



OHIO

Sciences & Life Sciences Achievement

STUDENT ACHIEVEMENT

NAEP Grade 8	OH	U.S. Avg.	State Rank
Science Average, 2005	155.4	147.1	13
Science, 2005 (% at or above "proficient")	35.2%	27.3%	11
Life Sciences Average, 2005	156.8	148.2	13

ACT	OH	U.S. Avg.	State Rank
Science Average, 2008	21.7	20.8	16
Biology, 2008 (% of students ready for college level)	33%	28%	17

AP	OH	U.S. Avg.	State Rank
Science Scores, 2008 (% with a score of 3 or higher)	62.6%	55.4%	8
Science Exams, 2008 (Exams as % of all H.S. grads)	8.2%	10.5%	30
Biology Scores, 2008 (% with a score of 3 or higher)	58.1%	49.8%	7
Biology Exams, 2008 (Exams as % of all H.S. grads)	3.3%	4.6%	34

SCIENCE TEACHER QUALITY and PROFESSIONAL DEVELOPMENT

	OH	U.S. Avg.	State Rank
Science Teachers with Major in Assigned Field, 2003–04 (% , Grades 7–12)	55%	77%	47
Science Teachers Certified, 2006 (% , Grades 7–8)	21%	N/A%	26
Biology Teachers Certified, 2006 (% , Grades 9–12)	85%	88%	23

Note: NAEP = National Assessment of Educational Progress, AP = Advanced Placement
N/A = Data not available.

Key Organization(s) Promoting Bioscience Education

One of four focus areas of **BioOhio** is workforce development and deployment, including K-12 education.

The **Biotech Career Coach** Web site of Lakeland Community College provides a comprehensive gateway to educational information in northeast Ohio.

OH STATE SCIENCE STANDARDS & REQUIREMENTS

STANDARDS PROFILE

- Most recent update of K-12 Science Standards: **2002**
- Current K-12 life sciences standards, benchmarks, and indicators all make multiple references to biotechnology's uses and its societal impacts

Ohio Department of Education, Academic Content Standards, K-12 Science

BIOSCIENCE-RELATED GRADUATION REQUIREMENTS:

One unit of biology is required (under core curriculum adopted in 2006)



Examples of Bioscience Education Activities

Teacher Preparation and Professional Development

Under its Math and Science Partnership grant from the National Science Foundation (NSF), the Ohio Department of Education has funded **science professional development consortia** in four regions of the state, as well as several Web-based resources.

Through its Ohio Resource Center for Mathematics, Science and Reading, the Ohio Board of Regents supports **five regional centers for teacher professional development in science, technology, engineering, and mathematics (STEM) disciplines**, typically involving a consortium of at least one university, community college, and school district or coalition. The Regents also support an **Evaluation and Assessment Center for Middle School Education**.

Case Western Reserve University and the Cleveland Municipal School District partner in a **Center for Science and Mathematics Education** funded by the NSF. The program offers laboratory-based summer programs that are required for 3 years in a row, carry a stipend, and offer credits that can be transferred to Cleveland State University and applied to a master's degree.

Sinclair Community College in Dayton offers professional instruction to teachers in **Ohio's Project Lead The Way** program.

Teacher education to obtain license to instruct the **Ohio College Tech Prep Biotechnology Program** is offered at the Ohio State University, Kent State University, Bowling Green State University, and Rio Grande University.

BioOhio identifies the following companies as participating in teacher professional development: Alkermes, Eurand, Amylin, Ben

Venue (Boehringer Ingelheim), WIL Research, Battelle, and Diagnostic Hybrids.

Experiential Learning and Outreach

The Ohio State University maintains extensive outreach programming, including support of a STEM school (see below) and on-campus enrichment programming for K-12 students, such as the **Ohio State University Academy**.

Through a program funded by the Howard Hughes Medical Institute, Cleveland Clinic offers students at John Hay High School opportunities to participate in hands-on research experiences. The Clinic's **Civic Education program** supports a variety of broader outreach efforts, including a paid, 9-week **Science Internship Program** for students from throughout northeast Ohio.

