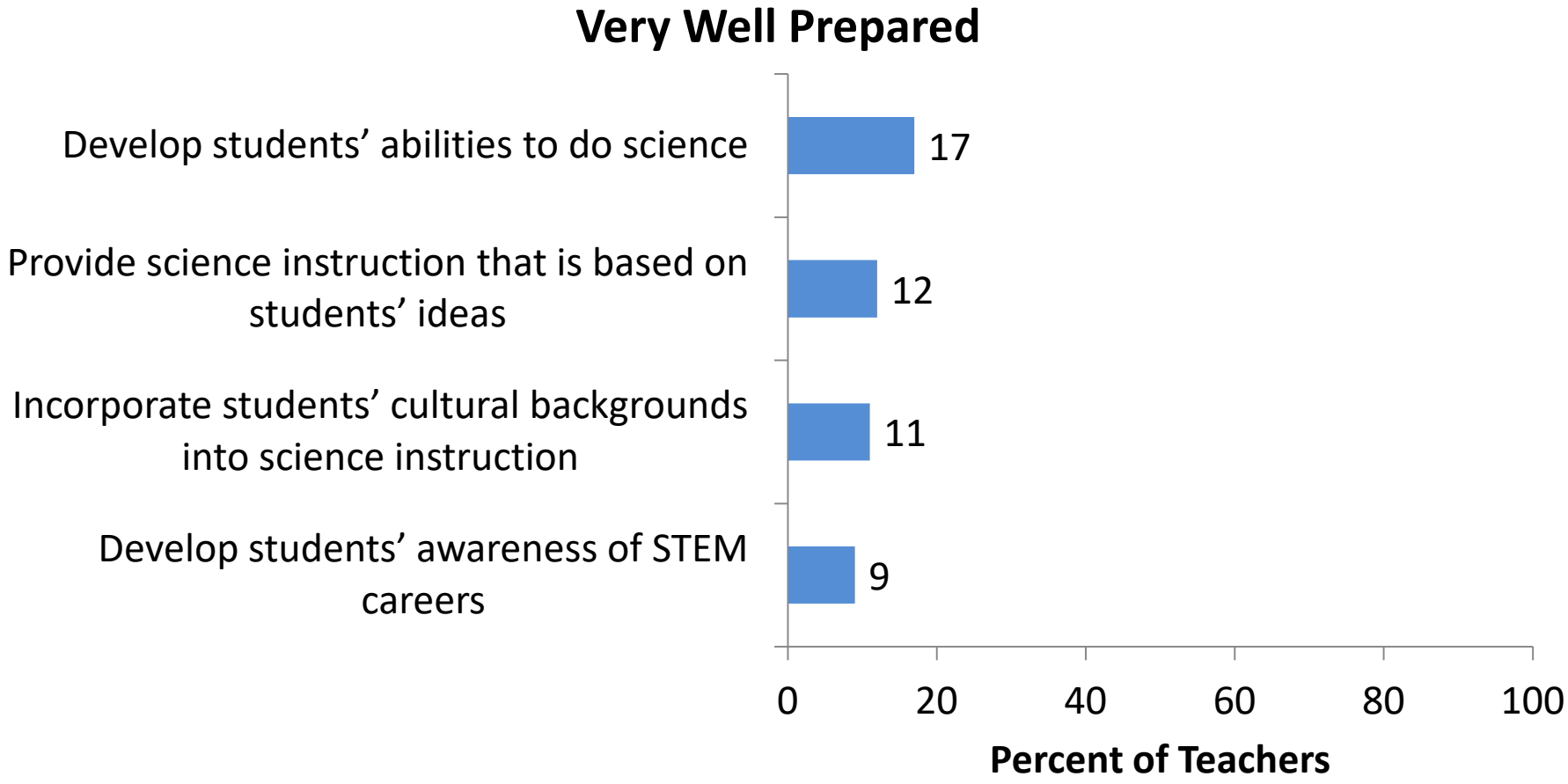
Perceptions of Content Preparedness, by Instructional Arrangement: Grades 3-5



