



CHIPS and Science Act Issue Brief

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History

The history of the CHIPS and Science Act is complex and full of twists, turns and Senate intrigues. The bill began as one of the signature legislative efforts of Majority Leader Chuck Schumer, who wanted to produce a bill that would help the US become more technologically competitive with China. The bill aimed to solve a few key issues, those being that the US had become progressively less competitive in producing semiconductors, that the US was too reliant on sometimes fragile international supply chains and that the US was losing its edge in innovation.

The first version of the legislation, the US Innovation and Competition Act was introduced by Senator Schumer in April 2021, and was passed that June in a 68-32 vote. The House introduced its Endless Frontiers Act shortly after, which was then transformed into the COMPETES Act, which did not pass until it left the House on a tight 222-210 vote in February 2022. Significant differences between the two acts led to a monthslong conference committee process that stretched through NAC 2022, where student advocates like you talked to legislators working on reconciling differences between the two acts.

That conference process stalled before it could produce any final legislation, and the final CHIPS and Science Act was instead a product of a legislative maneuver that allowed Majority Leader Schumer to pull the legislation out of the committee process while avoiding threats to hold up the legislation over concurrent efforts

to pass the Inflation Reduction Act. The CHIPS and Science Act ended up being a slimmed down version of some of its more expansive predecessors but kept their core foci of improving semiconductor production and research and expanding STEM innovation across the country.

The Legislation

Even though CHIPS is more focused than its predecessors, that does not mean it is a small bill. This sweeping legislative effort touches on every part of the US STEM landscape, from manufacturing to artificial intelligence, to education. We will focus here on some of the provisions most relevant to STEM student advocates but will give a brief overview of all the major provisions included in the act.

Title III – National Science Foundation for the Future

This title creates a host of new programs under the National Science Foundation (NSF), including many that provide additional funding and security for research, and attempt to broaden participation in it. Almost all the major provisions included in the bill relating to STEM Education are included in Title III. Listed below are some of those key sections of this title.

Section 10311 Part B - Supporting PreK-12 Informal STEM Opportunities

One of the most important provisions for student advocates is this title's Section 10311 (b). This section supports research into informal STEM Opportunities outside of the school day through grants to schools and non-profit

organizations. Applicants can use grants authorized under this section for programs that include: cooperative and hands-on learning, exposure to STEM role models, educator training, STEM academic and career advice, connections to real-world applications of STEM concepts, the purchase of parts and supplies in preparation for competitions, engagement with families, leadership training, and/or coordination with STEM focused non-profits. What differentiates these grants from other grants for STEM afterschool programs is that they require a plan for evaluating the program's success. Evaluation plans must include a yearly report on student outcomes, which must be written either to advance the body of research on informal STEM education as a whole or to help improve the program and keep the people running it accountable.

Section 10311 Part C - National STEM Teacher Corps Pilot

The National STEM Teacher Corps Pilot, as the name implies, is a program that creates a national corps of STEM teachers selected from applicants across the country based on their deep knowledge of STEM content and teaching, passion for STEM education, and experience in increasing student achievement in rural and high-need schools. Members of the corps will receive a stipend and continue teaching while contributing to research on STEM education and participating in training activities.

Section 10395 – Scaling Innovations in Pre K-12 STEM Education

This section directs the Director of the National Science Foundation to establish multidisciplinary Centers for Transformative Education Research. The NSF will establish these centers either at institutions for higher education or with non-profits based on whether they will establish local partnerships, build STEM education infrastructure to connect to other institutions and spread their innovations, research how to scale and expand STEM Education programs, focus on under resourced learners and learners with disabilities, and research how to support both urban and rural students.

Title V – Broadening Participation in Science

This title is focused at providing more opportunities for a broader subsection of the country to participate in science and creating more and healthier research environments.

