



# BEST PRACTICES IN MIDDLE SCHOOL CAREER AND TECHNICAL EDUCATION EXPANSION

December 2020

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# INTRODUCTION

A state education agency in the southeastern United States is interested in expanding middle school Career and Technical Education (CTE) across the state. To support this effort, the agency has partnered with Hanover Research (Hanover) to explore best practices in middle school CTE expansion and identify practices across other states in early career exploration at the middle school level. Thus, the following report explores best practices for implementing CTE at the middle school level, focusing on career exploration, equity, and CTE in rural areas, and describes the middle school CTE practices of three states. The report includes the following two sections:

- **Section I: Best Practices For Implementing Career And Technical Education In Middle School** synthesizes the literature on strategies for implementing and expanding CTE at the middle school level, including recommendations for career exploration, equity, and rural areas.
- **Section II: Middle School CTE In Practice** profiles three states' middle school CTE practices, focusing on implementation, programming, and funding.

## KEY FINDINGS

-  **Middle school CTE programs should expose students to a variety of careers and industries, help them explore and develop interests, and develop foundational technical and employability skills that they can continue to build in high school.** When expanding middle school CTE programming, state leaders can consider program delivery methods, such as one course that explores all 16 Career Clusters or multiple classes that each allow students to explore a few broad career areas, and whether to integrate CTE into the standard curriculum or create CTE-specific pathways. Regardless of the delivery model, states should establish a middle school CTE curriculum and clear standards, which help connect CTE activities to student outcomes and align CTE sequences between middle and school. Additionally, as part of expanding middle school CTE, state leaders should collect program, participation, and student outcome data to support CTE program evaluation and improvement.
-  **Career exploration should provide middle school students with an awareness of post-secondary options, engage student thinking about the future, and help students make connections between future interests and academic choices and achievement.** Effective career exploration in middle school develops students' non-cognitive skills, exposes students to different career paths, and may include individual academic and career plans. Comprehensive career exploration can also contribute to equity by reducing career exposure opportunity gaps between students and by reducing students' development of occupation gender bias.
-  **Equitable CTE access requires strategic outreach, messaging, and recruitment efforts that ensure all students receive program information in a language that they and their families can understand.** Strategies for equitable outreach and recruitment include building trust among students and families, enabling two-way communication, involving students and families in decision-making, and providing students and families with opportunities to provide feedback. Through these strategies and program requirements, state and local education leaders should ensure that CTE programming is both available to and not homogenously composed of students who need extra support, students with disabilities, and high-achieving students with educational advantages. Additionally, state leaders can leverage CTE program data to identify equity gaps in CTE access and outcomes.
-  **Challenges to expanding CTE in rural areas include smaller, more geographically dispersed student populations; less funding; a lack of technology infrastructure; less access to work-based learning**

**and career exploration opportunities; fewer partnership opportunities; and difficulties finding licensed CTE educators.** However, state leaders can help overcome these challenges through planning, funding, partnerships, technology, and strategic innovation. Sample innovative strategies for bringing CTE and work-based learning to rural areas include developing mobile CTE labs and classrooms with industry-relevant equipment and traveling instructors, virtual workplace access and video chats with industry professionals, and regional CTE centers that serve multiple districts and schools.



**Profiled states build middle school CTE programming that exposes students to various careers, includes introductory industry CTE courses, and prepares students for high school CTE pathways.** Typically, work-based learning at the middle school level includes project-based learning, field trips, and activities designed to help students explore their interests and connect their interests to the world of work. Profiled states fund middle school CTE initiatives through either Perkins V funding, grants specifically intended for middle school CTE, or a combination of both.

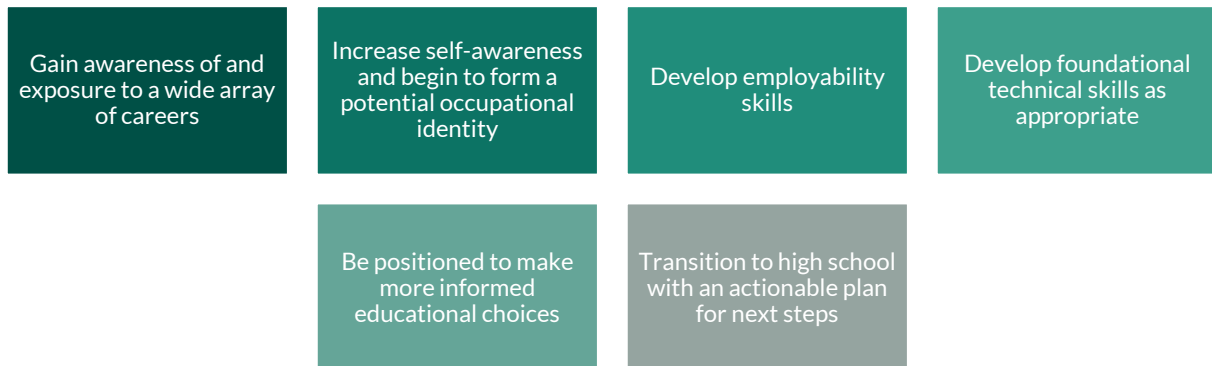
# SECTION I: BEST PRACTICES FOR IMPLEMENTING CAREER AND TECHNICAL EDUCATION IN MIDDLE SCHOOL

In this section, Hanover synthesizes the literature on strategies for implementing and expanding CTE at the middle school level, including recommendations for career exploration, equity, and rural areas.

## STRATEGIES AND CONSIDERATIONS FOR EXPANDING MIDDLE SCHOOL CTE

With the availability of Perkins V funds to expand CTE into the middle grades, states and districts should follow recommended practices to ensure that CTE programs appropriately serve and support middle school students. Indeed, Advance CTE and the Association for Career and Technical Education (ACTE) recommend that education leaders plan middle school CTE expansion with clear goals and outcomes for what students will gain from these programs. Clear goals and outcomes can help to establish aligned standards and activities that support attaining intended outcomes. For example, middle school CTE programs should expose students to a variety of careers and industries, help them explore and develop interests, and develop foundational technical and employability skills that they can continue to build in high school.<sup>1</sup> Accordingly, Advance CTE and the ACTE recommend that states and districts design middle school CTE initiatives to achieve the outcomes presented in Figure 1 below.

**Figure 1.1: Middle School CTE Student Learning Outcomes**



Source: Advance CTE and ACTE<sup>2</sup>

**Middle schools can offer CTE through a variety of approaches, such as with one course that explores all 16 Career Clusters or multiple classes that allow students to explore a few broad career areas each.** Similarly, schools may integrate CTE into the general curriculum, or create CTE pathways that guide students to specific CTE program sequences in high school.<sup>3</sup> States may require districts to structure CTE delivery a certain way, or can offer districts flexibility in structuring CTE delivery to meet the district’s and students’ needs. For example, districts will have to balance CTE delivery with other requirements, such as overall instructional time, scheduling, class size, physical classroom space, and educator qualifications.<sup>4</sup> States and districts should work together to determine a CTE delivery structure that balances meeting students’ needs with considerations of district and school resources.<sup>5</sup>

<sup>1</sup> “Broadening the Path: Design Principles for Middle Grades CTE.” Advance CTE and the Association for Career and Technical Education, March 2020. p. 4. <https://cte.careertech.org/sites/default/files/files/resources/BroadeningPathFINAL.pdf>

<sup>2</sup> Figure contents quoted verbatim from: Ibid., pp. 3–4.

