

CHAPTER 2:

School-Based Preparatory Experiences

This chapter explores the first *Guidepost for Success*, School-Based Preparatory Experiences. Based on the continued refinement of this *Guidepost*, this chapter is a significant revision of the original “Preparatory Experiences” chapter in the last edition of the HS/HT Program Manual. The rewrite is due in part to the recognition that preparation for STEM careers requires more attention to academic preparation. In addition, evolving HS/HT practices around the country are increasingly involving students in a multi-year program and a growing number of programs are implementing HS/HT during the school day as a credit course.

While HS/HT programs are locally housed in any number of places (schools, Career Technical Education programs, Independent Living Centers, Vocational Rehabilitation offices, One-Stop Career Centers, etc.), and may involve activities during the school day, after-school, on weekends, and during the summer, HS/HT is intended to be an enrichment program that complements what students are learning in school. School-based preparatory experiences identify those things that are necessary to ensure a high quality educational system and are primarily the responsibility of the schools.

In order to perform at optimal levels in all education settings, all youth need to participate in educational programs grounded in standards and clear performance expectations with graduation exit options based upon meaningful, accurate, and relevant indicators of student learning and skills development.

While these elements of an effective educational system are the responsibility of the schools, HS/HT can play an important role in reinforcing what is being taught within the general and special education curriculum. In addition, HS/HT can provide access to educational options and extra supports and assistance that are needed by some students to succeed in school. HS/HT activities need to be carefully structured to supplement what students are learning in school and ensure that youth with disabilities are getting what they need to prepare for a successful role in the workforce, with an emphasis on preparation for postsecondary education and entry into the STEM careers. In addition, HS/HT program coordinators can use the information that they gather through having an ongoing, long-term personal relationship with a student with a disability to assist the school in identifying the most effective ways to accommodate the needs of that student in the educational setting.

Component 1: Programs Based on Standards

For educational programs, the *Guideposts* call for academic programs that are based on clear state standards, and career and technical education programs that are based on professional and industry standards. While HS/HT programs have no direct control over such standards, HS/HT representatives can help support these concepts. When such standards are being developed or revised, or when high school reform efforts are underway, the program coordinator

can ask for a seat at the table and provide input into such initiatives in an effort to ensure that no child is left behind, particularly youth with disabilities.

HS/HT activities can also be designed to guide youth in the selection of programs of study that are grounded in state, professional, and industry standards, and that provide the educational prerequisites for pursuit of the STEM careers. HS/HT staff may need to recruit people who are working in STEM careers to volunteer to look at the courses students are taking in school to ensure that they include the prerequisites and are sufficiently rigorous to prepare them for the careers they are interested in pursuing.

Component 2: Qualifications of Teachers and Transition Staff

High quality educational experiences require access to and supports from highly qualified staff. This is another area where, although the schools have the lead role, HS/HT can play a supportive role. While the country is currently experiencing a significant shortage in qualified special education teachers, both the No

Child Left Behind Act (NCLB) of 2001 and the Individuals with Disabilities Education Act (IDEA) of 2004 stress the importance of teacher qualifications. Thus, schools and educational agencies must provide for appropriate professional development to ensure high quality teachers. Being in touch with both the educational system and a variety of community resources, HS/HT staff may be able to assist schools and educational agencies in identifying existing opportunities for professional development for teachers and paraprofessionals, both in general education and special education.

Students with disabilities need to be supported by highly qualified transition support staff that may or may not be school staff. Many schools employ specialized staff functioning as transition coordinators for special education and 504 students (i.e., students with physical or emotional disabilities, or who have impairments such as Attention Deficit Disorder, that restrict one or more major life activities for which accommodations are needed). Many do not. Even when a school employs specialized transition staff, they may not be aware of all the resources available in the community to assist students with disabilities as they



transition to adult life. To ensure access to the full range of transition services, HS/HT can assist schools by linking students with disabilities to qualified transition staff employed by other agencies such as postsecondary education institutions, One-Stop Career Centers, and Vocational Rehabilitation agencies.

Component 3: Assessments and Graduation Standards

School-based preparatory experiences also include access to an assessment system that includes multiple measures and graduation standards that include options. IDEA 2004 requires State Education Agencies (SEAs) to use universal design principles in administering assessments (see more about universal design under *Component 4*). NCLB requires schools to include students with disabilities in their standardized assessments to measure student achievement. In early April 2007, final regulations were published addressing the inclusion of students with disabilities in tests to determine the achievement of high academic standards. Prior to the publishing of these regulations, states were permitted to provide 10 percent of special education students (i.e., those with the most significant disabilities) with alternative tests to measure their academic achievement and have those results counted toward the school's annual progress under NCLB.

Under the new regulations, a school is allowed to give another 20 percent of students with disabilities modified tests to measure their academic achievement. These modified tests are targeted for students whose disabilities are less severe but who are still having difficulty and are unable to keep pace with grade-level academic achievement. States can define modified academic achievement standards so long as those standards (1) are aligned with the state's academic content standards for the grade in which the student is enrolled; (2) are challenging for eligible students, although they may be less difficult than the grade-level academic achievement standards; (3) include at least three achievement levels; and (4) are developed through a documented and validated standards-setting process that includes broad stakeholder input. Prior to the issuance of these regulations, these students had to be given either the same tests as their non-disabled counterparts or the alternative tests being given to

students with the most significant disabilities. For many students with disabilities, these tests would either be too difficult or too easy. It is believed that the new regulations which address this middle ground will provide greater flexibility for and more accuracy in tracking academic achievement. With the issuance of these regulations, approximately 30 percent of students with disabilities will now be able to take more applicable tests.

HS/HT program coordinators should monitor students to ensure they are being included in the school's assessment system and that, as appropriate, these students have access to the accommodations they need to participate successfully in the school's standardized assessments. In some cases, program staff may be more familiar with the needs of a particular student and may be able to offer suggestions on the most effective ways to accommodate a particular student during assessments. When a school determines that a student with a disability cannot participate in the school's standardized assessment system, the HS/HT program coordinator may want to ensure that any alternative measures being used constitute an appropriate measure of that student's accomplishments.

Another key component of a high quality educational system is the existence of graduation standards that include options. As discussed in Exhibit 2.1, such options can unfortunately have negative consequences for the young people who do not receive regular diplomas. An alternative diploma or certificate of participation may not be of much value when a young person begins looking for work, particularly in the STEM careers. While graduation standards are the responsibility of the educational system, a HS/HT program coordinator may want to advocate on behalf of a student to ensure that he or she is being provided with appropriate graduation options.

