VITAL SIGNS

MASSACHUSETTS

Business leaders in Massachusetts cannot find the science, technology, engineering and mathematics (STEM) talent they need to stay competitive. Students' lagging performance in K-12 is a critical reason why. The good news is that the nation's most effective STEM education programs can help turn the tide.

Massachusetts students outscore their peers in almost every other state on national tests of math and science, and they have made strong gains in math since 2003. Yet these gains have faltered in recent years, and the state's past success masks large racial gaps in student achievement and access to opportunity. Not enough students--least of all minorities--have the chance to learn rich and challenging content that prepares them for college and careers. Math and science teachers of low-income, black and Hispanic students are most likely to say they don't have the resources they need, and their schools are most likely to lack facilities and materials for science instruction.

MASSACHUSETTS NEEDS MORE STEM TALENT

STEM fields are growing in Massachusetts

Between 2017 and 2027:

STEM jobs will grow

7%

Non-STEM jobs will grow

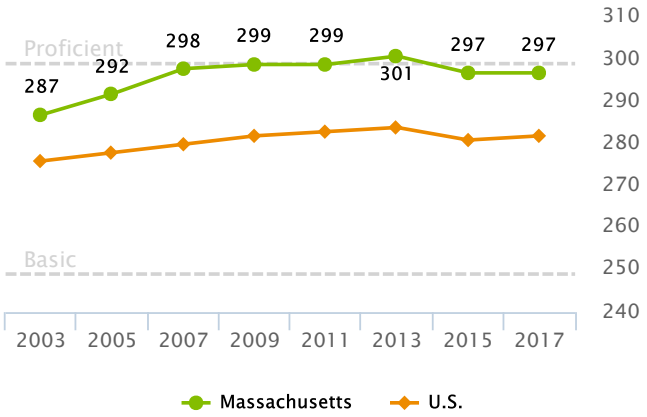
3%

THE MASSACHUSETTS STEM SKILLS SHORTAGE STARTS EARLY

Progress in math has faltered

After years of progress in math, eighth-graders have lost ground.

Trends in 8th grade math scores, 2003-2017

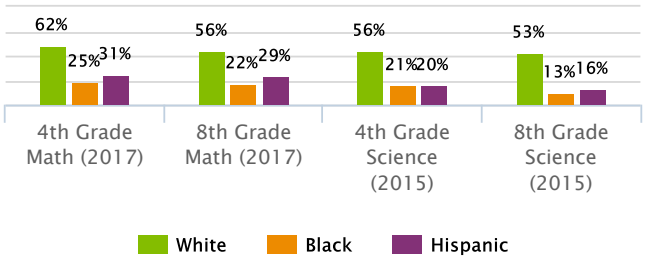


SOURCE: U.S. Department of Education, 2003–2017

Students of color lag farthest behind

Closing achievement gaps must remain a priority.

Percentage of Massachusetts students at or above proficient, by race/ethnicity



SOURCE: U.S. Department of Education, 2015–2017

*Data not available or reporting requirements not met.

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For the complete state report, methodology, and sources, see vitalsigns.ecs.org (vitalsigns.ecs.org)

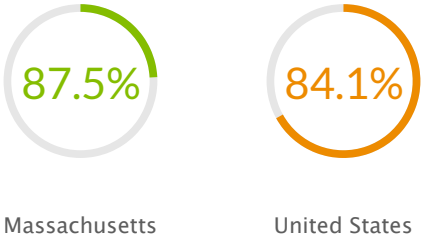
MASSACHUSETTS

VITAL SIGNS

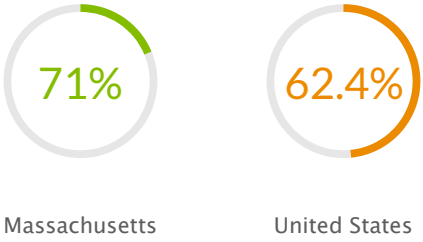
The state must plug the gaps in the STEM pipeline

The Massachusetts STEM pipeline loses young people at every level of the education system. Some fail to graduate from high school and many do not finish college, which narrows the pipeline of students who can gain advanced STEM skills. The 2-year college graduation rate is particularly low. Of those students who do graduate, few get a post-secondary degree in STEM.