<sup>3</sup> “Career Exploration in Middle School: Setting Students on the Path to Success.” Association for Career and Technical Education, 2018. p. 4. [https://www.acteonline.org/wp-content/uploads/2018/02/ACTE\\_CC\\_Paper\\_FINAL.pdf](https://www.acteonline.org/wp-content/uploads/2018/02/ACTE_CC_Paper_FINAL.pdf)

<sup>4</sup> “Broadening the Path: Design Principles for Middle Grades CTE,” Op. cit., p. 9.

<sup>5</sup> “Career Exploration in Middle School: Setting Students on the Path to Success,” Op. cit., p. 4.

To achieve the goals of exposing students to industries and career options and preparing them for careers and further CTE in high school, effective middle school CTE programs should follow the 11 design principals developed through research by Advance CTE and ACTE, in Figure 1.2 below.

**Figure 1.2: Essential Principles for Implementing Expanded Middle School CTE**

DESIGN PRINCIPLE	DESCRIPTION
<b>Equitable and inclusive of each student</b>	Middle grades CTE programs should be inclusive and accessible, reaching each and every student. The benefits of middle grades CTE programs should not be limited to a few students who choose to enroll in a single elective with limited availability or who are part of a specific population group. Program designers should also take care to ensure that middle grades CTE does not become segregated by student performance. It should not be a “dumping ground” for certain students, such as students with disabilities. On the other hand, careful attention must also be paid to ensure that students who need additional academic supports are not eliminated from the possibility of experiencing CTE due to scheduling constraints.
<b>Anchored in careers</b>	Learning about and exploring careers should be the foundation of middle grades CTE programs; the programs should not be merely life skills classes or an unconnected series of discrete tasks or projects. CTE program standards, curriculum and experiences should be built around students exploring an array of careers and the education and skills necessary to pursue those careers. Hands-on projects and lab activities should be clearly linked to specific career tasks while maintaining developmental appropriateness. Students should also be exposed to labor market information and taught how to understand and interpret information about careers 6 Broadening the Path: Design Principles for Middle Grades CTE in that context.
<b>Standards-based</b>	To ensure that students gain the full range of desired technical, academic and employability knowledge and skills, middle grades CTE programs should be standards based with clear expectations. However, programs should not be high stakes, which could be a disincentive for schools or teachers to participate, and standards should be broad enough to be met through a variety of flexible delivery models.
<b>Grounded in experiential and hands-on learning</b>	To reach middle grades students at their developmental level, middle grades CTE must be based in authentic, applied learning that involves hands-on activities to engage students and get them excited about learning. While online career exploration or planning platforms can be useful aids, these resources should not be the sole method of instruction. Rather, middle grades CTE will require a range of instructional strategies and experiences, including personalized instruction, project-based learning, work-based learning, and participation in career and technical student organizations (CTSOs).
<b>Balance breadth and depth across the curriculum</b>	Middle grades CTE should include enough breadth to ensure that students are exposed to careers across all 16 Career Clusters. It should not limit students to exploring a narrow set of careers or one specific career pathway, such as those programs that are offered at the local high school or area technical center, and should not simply serve as a CTE recruitment strategy. However, opportunities should be provided for students to dig deeper into career areas of interest after an initial period of exploration so they have true opportunities to understand whether those careers – and CTE pathways – are right for them.
<b>Integrated into the broader K-12 career development system</b>	Middle grades CTE programs should not operate in a silo. They should be aligned with other career development-related activities occurring at that level, such as student services, counseling and social emotional supports. In addition, middle grades CTE should be aligned with career development activities and experiences occurring before and after middle school, including high school-level college and career advising, through individual career and academic plans or other methods.
<b>Include intentional and meaningful employer engagement</b>	As with high school and post-secondary CTE programs, involving employers in program design and delivery is critical to ensure that students are receiving accurate information about career opportunities and begin to see adults in different roles. Business and industry engagement in middle grades programs may look different than at the high school level, with a larger focus on building career awareness and employability skills than on direct instruction aligned to a specific job or in-depth work-based learning such as apprenticeships or internships, but it is still key to ensuring that programs meet student and community needs.

DESIGN PRINCIPLE	DESCRIPTION
Involve dedicated instructional time	Whether CTE is integrated across the curriculum or offered through individual courses, specific and regular time should be dedicated to it in the middle grades. The delivery of CTE-related content should not be a one-time event or a single unit or activity if it is to have an impact on students' education and career choices. This requirement may affect master schedules, the availability and qualifications of educators, and even graduation requirements.
Effectively communicated to students and families	Comprehensive information on CTE programs in the middle grades should be provided early to students and their families in ways that begin to break down stereotypes and address misperceptions of CTE, as well as highlight opportunities available to students as they progress through their education. This is especially important for engaging students around careers and educational experiences that are non-traditional for their gender, race/ethnicity or income level. Family engagement is also critical so that students have support as they make future education and career decisions.
Focus on student growth	While some form of measurement should be employed to ensure that middle grades CTE programs are meeting their goals and student learning outcomes, the focus should be on student growth rather than on student performance only. Therefore, students must have opportunities to demonstrate their learning — through coursework, CTSO competitions, work-based learning experiences or otherwise — with both educators and employer partners that are playing a role in validating skill development.

Source: Advance CTE and ACTE<sup>6</sup>

**As highlighted in the figure above, states should establish standards and a curriculum for middle school CTE programs.** For example, the North Carolina Department of Instruction and State Board of Education developed [CTE standards](#) for middle and high school students.<sup>7</sup> Clear standards benefit CTE programs and students by aligning the curriculum and activities with outcomes, creating consistency across programs, and providing opportunities to align middle school CTE programs to high school CTE programs.<sup>8</sup> Effectively developing rigorous middle school CE standards includes the perspectives of teachers, post-secondary educators, and industry representatives in the development process.<sup>9</sup> Notably, when developing standards for middle school CTE, state education officials may want to consider “whether standards related to some outcomes, such as employability skills, should be incorporated across all content areas; whether “CTE” standards should be for all students in the middle grades or just those who elect to enroll; and how standards can be consistently implemented and assessed.”<sup>10</sup> Effective middle school CTE programs align with and prepare students for high school CTE programs.<sup>11</sup>

**Furthermore, critical components of all CTE programs are work-based and experiential learning, which state leaders should consider how to integrate into the middle school CTE experience.** Experiential and work-based learning “provide students with opportunities to engage in real-world, hands-on experiences and gain vital skills and knowledge about careers, as well as themselves, as they seek to develop an occupational identity.”<sup>12</sup> At the middle school level, early work-based and experiential learning opportunities can include guest speakers, career fairs, job shadowing, and participation in career and technical student organizations.<sup>13</sup> Notably, “states should consider how their work-based learning opportunities fit into the broader career

<sup>6</sup> Figure contents reproduced verbatim with modification from: “Broadening the Path: Design Principles for Middle Grades CTE,” Op. cit., pp. 5–7.

<sup>7</sup> “North Carolina Career and Technical Education Essential Standards.” North Carolina Department of Public Instruction, 2019. [https://files.nc.gov/dpi/documents/cte/curriculum/2019-20\\_cte\\_essential\\_standards.pdf](https://files.nc.gov/dpi/documents/cte/curriculum/2019-20_cte_essential_standards.pdf)

<sup>8</sup> “Broadening the Path: Design Principles for Middle Grades CTE,” Op. cit., p. 8.

