Launch Years On Track, On Time

A Tool for Accelerating High School Mathematics Learning

Introduction

As our students navigate their high school course sequences—and in particular as they tackle increasingly challenging mathematical ideas—we as educators, parents, and community members are always looking for ways to support their success.

This **Launch Years On Track, On Time tool** offers strategies to help all students stay engaged in their learning—and on track for graduating and progressing to the next stages in their learning and their lives.

This resource is organized by:

- WHO drives the work,
- WHY, to achieve what purpose, and
- WHAT specific actions to advance and accelerate student learning.

The tool draws on best practices for supporting students, families, and teachers; enacting effective instruction; and fostering clear and multidirectional communication among all stakeholders.

This tool has three parts:

(1) Launch Years On Track, On Time: Actions for Accelerating Learning

(2) Launch Years On Track, On Time: Accelerating Learning Through New Courses

(3) Resources

Context

Launch Years: Mathematics should be a way, not a wall

In spring 2020, the Dana Center and its partners published *Launch Years: A New Vision for the Transition from High School to Postsecondary Mathematics*, an analysis of barriers and opportunities in students' last years of high school and their first years in higher education.

The report's call to action is backed by specific recommendations and strategies for smoothing students' transition to and through their postsecondary learning.

In spring 2021, the Dana Center released a companion online, *Launch Years Resource Kit,* that supports implementation of the Launch Years recommendations.

Pushing through disruptions

This On Track, On Time tool is designed to extend and elaborate ideas in the Launch Years report and its companion resource kit. Specifically, this tool is for educators and other community members who support students navigating mathematics courses and sequences of courses—that is, **mathematics pathways**—as they finish high school and progress to the next phase of their education.

Launch Years On Track, On Time
Actions for Accelerating Learning

WHO: Drives the work	WHY: To achieve	WHAT: Actions to advance and accelerate student learning

Support team
Students' experiences of mathematics learning are shaped and driven by the support team.
The team supports student progress and could include all or some of the following:
• student
• parent/guardian
• family members
• community members,
• counselor(s)
• administrator(s)
• teacher(s)
Note: As a matter of mutual respect and clear communication, team members must
	To help students stay on track in their progress, the support team should help ensure that the following school-level success criteria are met:
	• All students' experiences of mathematics—and their high school learning experiences generally—are framed with high expectations that look forward to their futures.
	• All students' perceptions of future opportunities are explicitly connected to accessible mathematics pathways that align with their interests and aspirations.
	• All students entering high school are able to access high-quality, on-grade-level mathematics content regardless of their prior exposure and/or performance in mathematics.
		School-level success criteria for students' high school experiences are attained. These criteria include, but are not limited to, the following:
		• The school administration provides students who enter high school underprepared to succeed in their coursework, with the opportunity to catch up while enrolled in grade-level courses in their chosen mathematics pathway.
		  ○ Rather than using data to place students in a remedial course, the school uses multiple measures to determine the level of corequisite support required for the student to succeed in grade-level coursework.
		• Classroom instruction includes ongoing ***formative assessment*** of student learning.
		• Faculty use findings from formative assessment to deploy just-in-time developmental or supplementary teaching that is calibrated to student learning needs.
		• The school has solutions to possible roadblocks in place, such as:
		  ○ ***Courses targeted*** at bridging to high school course content, such as advisory courses, summer bridge classes, transition courses (e.g., Transition to College Mathematics).
		  ○ Courses, course programs, and other ***corequisite*** or corequisite-like programs that include instructional support in the course subject matter, as well as support for scaffolding or supplementary skills such as effective note-taking, approaches to studying and test preparation, and tools for managing and prioritizing classwork. Examples include AVID, Academic Youth Development, and effectively implemented ***advisory*** periods.