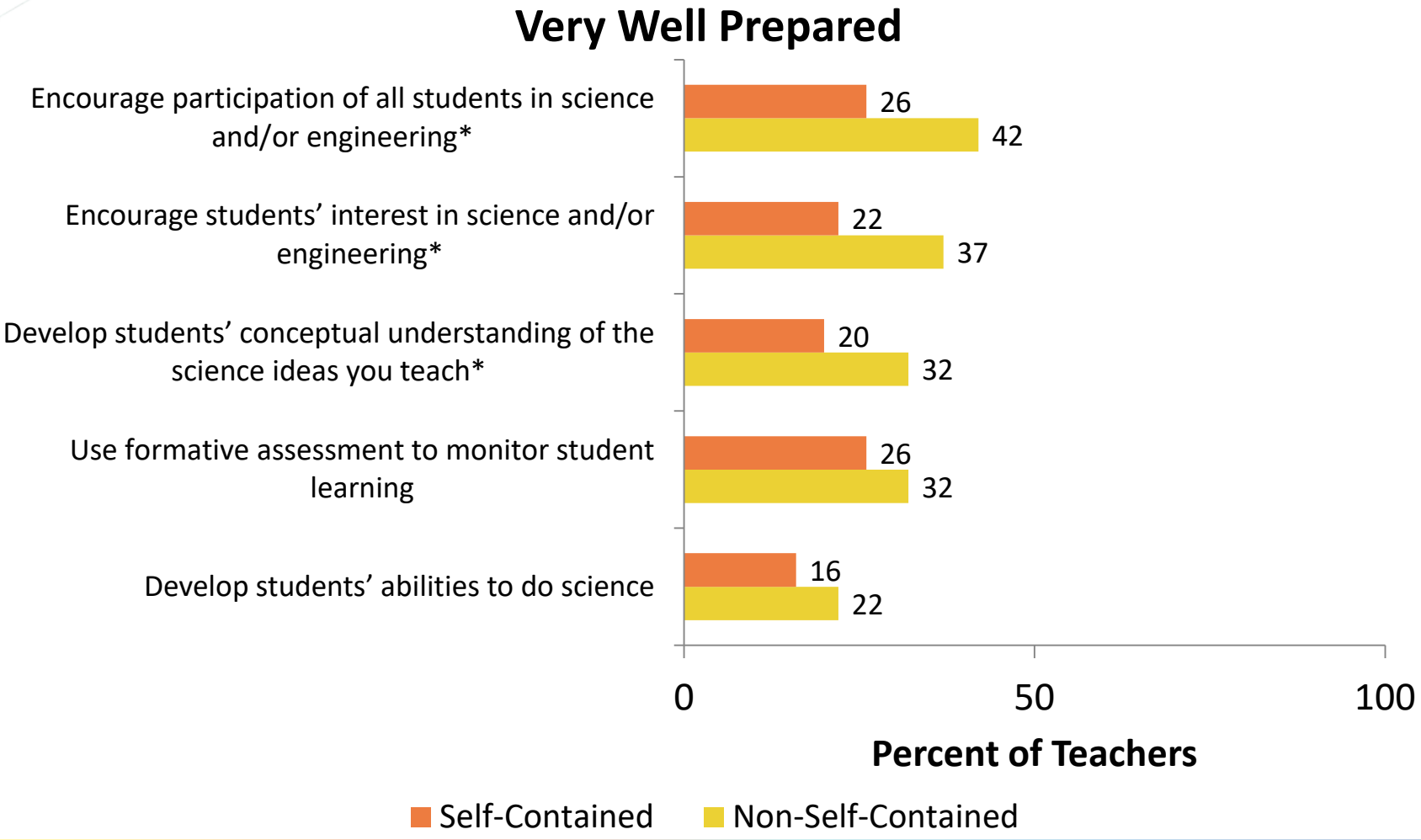
Perceptions of Pedagogical Preparedness



Perceptions of Pedagogical Preparedness



Pedagogical Preparedness: Grades 3-5

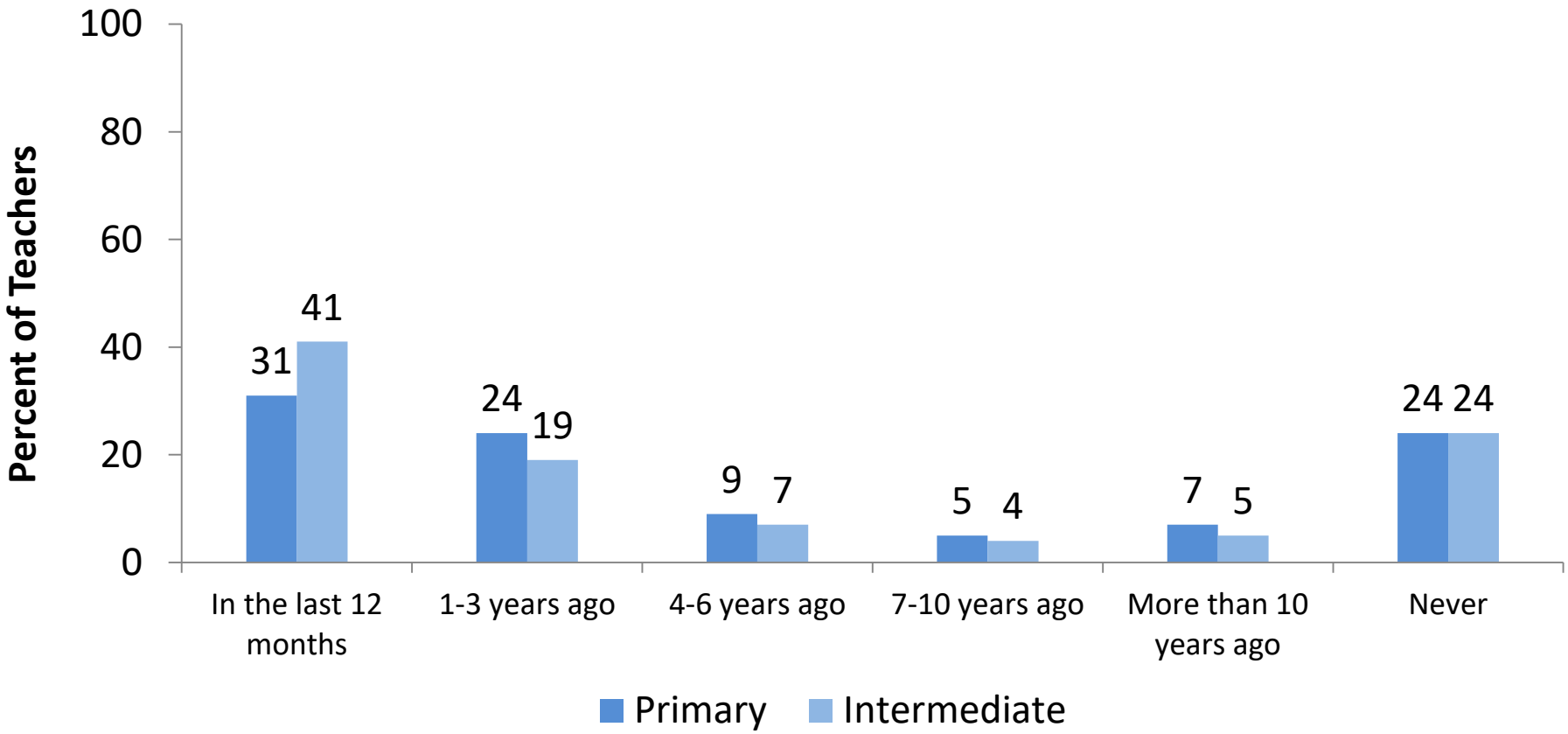


Takeaways

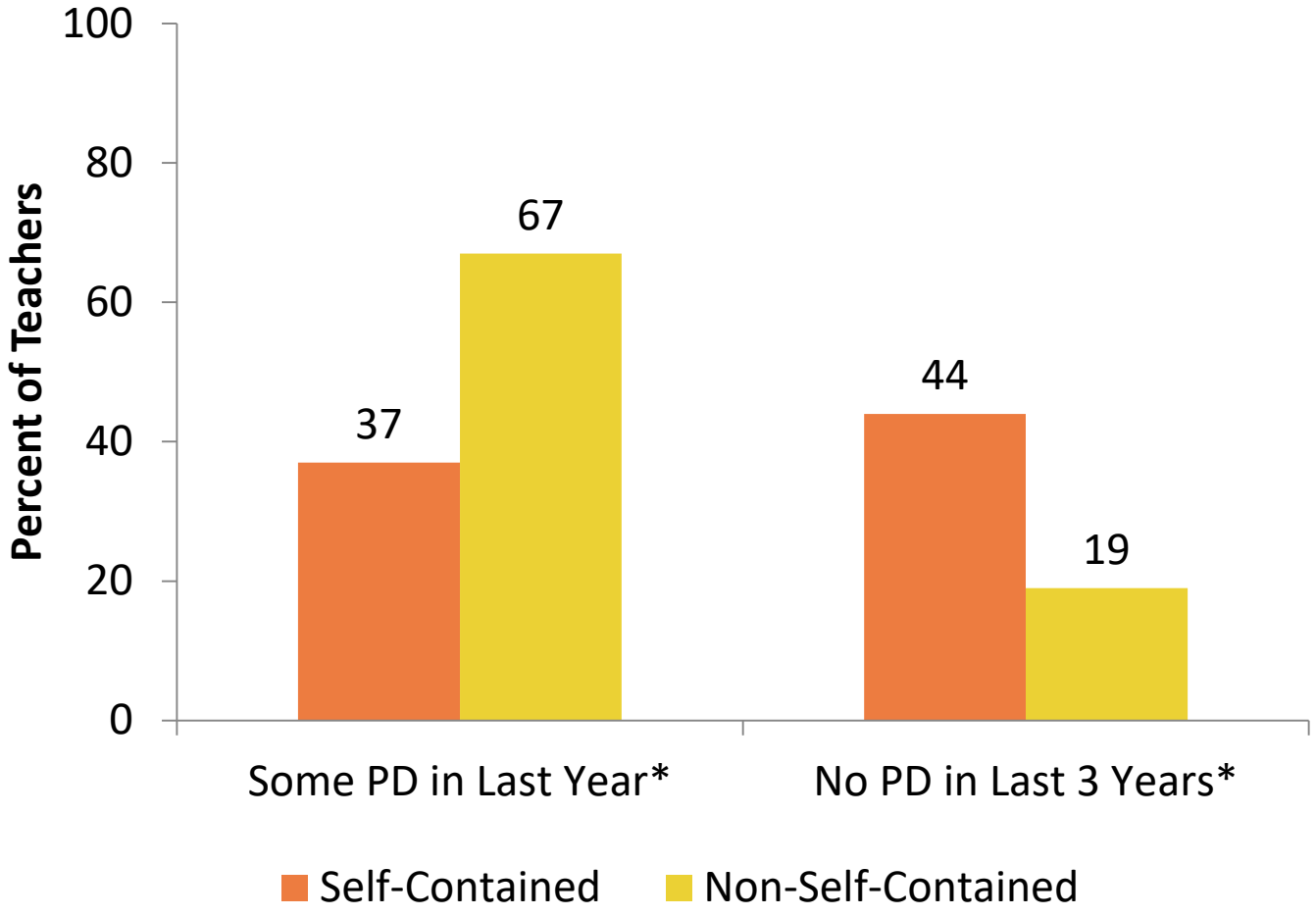
- **Elementary teacher beliefs generally align well with the NGSS.**
- **Only about one-third of elementary teachers meet NSTA's recommendation for course background.**
- **Elementary teachers generally do not feel well prepared for science instruction.**