Component 4: Universal Design for Learning

All learners, including students with disabilities, need an education that provides access to and participation and progress in the general education curriculum. IDEA 2004 promotes the idea of universal design by requiring education agencies to support the use of

technology, including technology with universal design principles. It also requires State Education Agencies (SEAs) to use universal design principles in administering standardized assessments.

To ensure a high quality education, particularly for students with disabilities, curriculum and program options must be based on universal design of school, work and community-based learning experiences. According to the Center for Applied Special Technology (CAST), universal design for learning (UDL) means teachers need to customize their teaching to address individual differences. This may include such things as

- *multiple means of representation* to give learners various ways of acquiring information and knowledge;
- *multiple means of expression* to provide learners alternatives for demonstrating what they know; and
- *multiple means of engagement* to tap into learners' interests, challenge them appropriately, and motivate them to learn.

A comprehensive approach to UDL applies these alternative approaches to different aspects of education, including the development of objectives/benchmarks, instructional materials, teaching methods, and assessments (<http://www.cast.org/research/udl/index.html>).

For example, “a traditional approach to instructional methods would be to provide a brief lecture and create workgroups for research, note taking, and an oral presentation. The UDL approach would recognize that all the students may not respond to a lecture and would consider the use of media with the lecture and other ways to enhance and illustrate the lesson in as interactive a manner as possible” (Wills & Sabia, n.d.).

HS/HT programs need to be familiar with and incorporate aspects of UDL as they prepare their program of activities, especially given that HS/HT targets youth with all types of disabilities, some of whom need accommodations and/or use assistive technology. Chapter 5, *Connecting Activities*, explores the need to determine individualized accommodations to ensure a student’s meaningful participation in

HS/HT activities and as they apply to settings other than educational settings. Exhibit 2.2 contains an Assistive Technology Checklist that can be used to assist students as they explore their needs for reasonable accommodations and assistive technology in a variety of settings.

Online Resources to Consider

Alliance for Technology Access (ATA) is a national network of technology resource centers, organizations, individuals, and companies that provide public education, information and referral, capacity building in community organizations, and advocacy/policy efforts, enabling people to acquire and use standard, assistive, and information technologies. An interactive information service provides quick and efficient access to information on assistive technology tools and services to consumers, families, and service providers worldwide. Visit <http://www.ataccess.org/default.html>.

Association of Tech Act Projects (ATAP) is a national, membership organization comprised of Statewide Assistive Technology (AT) Programs funded under the Assistive Technology Act. It promotes the collaboration of AT Programs with persons with disabilities, providers, industry, advocates, and others at the state and national level and seeks to increase the availability and utilization of accessible information technology and AT devices and services for all individuals with disabilities in the United States and territories. Visit <http://www.ataporg.org/>.

Center for Applied Special Technology (CAST) is a nonprofit organization that works to expand learning opportunities for all individuals, especially those with disabilities, through the research and development of innovative, technology-based educational resources and strategies. Frequent visits to the CAST website keep the reader abreast of advancements in the application of the Universal Design for Learning (UDL) framework. Visit <http://www.cast.org>.

National Center on Accessing the General Curriculum (NCAC) was established by the Center for Applied Special Technology (CAST) to provide a vision of how new curricula, teaching practices, and policies can be woven together to create practical approaches

for improved access to the general curriculum by students with disabilities. Visit <http://www.cast.org/policy/ncac/>.

Recording for the Blind and Dyslexic (RFB&D)

is a nonprofit volunteer organization, and the nation's educational library serving people who cannot effectively read standard print because of visual impairment, dyslexia, or other print disabilities. Their mission is to create opportunities for individual success by providing and promoting the effective use of accessible educational materials. Visit <http://www.rfbid.org/>.

Component 5: Supporting Learning Environments That Are Small and Safe and Include Extra Supports Such as Tutoring

To ensure a high quality education environment, the *Guideposts* also call for learning environments that are small and safe and include extra supports such as tutoring. Although there have been lots of discussions about the value of smaller classroom sizes, there is no national trend towards smaller classes. As a result, this is an area where HS/HT can have a real impact.

To support students in making the most of their high school experience and to increase the likelihood of their success in post-school activities, HS/HT programs can

- reinforce the lessons learned in school with after-school and summer programs;
- incorporate creative and engaging activities that are designed to supplement what students are learning in the classroom;
- involve students in small and large group discussions;
- provide opportunities for students to develop their listening skills and practice their oral and written communication skills in small group settings where they feel safe;

- teach students active listening skills and expose them to the spoken and unspoken rules of conversation and group discussions (e.g., the role of body language, being polite, not interrupting, taking turns, raising hands to speak, focusing attention on the speaker, etc.);
- encourage students to reflect on where and when they should use their listening skills and encourage them to practice their listening skills (e.g., at home, in school, in church, while watching a movie or listening to the radio, etc.);
- ask students to present information to groups of students and to summarize information from oral presentations in writing;
- involve students in writing exercises and introduce students to prewriting strategies (e.g., developing a focus, developing an outline to ensure the proper sequencing of ideas, creating diagrams, etc.);
- incorporate activities that expose students to different types of writing (e.g., creative writing, journalism, reflective compositions, etc.) and the use of correct punctuation and grammar;
- encourage students to try new things such as working in teams and experimenting with different presentation styles in a setting where individualized attention and additional support is readily available;
- help students connect what they are taught in school to the world of work and the expectations they will face as adults; and
- incorporate service-learning activities to demonstrate the application of math and science in the community.



On June 10, 2006, Florida HS/HT students from Levy, Bradford, and Putnam Counties were able to participate in a fun, hands-on, and educational field trip to Disney's Magic Kingdom. Students attended the Youth Education Series Program called, "World of Physics: Energy and Waves." Students experienced the Magic Kingdom through the eyes of a theme park scientist. On the interactive tour youth studied selected attractions to showcase the physics concepts of optics, acoustics, and magnetism in a real world context. Students were able to go behind the scenes of several attractions, including the Haunted Mansion! They had a wonderful time exploring the park after the tour. For some HS/HT students, this was their first trip ever to Disney or to any theme park. In addition, new friendships were made among the three groups.

The local HS/HT coordinator in Toledo, Ohio, encourages her students to participate in a Blogging Program where they are involved in online journaling activities. This activity was designed to coincide with the university chat rooms that are popping up around the country. Each week the coordinator posts one of the links distributed by NCWD/Youth and asks the HS/HT students to explore and critique the site. The goal is to expand the activity statewide for all HS/HT students in Ohio.

Funds appropriated under Title V, Part A of the No Child Left Behind Act (NCLB) may be used for supplemental educational services, which are defined as additional academic instruction designed to increase the academic achievement of students in schools that have not met state targets for increasing student achievement (adequate yearly progress) for three or more years. These services may include tutoring and after-school services, as well as activities to promote consumer, economic, and personal finance education. Consequently, this is a potential source of funding for tutoring services in some schools and, if the HS/HT program has a strong tutoring component, possibly a source of funding to help ensure the sustainability of HS/HT.