<sup>9</sup> “Expanding Middle School CTE to Promote Lifelong Learner Success.” Advance CTE, October 2018. p. 8.

[https://cte.careertech.org/sites/default/files/files/resources/AdvanceCTE\\_MiddleSchoolCTEReport\\_2018.pdf](https://cte.careertech.org/sites/default/files/files/resources/AdvanceCTE_MiddleSchoolCTEReport_2018.pdf)

<sup>10</sup> “Broadening the Path: Design Principles for Middle Grades CTE,” Op. cit., p. 8.

<sup>11</sup> “Expanding Middle School CTE to Promote Lifelong Learner Success,” Op. cit., p. 10.

<sup>12</sup> “Broadening the Path: Design Principles for Middle Grades CTE,” Op. cit., p. 11.

<sup>13</sup> Ibid.





exploration continuum and how they will engage employers to provide work-based learning opportunities to students.”<sup>14</sup>

As expanding CTE into the middle grades requires additional teachers with the content knowledge and pedagogical skills to teach middle school CTE course sequences, state education leaders should establish teacher preparation pathways, professional development, and support to ensure that districts and schools have the capacity to provide CTE programs.<sup>15</sup> Notably, when faced with national teacher shortages, “creativity and flexibility related to licensing and scheduling can help address this need as long as quality is maintained.”<sup>16</sup>

Additionally, expanding middle school CTE programs requires access to funding. In addition to Perkins V funds, states should consider and publish other federal, state, and local funding sources that states and districts can access to expand or sustain CTE programming in the middle grades. Advance CTE and the ACTE emphasize that states ensure funding “decisions are not in violation of ‘supplement not supplant’ provisions in federal law,” meaning that “Perkins funds can be used to supplement, and not supplant, state and local funds.”<sup>17</sup> Similarly, states should ensure that state policies and guidelines do not unintentionally inhibit access to CTE funds for middle school students, such as through restrictions on what grades can participate in CTE.<sup>18</sup>

When rolling out new or expanded CTE initiatives for the middle grades, state education leaders should consider how to share and communicate the new offering to students and families. For example, leaders can use the messaging strategies in Figure 1.3 below, which recommends emphasizing the benefits and flexibility of middle school CTE.

**Figure 1.3: Messaging Strategies for Communicating Middle School CTE Expansion**

DO 	DON'T 
Emphasize that CTE is about career exploration and students finding their passion.	Portray middle school CTE as job training.
Emphasize the flexibility of middle school CTE: Students can easily switch to another area of interest in high school.	Portray middle school CTE as “tracking” students into one program of study or area of interest.
Emphasize that middle school CTE is about developing real-world skills that will help students in high school, in post-secondary education and beyond.	Pit CTE against academics. CTE is not only about technical skills development.
Emphasize that middle school CTE helps students prepare for college AND careers.	Leave out all the other high school experiences that students can participate in such as competitions, career technical student organizations and more.
Emphasize the benefits of CTE: CTE learners and their parents are more satisfied with their education than those not involved in CTE.	

Source: Advance CTE and ACTE<sup>19</sup>

While collecting data to evaluate the effectiveness of middle school CTE supports program improvement, most current processes for monitoring CTE programs collect data at the high school level. Thus, state leaders

<sup>14</sup> “Expanding Middle School CTE to Promote Lifelong Learner Success,” Op. cit., p. 10.

<sup>15</sup> [1] Ibid., p. 9. [2] “Broadening the Path: Design Principles for Middle Grades CTE,” Op. cit., p. 11.

<sup>16</sup> “Broadening the Path: Design Principles for Middle Grades CTE,” Op. cit., p. 11.

<sup>17</sup> “Expanding Middle School CTE to Promote Lifelong Learner Success,” Op. cit., p. 9.

<sup>18</sup> Ibid.

<sup>19</sup> Figure contents reproduced verbatim from: Ibid., p. 5.



should consider what data and practices effectively support CTE program evaluation at the middle school level. For example, states should track student participation and outcomes.<sup>20</sup>

## MIDDLE SCHOOL CAREER EXPLORATION

**Career exploration represents a significant component of middle school CTE programs, aiming to expose students to industries and careers and provide foundational career preparation.**<sup>21</sup> Additionally, middle school students particularly benefit from career exploration, and middle school is an important time to focus on career exploration due to middle school students' developmental and social needs and preferences. More specifically:<sup>22</sup>

“Career exploration engages middle school students at a time when they are at a higher risk for disengaging from learning due to challenges in forming identity, coping with puberty and navigating new environments. It also capitalizes on their developing abilities to think abstractly, and their preferences for teamwork and active learning through relevant real-life scenarios.”

**Effective career exploration for middle school students emphasizes “building self-awareness, learning about potential careers, and developing a plan for reaching future goals.”**<sup>23</sup> Thus, teachers and counselors can use assessments and inventories that assess students' interests, skills, and values to help students connect their skills and interests to post-secondary options. Through these activities, students “actively begin to question who they are in relation to their future career and college choices.”<sup>24</sup> Additionally, middle school career exploration programs should develop students' non-cognitive skills such as communication, critical thinking, problem-solving, teamwork and collaboration, and adaptability.<sup>25</sup>

All middle school CTE programs should expose students to the 16 Career Clusters that comprise the National Career Clusters Framework, as middle school CTE programs should strive to expose students to careers and industries with which they are not already familiar.<sup>26</sup> Comprehensive career exploration can also contribute to equity by exposing all students to a wide variety of career possibilities, thus reducing career exposure gaps between students who have opportunities to gain awareness of multiple industries and careers and those with fewer opportunities due to family environment or local geography.<sup>27</sup>

Schools can also integrate deeper career exploration into introductory career and technical education (CTE) courses for middle school students. Middle school CTE courses introduce students to career options that interest them and help students develop employability skills.<sup>28</sup> Schools can use the strategies in Figure 1.4, on the following page, which emphasize real-world learning and flexibility, to implement CTE courses that promote career exploration in the middle grades.

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<sup>20</sup> [1] “Broadening the Path: Design Principles for Middle Grades CTE,” Op. cit., p. 13. [2] “Expanding Middle School CTE to Promote Lifelong Learner Success,” Op. cit., p. 9.

<sup>21</sup> “Expanding Middle School CTE to Promote Lifelong Learner Success,” Op. cit., p. 7.

<sup>22</sup> Quoted verbatim from “Career Exploration in Middle School: Setting Students on the Path to Success,” Op. cit., p. 1.

<sup>23</sup> Ibid.

<sup>24</sup> Curry, J. and A. Milsom. *Career and College Readiness Counseling in P-12 Schools, Second Edition*. , 2 edition., New York, NY: Springer Publishing Company, 2017. p. 219. [http://lghhttp.48653.nexcesscdn.net/80223CF/springer-static/media/samplechapters/9780826136145/9780826136145\\_chapter.pdf](http://lghhttp.48653.nexcesscdn.net/80223CF/springer-static/media/samplechapters/9780826136145/9780826136145_chapter.pdf)

<sup>25</sup> “Career Exploration in Middle School: Setting Students on the Path to Success,” Op. cit., pp. 1–2.

<sup>26</sup> [1] Ibid., p. 4. [2] “Broadening the Path: Design Principles for Middle Grades CTE,” Op. cit., p. 3.