Professional Development (PD)

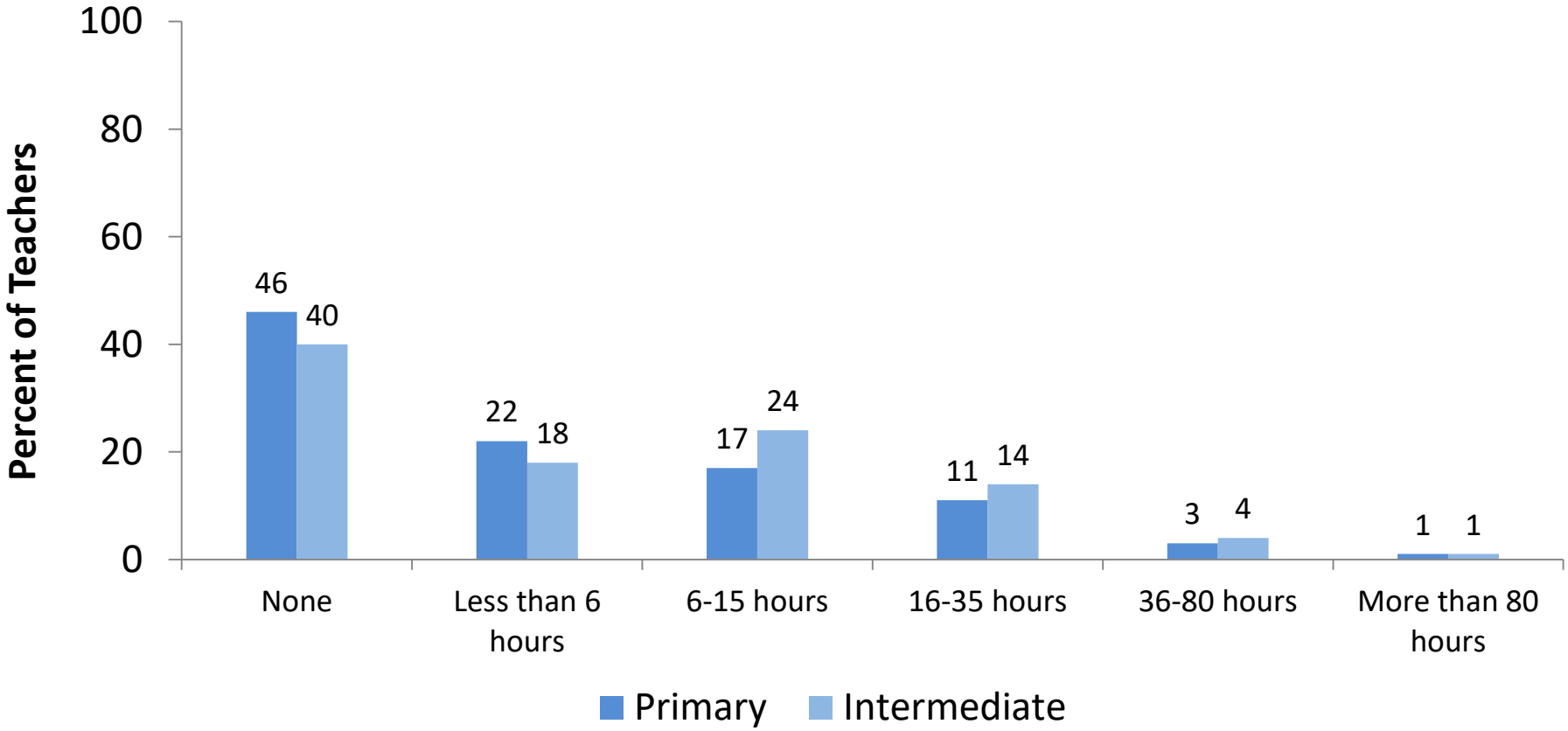
Most Recent Participation in Science-Focused PD