Providing Extra Support for Developing Computer Skills

With an emphasis on exposing students to high-tech careers, HS/HT programs incorporate many opportunities for students to practice the computer skills they are learning in school and develop additional skills. The HS/HT experience includes opportunities to do research online (e.g., exploring different careers and their prerequisite qualifications); develop documents online (e.g., resumes, marketing materials, etc.); create prototype websites, databases, and graphics; and troubleshoot hardware and software problems. Exhibit 2.3 includes a list of websites that provide interesting and engaging ways to reinforce what students are learning in school, particularly with regard to math and science. Some HS/HT programs partner with local community colleges to give participants the opportunity to take computer courses or use a college computer lab while they are still in high school. Some programs take students to local One-Stop Career Centers to learn about online computer training programs. In a few cases, the emphasis on computer literacy is so embedded in HS/HT that some schools have incorporated the HS/HT program into the school's general educational curriculum as a for-credit course.

Tech-Now in Oklahoma uses a standardized curriculum for HS/HT throughout the state. Tech-Now partners with a number of schools to provide the HS/HT curriculum as a for-credit class during the school day (i.e., Computer 1 or Technology 1). Students participate in the class five days a week, for 55 minutes a day. Students who complete a full year of the program receive a minimum of half of a Carnegie credit that can be applied towards Oklahoma's standard graduation diploma. The Carnegie Unit is 120 hours of class or contact time with an instructor over the course of a year at the secondary school level. In some Oklahoma schools, students participating in Tech-Now can earn two complete credits towards their graduation requirements.

The State HS/HT Coordinator in Colorado worked with a representative of the Denver Public Schools to embed the *Guideposts* into the Alternative Cooperative Education Program (ACE) curriculum. The ACE curriculum includes both general and specific occupational competencies that must meet the state's education standards and the Colorado workplace competencies. HS/HT launched a pilot program in Denver Public Schools for one semester, working together with the ACE teachers to further enrich the curriculum and bring HS/HT into the classroom in instances where at-risk students could not participate in out-of-school activities. These in-school sessions constituted a five-credit course. To further this effort, a two-day ACE State Conference included a session where HS/HT students talked about their experiences in the program and the value they saw in HS/HT. The agenda also included a session exploring ways to further embed the *Guideposts for Success* into the ACE curriculum. As a result of this effort, the *Guideposts for Success* were embedded into the ACE curriculum throughout the state after just one semester of the pilot program. In addition, a full year HS/HT after-school program with bi-weekly sessions is still being provided as a continuum for the in-school program and as an additional resource for at-risk and special education students. To view Standards 1-4 of the ACE curriculum, visit www.coloradoace.org, go to "Educator Resources" and click on "Standards."

Component 6: Helping Students Use Individualized Transition Plans (ITPs) to Drive Their Personal Instruction

In order to be successful in post-school activities, a special education student needs to use the IEP and ITP required under IDEA to drive the personal instruction s/he receives while still in school. IDEA 2004 requires the development of an ITP for each special education student who has turned 16 years of age. The ITP is the part of the IEP that focuses on what the student needs to prepare successfully for the transition from the secondary educational setting to adult outcomes. Transition services are a set of coordinated activities that assist students with disabilities as they move from school into self-determined, post-graduation activities

including postsecondary education, vocational training, competitive employment, supported employment, continuing and adult education, independent living, adult services, and participation in the community. Students with mild disabilities may only need limited services in one or two areas, while students with severe disabilities may need extensive services in all areas.

From a legal standpoint, the IEP team is required to consult with the student and his/her parent(s) in determining the transition services the student will receive. These services can include an array of educational and vocational options, some occurring within the school setting, some in the community, and some through other service providers. Available vocational options range from work-related high school classes to entry-level work in the community with assistance through a transition program.

Transition services are based on students' needs, preferences, and interests and include instruction, related services, community experiences (e.g., volunteer work and service-learning), functional vocational evaluations/assessments when appropriate, employment, independent living objectives, and daily living skills.

To determine the transition services to be included in an ITP, the student should go through a transition planning interview to identify his/her strengths, skills, abilities, capabilities, interests, and needs. The IEP team is then responsible for developing an ITP based on that interview. The ITP is designed to accomplish the student's stated post-school goals based on this interview. The ITP is part of the student's IEP and includes important information about the student, including

- post-high school goals;
- interests, strengths, and vocational goals;
- activities to help reach goals in the areas related to career development, self-advocacy, interpersonal/social skills, and independent living;
- school and post-school services that will facilitate the accomplishment of those goals;
- notice of rights a year before reaching age of majority; and
- recommendations for the next year.

The HS/HT program coordinator needs to know what is in a student's IEP and ITP to make sure it is in line with the student's expressed interests and goals. Through an ongoing personal relationship with a student and the student's school, the HS/HT coordinator can help the student formulate appropriate goals and objectives for the future.

The HS/HT coordinator can also work with the student to complement what the school is doing to address the student's remedial needs and to identify the most appropriate supports and services (e.g., accommodations, assistive technology, tutoring, etc.) that will help the student succeed in accomplishing his/her post-school goals. Through self-advocacy training, the HS/HT coordinator can help a student develop the skills needed to advocate for his/her goals

Embedding the *Guideposts for Success* in RFP Instructions

The Michigan Department of Education's Office of Special Education & Early Intervention Services (MDE/OSEIS) provides annual transition grants to all 57 county-level intermediate school districts (ISDs). The Request for Proposals (RFP) instructions for the 2006-07 grants suggested a number of appropriate fundable activities or strategies that the ISDs could implement to help them comply with State Performance Plan (SPP) Indicators. These SPP indicators track the percentage of youth aged 16 and above with an IEP that includes coordinated, measurable, annual goals and transition services that will reasonably enable the student to meet their postsecondary goals, and the percentage of youth with IEPs who are no longer in secondary school and who have been competitively employed, enrolled in some type of postsecondary school, or both, within one year of leaving high school. The list of fundable activities included community resource mapping, *Guidepost* activities and HS/HT activities. More than half of the 57 ISDs named community mapping as one of their proposed activities and about 18 percent sought funding for *Guideposts* and/or HS/HT activities.

and objectives within the IEP process and for the services and supports that will ensure his/her academic success.

In some cases, school personnel and members of the IEP Team may not be aware of all of the resources available in the community to assist a student through the transition process. The HS/HT program can be a great source of this type of information. In addition, HS/HT coordinators can use the *Guideposts for Success* to assist a student through the transition process. The comprehensive framework for transition services contained within the *Guideposts* can help students think through all aspects of their goals for the future and help them identify the services and supports they may need to accomplish those goals.

