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BAYER FACTS OF SCIENCE EDUCATION XVII

Executive Summary & Key Findings

2015

Introduction

In 2015, Bayer celebrates the 20th anniversary of its company-wide, Presidential award-winning Making Science Make Sense (MSMS) initiative. This initiative advances science literacy through the support of inquiry-based, hands-on science teaching and learning, employee volunteerism and a national public education campaign led by Dr. Mae C. Jemison, the nation's first African-American female astronaut.

One key component of the public education program is the Bayer Facts of Science Education public opinion survey. The surveys have polled a variety of audiences – from the nation's Ph.D. scientists and Science Teachers to Parents, students and business executives – on a number of timely science educational and literacy issues. These studies have helped gauge the state of science education in the U.S., measure the public's support for reform and recognition of the roles that science and science literacy play in everyday life, and provide important information to Bayer as it constantly reshapes and refocuses the MSMS program.

In 2015, this survey represents the 17th survey Bayer has commissioned during those 20 years. To celebrate this milestone, Bayer revisited the first survey it commissioned back in 1995. That survey polled 1,000 Parents and 1,004 Teachers of children in grades K-5.

The 1995 survey provides a benchmark compared to the 2015 survey in terms of how far elementary school teachers have come vis-a-vis the number of hours they teach science (compared to other subjects) and their own comfort levels teaching the subject, as well as if/how parental attitudes toward science and science education have changed over 20 years, particularly now with so much emphasis on STEM (Science, technology, engineering and Mathematics) education and careers – a term (STEM) no one used back in 1995.

The 2015 survey allows us to compare and contrast “then” and “now” by including some of the same questions from the 1995 survey.

The 2015 survey was specifically designed to measure:

- interest in and attitudes toward science and science education/science literacy
- comfort level teaching and talking about science
- use of hands-on science activities and teaching methods
- perceived support for science education in school systems
- overall assessment of the current and future status of science education

Methodology

The 2015 Bayer Facts of Science Education survey presents the findings of a national telephone survey conducted May 11- June 11, 2015, by SSRS among a representative sample of 1,009 adults with children in grades K-5 and a representative sample of 1,002 teachers who teach grades K-5. The margin of error associated with samples of this size is +/- 3.1% at 95% level of confidence.

Executive Summary

Even though coming from different perspectives, teachers and parents in 2015 are more similar than dissimilar in their opinions

- Both audiences state the quality of science education has improved since 1995. Teachers in 2015 are significantly more likely than 20 years ago to state they feel better qualified to teach science, whereas parents in 2015 are significantly more likely to rate their child's science education as excellent/good compared to 20 years ago.
- Parents are equally likely to say that teachers or the parents, themselves, play the biggest role in stimulating their child's interest in science.
- Both audiences agree, although sometimes teachers more emphatically than parents, that:
 - A good science education for children is not only important for our country's future success, but also for the success of these students in life.
 - Hands-on science-based education is a great way to encourage girls' and minorities' interest in science.
 - It's important girls and minorities receive a strong science and math education to eliminate under-representation.
 - It's important that children see science as an exciting, creative and interesting subject.
- Both teachers and parents also agree that the science and engineering community should develop programs that attract, encourage and retain girls' and minorities' interest in science and math.
- Teachers are less likely than parents to think they need to tailor their teaching style or lesson plans to ensure girls and minorities become more interested in science.

Strides have been made in the delivery of science education in schools with grades K-5

- Teachers feel more qualified to teach science than 20 years ago and are more likely to say that as it is presently taught, science is an exciting, creative and interesting subject.
- Parents state the quality of their child's science education has increased in the past 20 years.
- In 2015, parents state their child is most excited about science compared to the other three core subjects of English, math and social studies.
- Four in five parents state their child speaks positively about their science education at least sometimes, if not often or always.