Subtitle B – Rural STEM Education Research

This subtitle supports research into improving STEM education in rural areas. Its provisions include funding research into rural teaching and into professional development programs for teachers. The subtitle funds research into online programs as a tool for improving rural education. It also creates regional rural cohorts of students meant to help facilitate peer learning, hands-on STEM experiences and mentorship. Finally, the subtitle creates a competition to promote innovation in technology for deploying rural broadband.

Division A – The CHIPS Act of 2022

We've covered the sections of the bill most relevant to student advocates, so from here we'll give a brief explanation of CHIPS' other provisions.

Division A is the bread and butter of what CHIPS is all about, hence the title, and it provides over \$50 billion in funding to encourage semiconductor manufacturing, research into semiconductors, programs designed to expand the workforce for semiconductor manufacturing, laboratories designing and producing semiconductors for defense applications, and research into cutting-edge wireless technologies.

Division B – Research and Innovation

Title I – Department of Energy Science for the Future

This title funds research into basic energy sciences meant to improve the ways we produce and store energy, and the ways we remove waste products like CO₂. It also funds environmental research, physics research into the fundamentals of the universe, high-end and quantum computing research, and several efforts at growing the STEM workforce through scholarships, fellowships, recruitment and student and teacher engagement.

Title II – National Institute of Standards and Technology for the Future Act

This title funds research at the institute in biometrics, cybersecurity, greenhouse gas measurement, premise plumbing, advanced communications, and AI. The title also funds

educational outreach, as well as support programs for manufacturers.

Title IV: Bioeconomy Research and Development

This title supports research into the practice, safety, security, and ethics of bioengineering. It also funds efforts to translate bioengineering discoveries into technological innovations.

Title VI – Miscellaneous Science and Technology Provisions

This title contains many miscellaneous programs supporting research. These include a fellowship program that allows early-career scientists to begin research at an institution of their choice, a requirement that the Office of Science and Technology Policy produce a four-year national science and technology strategy, a directive to the Commerce Department to create twenty regional innovation hubs, measures against foreign talent recruitment in publicly funded research projects, support for ocean and coastal acidification research, and support for quantum computing research. The title also requires the Office of Science and Technology Policy to hire a specialist to advise the president on blockchain technologies, establishes the Foundation for Energy Security and Innovation, supports the commercial application of clean energy technologies and supports nuclear research at the university level, supports the research and development of microelectronics and low-carbon steel.

Title VII – National Aeronautics and Space Administration Authorization Act

This title directs NASA to establish a Moon to Mars Office to achieve the goal of humans exploring Mars, and extends the authorization of several other NASA programs, such as the International Space Station, the Office of STEM Engagement, and the Planetary Defense Coordination Office. The title also authorizes research into unmanned aircraft, greener and quieter airplanes, nuclear propulsion, and the search for extraterrestrial life. The title also requires NASA to report to Congress about its industrial base, supply chains and workforce.

Division C – Supplemental Appropriations to Address Threats to the Supreme Court of the United States

This division authorizes emergency appropriations to ensure the security of the Supreme Court.

Key Issues

SASA calls on states, Congress, and the Administration to meaningfully incorporate policies that ensure every student has equitable access to STEM engagement programs. Legislation and regulations must increase funding for grants used for STEM engagement activities at every level, including raising funding for STEM Education Programs run by the National Science Foundation, including grants for research into hands-on STEM learning under Section 10311 of the CHIPS and Science Act.

Relevant Funding Levels

Program	Most Recent Authorization	FY19 Appropriation	FY20 Appropriation	FY21 Appropriation	FY22 Appropriation	FY23 Appropriation	FY24 Appropriation
NSF STEM Education Funding* (Section 10311, 10395, etc.)	\$1.95 billion	\$910 million	\$940 million	\$968 million	\$1.01 billion	\$1.15 billion	\$1.17 billion

*The Advancing Informal STEM Learning program (Section 10311b) and other STEM Education programs run by the NSF and included in the CHIPS and Science Act are funded through the existing appropriation for education programs run by the NSF. The appropriation for FY23 and future appropriations will include these key programs.