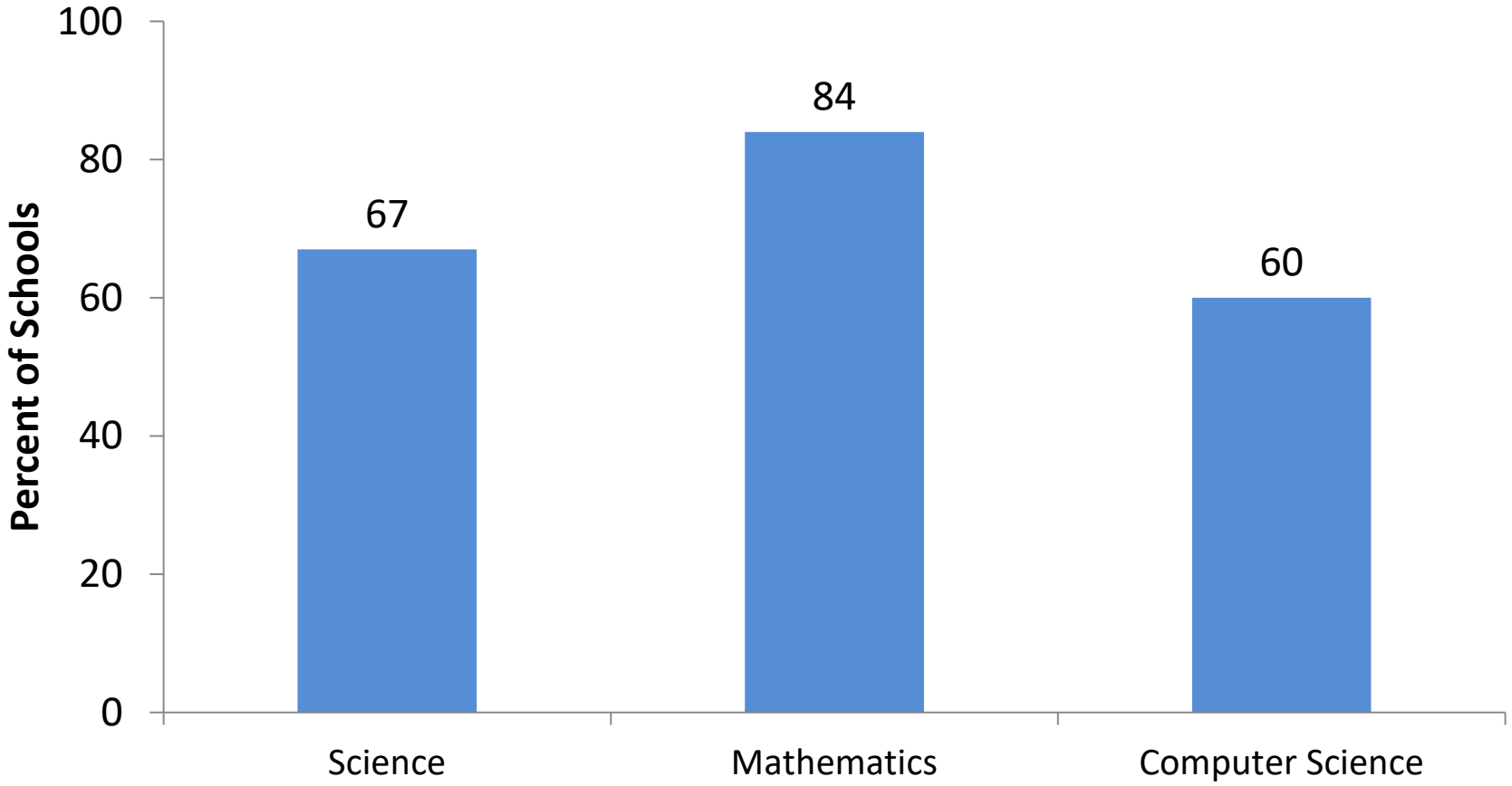
Science PD Participation: Grades 3–5



Time Spent on PD in the Previous 3 Years



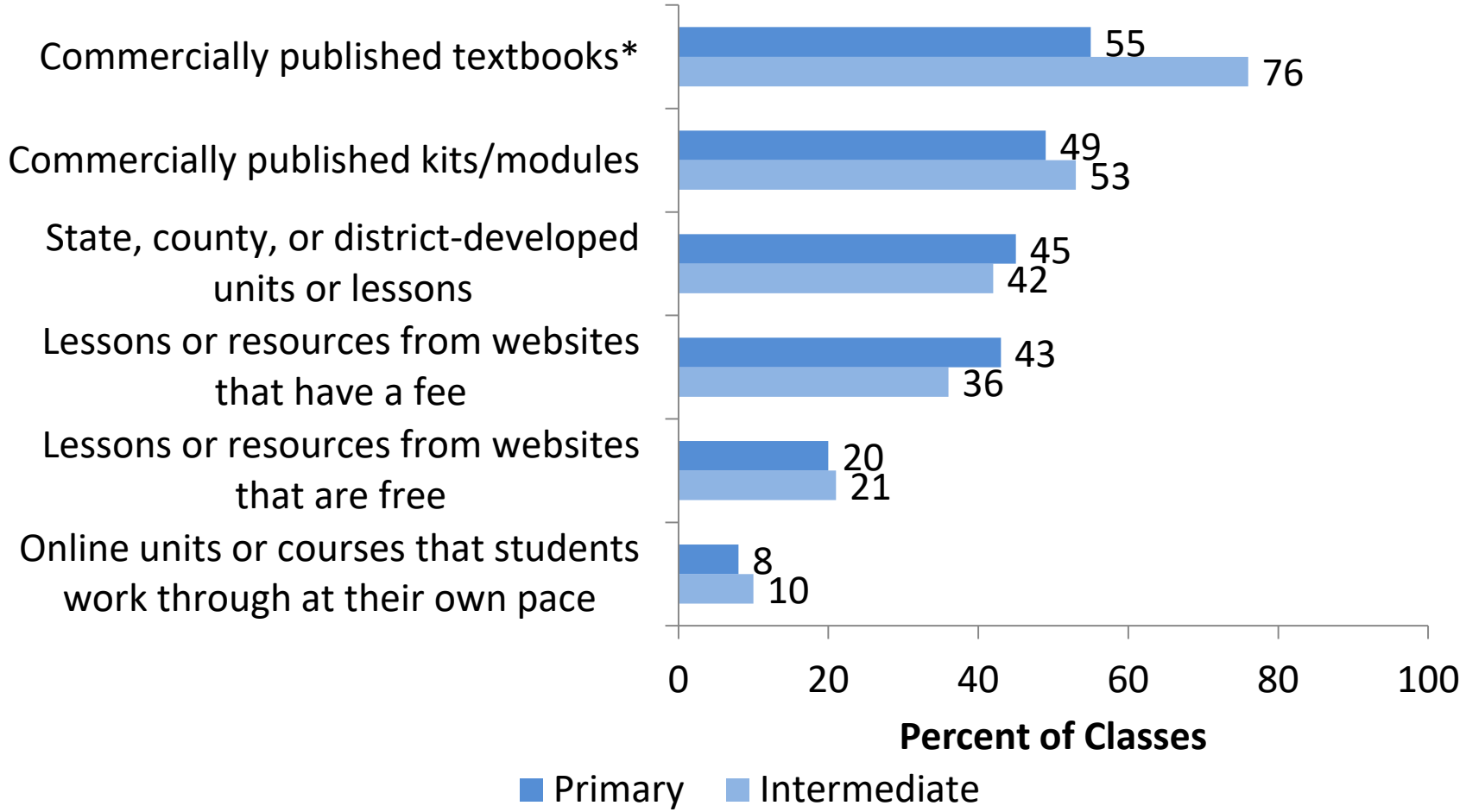
Elementary Schools Offering Any Type of PD in the Last 3 Years



