FACILITIES, EQUIPMENT, TECHNOLOGY & MATERIALS

High-quality CTE programs of study are attentive to the alignment, appropriateness and safety of the physical/material components of the program, including laboratories, classrooms, computers, industry-specific equipment, and tools and supplies that support learning. When considering the use of facilities and equipment in COVID-19-impacted learning, there are numerous critical considerations across all three potential instructional models.

Key Issues to Address

- Setting up any in-person classrooms, labs and other facilities to ensure social distancing and safety
- Cleaning and sanitizing facilities, equipment and technology used by students or staff
- Ensuring adequate personal protective equipment, as necessary
- Providing access to technology, equipment and instructional materials to students engaged in remote learning

In-person Considerations

If any learners return to campus, CTE programs will likely be required to adapt their classrooms and laboratories to meet new state and local safety requirements and guidelines for social distancing. This may be accomplished with fewer desks or workstations that are six feet apart. CDC guidelines also recommend setting up desks so that learners are not facing each other, instead facing ahead. Where space does not allow for six-foot distancing, another option being explored by administrators is erecting clear Plexiglas barriers between students. Where weather permits, classes or labs could even occur outside. Similarly, learning that already takes place in the open air, such as on a farm or construction site operated by the institution or district, could likely continue because of the seemingly lower rate of virus transmission outside (although recommendations on this topic could change).

While some CTE programs already make use of individual workstations that are spaced for safety, classrooms and other laboratory or hands-on spaces that are more collaborative will be impacted by socially distanced layouts that discourage students from working in small groups in the same space. More information on this topic can be found in the Engaging Instruction section.

Another adaptation will be cleaning and safety protocols. CDC guidelines recommend frequent disinfection of high-touch surfaces with EPA-recommended disinfectants. Individual teachers will likely bear at least some responsibility for cleaning and sanitizing within their classroom and lab spaces. Administrators are looking at methods for cleaning efficiently, such as electrostatic sprayers with dispensing hoses that quickly and evenly coat surfaces with disinfectant. Sanitizer cabinets are another option for quickly disinfecting equipment. While campuses may be investigating other promising options, such as UV disinfection, the CDC states that the efficacy of these and similar methods against COVID-19 are unknown.

Smaller equipment, tools and supplies can also be assigned to only one student to reduce the need for cleaning and the spread of germs. This will likely require purchasing more tools and supplies than usual. Requiring even more frequent handwashing or sanitizing than usual within labs and shared spaces will be an important preventative measure as well. Business partners may be able to recommend best practices on cleaning and safety protocols within specific industries.

Another consideration is providing general personal protective equipment (PPE) to learners and staff, such as masks and gloves, as well as providing and cleaning occupation-specific PPE. Administrators are looking at bulk orders of reusable cloth masks from school uniform and equipment suppliers, as well as stocking up on exam gloves, paper towels, sanitizer, soap and disinfectant. Many CTE programs are replacing PPE that was donated to health care professionals during the pandemic in order to keep students and staff safe. Cost increases and high demand for these products, leading to back orders, will impact availability. Business and community partners may be able to donate some supplies, depending on their financial resources and capacity.

CTE programs in which students wear safety glasses are particularly concerning. Face masks can fog up glasses and goggles. One option is to invest in face shields that cover the eyes, mouth and nose. Instructors and students can also experiment with adding a waterproof layer to safety glasses through products and techniques used by scuba divers.

Remote Considerations

If some or all students continue to learn remotely, instructors may be able to turn to partner institutions or businesses for lab-based activities. For instance, if a local community college is open while the high school campus is closed for in-person learning, individuals or groups of high school students may be able to schedule time in the college lab. The same could happen with a local union training center or even a business, although these sites may be unwilling to have learners and instructors on site for safety and liability concerns.

In addition, programs can look to models for supplementing or replacing hands-on and lab-based instruction through video, simulations and mobile labs, as well as at-home kits of materials. Programs, particularly those in rural areas, have already been exploring these technologies to increase access to instruction and hands-on skill development. Several examples are included in the Resources, Tools and Examples section below.

In some cases, simulations can be an option for replacing access to lab equipment. Fully computerized simulations, such as some simulated patient interactions, electricity simulations and business simulations, may be good alternatives for certain programs of study. Many simulation packages include both computer modules and physical equipment such as an extended reality (XR) helmet and stylus, or a mannequin arm. This equipment could be checked out to learners to use at home on a rotating basis, provided it is not too unwieldy or complex to use. Any materials that are checked out will need to be disinfected before and after use.

If the district or institution allows it, mobile labs could offer learners the chance to practice hands-on skills in a contained space that can be disinfected and minimally staffed. These labs typically rotate among multiple school districts or institutions, and could be used to supplement mostly remote instruction for students who need end-of-course lab hours or to complete in-person credentialing assessments.

These technology-heavy options require start-up costs, which may include physical components, software updates, maintenance and technical support, and access to high-speed internet. However, these costs can be shared among districts and institutions.