Using Career Planning Portfolios to Record Student Accomplishments

An important aspect of the school-based preparatory experiences is getting students to learn how to reflect on their school work, extracurricular activities, and life experiences in a way that demonstrates their knowledge, skills, and abilities. Some programs use this information to assist students in creating Career Planning Portfolios. A Career Planning Portfolio is a comprehensive collection of student work that illustrates the student's efforts, progress, and achievements throughout high school. It is a tool to help students and parents with educational and career decision-making. A portfolio is sequential and usually addresses five different levels of development: self-awareness, educational and career exploration, educational and career planning, achievement, and transition. A portfolio can provide an alternative method of assessing a student's performance and provide reliable and valid information on the student's accomplishments. As a student completes new course work and becomes involved in new activities, these accomplishments are added to the portfolio and are used to identify connections between post-high school plans, high school course plans, extracurricular activities, and guidance activities. (Exhibit 2.4 provides a sample Portfolio Assessment Criteria Checklist.)



Online Resources to Consider

Academic Preparation includes information on learning style assessments, goal setting, high school transition, SAT preparation, career portfolios, how different degrees can be used in finding a job, labor market trends, anger management, etc. Some lesson plans and activities are free and some are available for a fee. Visit <<http://www.reynoldsindiana.net/TCS/TCS%20Lesson%20Plans/>>.

Education World is a free resource available to educators, school administrators, and others involved in educating children. It includes a search engine dedicated solely to educational websites; original content, including lesson plans; practical information for educators; information on how to integrate technology in the classroom; and articles written by education experts. The goal of Education World is to make it easy for educators to integrate the Internet into the classroom. Visit <<http://www.education-world.com/>>.

All-Learners: The Website for Exploring Inclusive Education lists and connects to a wide variety of resources for educators, administrators, and parents who are working to provide an inclusive education to all students. Visit <<http://www.infinitec.org/all-learners/resources.html#Anchor-Math-23522>>.

P.R.O. Filer Personal Portfolio & Filing System is an innovative tool designed by students for students that provides a way to organize important documents, keep records of school and community learning opportunities, and create a personal portfolio to showcase the student's accomplishments. Published by the Institute on Community Integration, the P.R.O. Filer includes a manual and dividers for storing information about accomplishments, education, finances, support services, transportation, vocational/work issues, etc. Visit <ici.umn.edu/all/helptool.html#profiler>.

Getting Organized

There are several tasks that HS/HT staff can undertake to ensure that students are able to access the educational programs, services, and supports available at their schools, and to identify HS/HT program

components that will complement and supplement what the students are learning in school. This list is by no means exhaustive, but it is a good place to start.

- **Review** existing information on each HS/HT student (e.g., school records, the IEP, and the ITP). Don't forget, you will need written permission from parents to access information found in school records, medical records, etc.
- **Determine** whether a student needs tutoring and, if so, the type of tutoring that would best meet the needs of that particular student and identify where those services are available in the local community.
- **Poll** HS/HT participants to identify their interests as they apply to science, technology, engineering, and math, and to identify what they are being taught in school. Use this information to identify activities of interest to students and to complement what the students are learning in school.
- **Use the information** you have gathered to identify the individualized supports each student needs to promote his/her academic achievement and to determine the nature of any group activities to be undertaken by the HS/HT program.
- **Identify** assistive technology, materials in alternate formats, or other reasonable accommodations that might be needed by your students. Ask each student directly about his/her needs and preferences.
- **Recruit** volunteers who are working in STEM careers to talk to HS/HT students about the prerequisite courses needed to enter particular STEM careers.
- **Partner** with the schools where your HS/HT students are located and ask to be invited to appropriate IEP, 504, or transition planning meetings, as well as other appropriate general education-related activities.
- **Stress** the importance of good grades and, based on the student's plans for the future, stress the importance of taking prerequisite courses in high school.



Supporting Research: School-Based Preparatory Experiences

To gain the knowledge and skills necessary for success in a variety of settings, all students—including students with disabilities—must have access to educational curriculum and instruction designed to prepare them for life in the 21st century (Murnane & Levy, 1996). The No Child Left Behind Act (NCLB) underscores this assumption, as does federal legislation in the areas of workforce development, youth development, postsecondary education, and other areas. This assumption was the basis, in part, for some of the amendments included in the Individuals with Disabilities Education Act (IDEA) when it was reauthorized in 1990, 1997, and 2004. Under IDEA, states must provide students with disabilities access to the general education curriculum, including the identification of performance goals and indicators, information on how to access the general curriculum, access to general or alternate assessments, and access to public reporting of assessment results. All of these requirements are embedded within a context of standards-based education, in which standards for what students should know and be able to do are defined at the state level, appropriate standards-based education is provided, and success in meeting expectations is measured through large-scale assessment systems.

The need for access requirements in legislation was supported by research demonstrating a lack of educational success (or a lack of any information about educational success) for many students with disabilities (e.g., McGrew, Thurlow, & Spiegel, 1993; Shriner, Gilman, Thurlow, & Ysseldyke, 1994-95), the all too common provision of an inappropriately watered-down curriculum (Gersten, 1998), or a curriculum undifferentiated for students with disabilities (McIntosh, Vaughn, Schumm, Haager, & Lee, 1993). According to Nolet and McLaughlin (2000), the 1997 IDEA reauthorization was “intended to ensure that students with disabilities have access to challenging curricula and that their educational programs are based on high expectations that acknowledge each student’s potential and ultimate contribution to society.” Within the educational context of the late 1990’s and early 2000’s, this meant that all students with disabilities, regardless of the nature of their disability, need to have access to standards-based education.

Providing meaningful access to the general curriculum requires a multifaceted approach. Appropriate instructional accommodations constitute one piece of this picture (Elliott & Thurlow, 2000). Other elements include the specification of curriculum domains, time allocation, and decisions about what aspects of the curriculum to include or exclude (Nolet & McLaughlin, 2000). The process of specifying the curriculum in a subject matter domain requires cataloging the various types of informa-

tion included in the domain (facts, concepts, principles, and procedures) and setting priorities with respect to outcomes. Allocation of time for instruction should be based on established priorities. Decisions about what to include or exclude in curricula should allow for adequate breadth (or scope) of coverage, while maintaining enough depth to assure that students are learning the material. Universal design is another means of ensuring access to the general curriculum (Orkwis & McLane, 1998). When applied to assessment, universal design can help ensure that tests are usable by the largest number of students possible (Thompson, Johnstone, & Thurlow, 2002).