WHO: Drives the work	WHY: To achieve	WHAT: Actions to advance and accelerate student learning
be approved by the student's family.		○ Curriculum nights and other events and communications to inform families and community about pathways course sequences.
Support team	To help students keep moving on track toward their futures, the support team collaboratively develops, implements, monitors, evaluates, and communicates a plan to advance and celebrate student mathematics learning and success.	**Develop** • Support team members help the family and student take the lead to develop their own vision and goals, and to create an **individualized plan** for coursework and supports that will help the student achieve their goals and vision. • The individualized plan seeks and incorporates diverse thinking from stakeholders. The plan is: ○ Centered on the student ▪ Student perspectives: The support team gathers family and student perspectives—which are used to set priorities—through strategies such as ***empathy interviews***, focus groups, and/or ***community walks***. ▪ Student goals: The plan reflects goals set by the family and student, and incorporates their ideas about which services and support strategies are most likely to help them reach their goals. ▪ Student strengths: The plan identifies and builds on student strengths, and includes strategies for strengths-based communications and action steps that support students. ○ Grounded in the community ▪ The plan respects and values the student's family and community culture, beliefs, and values, as well as those of other team members. ○ Designed with the end in mind ▪ The plan includes success indicators to help track whether it is working.

WHO: Drives the work	WHY: To achieve	WHAT: Actions to advance and accelerate student learning

		Implement and monitor
		• Support team members work together to put the plan into action, monitor how well it is working, and modify it, as needed, to work toward success over time. The support team:
		  ○ Communicates and meets frequently to monitor progress.
		Evaluate
		• Support team members collect data from students' families, faculty and staff, and community partners.
		  ○ Use collection strategies, which could include:
		  ▪ Surveys
		  ▪ Focus groups
		  ▪ Interviews
		  ▪ Observations
		  ○ Measure progress on the plan against the success indicators.
		  ○ Revise plan components and strategies when the team determines that they are not working—that is, when the relevant success indicators are not being achieved.
		Communicate and celebrate
		• Support team members communicate about strategies and the progress toward goals to—and with (multidirectional communication)—students, parents, faculty, and administrators.
		• Support team members coordinate highlighting and celebrating successful strategies, attainment of goals, and most of all, student progress. Celebration strategies could include:
		  ○ Blog posts and media releases
		  ○ School assemblies

WHO: Drives the work	WHY: To achieve	WHAT: Actions to advance and accelerate student learning
		○ Parent nights ○ Award ceremonies
Educators	To help students stay on track in their learning, educators deploy effective, research-based instructional strategies that facilitate a student-centered learning experience.	Educators, leaders, and the local education system will prioritize students' learning mathematics content just in time, rather than just in case, by: • Holding high expectations for students and communicating that they know that all students can meet grade-level standards. • Mapping out the ***prerequisite*** content knowledge that students need to be able to access on-grade-level course objectives, so that students get instruction in what they need when they need it. • Using pre-assessment data to group students and formative assessment data to regroup students. • Making available to students consistent opportunities to engage in grade-appropriate—that is, on-grade-level—assignments. • Putting in place contextualized (i.e., relevant to the students) mathematics content to help students engage deeply in what they are learning, regardless of the course or pathway. • Providing students with multiple ways to demonstrate mastery. • Drawing on the eight Mathematics Teaching Practices from the National Council of Teachers of Mathematics (NCTM)'s 2014 publication, *Principles to Actions: Ensuring Mathematical Success for All* (what follows is a direct quotation): ○ **Establish mathematics goals to focus learning.** Effective teaching of mathematics establishes clear goals for the mathematics that students are learning, situates goals within learning progressions, and uses the goals to guide instructional decisions. ○ **Implement tasks that promote reasoning and problem solving.** Effective teaching of mathematics engages students in solving and

WHO: Drives the work	WHY: To achieve	WHAT: Actions to advance and accelerate student learning
		discussing tasks that promote mathematical reasoning and problem solving and allow multiple entry points and varied solution strategies. ○ **Use and connect mathematical representations.** Effective teaching of mathematics engages students in making connections among mathematical representations to deepen understanding of mathematics concepts and procedures and as tools for problem solving. ○ **Facilitate meaningful mathematical discourse.** Effective teaching of mathematics facilitates discourse among students to build shared understanding of mathematical ideas by analyzing and comparing student approaches and arguments. ○ **Pose purposeful questions.** Effective teaching of mathematics uses purposeful questions to assess and advance students' reasoning and sense making about important mathematical ideas and relationships. ○ **Build procedural fluency from conceptual understanding.** Effective teaching of mathematics builds fluency with procedures on a foundation of conceptual understanding so that students, over time, become skillful in using procedures flexibly as they solve contextual and mathematical problems. ○ **Support productive struggle in learning mathematics.** Effective teaching of mathematics consistently provides students, individually and collectively, with opportunities and supports to engage in productive struggle as they grapple with mathematical ideas and relationships. ○ **Elicit and use evidence of student thinking.** Effective teaching of mathematics uses evidence of student thinking to assess progress toward mathematical understanding and to adjust instruction continually in ways that support and extend learning.

