

Students shouldn't have to choose between an education that readies them for college and one that prepares them for a career. Pathways provide both.....

Multiple Pathways Defined

Pathways are programs of academic and technical study that integrate classroom and real-world learning organized around multiple sectors of industry—fields such as finance and business; health science and medical technology; building and environmental design; and arts, media, and entertainment. Pathways combine college-preparatory curriculums with exceptional career and technical education, motivating students to learn by helping them answer the question, Why do I need to know this?

Organizing Principles

In high schools, pathways can take various forms and be offered through different delivery systems. But whatever their design, each pathway is grounded in four guiding principles.

- *Pathways prepare students for both postsecondary education and a career.* A pathway is always about both objectives; it's never a choice between the two. Although the Bureau of Labor Statistics projects only modest increases during the next 10 years in the number of occupations requiring a bachelor's degree (Barton, 2006; Mishel, 2007), there is consensus that career success will increasingly depend on the student taking some postsecondary education and completing a formal credential—a certificate, associate's degree, bachelor's degree, or higher credential.
- *Pathways connect academics to real-world applications.* Pathways alter *how* core academic subjects are taught; they do not lower expectations about *what* is taught. Through the pathways approach, students are expected to achieve at high levels in mathematics, science, English, social studies, and foreign language. Students master these subjects by tackling authentic problems and situations that are part of the modern workplace.
- *Pathways lead to the full range of postsecondary opportunities.* These include two- and four-year colleges, apprenticeships, formal employment training, and the military. Each pathway represents a broad industry theme that can appeal to a student regardless of his or her prior academic achievement or postsecondary aspirations. Pathways can eliminate current practices that sort and track high school students in ways that limit their options after high school.
- *Pathways improve student achievement.* Pathways are based on accountability. They are designed to produce higher levels of accomplishment in a number of measurable arenas, including grade-level performance on tests of academic achievement, demonstrated mastery of demanding technical knowledge and skill, high school completion, postsecondary transition, and attainment of a formal postsecondary credential. Pathways also contribute—in ways that most conventional academic and CTE curriculums do not—to increased student proficiency in such vital areas as critical thinking, problem solving, media and information literacy, and collaboration. Finally, pathways make an immediate difference, helping young people gain higher earnings right after high school and giving them a leg up in the labor market while they pursue postsecondary education.

Core Components

Multiple pathways offer many strong options for students. Organized around a major industry sector, each pathway contains four essential ingredients:

- A challenging *academic component*, which typically spans multiple years and places learning in the context of real-world applications. Subjects studied include college-preparatory English, mathematics, science, and social studies.
- A demanding *technical component*, which delivers concrete industry-related knowledge and skills required for high-skill, high-wage employment.
- A *work-based learning component*, which offers students opportunities to learn through intensive internships, virtual apprenticeships, and school-based enterprises.
- *Supplemental services*, which include counseling as well as additional instruction in reading, writing, and mathematics to help students succeed with a challenging program of study.

For example, consider a pathway in Building and Environmental Design. Core academic courses systematically take advantage of the building theme to introduce authentic applications of essential academic knowledge. Geometry classes teach the concepts and skills needed to build roofs and frame walls that can withstand gale force winds. A precalculus class stresses the role of mathematics in designing and building a seismically sound bay bridge. History helps students better understand how the built environment reflects and also helps shape culture, politics, and the economy. An English class not only emphasizes the importance of mastering strong technical reading and writing, but also helps students appreciate relevant literature, such as *House*, the compelling nonfiction account of building the American dream by Pulitzer Prize winner Tracy Kidder.

Technical courses include instruction in carpentry, electricity, and masonry; but they also introduce students to fundamental principles of engineering and design, project and site planning, construction management, and emerging technologies. The work-based component connects 9th and 10th graders to mentors in such fields as architecture, construction, planning, and interior design; in 11th and 12th grade, students engage in more intensive internships, working with professionals who assess their work according to industry standards. Finally, supplemental services provide additional instruction in reading and mathematics and use industry themes to give meaning to the academic content. For example, to help students better understand the Pythagorean theorem, a supplemental mathematics class that is part of a construction technology academy may engage students in using the standard "three-four-five" triangle to ensure plumb construction of wall frames or parallel layout of flooring tile.

On-site learning is integral to the pathway approach. Seniors at Palmdale High School's Health Careers Academy in California spend two mornings each week at Kaiser Permanente learning under the supervision of their classroom teacher, who works side by side with a physician's assistant, nurse, radiology technician, or other medical professional. Students interact with real patients and learn how to conduct electrocardiograms, draw blood, interpret X-rays, set broken bones, and perform a range of other challenging tasks. Back in the classroom in the afternoon, their medical sciences class connects practical work-based experiences to in-depth study of such topics as the human cardiovascular system and the role that electricity plays in regulating the heart. Alternatively, students may dig into nuclear cardiology and the science of injecting isotopes into the blood system to assess the flow of oxygen to the heart.

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