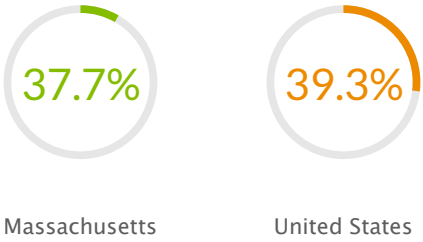
What percentage of high school students graduate? (2014-2015)



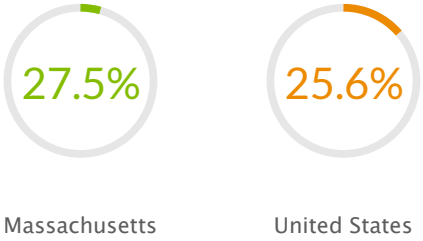
Of high school graduates who enter a 4-year degree program, what percentage graduate? (2012-2013)



Of high school graduates who enter a 2-year associate's degrees program, what percentage graduate? (2012-2013)



What percentage of certificates and degrees is in STEM fields? (2014-2015)



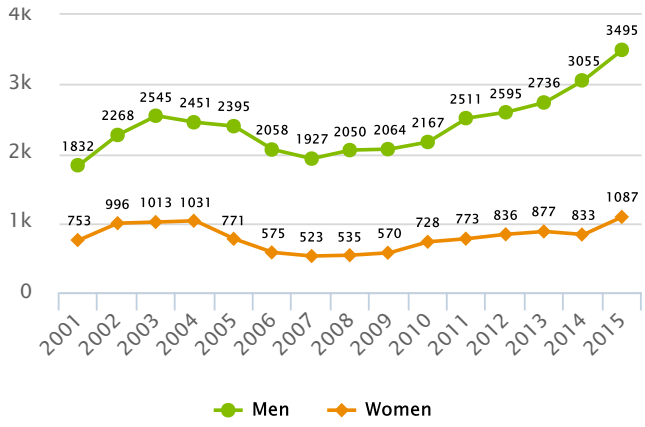
TAP MASSACHUSETTS'S FEMALE AND MINORITY TALENT

Together, females and minorities make up more than half of Massachusetts's population, yet they are much less likely to earn STEM degrees or become STEM professionals. Closing these gaps can pay big dividends in the state.

Women have lost ground in computing

The available talent in computer science would rise dramatically if the state simply closed the gender gap in these subjects.

Number of computing degrees/certificates in Massachusetts

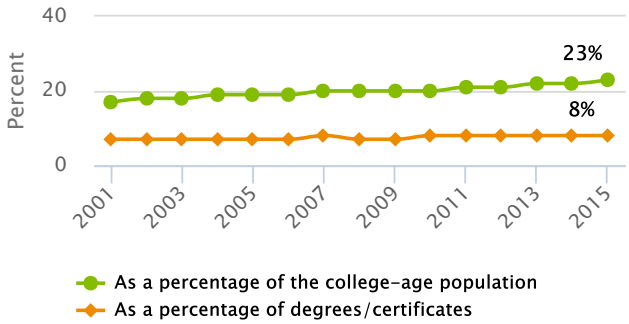


SOURCE: U.S. Department of Education, 2001–2015

People of color are not gaining ground in engineering degrees

It is critical to prepare and inspire many more students of color to pursue STEM subjects such as computer science and engineering.

Underrepresented minorities in Massachusetts earning engineering degrees/certificates



SOURCE: U.S. Department of Education, 2001–2015

*Data not available or reporting requirements not met.

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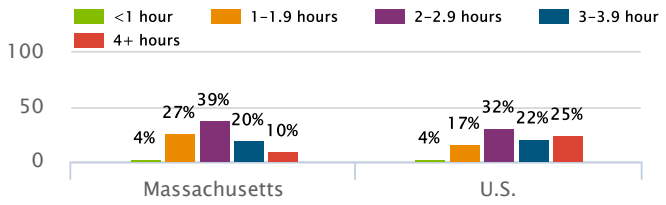
VITAL SIGNS

GIVE MASSACHUSETTS STUDENTS ACCESS TO BETTER STEM LEARNING OPPORTUNITIES

Lack of access to such opportunities severely limits young people's college and career prospects.

The state should make time for elementary science

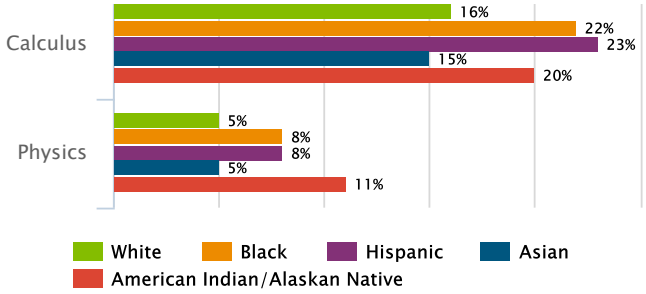
Hours per week spent on science, grades 1-4, 2015



The state should improve access to advanced courses

Many students lack access to such courses.

Students in Massachusetts high schools that do not offer challenging math and science courses, 2013/14



Success in Advanced Placement courses can put more students on a path to STEM careers.