The Center of Science and Industry museum in Columbus offers a "**COSI On Wheels**" **extension program**, as well as extensive teleconferences for K-12 students with experts including in biotechnology disciplines.

Bioscience-focused Schools and Programs

Some 24 schools in Ohio's Tech Prep program currently offer the **Biotechnology Lab Program**, many with articulation agreements with 2-year colleges offering associate's degrees in biotechnology.

Ohio State University's outreach programs sponsor **Metro Early College High School**, a STEM-focused program in Columbus. BioOhio identifies other bioscience-focused programs at Eastmoor Academy and Berwick Alternative Academy and a **Gateway to Technology program** at Miller City Middle School that graduates students into the bioscience program at Miller City High School.



BioOhio identifies minority outreach programs for biosciences at Eastmoor Academy, Ohio College Tech Prep, and in city school districts in Columbus, Cleveland, Cincinnati, and Akron.

Ohio's Community Schools (charter schools) program includes numerous science academies.





Basic Skills Achievement and Other Summary Metrics

STUDENT ACHIEVEMENT

NAEP Grade 8	OH	U.S. Avg.	State Rank
Math Average, 2007	284.9	280.2	21
Math, 2007 (% at or above “proficient”)	35.4%	31.0%	17
Reading Average, 2007	268.0	261.0	10
Reading, 2007 (% at or above “proficient”)	35.9%	29.2%	11
Writing Average, 2007	156.1	154.3	19
Writing, 2007 (% at or above “proficient”)	31.7%	30.6%	19

ACT	OH	U.S. Avg.	State Rank
Percentage of Graduates Tested	65%	43%	20
Math Average, 2008	21.5	21.0	27
Reading Average, 2008	22.1	21.4	26
English Average, 2008	21.1	20.6	26

SAT	OH	U.S. Avg.	State Rank
Percentage of Graduates Tested	27%	48%	28
Math Average, 2008	544	515	23
Critical Reading Average, 2008	534	502	24
Writing Average, 2008	521	494	23

AP	OH	U.S. Avg.	State Rank
Math Scores, 2008 (% with a score of 3 or higher)	64.7%	65.2%	26
Math Exams, 2008 (Exams as % of all H.S. grads)	7.4%	8.7%	29
English Scores, 2008 (% with a score of 3 or higher)	67.5%	59.2%	12
English Exams, 2008 (Exams as % of all H.S. grads)	11.0%	18.9%	42

SUMMARY STATE EDUCATION METRICS

Selected Indicators	OH	U.S. Avg.	State Rank
High School Graduation Rate, 2005–06	79.2%	73.4%	19
Student/Teacher Ratio, 2006–07	16.6	15.5	40*
Low-income Students, 2006–07 (% of all students)	33.8%	41.6%	–
Expenditure per Student (\$), 2005–06	\$9,692	\$9,154	17

Note: NAEP = National Assessment of Educational Progress, AP = Advanced Placement
 N/A = Data not available. * Lowest value receives highest ranking.

TABLE SOURCE NOTES:

NAEP Assessments, grade 8: U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics (NCES), National Assessment of Educational Progress (NAEP), 2005; **ACT Exam:** ACT, Inc., 2008; **SAT Reasoning Test:** The College Board, 2008.

Advanced Placement (AP): Battelle analysis of data from the College Board, 2008; AP test takers as a share of high school graduates includes graduate data from U.S. Department of Education, NCES for both public (Common Core of Data) and private high schools (Private School Survey).

Science Teacher Indicators: Council of Chief State School Officers (CCSSO) analysis of State Departments of Education data on public schools, 2007; U.S. Department of Education, NCES Schools and Staffing Survey, 2003–04 as reported by CCSSO, 2007.

Summary State Education Metrics: U.S. Department of Education, National Center for Education Statistics (NCES), Common Core of Data (CCD) on public elementary and secondary education.

Note: High school graduation rates are averaged freshman graduation rates—the rate is the number of graduates divided by the estimated count of freshmen 4 years earlier. U.S. figure for share of students eligible for free or reduced-price school lunch (“low-income” students) is available for 2005–06 only (state data are for 2006–07).