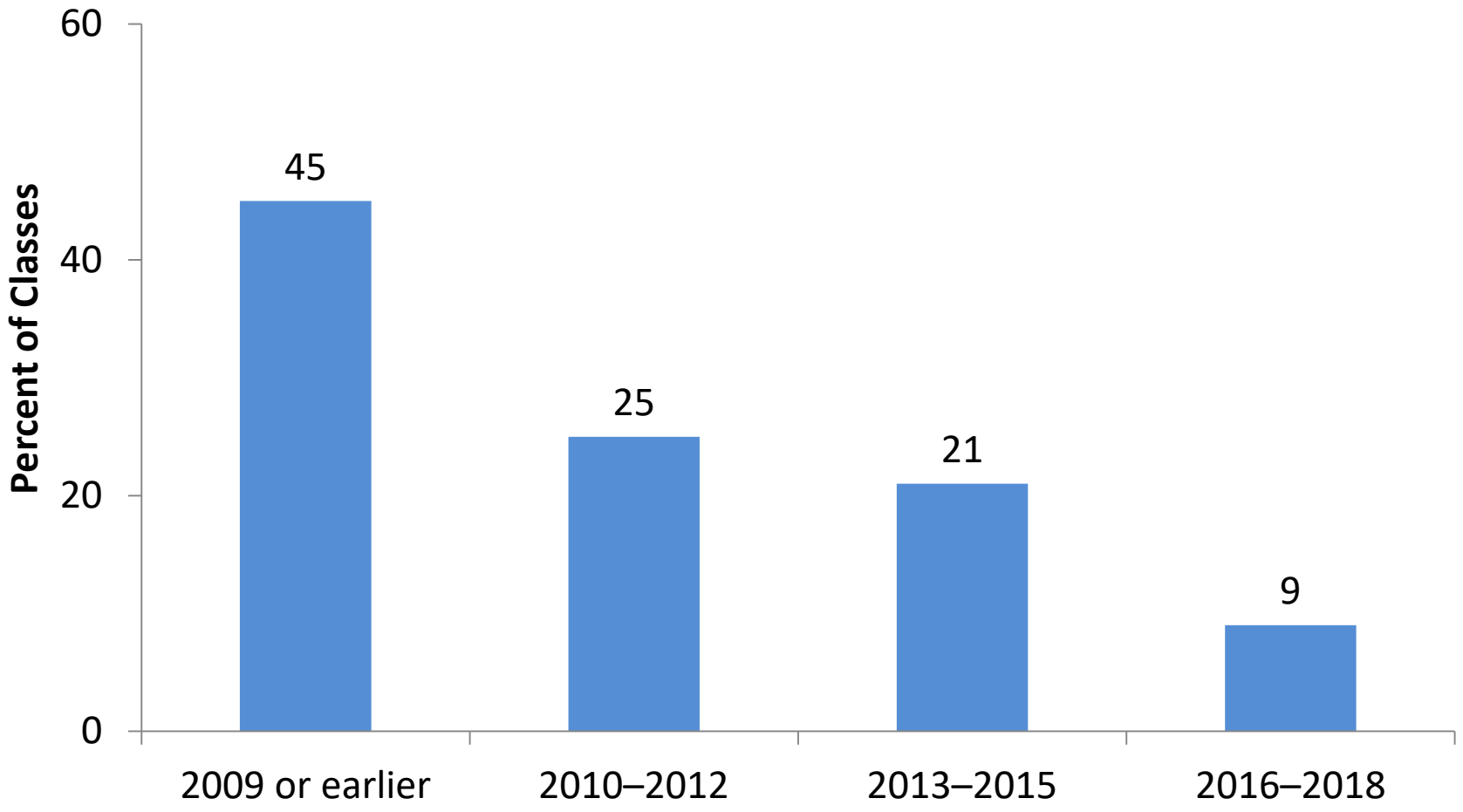
Resources for Instruction

Instructional Materials

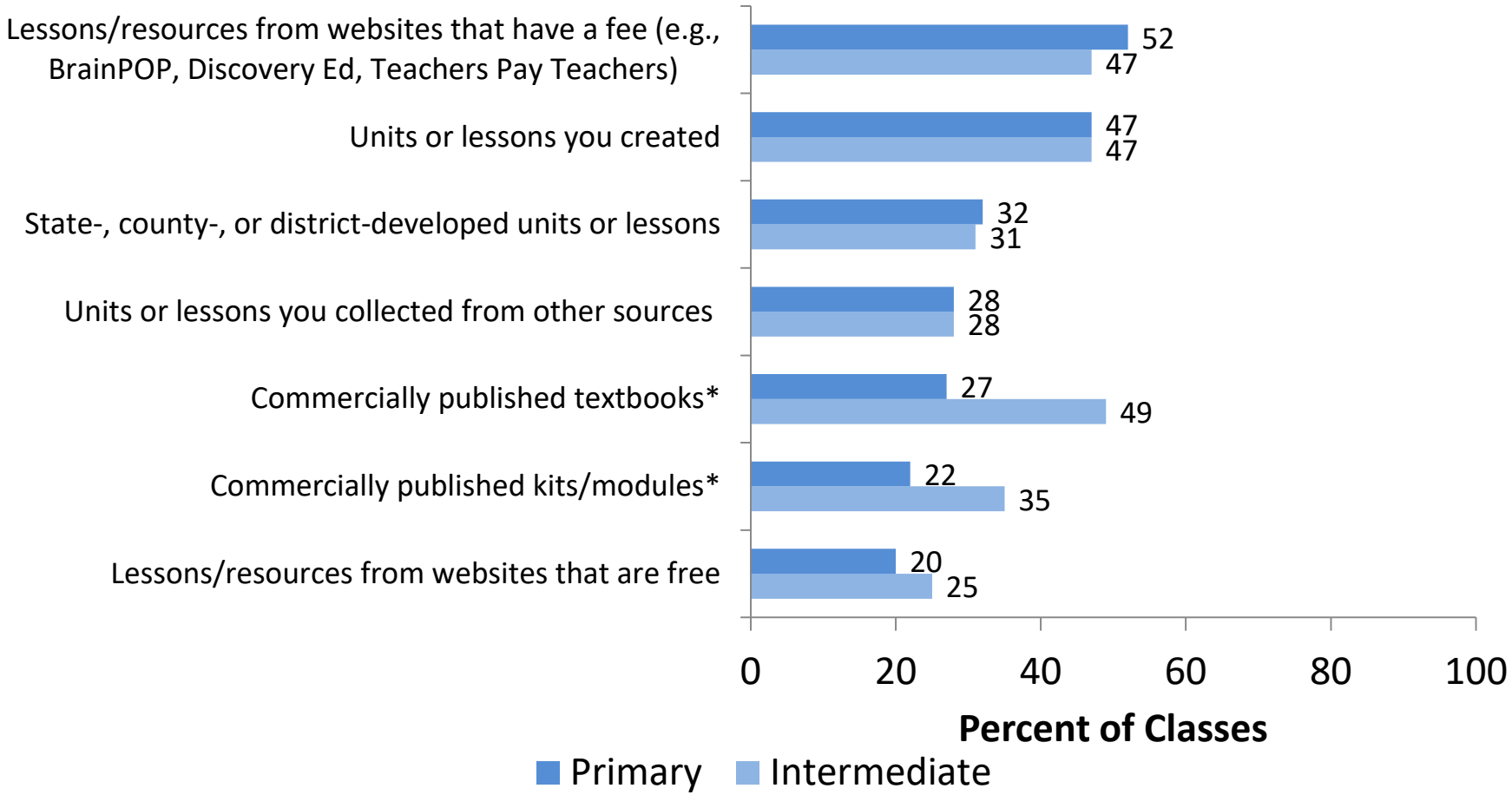
Elementary Science Classes for Which Various Types of Instructional Resources Are Designated