<sup>27</sup> “Broadening the Path: Design Principles for Middle Grades CTE,” Op. cit., p. 3.

<sup>28</sup> “Career Exploration in Middle School: Setting Students on the Path to Success,” Op. cit., p. 1.

**Figure 1.4: Strategies for Promoting Middle School Career Exploration through CTE Courses**

**Incorporate career-related project-based learning in the classroom.**

- Project-based learning is a fundamental CTE instructional approach that can engage middle-grades students in learning about careers. To make projects relevant for middle schoolers, teachers should start with a topic that is personally meaningful to students and grounded in their choices, such as developing a product or process used in a career that interests them. High-quality projects also generate questions for students to investigate, incorporate feedback and revision, result in presentations that build oral communication skills and pave the way for further exploration.

**Design projects and activities to develop employability skills.**

- Projects and other activities should foster employability skills, as students assess the skills and knowledge needed for a project, collaborate with others and solve any issues that occur. Students also learn proper workplace behavior when classrooms and laboratories mimic the rules and culture of the related work environment. In addition, students can learn to be conscious about career decision-making— another skill with lifelong value—when counselors and educators help them think critically about their interests, abilities and goals.

**Be flexible when offering exploratory and introductory CTE courses.**

- There are a variety of models for offering middle-grades students exploratory and introductory CTE courses, from year-long courses that address all 16 Career Clusters to semester-length courses in one broad career area. Teacher content expertise will impact these decisions, as well as scheduling and whether the school is affiliated with an area career center that provides CTE programs to students in several schools and districts. Virtual learning can supplement a middle school's ability to offer exploration in multiple career areas.

**Facilitate academic and career planning with scalable online tools.**

- Online planning and exploration programs support middle school career exploration with a trove of up-to-date information on education, careers and employment and wage projections. These programs also incorporate online inventories and assessments to help students learn about their skills, strengths and interests and match them with potential occupations. Incorporating web-based planning systems across a district's K-12 programs can make it easier for counselors, teachers, students and parents to get the information they need, while deepening the planning process through interactivity, personalization and immediate feedback that engages participants. Parents particularly benefit from being informed and engaged in planning, and their support for this process can help their students see the value in academic and career plans.

**Enable short-term interactions with business and community leaders.**

- Short-term interactions with employers, such as guest speakers, site visits and job shadowing, can introduce middle school students to a variety of careers and the demands of the workplace in a low-stakes way, setting the stage for more demanding activities like internships and apprenticeships. In addition, multiple, shorter experiences can show students that all careers have value, while being easier for administrators, teachers and business representatives to coordinate.

Source: ACTE<sup>29</sup>

In addition to overall career awareness, career and industry exploration should also incorporate exposure to high school CTE pathways, post-secondary educational opportunities, and the local labor market. Programs should enable students to not only learn about careers and identify their interests, but learn how educational opportunities and decisions in middle school can lead to education and career opportunities in the future.<sup>30</sup>

<sup>29</sup> Figure content quoted verbatim from: Ibid., p. 8.

<sup>30</sup> "Broadening the Path: Design Principles for Middle Grades CTE," Op. cit., p. 4.

## EQUITY IN MIDDLE SCHOOL CTE

As effective CTE programs support positive outcomes for all students, state leaders should actively consider equity as they expand CTE to the middle grades.<sup>31</sup> Indeed, Advance CTE emphasizes that “To advance equity in CTE effectively, state CTE leadership must make it a priority and lead by example.”<sup>32</sup> All middle school students should have access to CTE programs, so CTE should not be a single, selective class with limited enrollment. Similarly, policymakers and district leaders should ensure that students who need extra support can participate in CTE, and avoid homogenous student populations, such as by student performance, students with disabilities, or exclusively high-achieving students with educational advantages. Indeed, a study by the MDRC recommends that program designers avoid:<sup>33</sup>

“Reinforc[ing] existing inequities by creating a bifurcated system in which students with educational advantages fill high-quality, in-demand programs designed to provide entry into competitive, growth industries (for example, engineering, robotics, or health care), while students and trainees with fewer options only end up in those programs that are less well designed and funded, or that are in fields more like the old model of vocational education.”

The majority of recommendations for ensuring equity within CTE programs examine improving equitable program access. At the state level, state administrators can support equitable access by enabling high-quality CTE programs across the state “so that no student anywhere can enroll in low-quality programs that lead to terminal, low-wage occupations.”<sup>34</sup> State leaders can also address barriers to equitable CTE access, including:<sup>35</sup>



**At the local level, equitable CTE access requires strategic outreach, messaging, and recruitment efforts.** Program leaders should consider how they communicate and promote CTE programs to ensure that all students receive messaging about the program, in a language that they and their families can understand. CTE programs that require applications, especially those with complex requirements, documentation, and deadlines, can inhibit equitable enrollment and access.<sup>36</sup> Additionally, equitable outreach and recruitment strategies include building trust among students and families, enabling two-way communication, involving students and families in decision-making, and providing opportunities for students and families to provide feedback. As such, “building trust with families and students means intentionally including diverse voices—especially those who have been historically underserved by CTE—in conversations about policy and

<sup>31</sup> [1] Ibid., p. 5. [2] “Expanding Middle School CTE to Promote Lifelong Learner Success,” Op. cit., p. 10.

<sup>32</sup> “Building Trust to Promote Equity in CTE.” Advance CTE, 2019. p. 2. [http://coloradostateplan.com/wp-content/uploads/2019/01/Building\\_Trust\\_Promote\\_Equity\\_CTE\\_Jan\\_2019.pdf](http://coloradostateplan.com/wp-content/uploads/2019/01/Building_Trust_Promote_Equity_CTE_Jan_2019.pdf)

<sup>33</sup> Rosen, R. and F. Molina. “Practitioner Perspectives in Equity in Career and Technical Education.” MDRC, July 2019. p. 2. [https://www.mdrc.org/sites/default/files/CTE\\_Equity\\_Brief\\_2019.pdf](https://www.mdrc.org/sites/default/files/CTE_Equity_Brief_2019.pdf)

<sup>34</sup> Estes, A. and B. McCain. “Four Strategies to Address Equity in CTE.” *State Education Standard*, 2019. p. 13. <https://files.eric.ed.gov/fulltext/EJ1229646.pdf>

<sup>35</sup> Figure contents quoted verbatim from: Ibid.

<sup>36</sup> Rosen and Molina, Op. cit., p. 3.

programmatic decisions that will affect them.”<sup>37</sup> Administrators can consider the following questions when reflecting on messaging, accessibility and communication around middle school CTE:<sup>38</sup>

- In what languages are plans, data, policy, and program information presented? What languages may community members use to provide feedback
- Is information presented in plain language that the average layperson can understand? Is jargon translated into lay terms?
- What timeframe for providing feedback is given? Who may be excluded from providing feedback due to the times and dates of meetings?
- What delivery methods may community members use to provide feedback (online, mail, in person)? Who may be unable to access these opportunities because of the location or time of day?

Additionally, state and local educators should approach career exploration from an equity perspective to ensure all students learn about various occupations and to “mitigate bias related to specific occupation.”<sup>39</sup> At the state level, administrators should also promote professional development and teacher pipelines that promote diversity and inclusion within the CTE teacher force as well as within student access.<sup>40</sup>

Furthermore, states can leverage their data system and data collected on CTE programs to identify equity gaps in CTE access and outcomes. Analyzing CTE program data allows state leaders to “gain an understanding of the CTE landscape, examine root causes, empower local leaders to take action, and hold local institutions accountable.”<sup>41</sup> When determining which data to collect, state leaders should build a data system that allows them to answer the equity questions in Figure 1.5.