Research indicates that a variety of instructional approaches can be used to increase access to the general curriculum and standards-based instruction (Kame’enui & Carnine, 1998). Approaches such as differentiated instruction (Tomlinson, 1999), strategy instruction (Deshler et al., 2001), and technology use (Rose & Meyer, 2000) are showing that access to the curriculum can be substantially improved, with positive outcomes for students with disabilities.

Other researchers have examined the teaching, learning conditions and strategies in schools that lead to positive outcomes for students (Wagner, 1993). Gersten (1998), the National Center on Secondary Education and Transition (2004a), and Nolet and McLaughlin (2000) note that students with disabilities and other at-risk students need access to the full range of curriculum options, rather than watered-down versions, if they are to meet content and performance standards. Research by Tralli, Colombo, Deshler, and Schumaker (1999) indicates that many low-achieving students can be taught strategies that will raise their performance to meet content standards.

A meta-analysis of findings looked at independent evaluations of 65 school tutoring programs and found the programs positively impacted the academic performance and attitudes of the people being tutored. The students who received tutoring outperformed students in a control group on exams. They also developed positive attitudes about the subjects that were the focus of tutorial programs. The positive effects also extended to the youth who serve as tutors, as they gained a better understanding of and developed more positive attitudes toward the subjects addressed in the tutorial programs (Cohen, Kulik, & Kulik, 1982).

In two studies of “at-risk” junior high school students and students with learning disabilities who were failing classes found participation in after-school tutoring programs impacted the students’ ability to earn average or better than average grades on quizzes and tests when they were supported by trained

EXHIBIT 2.1

adult tutors (Hock, Pulvers, Deshler, & Schumaker, 2001).

In an examination of the development and evaluation of two demonstration peer tutoring programs during two semesters in 1995 during which more experienced students tutored novice students, both types of participants benefited greatly. Both parties benefited in terms of improved understanding and performance in the subject matter, heightened confidence and improved study skills, and the development of lasting friendships (Beasley, 1997).

Other academic and non-academic components that have been linked to positive youth outcomes include

- a broad spectrum of work-based learning components such as service-learning, career exploration, and paid work experience (American Youth Policy Forum & Center for Workforce Development, 2000; Benz, Yovanoff, & Doren, 1997; Hamilton & Hamilton, 1997; National Commission on the High School Senior Year, 2001);
- academic and related standards (Nolet and McLaughlin, 2000) and a full range of postsecondary options (National Center on Secondary Education and Transition, 2004a);
- universally designed curricula and materials (Bowe, 2000; Orkwis & McLane, 1998) including culturally appropriate strategies (Hale, 2001);
- instructional approaches that include the use of technology (Rose & Meyer, 2000) and learning supports including advising and counseling (Aune, 2000); and
- a move to smaller learning communities (Darling-Hammond, Aness, & Ort, 2002; Stern & Wing, 2004).

Basing Assessment on Appropriate Standards

States and districts have become engaged in identifying content standards and setting performance standards for what students should know and be able to do in the 21st century (Partnership for 21st Century Skills, 2003). While these standard-setting efforts may not have initially considered students with disabilities (Thurlow, Ysseldyke, Gutman, & Geenen, 1998), as time has passed, many states have reconsidered their standards in this light. This reconsideration occurred, if for no other reason, because the No Child Left Behind Act (NCLB, the bill that reauthorized the Elementary and Secondary Education Act) required states to develop alternate assessments for those students who are not able to participate in general assessments. The alternate assessments, like the general assessments, are to be aligned to state standards.

NCLB requires that students with disabilities participate not only in assessments, but also in accountability systems. The purpose of these requirements is to ensure that schools are held accountable for access to the general curriculum, high expectations, and improved learning. Such requirements have heightened the importance of access to the general curriculum for all students with disabilities, while also raising concerns about access to transition-related curricula and experiences (Furney, Hasazi, Clark/Keefe, & Hartnett, 2003).

Research (Thurlow, Elliott, & Ysseldyke, 1998) and reviews of standards-based approaches (Elmore & Rothman, 1999; McDonnell, McLaughlin, & Morison, 1997; Thurlow & Johnson, 2000) indicate that assessments and standards must be aligned and that all youth, including those with disabilities, must be included in large-scale assessments and other accountability measures to ensure that accountability systems are valid. Further, schools should provide the supports and resources to help all students meet challenging standards (National Research Council & Institute of Medicine, 2004). Assessment accommodations, alternate assessments, and other performance indicators should be addressed within accountability systems (National Center on Secondary Education and Transition, 2004a; Thurlow et al., 1998), and assessment results should be used in individualized educational planning. Standards should also look beyond purely academic goals and include the knowledge and skills required for desired postsecondary outcomes (National Center on Secondary Education and Transition, 2004a).

NCLB requires that educational decisions be based on student performance data and research-based instructional strategies, and that performance data be shared with parents and other stakeholders. Components of this data-based decision-making process that have been identified through research and best practice reviews include: (a) reporting data in understandable language and in useful categories (Halpern, 1990; Hogan, 2001); (b) sharing data and analyses with a broad range of stakeholders and the general public (Halpern, 1990; Hogan, 2001); (c) including stakeholders in the process of developing data collection instruments (Florio & DeMartini, 1993; Halpern, 1990; Hogan, 2001); and (d) using data to evaluate programs and develop additional programs and services (Halpern, 1990; Hogan, 2001).

Improving School Completion

The prevalence of students dropping out of school is one of the most serious and pervasive problems facing special education programs nationwide. The National Longitudinal Transition Study (NLTS) found that more than a third of students with disabilities exited school by dropping out. The NLTS data also revealed that factors such as ethnicity and family income are

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related to dropout rates, and that some groups of special education students are more apt to drop out than others. Of youth with disabilities who do not complete school, the highest proportions are among students with learning disabilities and students with emotional/behavioral disabilities (Wagner et al., 1993).

National data indicate that there has been some improvement in the overall graduation rate of students with disabilities in the United States. Between the 1995-1996 and 1999-2000 school years, the percentage of youth with disabilities graduating with regular diplomas, as reported by states, grew from 52.6 to 56.2 percent. During the same period, the percentage of students with disabilities reported as having dropped out of school declined from 34.1 to 29.4 percent (U.S. Department of Education, 2003). While these data are encouraging, the dropout rate for students with disabilities still remains twice that of students without disabilities.