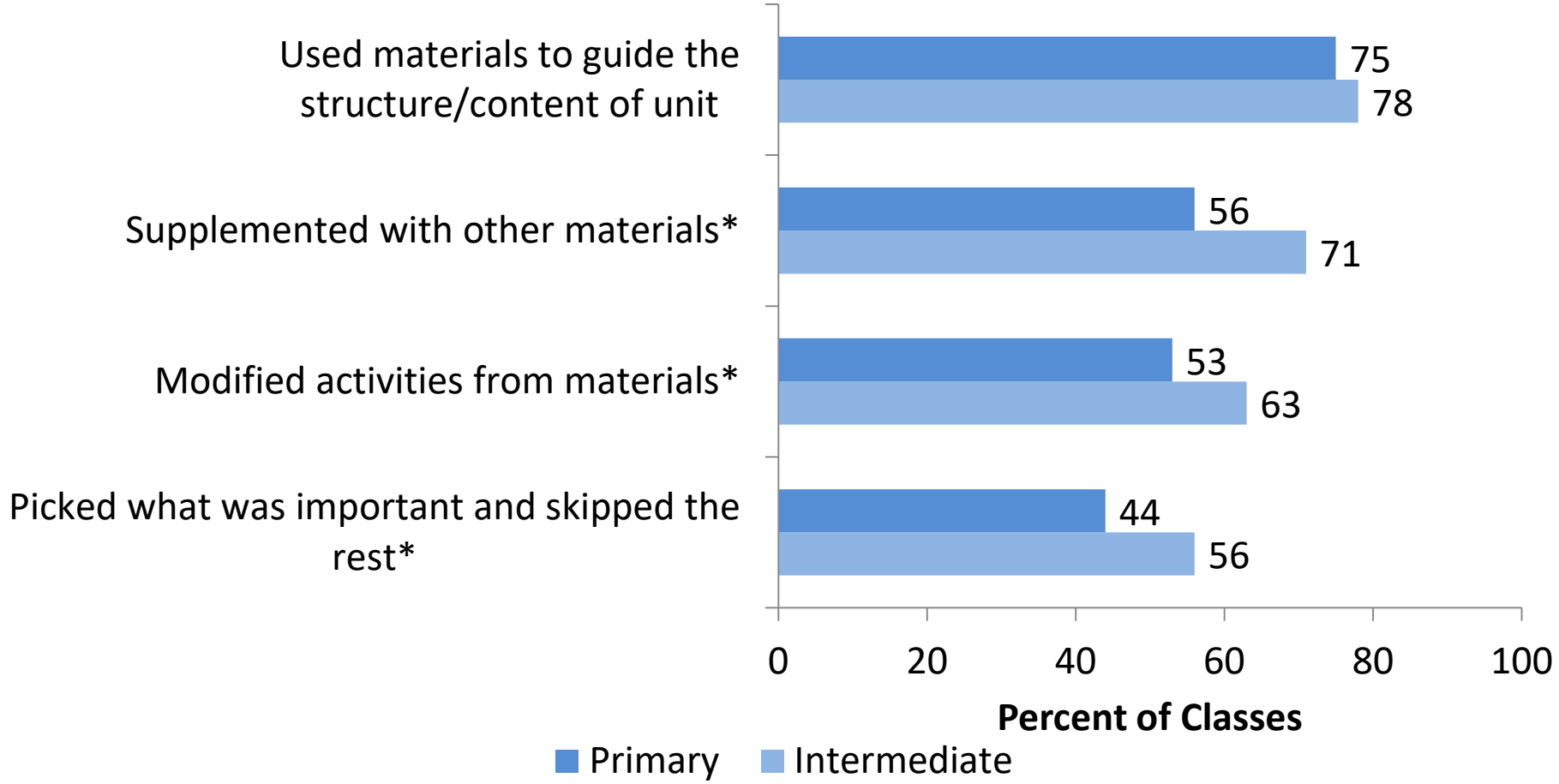
Publication Year of Science Textbooks/Programs



Elementary Science Classes Basing Instruction on Various Instructional Resources at Least Once a Week