**Figure 1.5: Reflection Questions for Evaluating Equity with CTE Data**

?	?	?
<p>Which student populations are overrepresented in CTE programs that are not aligned to high-skill, high-wage, in-demand occupations? Which are underrepresented?</p>	<p>How does the population of CTE students vary across Career Clusters? Are students enrolling in programs aligned to industries in which individuals with their gender, racial, ethnic, or socioeconomic background are underrepresented?</p>	<p>How does performance and success vary across student populations? Which students are graduating from high school, earning credentials of value, enrolling in further education, or securing high-wage employment?</p>

Source: Estes and McCain<sup>42</sup>

## EXPANDING MIDDLE SCHOOL CTE IN RURAL AREAS

**CTE programs in rural areas offer strengths and face unique challenges compared to CTE programs in other areas.** Indeed, rural CTE programs often serve small, geographically dispersed student populations, which can bring challenges related to program quality, funding, lack of technology infrastructure, less access to the work-based learning and career exploration opportunities, fewer partnership opportunities, and difficulties

<sup>37</sup> Estes and McCain, Op. cit., p. 12.

<sup>38</sup> Ibid.

<sup>39</sup> “Expanding Middle School CTE to Promote Lifelong Learner Success,” Op. cit., p. 10.

<sup>40</sup> “Building Trust to Promote Equity in CTE,” Op. cit., p. 2.

<sup>41</sup> Estes and McCain, Op. cit., pp. 11–12.

<sup>42</sup> Figure contents quoted verbatim from: Ibid.

finding educators to teach CTE course sequences.<sup>43</sup> According to the National Rural Education Association, challenges facing rural CTE programs include:<sup>44</sup>

- **Ensuring all programs are high-quality and aligned to labor market needs.** This includes defining quality criteria, empowering local leaders with data and resources to assess the quality of their program offerings, and discontinuing legacy programs that do not lead to positive outcomes for learners.
- **Connecting learners with the world of work through meaningful employer mentorships and work-based learning opportunities.** Rural communities often lack the rich employer base that is present in metropolitan areas and economic hubs, limiting their ability to engage and build relationships with industry experts. These relationships are critical for successful CTE programs.
- **Providing access to diverse career pathways.** Whereas well-funded urban schools with large student populations may have a menu of diverse options to choose from, rural schools and colleges are often limited in the number of courses and programs they can provide. As a result, students are often unable to pursue their study of interest.
- **Strengthening the pipeline of qualified educators.** Recruiting experienced teachers is an urgent challenge, no matter the locale. Rural schools in particular struggle to recruit CTE teachers due to competitive industry wages, declining CTE teacher preparation programs, and a limited industry base from which to recruit.

However, through planning, funding, and partnerships, state leaders can effectively expand middle school CTE to rural areas. Accordingly, “CTE has a long history of delivering education in a variety of models to facilitate student learning and engagement while working with financial, geographic and access challenges.”<sup>45</sup> One strategy for expanding CTE in rural areas is by implementing centralized locations for CTE instruction and experiences. Regional, centralized locations offer CTE explore to students from multiple districts, thus “eas[ing] the burden on individual schools and districts by locating CTE expertise in one place.”<sup>46</sup> Additionally, Advance CTE created a “Rural CTE Strategy Guide” to help state leaders address common challenges with expanding CTE in rural areas. Figure 1.6 below presents their recommendations, and provides a link to the full report which also includes consideration questions for state leaders to reflect and look ahead.

**Figure 1.6: Recommendations for State Leaders Expanding CTE in Rural Areas**

RECOMMENDATION	CONSIDERATIONS
<b>Secure buy-in and commitment for new or ongoing reform – and its place within the statewide vision for CTE and career readiness – at the state and local levels</b>	Change is never easy and requires not only a strong vision of where you want to go but also buy-in and support from the stakeholders who will actually be responsible for implementing the change. Building cross-sector will and commitment to reform is a critical first step to raising the quality of CTE pathways in any community, including rural areas.
<b>Use data strategically to understand access gaps and assess programmatic and policy impact.</b>	Before you can design or execute your strategy, you need to understand the scope of the challenge, the extent of the access gaps, and the degree of quality and relevancy in your CTE pathways. You also need to identify what success looks like – and develop the data collection and feedback loops that will tell you when you are making progress or need to course correct.
<b>Leverage regional, cross-sector partnerships.</b>	Partnerships are key to any strategy, especially in communities with fewer resources where strategic partnerships can maximize limited capacity. Any state-supported strategy to increase CTE pathways in rural communities must

<sup>43</sup> [1] “Career and Technical Education’s Role in Rural Education.” Association for Career and Technical Education, August 2015. p. 1. <https://files.eric.ed.gov/fulltext/ED580921.pdf> [2] “CTE on the Frontier: Connecting Rural Learners with the World of Work.” Advance CTE, 2017. p. 1. [https://cte.careertech.org/sites/default/files/files/resources/CTE\\_Frontier\\_World\\_Work\\_2017FINAL.pdf](https://cte.careertech.org/sites/default/files/files/resources/CTE_Frontier_World_Work_2017FINAL.pdf)

<sup>44</sup> Bullet points quoted verbatim from: “How Career Technical Education Can Help Close the Rural/Urban Education Gap.” National Rural Education Association. [https://www.nrea.net/Blog\\_Post?blogid=374011](https://www.nrea.net/Blog_Post?blogid=374011)

<sup>45</sup> “Career and Technical Education’s Role in Rural Education,” Op. cit., p. 1.

<sup>46</sup> Ibid.

	promote and advance regional partnerships – whether through resources, policy, technical assistance, or a combination of the three.
<b>Use technology to expand access and reach.</b>	Given the sheer distance between many schools, institutions and places of business, technology is increasingly a must-have in connecting learners with a diversity of experiences and coursework. But any investment in technology – whether hardware, software or high-speed internet – needs to be made with intentionality and must still lead to quality experiences for learners.
<b>Invest resources to spark innovation.</b>	While money is not the only component of your strategy, ensuring that all learners have access to high-quality CTE pathways will inevitably require some resources, financial or otherwise. Before putting new resources on the table, however, you should explore existing assets and funding streams and consider how those can be best leveraged by and for rural communities.
<b>Click <a href="#">here</a> to access the full strategy guide with questions for reflection and looking ahead</b>	

Source: Advance CTE<sup>47</sup>

While work-based learning represents a significant challenge in rural areas where there are relatively fewer numbers of industries and employers, states can implement specific strategies to increase exposure opportunities for students.<sup>48</sup> Indeed, experiential and work-based learning opportunities require that schools and students in rural areas have access to a variety of industries.<sup>49</sup> For example, some states that serve large portions of rural students, such as Nebraska, Montana, and South Dakota, use mobile CTE labs and classrooms “to reach a wider audience and physically bring career and industry exposure to learners who face geography and transportation barriers.”<sup>50</sup> Mobile CTE labs include industry-relevant equipment and traveling instructors who facilitate the lessons for students. For example, Nebraska students receive exposure to different industries through visits from mobile labs, which are led and staffed by post-secondary instructors with industry experience from a consortium of colleges.<sup>51</sup> While mobile labs require purposeful funding, preparation, and goals, they can help address CTE challenges and gaps experienced by rural middle schools.<sup>52</sup>

Similarly, states and districts can provide students with industry and career exposure through technology to “help bridge the gap between learners and industry partners” separated by geographical barriers. For example, Louisiana’s Jump Start CTE initiative promotes micro-industry engagement and exemplifies how states can leverage technology and video chat platforms to bring industry partners and connections to students.<sup>53</sup> Louisiana’s program comprises the following four tenets:<sup>54</sup>

- All students have virtual access to workplace experts un every industry sector they are interested in exploring;
- Teachers are empowered with the technologies and curated instructional resources to find virtual workplace experts relevant to every student’s individual interests;
- Schools and teachers offer students a menu of virtual and in-school exercises that provide the best possible analog to onsite workplace-based learning; and
- Students must prepare for productive sessions with workplace experts, mastering increasingly sophisticated communication skills with unfamiliar workplace adults.