In the United States, dropout prevention programs have been implemented and evaluated for decades, but the empirical base of well-researched programs is scant, and well-done evaluations of dropout prevention programs specifically targeted towards students with disabilities are rare. Perhaps the most rigorously researched secondary level program for students with disabilities at risk of dropping out is the Check & Connect program (Christenson, 2002; Sinclair, Christenson, Evelo, & Hurley, 1999). Using randomized assignments to experimental and control groups, researchers found significant positive effects of their program. Check & Connect includes the following core elements: (a) a monitor/advocate who builds a trusting relationship with the student, monitors the student on risk indicators, and helps problem-solve difficult issues between the student and the school; (b) promotion of student engagement with the school; (c) flexibility on the part of school administrative personnel regarding staffing patterns and use of punitive disciplinary practices; and (d) relevancy of the high school curriculum to students.

Two common components of successful secondary dropout prevention programs are work-based learning and personal development/self-esteem building (Farrell, 1990; Orr, 1987; Smink, 2002). Of equal importance, however, is tailoring or contextualizing these and other intervention components to the particular school environment (Lehr et al., 2003). Finally, early intervention also appears to be a powerful component in a school district's array of dropout prevention strategies.

Professional Development as a Means to Improve Educational Results

Training and professional development for educators and other stakeholders have been identified as critical components of school reform and improving student achievement and other outcomes. Research studies and analyses of best practices have identified the following essential components of training and development programs: (a) ensuring that school personnel have the knowledge, skills, and attitudes to effectively perform their duties (Joyce, 1990); (b) incorporating student performance data and effective strategies for improving student achievement into professional development (National Association of Elementary School Principals, 1996; National Association of Secondary School Principals, 2001); (c) including educators, family members, and other stakeholders on school leadership teams (National Center on Secondary Education and Transition, 2004b); (d) person-centered planning activities for youth, such as involving youth in individualized school and career related decision-making and planning (National Center on Secondary Education and Transition, 2004b); and (e) collaborative leadership (National Association of Secondary School Principals, 2001).

Many new teachers are entering the field without the specific knowledge, skills, and attitudes needed to support transition. Miller, Lombard, and Hazelkorn (2000) report that few special education teachers have received training on methods, materials, and strategies for developing meaningful IEPs that include goals and objectives on transition or that specifically address students' transition needs through curriculum and instruction. Further, many special education teachers underutilize community work-experience programs and fail to coordinate referrals to adult service providers.

Beyond pre-service training, high-quality continuing professional development is needed to ensure that teachers are up-to-date and fully able to support students in the transition from school to adulthood. Miller et al. (2000), in a national study, found that nearly 8 out of 10 teachers (79 percent) reported receiving five hours or less of in-service training regarding inclusion of students with disabilities in their districts' school-to-work programs. Further, nearly half (49 percent) indicated they had received no in-service training related to practices for including students with disabilities in regular education classes and activities. These findings are consistent with the report published by the National Center for Education Statistics regarding the preparation and qualifications of public school teachers (Lewis et al., 1999). This report notes that fewer than 2 out of 10 teachers (19 percent) spent more than eight hours per year on professional development activities to address the

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needs of students with disabilities, despite the fact that teachers report that professional development of longer duration is more effective. The promotion of improved levels of collaboration between general education and special education is in response to another area of need. General education classroom teachers, work-study coordinators, career and technical education instructors, and high school counselors all play an important role in supporting the transition of students with disabilities. These general education personnel need training and other support to help them work effectively with students with disabilities. A recent study of personnel needs in special education (Carlson, Brauen, Klein, Schroll, & Willig, 2001) found that general educators' confidence in serving students with disabilities was dependent on their relationship with special education teachers: those who often received instruction-related suggestions from special educators felt significantly more confident.

Basing Graduation Requirements on Meaningful Measures and Criteria

Requirements that states set for graduation can include completing Carnegie Unit requirements (a certain number of class credits earned in specific areas), successfully passing a competency test, passing high school exit exams, and/or passing a series of benchmark exams (Guy, Shin, Lee, & Thurlow, 1999; Johnson & Thurlow, 2003; Thurlow, Ysseldyke, & Anderson, 1995). A study conducted by Johnson & Thurlow (2003) found that 27 states had opted to require that students pass state and/or local exit exams in order to receive a standard high school diploma. This practice has been increasing since the mid-1990s (Guy et al., 1999; Thurlow et al., 1995). States may also require any combination of the above requirements.

Variability in graduation requirements is complicated further by an increasingly diverse set of diploma options. In addition to the standard high school diploma, options now include special education diplomas, certificates of completion, occupational diplomas, and others.

Many states have gone to great lengths to improve the proportion of students with disabilities passing state exit exams and meeting other requirements for graduation. Strategies have included grade-level retention, specialized tutoring and instruction during the school day and after-school, and weekend or summer tutoring programs. While these may be viewed as appropriate interventions and strategies, there is little research evidence supporting these practices. Available research indicates, for example, that repeating a grade does not improve the overall achievement of students with disabilities (Allington & McGill-Franzen, 1992; Holmes, 1989).

The implications of state graduation requirements must be thoroughly understood, considering the negative outcomes students experience when they fail to meet state standards for graduation. The availability of alternative diploma options can have a considerable impact on raising graduation rates. However, the ramifications of receiving different types of diplomas need to be considered. A student who receives a non-standard diploma may find their access to postsecondary education or meaningful employment is limited. It is also important for parents and educators to know that if a student graduates from high school with a standard high school diploma, the student is no longer entitled to special education services unless a state or district has a policy allowing continued services under such circumstances. Most states do not have such policies.



Assistive Technology Checklist

(Please check any accommodations you use or need to complete the tasks in bold.)

WRITING

Mechanics of Writing

- Pencil/pen with adaptive grip
- Adapted paper (raised line, highlighted lines)
- Slant-board
- Typewriter
- Portable word processor
- Computer
- Other _____

Alternate Computer Access

- Keyboard with easy access or Access DOS
- Keyguard
- Arm support (e.g., Ergo Rest)
- Track ball/track pad/joystick
- Alternate keyboard (e.g., IntelliKeys, Discover Board, TASH)
- Mouth stick/head pointer
- Head mouse/head master/tracker
- Switch with Morse code
- Switch with scanning
- Voice recognition software
- Word prediction (e.g., Co:Writer) to reduce keystrokes
- Other _____

Composing Written Material

- Word cards/work book/word wall
- Pocket dictionary/thesaurus
- Electronic/talking electronic dictionary, thesaurus/spell checker (e.g., Franklin Bookman)
- Word processor with spell checker/grammar checker
- Word Processor with word prediction (e.g., Co:Writer) to facilitate spelling and sentence construction
- Talking word processor for multi-sensory typing
- Voice recognition software
- Multimedia software for expression of ideas (assignments)
- Other _____