At-home kits of materials are another option in the remote environment. These could include industry-standard tools and equipment, the simulation tools described above or non-industry standard materials like cardboard in place of wood. Examples of kits sent home this spring include materials and tools for building Adirondack chairs; mannequin heads, color mixing bowls and hair clips; and ingredient kits for recipes. Safety would be a paramount concern with these at-home kits, and guardian permission and oversight may be needed if there is any risk of injury.

Ideally, educators will have access to video technology to demonstrate hands-on techniques, as further described in the Engaging Instruction section. Students in a fully remote environment will also need access to online videos, modules, digital or print textbooks,

Access and Equity Implications

When you are considering how to adapt facilities and equipment, remember that learners with disabilities and English learners may be particularly challenged by communicating through masks and navigating redesigned spaces. In remote scenarios, internet speeds and connection quality can be major sources of inequities in accessing video, simulations and other remote tools. In addition, many learners may struggle to adapt to remote lab experiences that are less tactile than in-person labs.

software or other instructional resources to complete more theoretical assignments. During the spring, many institutions made online textbooks or other resources available to all students, so these materials and how to access them will likely be familiar. Filling in gaps in readily available resources will be key if all instruction continues remotely.

Blended Considerations

In blended learning scenarios, CTE educators must attend to all of the considerations noted above during the times that students are learning at a distance or in person. Additional considerations related to facilities, equipment, technology and materials in the blended model include cleaning between groups of students, ensuring student access to appropriate materials both at home and on campus, and the safety of transporting tools or equipment between learning locations.

Many of these decisions will be heavily influenced by the blended model adopted. For example, if students are physically present every other day, and working remotely other days, all lab activities may be completed during class time, with no need for materials or equipment to be sent home with learners. Instead, students would need virtual access to the instructional materials discussed above, such as online modules, digital textbooks and software to complete assignments while learning remotely. However, if the blended approach does not provide enough time to complete hands-on activities in the lab, students may need remote access to equipment or technology, such as the simulations or at-home kits described above.

Resources, Tools and Examples

- Relevant CDC guidance includes the agency's detailed reopening guide, released in May, with a section for schools and day camps, as well as cleaning and disinfecting recommendations.
- Education Week has produced several articles and resources on adapting educational facilities to social distancing, including a measurement guide and other articles. This Spaces4Learning article also describes how to rethink school spaces in light of social distancing.
- Case studies about mobile labs/equipment, simulators and interactive video can be found in Promising Practices and Design Principles in Career and Technical Education Delivered via Distance Learning Technology, Simulated Work-Based Learning: Instructional Approaches and Noteworthy Practices and Advance CTE's CTE on the Frontier series and CTE Distance Learning in Rural Communities brief.
- The International Nursing Association for Clinical Simulation and Learning (INACSL) has developed the INACSL Standards of Best Practice: Simulation. This blog post from Advance CTE also discusses nursing simulations. In spring 2020, Oregon provided guidance on virtual options for clinical experiences.
- This report from technology provider zSpace describes benefits from 3D, virtual reality and related learning environments.
- Online OSHA safety training can support safety in and out of the classroom and laboratory.

This is an excerpt from High-quality CTE: Planning for a COVID-19-impacted School Year. Access the complete guide for additional content about providing high-quality CTE programs in a COVID-19-impacted school year. **Last Update:** June 22, 2020

This document is not legal advice, nor is it an exhaustive list of every consideration or action that CTE educators may need to take for the 2020–21 school year. Readers should defer to federal, state, local and/or institution requirements and guidance. The instructional models, ideas, resources, tools and examples shared do not constitute endorsements of any products, services or strategies, as different products, services and strategies will work in different contexts. As knowledge is gained, this guide may be updated to incorporate new ideas and resources and emerging issues.

Facilities, Equipment, Technology & Materials: Key Questions to Consider

In-person Questions

- How can furniture and equipment in labs be arranged so that students remain socially distanced during class time? If this cannot be accomplished, can you use clear barriers between workstations or even situate labs outside?
- How will you efficiently clean and sanitize classrooms, lab spaces and tools? Will learners be responsible for cleaning and sanitization before and/or after usage? How much time will you schedule for cleaning?
- How can you reduce the sharing of tools or equipment among students?
- Do you have enough PPE for staff and students? How will you restock supplies of PPE in time for classes to resume?

Remote Questions

- Can learners access facilities and equipment through affiliated campuses, partner institutions, local union training centers or businesses for in-person, hands-on instruction?
- What equipment or technology do students need to practice applied skills remotely? Can that be accomplished using video, simulations or mobile labs? Could you band together with other districts or institutions for the start-up costs for simulators or mobile labs?
- Which instructional resources, such as online textbooks, modules or videos, can be made available online for students (assuming internet access issues have been addressed)?
- Are there personal tools, supplies or manipulatives that could be made available to students learning from a distance? How will you distribute and collect, as well as sanitize, personal tools and supplies?
- How will safety concerns be addressed with personal tools and supplies used at home? What instructions/remote training will you provide?

Blended Questions

- How will equipment and facilities be transported and deep cleaned between different groups of students?