<sup>47</sup> Figure contents quoted verbatim from: “CTE on the Frontier: Rural Strategy Guide.” Advance CTE. pp. 2–11. [https://cte.careertech.org/sites/default/files/files/resources/CTE\\_RuralStrategyGuideFINAL.pdf](https://cte.careertech.org/sites/default/files/files/resources/CTE_RuralStrategyGuideFINAL.pdf)

<sup>48</sup> “Career and Technical Education’s Role in Rural Education,” Op. cit., p. 2.

<sup>49</sup> “CTE on the Frontier: Connecting Rural Learners with the World of Work,” Op. cit., p. 1.

<sup>50</sup> Ibid., p. 4.

<sup>51</sup> Ibid.

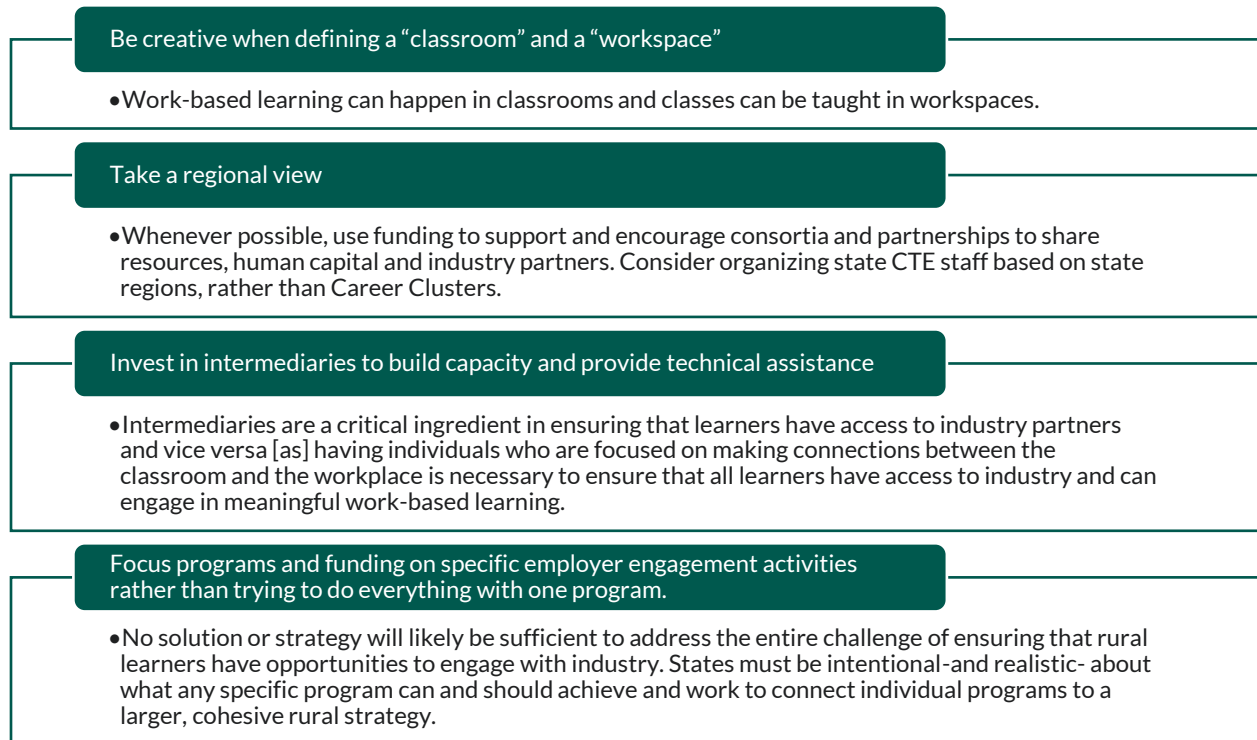
<sup>52</sup> Ibid., p. 5.

<sup>53</sup> Ibid., p. 6.

<sup>54</sup> Bullet points quoted verbatim from: Ibid.

As discussed in the sample strategies above, states can expand middle school CTE in rural areas through specialized and targeted initiatives that consider the challenges and unique context of rural areas in order to provide access to industry experiences for all students. To effectively expand CTE in rural areas, states should consider the practices in Future 1.7 below.

**Figure 1.7: Strategies for Bringing Work and Industry Exposure to Rural CTE Programs**



Source: Advance CTE<sup>55</sup>

<sup>55</sup> Figure contents adapted from: Ibid., pp. 12–13.



## SECTION II: MIDDLE SCHOOL CTE IN PRACTICE

In this section, Hanover profiles three states' middle school CTE practices, focusing on implementation, programming, and funding. Notably, Hanover examined the majority of southern states and found limited public information.

### NORTH CAROLINA

In recent years, North Carolina has prioritized expanding its CTE programming into the middle grades. Indeed, the North Carolina Department of Public Instruction (NCDPI) publicizes middle school CTE on their website, emphasizing that “CTE programs are a part of middle and high school - students can participate in CTE and the other activities they enjoy, such as sports, the arts or whatever else their friends are doing.”<sup>56</sup> The NCDPI offers a variety of introductory industry-specific CTE courses designed for middle school students, and all CTE courses align to the NC CTE Essential Standards, which describes how each course aligns with the 16 Career Clusters.<sup>5758</sup> Relatedly, the NCDPI organizes CTE courses for both middle and high schools students in eight broad clusters, including:<sup>59</sup>



North Carolina focuses on providing age-appropriate work-based learning, noting that “the first steps to understanding work-based learning and the many career pathways is to understand how important each aspect of career development is for the stakeholder involved at that precise periods of time of career awareness, exploration, and preparation.” Accordingly, their work-based learning continuum implements career awareness in Grades 6-7 and career exploration in Grades 8-11. Career awareness is intended to provide students in Grades 6-7 with an understanding of themselves and their interests in relation to work through the following opportunities:<sup>60</sup>

- Understand how school relates to the world of work;
- Become aware of different careers and career pathways;
- Experience field trips to various businesses and industries;
- Participate in community volunteer organizations and service-learning projects;
- Embrace classroom assignments and project-based learning around specific industries;
- Become involved in school-based business entrepreneurship projects;

<sup>56</sup> “Career and Technical Education.” North Carolina Department of Public Instruction. <https://www.dpi.nc.gov/districts-schools/classroom-resources/career-and-technical-education>

<sup>57</sup> “North Carolina Career and Technical Education Essential Standards,” Op. cit.