But there is still room for improvement

- Three in five parents think the emphasis placed on science is greater than when they were children. However, while more teachers say that the emphasis placed on science is the right amount compared to twenty years ago, three in five teachers still feel more emphasis needs to be placed on science education.

- In fact, teachers feel their schools least properly equip them to teach science and social studies among the four core subjects, and, science receives the third level of emphasis behind English and math, with social studies receiving the least emphasis in schools in 2015.

Both teachers and parents agree that hands-on learning is the most frequent and effective teaching method for science

- Teachers current science curriculum includes 50% or more based on hands-on activities and they prefer to dedicate more instructional time to hands-on science learning opportunities.
- Teachers feel the greatest advantage of hands-on science learning is that it appeals to different types of learners.
- However, teachers assign significantly fewer take-home science activities per month compared to what parents would like to be sent home.
- In fact, teachers are sending significantly fewer take-home activities in 2015 compared to 1995 data while parents are looking for significantly more take-home activities compared to twenty years ago.
- Both teachers and parents state similar barriers to hands-on science-based experiences as lack of time and money/resources.

Key Findings

CHILDREN SHOULD BE EXCITED BY SCIENCE

- Parents and teachers universally agree it's important children see science as an exciting, creative and interesting subject (97% and 99% respectively) and that it's important to children's future success in life to receive a good science education (94% and 99%, respectively).
- Teachers are 42 percent more likely in 2015 to say science is an exciting, creative, and interesting subject as it is presently taught, compared to 1995 (44% vs. 31%).
- Beyond the child, parents and teachers also agree (95% and 99%, respectively) it's important for the country's future success that all children have a good science education.
- Parents are 21 percent more likely to say their child gets excited about the subject of science (88%), compared to math (73%), English (73%) and social studies (73%).
- Just over half (56%) of parents say their child always or often talks to them about their science education or science teacher in a positive way.
- Yet, nearly three-fifths (57%) of parents wish their child had a greater interest in science and math.
- However, nearly one-third (31%) of parents don't feel confident enough in their scientific knowledge to help their children engage in hands-on science activities. Moms are more likely than dads to feel this way (36% vs. 23%, respectively).

SCHOOLS NEED TO PLACE MORE EMPHASIS ON SCIENCE EDUCATION

- Ninety-eight percent of teachers feel they are qualified to teach science, yet three-fifths (61%) believes schools should place more emphasis on science education. In fact, one-fifth (21%) of teachers say science receives the least amount of emphasis at their school.
- Parents do not feel there is a greater emphasis on getting a good science education today, compared to when they were young (60% in 2015 and 63% in 1995). In fact, 17 percent feels there is less emphasis today, compared to 12 percent who felt the same in 1995.
- Parents are seven percent more likely to rate the quality of their child's science education as excellent or good in 2015 vs. 1995 (74% vs. 69%, respectively).
- Nearly seven in 10 parents today stated they thought the quality of their child's science education would be better than their own at the same age

HANDS-ON LEARNING IS BY FAR THE BEST WAY FOR CHILDREN TO LEARN ABOUT SCIENCE

- Nearly all (95%) teachers believe hands-on activities are the most effective way for students to learn science, and 79 percent of parents say the same.
- Only two-in-five (44%) parents believe hands-on activities are used most often to teach science to their child. Yet, 69 percent of teachers indicate they use hands-on activities most often to teach science to their students.
- One-quarter (23%) of parents believe textbooks are most often used to teach their child science, but only five percent think textbooks are the most effective way for students to learn about science.
- More than three-fifths (63%) of teachers say at least 50 percent of their school's science curriculum includes hands-on learning opportunities.
- Teachers say they have done an average of six hands-on science activities with students in the previous four weeks of class, up from just four activities in four weeks in 1995.
- The greatest advantages of hands-on science education, according to teachers, is that it appeals to different types of learners (73%), makes complex information more relatable to students (67%) and makes the subject more exciting overall (66%).
- Teachers universally agree (99%) more hands-on experiential learning in general would benefit students' learning.