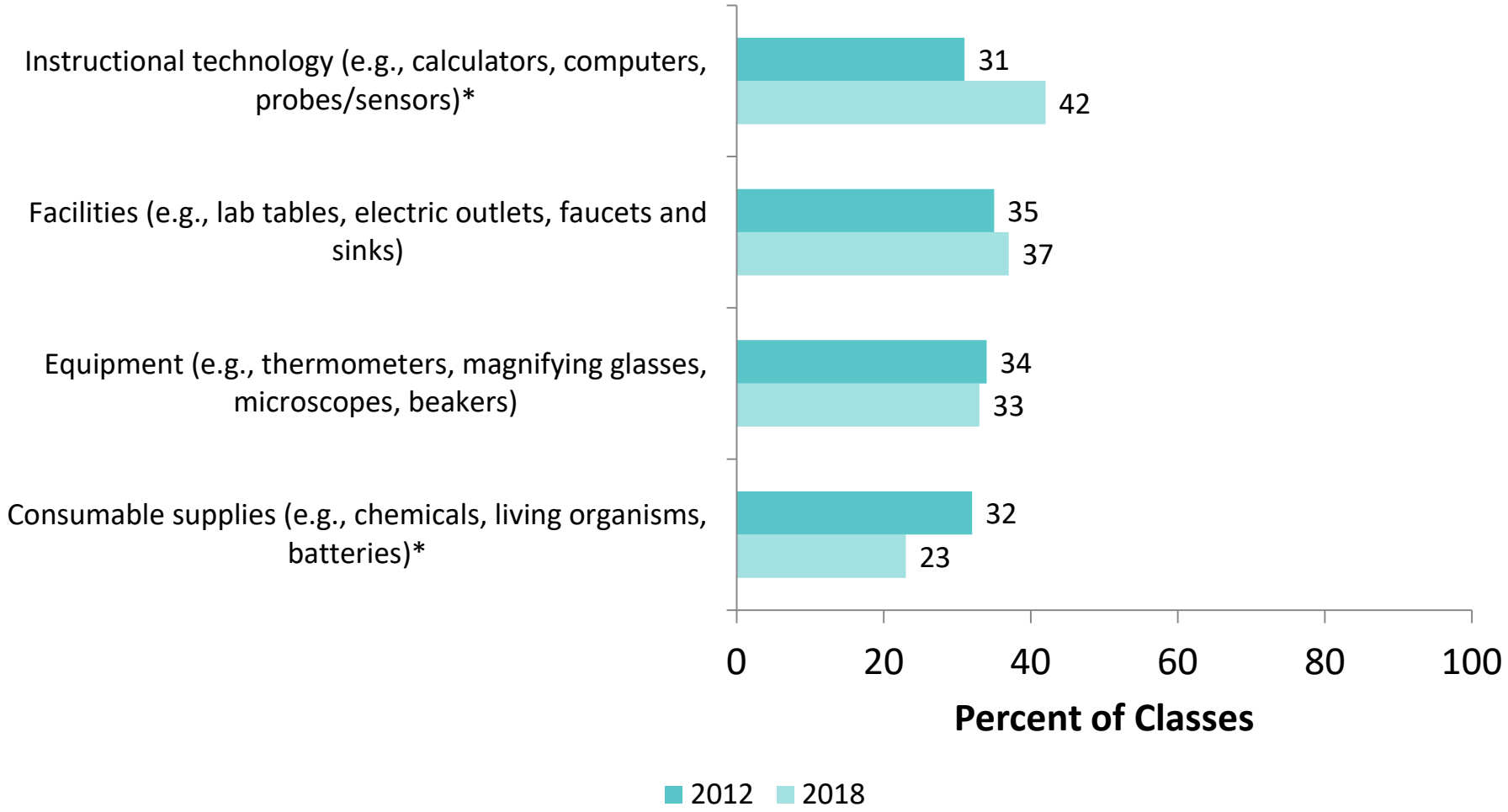


Ways Science Teachers Substantially Used Their Textbook in the Most Recent Unit

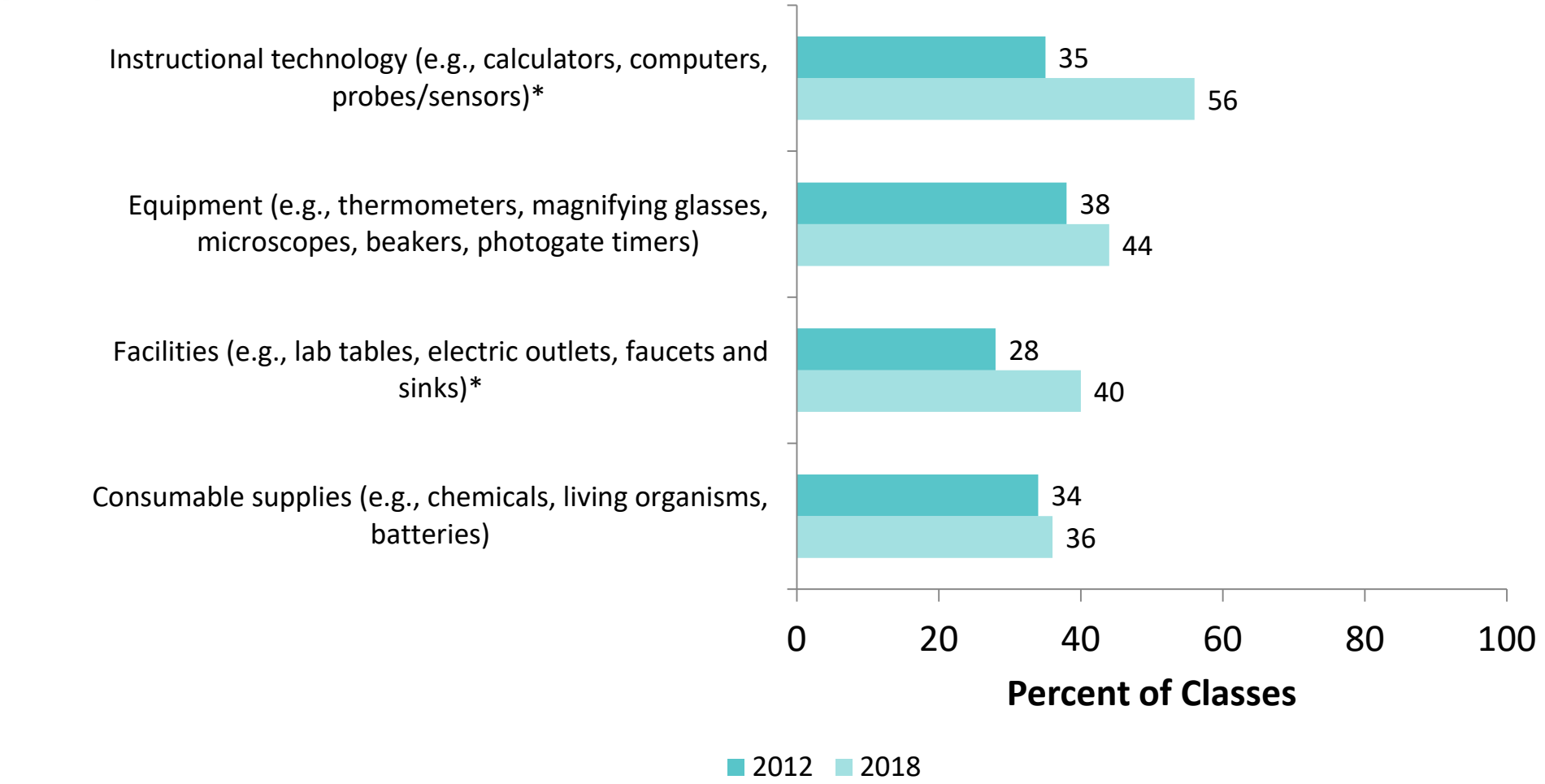


Facilities and Equipment

Classes in Which Teachers Feel Various Resources are Adequate (Primary)

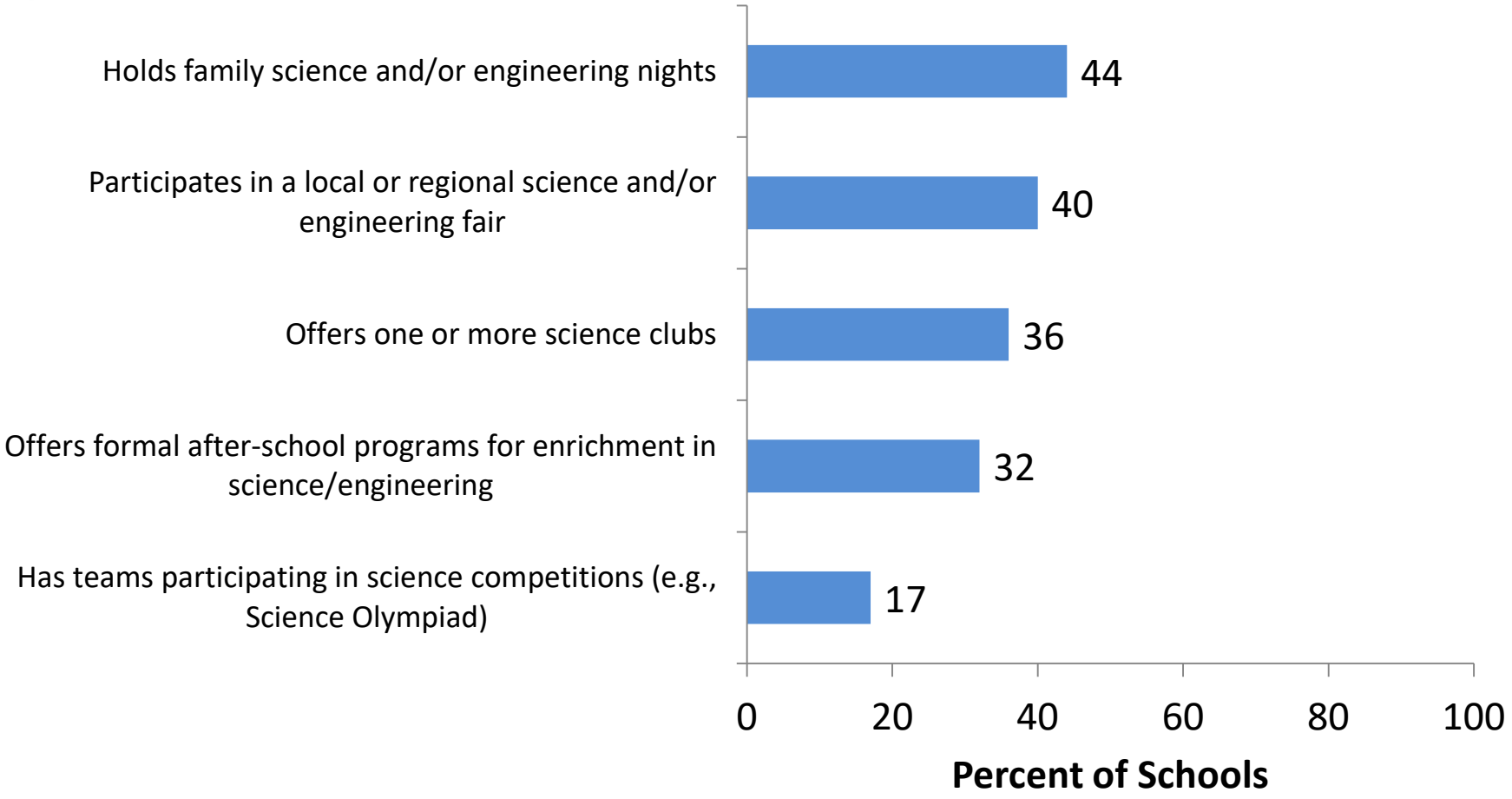


Classes in Which Teachers Feel Various Resources are Adequate (Intermediate)