<sup>58</sup> “Expanding Middle School CTE to Promote Lifelong Learner Success,” Op. cit., pp. 7–8.

<sup>59</sup> “North Carolina Career and Technical Education Essential Standards,” Op. cit.

<sup>60</sup> Bullet points quoted verbatim from: Ibid., p. 5.

- Hear guest speakers from industry experts; and
- Visit theme-specific high schools that are of interest to them via class tours and open houses.

Furthermore, the NCDPI partnered with the North Carolina Business Committee for Education to enable businesses to help spread career awareness among middle school students through job shadowing, classroom visits, field trips to various business and industry, assignments aligned with career exploration and discovery, and parent/child day.<sup>61</sup>

For students in Grades 8-11, career exploration initiatives enable students to:<sup>62</sup>

- Understand how school relates to the world of work;
- Research and design a career interest;
- Take an inventory assessment to help align specific educational courses and career goals;
- Develop an understanding of various occupations within a specific career theme/pathway;
- Become aware of how specific skills are needed to be successful in the work world; and
- Research, design and develop a plan for post-secondary training and education for a specific career pathway.

In addition to Perkins V funds, North Carolina funds middle school CTE through the Career and Technical Education Grade Expansions Program, which the state established through the passing of the G.S. 115C-64.17 statute in 2017. The program provides grants for expanding CTE in Grades 6 and 7 with funding for licensed personnel in CTE, support services, and career development coordinators.<sup>63</sup> North Carolina also supports high school CTE in rural areas through the North Carolina Investing in Rural Innovative Schools program, which provides high school students with access to community college and online courses<sup>64</sup>

## GEORGIA

The Georgia Department of Education (GDE) promotes middle school career, technical, and agricultural education (CTAE) courses as a way for students to learn about careers, explore their interests, and prepare for high school CTAE pathways.<sup>65</sup> In the 2017-2018 school year, 61.75 percent of all middle school students enrolled in at least one CTAE class, compared with 67.88% of all high school students who enrolled in at least one CTAE class.<sup>66</sup> The GDE follows Advance CTE's framework for effective middle school CTE, and produces [this infographic](#) displaying the goals, principles, and outcomes of middle school CTAE.<sup>67</sup> Georgia offers middle school CTAE courses for students in Grades 6-8 in eight career clusters, in Figure 2.1 on the following page.

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<sup>61</sup> Ibid.

<sup>62</sup> Bullet points quoted verbatim from: Ibid., pp. 5–6.

<sup>63</sup> [1] "Career and Technical Education Grade Expansion Program." North Carolina Department of Public Instruction. <https://www.dpi.nc.gov/districts-schools/classroom-resources/career-and-technical-education/grants#career-and-technical-education-grade-expansion-program> [2] "§ 115C-64.17. The Career and Technical Education Grade Expansion Program." North Carolina General Assembly, 2017. [https://www.ncleg.gov/EnactedLegislation/Statutes/PDF/BySection/Chapter\\_115C/GS\\_115C-64.17.pdf](https://www.ncleg.gov/EnactedLegislation/Statutes/PDF/BySection/Chapter_115C/GS_115C-64.17.pdf) [3] "Expanding Middle School CTE to Promote Lifelong Learner Success," Op. cit., pp. 8–9.

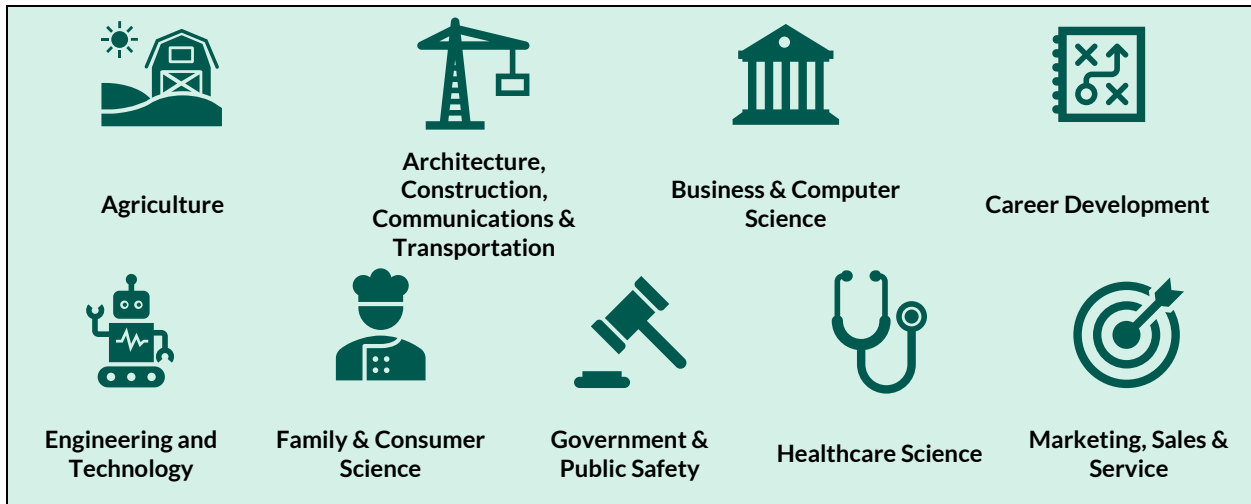
<sup>64</sup> "Career and Technical Education's Role in Rural Education," Op. cit., p. 2.

<sup>65</sup> "Middle School CTAE Courses." Georgia Department of Education. <https://www.georgiastandards.org/standards/Pages/BrowseStandards/ctae-middle.aspx>

<sup>66</sup> "CTAE Delivers." Georgia Department of Education. <https://www.gadoe.org/Curriculum-Instruction-and-Assessment/CTAE/Documents/CTAE-Delivers-Infographic.pdf>

<sup>67</sup> "CTAE Delivers Middle Grades CTAE." Georgia Department of Education. <https://www.gadoe.org/Curriculum-Instruction-and-Assessment/CTAE/Documents/BroadeningPathTheoryAction-Middle-Grades.pdf>

Figure 2.1: Georgia Middle School CTAE Career Pathways



Source: Georgia Department of Education<sup>68</sup>

Georgia funds secondary and post-secondary CTAE through the state’s Perkins V funds. Institutions must submit a Perkins V four-year Local Application detailing the following factors: student core indicators of performance; labor market alignment; program size, scope and quality; career pathway programs; recruitment, retention, and professional learning; and equity and access.<sup>69</sup> Notably, “in order to be eligible for Perkins V funding, an eligible recipient must meet the Georgia secondary definitions of Size, Scope, and Quality for its classification by student enrollment,” accessible [here](#).<sup>70</sup>

## TENNESSEE

Tennessee offers introductory middle school CTE courses intended to prepare students for high school CTE. Specifically, the following figure describes the CTE courses available to students in Grades 6-8 as well as for which high school career cluster the course prepares students. Districts can also offer the “Keyboarding” class to students in Grades 4-5 and the “Introduction to Social Health” course to Grade 5 students.<sup>71</sup>

Figure 2.2: Tennessee Middle School CTE Courses

CTE COURSE TITLE	HIGH SCHOOL CAREER CLUSTER ALIGNMENT	
	Grade 6	
Keyboarding	<ul style="list-style-type: none"> <li>Business Management &amp; Administration</li> <li>Finance</li> </ul>	<ul style="list-style-type: none"> <li>Information Technology</li> <li>Marketing</li> </ul>
Introduction to Social Health	<ul style="list-style-type: none"> <li>Education &amp; Training</li> </ul>	<ul style="list-style-type: none"> <li>Human Services</li> </ul>
STEM Explorers	<ul style="list-style-type: none"> <li>Information Technology</li> <li>Manufacturing</li> </ul>	<ul style="list-style-type: none"> <li>Science, Technology, Engineering &amp; Mathematics (STEM)</li> </ul>

<sup>68</sup> “Middle School CTAE Courses,” Op. cit.