Of the high school graduating class of 2015 in Massachusetts:

	Took AP Math Exam	Scored 3+ on AP Math Exam
All Students	20%	13%
White	19%	13%
Black	12%	4%
Hispanic	11%	4%
Asian	49%	36%
American Indian/Alaskan Native	19%	7%

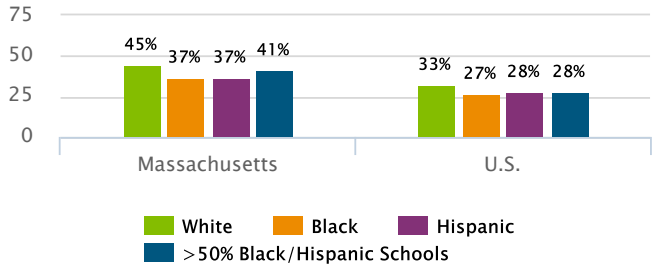
EDUCATION COMMISSION OF THE STATES

DEVELOP AND RETAIN TALENTED STEM TEACHERS IN MASSACHUSETTS

Research shows that teachers' content knowledge and teaching experience can affect student performance

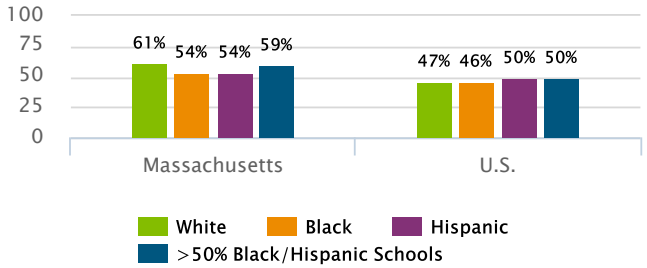
Boost teachers' content knowledge

Eighth-graders whose math teachers have an undergraduate major in math, 2017



SOURCE: U.S. Department of Education 2017

Eighth-graders whose science teachers have an undergraduate major in science, 2015

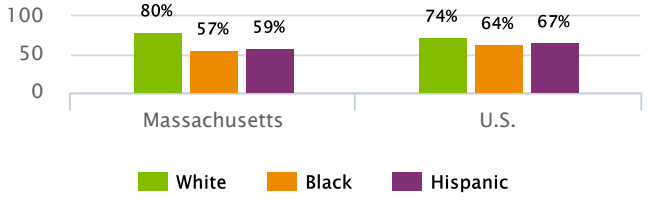


SOURCE: U.S. Department of Education 2015

Retain excellent teachers

Research shows that new teachers are less effective than teachers with three to five years of experience.

Eighth-graders whose math teachers have 6+ years of experience teaching their subject



SOURCE: U.S. Department of Education 2017

*Data not available or reporting requirements not met.

MASSACHUSETTS

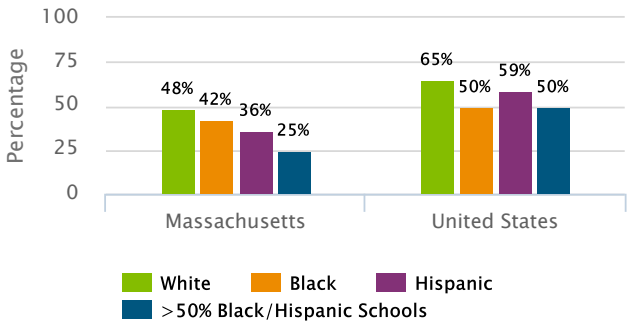
VITAL SIGNS

GIVE MASSACHUSETTS SCHOOLS AND TEACHERS THE RESOURCES THEY NEED

Teachers in Massachusetts need better resources, facilities, and teaching materials to succeed.

Too many teachers lack the tools of their trade

Eighth-graders whose science teachers say they have all or most of the resources they need, 2015

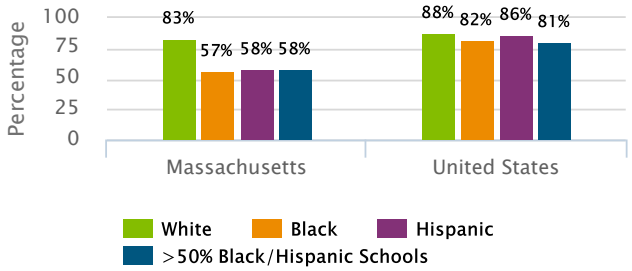


SOURCE: U.S. Department of Education, 2015

*Data not available or reporting requirements not met.

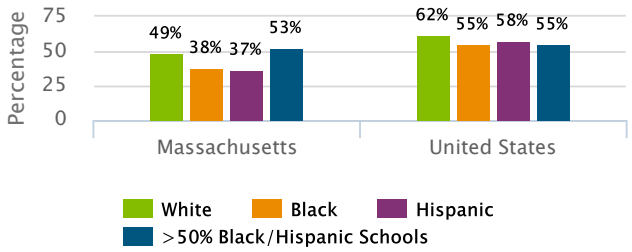
The state should improve access to science facilities and supplies

Eighth-graders whose schools have science labs, 2015



SOURCE: U.S. Department of Education, 2015

Eighth-graders whose schools report that supplies or materials for science labs are available "to a large extent," 2015



SOURCE: U.S. Department of Education, 2015

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