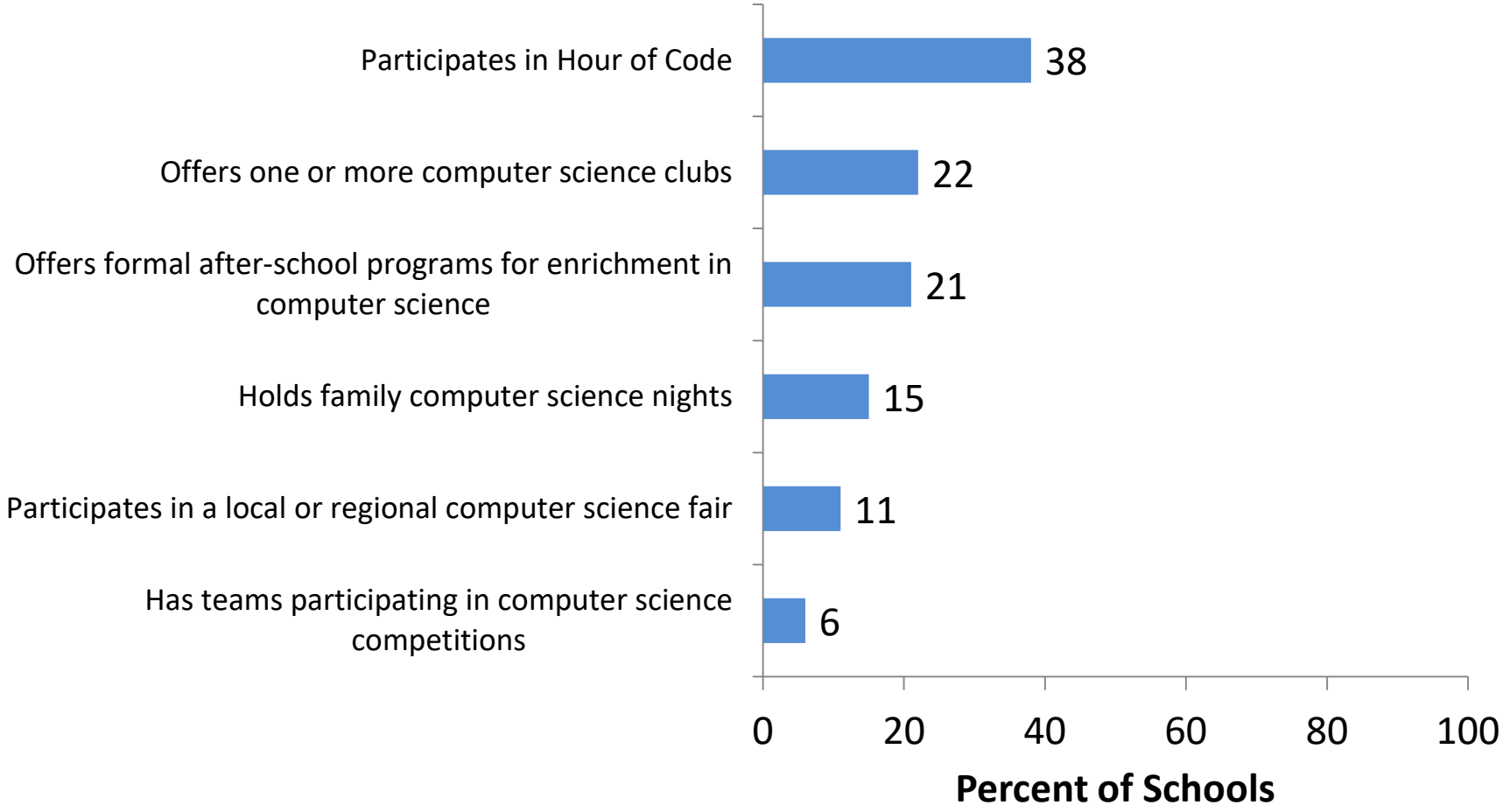


School Practices to Encourage Student Interest and Achievement

Science/Engineering Opportunities Outside of the Classroom

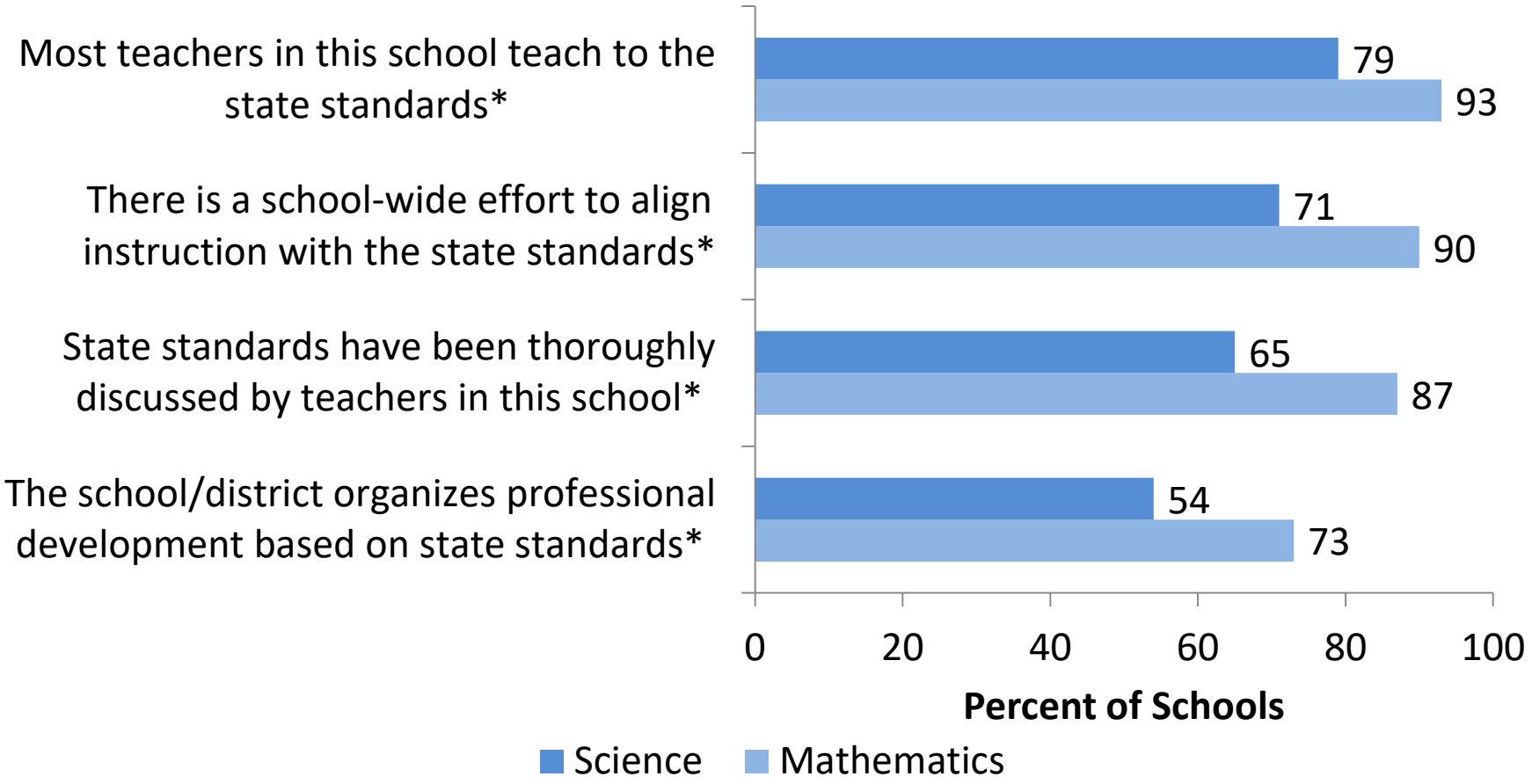


Computer Science Learning Opportunities



State Standards

Influence of State Standards



Takeaways

1. **Elementary teachers face systemic and substantial obstacles to providing excellent science instruction.**
2. **Little has changed for the better since 2012. On some indicators, the status of elementary science education has declined.**
3. **Major obstacles to improvement**
    1. Lack of NGSS-aligned instructional materials.
    2. Lack of professional learning opportunities.
    3. Low priority given to science relative to reading/language arts and mathematics.