<sup>69</sup> “Georgia’s State Plan Perkins V: Strengthening CTE for the 21st Century Act.” Georgia Department of Education, 2020. p. 33. <https://www.gadoe.org/Curriculum-Instruction-and-Assessment/CTAE/Documents/GA-Perkins-V-State-Plan-with-FY21-Budget.pdf>

<sup>70</sup> Ibid.

<sup>71</sup> “Middle School CTE Coursework.” Tennessee Department of Education. <https://www.tn.gov/education/career-and-technical-education/career-clusters/cte-cluster-middle-school-cte-coursework.html>

CTE COURSE TITLE	HIGH SCHOOL CAREER CLUSTER ALIGNMENT
<b>Grade 7</b>	
<b>Introduction to Agricultural Sciences</b>	<ul style="list-style-type: none"> <li>▪ Agriculture, Food &amp; Natural Resources</li> </ul>
<b>Introduction to Social Health</b>	<ul style="list-style-type: none"> <li>▪ Education &amp; Training</li> <li>▪ Human Services</li> </ul>
<b>STEM Innovators</b>	<ul style="list-style-type: none"> <li>▪ Information Technology</li> <li>▪ Science, Technology, Engineering &amp; Mathematics (STEM)</li> </ul> <ul style="list-style-type: none"> <li>▪ Manufacturing</li> </ul>
<b>Introduction to Health Science</b>	<ul style="list-style-type: none"> <li>▪ Health Science</li> </ul>
<b>Grade 8</b>	
<b>Career Exploration Standards</b>	<ul style="list-style-type: none"> <li>▪ All career clusters</li> </ul>
<b>Introduction to Agricultural Sciences</b>	<ul style="list-style-type: none"> <li>▪ Agriculture, Food &amp; Natural Resources</li> </ul>
<b>Keyboarding</b>	<ul style="list-style-type: none"> <li>▪ Business Management &amp; Administration</li> <li>▪ Information Technology</li> </ul> <ul style="list-style-type: none"> <li>▪ Finance</li> <li>▪ Marketing</li> </ul>
<b>Computer Applications</b>	<ul style="list-style-type: none"> <li>▪ Business Management &amp; Administration</li> <li>▪ Information Technology</li> </ul> <ul style="list-style-type: none"> <li>▪ Finance</li> <li>▪ Marketing</li> </ul>
<b>Introduction to Social Health</b>	<ul style="list-style-type: none"> <li>▪ Education &amp; Training</li> <li>▪ Human Services</li> </ul>
<b>STEM Designers</b>	<ul style="list-style-type: none"> <li>▪ Information Technology</li> <li>▪ Science, Technology, Engineering &amp; Mathematics (STEM)</li> </ul> <ul style="list-style-type: none"> <li>▪ Manufacturing</li> </ul>
<b>Introduction to Health Science</b>	<ul style="list-style-type: none"> <li>▪ Health Science</li> </ul>

Source: Tennessee Department of Education<sup>72</sup>

The TDE notes that “Middle school courses are not funded by career and technical education funds.”<sup>73</sup> Rather, the TDE funds middle school CTE through a variety of grant programs, such as the Middle School STEM Start-Up Grants, Middle School CTE Start-Up Grants, and EPSO (early post-secondary opportunities) Expansion Grants. Additionally, in November 2020, the TDE announced that districts would receive over \$700,000 in additional grant funding for middle school CTE and STEM education. science, technology, engineering, and math (STEM) education.<sup>74</sup>

Tennessee also offers a comprehensive work-based learning continuum. In the middle grades, work-based learning opportunities include industry and career awareness and career exploration, based on students’ age and grade levels. The figure on the following page presents the industry and career awareness and career exploration activities available to students in the middle grades, including the purpose, definition, target grades, and sample activities per experience cluster.<sup>75</sup>

<sup>72</sup> Ibid.

<sup>73</sup> Figure contents reproduced verbatim from: Ibid.

<sup>74</sup> [1] “Middle School STEM Start-Up Grants.” Tennessee Department of Education, 2019. <https://www.tn.gov/education/news/2019/12/19/middle-school-stem-start-up-grants.html> [2] “TDOE Awards Over \$700K for Middle School STEM Start-Up and CTE Career Exploration Grants.” Tennessee Department of Education, November 2020. <https://www.tn.gov/education/news/2020/11/23/t DOE-awards-over--700k-for-middle-school-stem-start-up-and-cte-career-exploration-grants.html>

<sup>75</sup> “Work-Based Learning Policy Guide.” Tennessee Department of Education, May 2017. p. 8. [https://www.tn.gov/content/dam/tn/education/ccte/wbl/wbl\\_policy\\_guide.pdf](https://www.tn.gov/content/dam/tn/education/ccte/wbl/wbl_policy_guide.pdf)

**Figure 2.3: Middle School Work-Based Learning Experiences**

	INDUSTRY AND CAREER AWARENESS EXPERIENCES	CAREER EXPLORATION EXPERIENCES
<b>Purpose</b>	Building awareness of options and skills needed	Encouraging self-knowledge and agency
<b>Definition</b>	School-directed experiences with industry involvement focused on exposing students to a broad range of industries and the career opportunities within them.	Student-driven experiences with professionals that allow students to learn about specific areas of interest.
<b>Embedded or Credit-Bearing Strategies</b>	Activities are embedded into CTE or general education classes to enhance curriculum and differentiate instruction	Activities are embedded into CTE or general education classes to enhance curriculum and differentiate instruction.
<b>Grades Targeted</b>	Elementary/middle school through Grade 9 and ongoing	Middle school through Grade 11 and ongoing
<b>Sample Activities</b>	<ul style="list-style-type: none"> <li>▪ Career fairs</li> <li>▪ Career speakers and industry-in-the-classroom</li> <li>▪ Field trips and tours</li> </ul>	<ul style="list-style-type: none"> <li>▪ Career mentoring</li> <li>▪ Informational interviewing</li> <li>▪ Job shadowing</li> <li>▪ Participation in <i>Career Exploration</i> class</li> <li>▪ Service-learning projects- embedded in Service-Learning class</li> </ul>

Source: Tennessee Department of Education<sup>76</sup>

Additionally, the Tennessee STEM Innovation Network offers schools a Defined Learning platform, which introduces middle school students to STEM careers. The program, intended for students in Grades 5-8, uses a project-based learning model to increase engagement and facilitate connections across science, math, language arts, social sciences, the arts, and career, and technical education. The Defined Learning platform is an online content library where educators can access hundreds of projects relates to STEM careers.<sup>77</sup>

<sup>76</sup> Figure contents reproduced verbatim from: Ibid., p. 10.

<sup>77</sup> "Middle School CTE Coursework," Op. cit.

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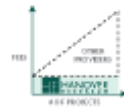
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