Communication

- Communication board/book with pictures/objects/letters/words
- Eye gaze board (eye gaze communication)
- Simple voice output device (e.g., BigMack, Cheap Talk, Voice in a Box, MicroVoice, Talking Picture Frame, Hawk)
- Voice output device with levels (e.g., 6 Level Voice in a Box, Macaw, Digivox, DAC)
- Voice output device with dynamic display (e.g., Dynavox, Speaking Dynamically with laptop computer/ Freestyle)
- Voice output device with icon sequencing (e.g., AlphaTalker Liberator, DAC)
- Device with speech synthesis for typing (e.g., Cannon Communicator, Link, Write:Out Loud with laptop computer)
- Other _____

READING, STUDYING, AND MATH

Reading

- Changes in text size, spacing, color, background color
- Use of pictures with text (e.g., Picture It, Writing with Symbols)
- Book adapted for page turning (e.g., page fluffers, 3-ring binder)
- Talking electronic device to pronounce challenging words (e.g., Franklin Bookman)
- Scanner with talking word processor
- Electronic books
- Other _____

Learning/Studying

- Low tech aids to find materials (e.g., index tabs, color coded folders)
- Highlight text (e.g., markers, highlight tape, ruler, etc.)
- Voice output reminders for assignments, steps of task, etc.
- Software for manipulation of objects/concept development (e.g., Blocks in Motion, Toy Store)—may use alternate input device, (e.g., switch, touch window)
- Software for organization of ideas and studying (e.g., Inspiration, Claris Works Outline, PowerPoint, etc.)

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- Recorded material (books on tape, taped lectures with number coded index, etc.)
- Other _____

Math

- Abacus/math line
- Calculator/calculator with print out
- Talking calculator
- Calculator with large keys and/or large LCD print
- On screen calculator
- Software with templates for math computation (may use adapted input methods)
- Tactile/voice output measuring devices (e.g., clock, ruler)
- Other _____

Activities of Daily Living (ADLs)

- Adaptive eating devices (e.g., foam handle on utensil)
- Adaptive drinking devices (e.g., cup with cut out rim)
- Adaptive dressing equipment (e.g., button hook, reacher)
- Other _____

Mobility

- Walker
- Grab rails
- Manual wheelchair
- Powered mobility toy (e.g., Cooper Car, GoBot)
- Powered wheelchair with joystick, head switch or sip/puff control
- Other _____

Environmental Control

- Light switch extension
- Use of powerlink and switch to turn on electrical appliances (e.g., radio, fan, blender, etc.)
- Radio/ultra sound/remote controlled appliances
- Other _____

Positioning & Seating

- Non-slip surface on chair to prevent slipping (e.g., Dycem)
- Bolster, rolled towel, blocks for feet

- Adapted/alternate chair, side lyer, stander
- Custom fitted wheelchair or insert
- Other _____

Vision

- Eye glasses
- Magnifier
- Large print books
- Screen magnifier (mounted over screen)
- Screen color contrast (e.g., CloseView)
- Screen magnification software (e.g., CloseView, Zoom Text)
- CCTV (closed circuit television)
- Screen reader (e.g., OutSpoken)
- Braille keyboard and note taker (e.g., Braille N Speak)
- Braille translation software
- Braille printer
- Other _____

Hearing

- Hearing aid
- Classroom amplification
- Captioning
- Signaling device (e.g., vibrating pager)
- TDD/TTY for phone access
- Screen flash for alert signals on computer
- Other _____

Comments

Adapted from the Wisconsin Assistive Technology Initiative's Technology Checklist. Visit <<http://www.wati.org/loanlibrary/techchecklist.html>>.

Portfolio Assessment Criteria Checklist

Does this portfolio:

- Involve the student in the selection of best pieces
- Include raw data and summarizing data
- Show no conflict in purpose
- Involve the collection of student samples over time
- Involve the student in a self-reflection process
- Include contents different from a cumulative folder
- Include contents generated from multiple procedures
- Include the teacher's own instructional reflections
- Show evidence of teacher and student collaboration in setting goals
- Incorporate student-teacher conferences
- Involve the student in the self-assessment process
- Incorporate tasks that are performed in authentic contexts
- Include a mutually agreed upon criteria for evaluation

Source: Florida HS/HT Sample Curriculum (2006).



Websites with Activities, Lesson Plans, and Curricula Addressing Science and Math

Ask Dr. Math provides answers to math questions found in homework, puzzles, math contests, and math education. Questions and answers are listed by school level and specific math skill. Questions from students can be submitted through e-mail. Visit <<http://forum.swarthmore.edu/dr.math/dr-math.html>>.

Busy Teachers' WebSite K-12 contains valuable resources for teachers. Visit <<http://www.ceismc.gatech.edu/BusyT>>.

Cyberinfrastructure examines the convergence of three realities—the spread of the Internet, the shrinkage of computers, and the accumulation of databases—that have led researchers to envision a planet-wide grid of computing, information, networking, and sensor resources. Learn about projects to develop the emerging cyber-infrastructure. Discover resources for teaching and learning about information technology. Sponsored by the National Science Foundation (NSF), visit <http://www.nsf.gov/news/special_reports/cyber/index.jsp>.

Junior Solar Sprint and Hydrogen Fuel Cell Car Competitions focuses on designing and building solar and hydrogen fuel cell cars. Explore components of solar cars, conduct experiments to improve car performance, find activities for measuring solar cell output, tips on vehicle construction and transmission design, and formulas for calculating vehicle performance. See a list of regional competition sites and find out how to integrate solar vehicle activities into the curriculum. This site is sponsored by the Department of Education. Visit <http://www.nrel.gov/education/jss_hfc.html>.

Kids' Space at the Internet Public Library contains ideas on and help with science projects and allows students to go on virtual field trips. Visit <<http://ipl.sils.umich.edu/div/project-guide/>>.

NASA Connect: Sun-Earth Day features teacher guides and other resources for studying sun-earth connections and celebrating Sun-Earth Day. In "Ancient Observatories," students measure the movement of the sun and find solar noon. In "Venus Transit," students learn about scale models and the "Astronomical Unit," which is used to determine distances from the earth to other planets and stars. In "Dancing in the Night Sky," students learn about the Aurora Borealis, or the Northern Lights. This site is sponsored by the National Aeronautics and Space Administration (NASA). Visit <<http://sunearthday.nasa.gov/2006/events/broadcasts.php>>.

National Institute of Standards and Technology (NIST) Virtual Museum features the work of a federal agency that has helped keep U.S. technology at the leading edge. Visit the online exhibits to learn about the standardization of women's clothing, weights and measures (crucial to industrialization), technology development during World War II, the first government computer with an internal program, OCR machines, the weathering of stone, and more. This site is sponsored by the U.S. Commerce Department's National Institute of Standards and Technology (NIST). Visit <<http://museum.nist.gov/>>.