Launch Years On Track, On Time
Accelerating Learning Through New Courses

All the principles and practices to help students stay on track also apply when we—as mathematics educators, curriculum designers, administrators, and more—develop and deploy new mathematics courses.

The table below unpacks an example of how these processes might unfold or develop in schools implementing new data science courses.

WHO: Drives the work	WHY: To achieve	WHAT: Actions to advance and accelerate student learning

Administrators	To offer students modern mathematics courses aligned to the changing needs in postsecondary education and the workforce, administrators should be open and willing to adopt new courses like data science and make them available for all students.	• Recognize a need for students to understand statistical reasoning through statistical literacy and thinking.
		• Designate team lead and members of the Data Science School Implementation Team.
		• Provide and protect:
		  ○ Opportunities for teachers to prepare to teach data science.
		  ○ Time for students to engage in ***project-based learning*** with interdisciplinary focus.
		• Provide time for General Education, ESOL (English for Speakers of Other Languages), and Special Education teachers to collaborate and enhance data science instruction for all interested students.
		• Enable access to high-quality data science technology.
		• Review student assessment data frequently.
		• Acknowledge the value and relevance of data science courses by encouraging school and student participation in statistics competitions (locally, regionally, and nationally).
		• Monitor data science course implementation, reflections on implementation, and subsequent revisions to implementation.

WHO: Drives the work	WHY: To achieve	WHAT: Actions to advance and accelerate student learning
		• Deploys model teachers (i.e., teachers proficient in data science instruction) to support teachers of promise (i.e., teachers demonstrating potential in data science instruction).
Data Science Course Implementation Lead	To thoughtfully implement a new course, the implementation lead should work with administrators and teachers in promoting a culture of change.	• Collects foundational knowledge on the importance of statistical reasoning through statistical literacy and thinking. • Fosters a clear understanding of statistics, mathematical topics, and interdisciplinary project-based learning. • Develops a school- or district-level statistics instructional and pedagogical hub (centralized location for lesson plans, resources, and teaching strategies associated with data science instruction). • Supports development of collaborative course planning teams, focus groups, or professional learning communities, including a meeting schedule with distinctive policies and procedures in place (i.e., mission and vision, agendas, and meeting norms). • Facilitates unpacking statistics standards for previous mathematics courses relevant to data science, as well as the subsequent mathematics course(s), to look at learning progressions as they relate to statistics. • Monitors and supports the development and data analysis of assessments carried out by the collaborative planning teams and focus groups. • Promotes and supports ***teacher math labs*** where teachers learn through feedback, modeling, and scenario planning in order to provide meaningful real-world experiences for students. • Encourages teachers to have their students demonstrate their knowledge through participation in statistics competitions (locally, regionally, and nationally).

WHO: Drives the work	WHY: To achieve	WHAT: Actions to advance and accelerate student learning
		• Orchestrates reflection on, and revisions of, data science course implementation.

Data Science Course School Implementation Team	To successfully implement the new course, the implementation team should support the administrators and team lead by actively participating, engaging, and embracing the change.	• Speaks the language of the importance of statistical reasoning through statistical literacy and thinking.
		• Participates in:
		  ○ Collaborative course planning teams, focus groups, or professional learning communities, including helping create distinctive policies and procedures for those groups (i.e., mission and vision, agendas, and meeting norms).
		  ○ Unpacking statistics standards for previous math courses relevant to data science, as well as the subsequent mathematics course(s), to look at learning progressions as they relate to statistics.
		  ○ The development and data analysis of assessments.
		• Engages in ***teacher math labs*** to learn through feedback, modeling, and scenario planning to provide meaningful real-world experiences for students.
		• Support of the model teacher or serves as the model teacher.
		• With the support of the administrator and the data science course implementation lead, encourages students to demonstrate their knowledge through participation in statistic competitions (locally, regionally, and nationally).
		• Actively participates in the reflection and revision of data science course implementation.