PARENTS WANT TO BE INVOLVED IN HANDS-ON SCIENCE LEARNING WITH THEIR CHILDREN

- One-third (32%) of teachers say parent support or involvement at home would be most helpful in increasing hands-on science learning experiences.
- Nearly two-thirds (64%) of parents would like their child's teacher to provide take-home science activities at least once a week, up 33 percent from 1995 (49), but teachers indicate they only assign an average of two take-home activities a month, down from three per month in 1995.
- Eighty-five percent of parents enjoy having to help their children with hands-on science-based activities.
- Out in nature or at home are the top places parents say they always or often engage in hands-on science learning experiences with their child. One third (34%) of parents say they always or often do so out in the community, such as at science museums, libraries or science centers.

TIME AND MONEY ARE THE LARGEST BARRIERS TO HANDS-ON SCIENCE ACTIVITIES

- Nearly all teachers (92%) say they have a lot more educational priorities today than in years past.
- Eighty-five percent of teachers would dedicate more instructional time to hands-on science-based learning if given the opportunity, but are prevented due to lack of time due to other educational priorities (80%) and lack of funds (49%).
- The barriers are the same for parents – they say they are prevented from enjoying more hands-on science activities with their child because they don't have enough time (59%) or because it costs too much money (25%). One-in-five (19%) parents say not having access to information or ideas about hands-on activities prevents them from enjoying more activities with their child.
- On the other hand, two-fifths (39%) of parents would rather spend time with their child doing other activities besides hands-on science-based activities.
- To increase hands-on science learning, teachers say they need opportunities to get out of the classroom (44%), access to outside science experts or speakers (43%) and more professional development or training opportunities (42%).
- Four-out-of-five (79%) teachers think their schools focus more on standardized test scores and the common core than experiential learning, but nearly all (94%) agree hands-on learning in general is a valuable strategy for improving standardized test scores and overall performance.

PARENTS PLAY A PIVOTAL ROLE IN GETTING THEIR KIDS EXCITED ABOUT SCIENCE

- Parents are most likely to say they, themselves, play the biggest role in stimulating their child's interest in science (46%), followed closely by teachers (44%).
- However, two-fifths (41%) of parents don't believe their child has an inspiring science role model to look up to.
- One-in-five (19%) parents say not having access to information or ideas about hands-on activities prevents them from enjoying more activities with their child.

PARENTS, TEACHERS AND THE STEM COMMUNITY NEED TO WORK TOGETHER TO ENCOURAGE GIRLS' AND MINORITIES' INTERESTS IN SCIENCE

- 85% of teachers say female students are just as interested in science education as their male counterparts.
- According to parents (98%) and teachers (97%), hands-on science-based education is a great way to encourage girls' and minorities' interest in science.
- In fact, nine-in-ten parents (91%) – and even more teachers (95%) – agree the science and engineering community, including companies who employ science and engineering

workers, should develop programs that attract, encourage and retain girls' and minority students' interest in science and math in school.

- Four-out-of-five parents (78%) say teachers should tailor their teaching style and lesson plans to get girls and minorities more interested in science; in fact, three-quarters (74%) of teachers say they do tailor their teaching style and lesson plans.
- Parents place the most responsibility on themselves to ensure women and minorities succeed in science and engineering fields (73%), followed by schools (64%) and other women and minorities (56%). Teachers place more emphasis on schools (71%), but agree parents are key (63%).
- Nearly all parents and teachers (96% and 99%, respectively) believe it is important that girls and minorities receive a strong science and math education beginning in elementary school in order to eliminate under representation in the science and engineering fields.

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Making Science Make Sense® is Bayer's award-winning, company-wide initiative that works to advance science literacy through hands-on, inquiry-based science learning, employee volunteerism and public education. For more information, visit MakingScienceMakeSense.com.

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