National Science Foundation: Where Discoveries Begin contains ideas for classroom activities and resources that promote science, math, and technology. Visit <<http://www.nsf.gov/news/classroom/>>.

New York Times Learning Network is a free service for students in grades 3-12, their teachers, and parents. Students can read the day's top stories, take a news quiz about today's world, and play special crossword puzzles. Teachers can access a daily lesson plan for grades 6-12, as well as access archived and thematic lesson plans. Parents can enhance their children's understanding of current events using conversation starters and joining online discussions. The site is updated Monday through Friday throughout the year. Visit <<http://www.nytimes.com/learning/teachers/index.html>>.

NIDA Goes Back to School is a source of free information about the latest science-based drug abuse publications and teaching materials. Students can learn about the science behind drug abuse. Sponsored by the National Institute on Drug Abuse, National Institutes of Health, U.S. Department of Health and Human Services, this site includes publications, curriculum and a "Teen Site," <teens.drugabuse.gov>. Visit <<http://www.backtoschool.drugabuse.gov/>>.

Path of Totality: Measuring Angular Size and Distance examines the natural phenomena that create a total eclipse. NASA scientists and engineers introduce a satellite used to make artificial eclipses in order to learn about the sun's corona. Students measure the angular size and predict the angular distance of objects in the sky. This site is sponsored by the National Aeronautics and Space Administration (NASA). Visit <http://connect.larc.nasa.gov/programs/2005-2006/path_of_totality/>.

Preview the Heart takes students on a virtual tour of the heart. Visit <<http://sln2.fi.edu/biosci/preview/heartpreview.html>>.

EXHIBIT 2.4: WEBSITES WITH ACTIVITIES, LESSON PLANS, AND CURRICULUM

ScienCentralNews provides the latest news on developments in life sciences, physical sciences, and technology. You can sort articles by topic, e.g., genetics, animals, the brain, chemistry, physics, earth, oceans, astronomy, climate, engineering, biotechnology, computers, nanotechnology, and others. See articles on cancer-causing genes, music for pain, fat vaccine, biofuel energy, no-mow grass, liquid armor, fouled beaches, phones and driving, auto-focus eyewear, activity breaks, memory, and more. Visit <<http://www.sciencentral.com/>>.

Smithsonian National Zoological Park is used to teach people to engage in conservation of wildlife, water, and habitats. It provides fact sheets and photos for many of the 2,400 mammals, birds, reptiles and amphibians, fish, and invertebrates at the National Zoo and the Zoo's Conservation and Research Center, including species at the Zoo that are endangered or threatened. Visit <<http://nationalzoo.si.edu/default.cfm>>.

Smithsonian: Science and Technology explores the Apollo 11 mission to the moon, Arctic wildlife, migratory birds, stars and black holes, sky watching, the Galapagos Islands, invasive species, views of earth, milestones of flight, shade grown coffee, species of Indian River Lagoon, polio, and much more. Visit <http://www.si.edu/science_and_technology/>.

Sun-Earth Day is a series of programs and events throughout the year that culminates with a celebration of the spring equinox. "Eclipse: In a Different Light" shows how eclipses have inspired people to study the sun-earth-moon system. Join this journey of exploration and discovery in preparation for a total solar eclipse. This site is sponsored by the National Aeronautics and Space Administration (NASA). Visit <<http://sunearthday.nasa.gov/>>.

Teacher Talk contains resources for teachers. Visit <<http://education.indiana.edu/cas/tt/tthmpg.html>>.

Teacher Workshops provides materials from dozens of teacher presentations on literacy, math, science, history, and the arts at the U.S. Department of Education's Teacher-to-Teacher Summer Workshops. Topics include reading, writing, algebra, computation, data, geometry, peer teaching, earth systems, cells, physical science, labs, science mysteries, historical literacy, arts, reading, and more. Visit <<http://www.t2tweb.us/Workshops/Sessions.asp>>.

Teachers Helping Teachers provides additional resources for teachers. Visit <<http://www.pacificnet.net/~mandel>>.

The Seven Wonders of the Ancient World provides opportunities for students to go on virtual field trips. Visit <<http://ce.eng.usf.edu/pharos/wonders/>>.

The Structures of Life takes you into the world of "structural biology"—a branch of molecular biology that focuses on the shape of nucleic acids and proteins (the molecules that do

most of the work in our bodies). Learn about the structures and roles of proteins, tools used to study protein shapes, how proteins are used in designing new medications (for AIDS and arthritis), and what structural biology reveals about all life processes. Find out about careers in biomedical research. This site is sponsored by the National Institutes of Health (NIH). Visit <<http://publications.nigms.nih.gov/structlife/>>.

The Weather Channel is devoted to providing the current weather, weather outlooks and forecasts, and "weather whys" on every state in America. Visit <<http://www.weather.com>>.

TryScience is a gateway to the excitement of contemporary science and technology through on and offline interactivity with more than 400 science and technology centers worldwide. A partnership of IBM Corporation, the New York Hall of Science (NYHOS), the Association of Science-Technology Centers (ASTC), and science centers worldwide, TryScience provides opportunities to investigate, discover, and try science. Visit <<http://www.tryscience.org>>.

U.S. Antarctic Program aims to understand the world's coldest, windiest, driest, and harshest continent (Antarctica)—its ecosystems and its effects on global processes such as climate. Learn about important discoveries. See articles about a killer crater found under the ice and the melting of polar ice sheets. This site is sponsored by the National Science Foundation. Visit <<http://www.usap.gov/scienceAndEducation.cfm>>.

Visualization Projects includes simulations of more than 40 phenomena: sea ice and CO₂, climate change (230-year period), clouds and precipitation, coral reef evolution (starting 21,000 years ago), universal fire shape, fire twirl and burst behavior, tornadoes, thunderstorms, typhoons, El Niño events, greenhouse gases and sulfate aerosols, polar vortex breakdown, CO₂ and temperature, CFCs in the ocean, cloud evolution (7-day period), daily weather in the U.S., and more. Visit <<http://www.vets.ucar.edu/vg/categories/all.shtml>>.

Volcano World allows you to tap into a volcanologist who can greatly enrich the learning experiences of students through information, photographs, data, and interactive experiments involving volcanoes. Visit <<http://volcano.und.nodak.edu>>.

Zero Gravity provides an attractive teaching environment for getting students interested in science. This unique program enables students to design and conduct science experiments in a zero-gravity environment. The Weightless Flights of Discovery program teaches educators how to relate zero-gravity experiments to science, engineering, technology, and mathematics curriculum development. Registration is free. Visit <<http://www.eschoolnews.org/news/showStoryts.cfm?ArticleID=6376>>.