Launch Years On Track, On Time Resources

Glossary

Term	Definition and resources
Acceleration	In mathematics education, ***acceleration*** refers to the principle of accelerating student learning through targeted or corequisite courses. Acceleration is often a more productive alternative to remediation.
Community walk	In an education context, a ***community walk*** entails the teacher or school team visiting—and/or simply meeting with—the community or communities that the school serves. As with other recommendations in this On Track, On Time tool, this activity is best shaped by a support team that includes members of the communities served. A community walk might include a presentation from the students in a particular community being served, along with a guided visit to a neighborhood or community center. For more on community walks, see, for example: https://www.edutopia.org/blog/community-walks-create-bonds-understanding-shane-safir https://www.theedadvocate.org/how-community-walks-transform-schools
Corequisite	***Corequisite***, as in corequisite courses, supports, or models, refers to the practice of placing students who are identified as being underprepared with additional learning support through various structures such as concurrent courses, labs, or tutoring sessions. This approach contrasts with prerequisite models, in which students are required to take developmental or remedial courses before entering a grade-level course. See also ***prerequisite***. For more on corequisites, see, for example: https://completecollege.org/strategy/corequisite-support

Term	Definition and resources
Developmental education	***Developmental education*** and developmental learning, also known as remedial education, typically consists of courses—which usually do not count as a credit toward graduation—that are designed to remediate or develop learning that a student was not able to access earlier in their education. Mathematics pathways programs often replace developmental courses with targeted or corequisite courses to support students in accelerating (rather than remediating) their learning.
Empathy interview	***Empathy interviews*** are structured conversations consisting of open-ended questions that allow students to describe their experiences with education.
Formative assessment	High-quality ***formative assessment*** tasks provide evidence of student insight, student misconceptions, and problem-solving strategies that can be used by teachers to guide instruction. Equally important, however, is the opportunity such tasks provide for teachers to help students build proficiency and automaticity with the mathematical practices.
Mathematics pathways, pathways	A ***mathematics pathway*** refers to the series of mathematics courses that students take to complete requirements for an academic goal such as high school graduation or completion of a postsecondary program, certificate, or degree. The Launch Years initiative recommends that educators align mathematics pathways across secondary and postsecondary education. A high-quality mathematics pathway offers students a coherent and consistent learning experience that supports their development as independent mathematical learners and is aligned with their academic and career goals.
Prerequisite	A ***prerequisite*** course is one that is required before a student can take a given course. Prerequisite courses are common in mathematics education given the progression of learning in mathematics, particularly the importance of building on prior knowledge. See also ***corequisite***.

Term	Definition and resources
Project based learning (PBL)	***Project Based Learning (PBL)*** is a teaching method in which students learn by actively engaging in real-world and personally meaningful projects.
Strengths-based	A ***strengths-based*** approach to teaching and learning, also known as an asset-based approach, starts by learning about and capitalizing on the strengths of the people—students, families, teachers, community members—in the system. Research demonstrates that asset-based approaches are more successful than approaches based on perceived deficits. For more on strengths-based approaches, see, for example: https://teachereducation.steinhardt.nyu.edu/an-asset-based-approach-to-education-what-it-is-and-why-it-matters
Targeted courses	***Targeted courses*** are various kinds of courses that typically augment or support courses on core academic content. Often used interchangeably, terminology for various kinds of targeted courses can include: **Advisory courses:** An a*dvisory course* is typically a course in which a teacher or an educator team meets regularly with a group of students to help the students navigate their academic choices and pathways. When well implemented, an advisory course can help scaffold and support student progress, while directly attending to students' social, emotional, and academic development. See, for example, this short post from Great Schools: https://www.greatschools.org/gk/articles/advisory-the-most-important-class-in-high-school-isnt-what-you-think **Summer bridge courses**: Effective s*ummer bridge courses* provide students with targeted problem-solving strategies that are essential to grade-level achievement. **Transition courses:** *Transition courses* provide students with an opportunity to demonstrate college readiness in their senior year of high school, thus avoiding remedial or developmental courses in higher education.

Term	Definition and resources
	See, for example: https://www.edglossary.org/advisory https://ies.ed.gov/ncee/wwc/Docs/InterventionReports/wwc_summerbridge_071916.pdf https://ccrc.tc.columbia.edu/media/k2/attachments/what-we-know-about-transition-courses.pdf
Teacher math labs	***Teacher math labs,*** also known as learning labs, are a form of embedded professional learning in which educators, typically led by a teacher-leader or other subject matter expert, participate in "labs," collaborative learning and teaching sessions in which they try out new pedagogical and content approaches with their students. See, for example: https://coetedd-wpengine.netdna-ssl.com/wp-content/uploads/2017/05/JMEL-Math-Labs-2018.pdf

Sources and Further Reading

Classroom teaching practices

National Council of Teachers of Mathematics. (2014). *Principles to actions: Ensuring mathematical success for all.* Reston, VA: National Council of Teachers of Mathematics. https://www.nctm.org/PtA | Specifically, "Mathematics Teaching Practices" (page 3) in NCTM: National Council of Teachers of Mathematics. (2014). *Principles to actions: Executive summary.* https://www.nctm.org/uploadedFiles/Standards_and_Positions/PtAExecutiveSummary.pdf

Data science

Charles A. Dana Center at The University of Texas at Austin. (2021, May). *Data science course framework, version 1.0.* Austin, TX: Author. https://www.utdanacenter.org/sites/default/files/2021-05/data_science_course_framework_2021_final.pdf

University of Chicago's Center for RISC's Data Science 4 Everyone resource hub: https://www.datascience4everyone.org/resources

Educator development and learning

Kazemi, E., Gibbons, L., Lewis, R., Fox, A., Hintz, A., Kelley-Petersen, M., Cunard, A., Lomax, K., Lenges, A., & Balf, R. (2018). Math labs: Teachers, teacher educators, and school leaders learning together with and from their own students. NCSM *Journal of Mathematics Education Leadership (JMEL), 19*(1). https://coetedd-wpengine.netdna-ssl.com/wp-content/uploads/2017/05/JMEL-Math-Labs-2018.pdf

Launch Years

Charles A. Dana Center at The University of Texas at Austin. (2020). *Launch Years: A new vision for the transition from high school to postsecondary mathematics.* Austin, TX: Author. https://www.utdanacenter.org/sites/default/files/2020-03/Launch-Years-A-New-Vision-report-March-2020.pdf

Charles A. Dana Center at The University of Texas at Austin. (2021). *Launch Years resource kit: Information, tools, and resources to implement the Launch Years recommendations*. https://www.utdanacenter.org/our-work/k-12-education/launch-years/launch-years-resource-kit | Users of this On Track, On Time tool may find of particular interest the selection of resources for Recommendation 6: "State agencies and education systems, institutions, and schools build a strong shared understanding of—and commitment to—goals among their constituents."

Launch Years course frameworks

Charles A. Dana Center at The University of Texas at Austin. (2021 May). *Data science course framework, version 1.0.* Austin, TX: Author. https://www.utdanacenter.org/sites/default/files/2021-05/data_science_course_framework_2021_final.pdf

Charles A. Dana Center at The University of Texas at Austin. (2021). *Modern Algebra II course framework.* Austin, TX: Author. https://www.utdanacenter.org/sites/default/files/2021-04/modern_algebra_II_course_framework_2021_final.pdf

Charles A. Dana Center at The University of Texas at Austin. (2020). *Transition to College Mathematics course framework.* Austin, TX: Author. https://www.utdanacenter.org/sites/default/files/2021-01/transition_to_college_mathematics_course_framework.pdf

Launch Years On Track, On Time: ABOUT

How this tool was developed

This resource is grounded in idea generation and research work carried out by an advisory group over the summer of 2021. Members of the group include the following individuals, listed alphabetically.

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In late summer and early fall 2021, Dana Center staff course program specialist **Josh Recio** distilled, organized, and augmented the advisory group's work into this Launch Years On Track, On Time Tool and worked with Dana Center staff **Rachel Jenkins, Alison Kothe, and Ophella Dano** to finalize this tool for use by educators everywhere.

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