In the following report, Hanover Research examines the literature on best practices in middle school organization and curriculum. The report also profiles three exemplary middle schools and describes their organization, curriculum, and support services.
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EXECUTIVE SUMMARY AND KEY FINDINGS

INTRODUCTION
During adolescence, students develop a sense of connection or detachment with school that continues in future years. The literature notes that middle school students experience accelerated growth, both physically and mentally, at a rate unparalleled by later development. Students at this age often struggle with the rapid changes they are experiencing and schools must provide the appropriate supports and stimulation to meet these unique needs.¹

With these considerations in mind, this report provides information on optimal middle school design for Boyertown Area School District as it transitions from a junior high school model to a middle school model, serving students in Grades 6 through 8. The report proceeds in three sections:

- **Section I: Middle School Organization** examines research on best practices in middle school structure, specifically in regards to staffing, student organization, scheduling, and support services.
- **Section II: Middle School Curriculum** reviews best practices in middle school curriculum design and deployment. Topics covered include appropriate curricular features, pedagogical methods, and professional development for staff transitioning to a middle school model.
- **Section II: Best Practice School Profiles** describes three exemplary middle schools in Pennsylvania, highlighting each school’s organization, curriculum, and support services.

KEY FINDINGS

MIDDLE SCHOOL ORGANIZATION

- **The predominant organizational structure employed in middle schools, also supported by best practice research, is team teaching.** A study of effective middle schools demonstrates that they are more likely to implement teacher teams, instructional cohorts that group two to four teachers with 50 to 125 students for core content instruction. Experts assert that team teaching is uniquely advantageous for middle school students, as it promotes student bonding and fosters closer relationships between teachers and students. Additionally, team teaching promotes interdisciplinary instruction and coordination, especially when teacher teams receive common planning time.

¹ Wallace, J. J. “Effects of Interdisciplinary Teaching Team Configuration upon the Social Bonding of Middle School Students.” *Research in Middle Level Education Online*, 30:5, 2007, p. 2.  
The literature suggests that middle school staffing should reflect the unique developmental needs of young adolescents through lower student to staff ratios. Young adolescents require a sense of connectedness to peers, teachers, and the school in order to remain engaged. To foster this sense of connectedness, experts recommend reducing student to teacher ratios. Hanover’s survey of 2015 Pennsylvania Schools to Watch finds that the average student to teacher ratio among the seven exemplary schools serving Grades 6 through 8 is 14.07, with the range spanning from 11.67 to 16.24.

Education experts advocate for the use of block scheduling in middle schools, a model in which students attend fewer, longer class periods during the school day. This is a departure from traditional middle school schedules that comprise six or more class periods per day, each lasting no more than one hour. Block schedules may promote a greater variety of instructional techniques (e.g., experiments, class discussions, debates). However, the longer class periods that block schedules entail may risk diminishing student focus.

Middle schools should supply an array of student support services, including counselling and advisory periods. Formal advisory programs with regular interaction between students and teachers may help students forge bonds, set goals, and explore academic and career interests. A comprehensive school guidance program can supplement and extend the work of teacher-led advisory periods. Counsellors are equipped to coordinate support services for students and provide a higher level of individualized support for learners who need it.

Exemplary middle schools profiled in this report typically adhere to a traditional schedule and implement team teaching. All of the schools profiled use a traditional scheduling model of seven to nine class periods per day. They organize students into teams, with at least one teacher per core content area. In addition, two of the three schools integrate daily advisory periods into their schedules.

**Middle School Curriculum**

An effective middle school curriculum is challenging, exploratory, integrative, and relevant. These central tenets may be delivered through a wide array of curricula. Indeed, two curricula that incorporate these principles have gained in popularity recently – namely, 21st Century learning and STEM. Both approaches retain central focus on core academic subjects, but also strive to incorporate cross-curricular skill building to prepare students for college and the workforce.
Experts emphasize the importance of exploratory learning for middle level learners and posit elective coursework as an effective tool for promoting exploration. Electives supplement the curriculum and help students identify and pursue interests outside of core academic subjects. They further help learners begin to develop a sense of their career interests. In addition to general exploratory course offerings, a number of exemplary middle schools utilize electives to build upon and deepen the core curriculum. In these instances, the school may offer electives that integrate into a core theme or goal of the school.

Successful middle schools implement student-centered instruction, which employs pedagogical approaches that encourage learners to take an active role in their education. Experts recommend using varied pedagogical approaches that reflect individuals’ skills and multiple intelligences. Both instructional technology and blended learning are common methods for administering suggested instructional techniques. These approaches require students to engage in active decision-making and focus on making classroom instruction relevant and engaging to individual learners’ interests.

The literature suggests that professional development for teachers transitioning from a junior high school model to a Grade 6 through 8 middle school model should reflect the structural and instructional changes accompanying the shift. One source recommends following a three-step process for delivering effective professional development in this context. The process consists of surveying teachers, using survey results to identify professional development needs, and administering professional development within both teacher teams and subject area groupings.

The exemplary middle schools profiled here receive recognition for their integrated curricula as well as their student-centered approach to delivering instruction. The middle schools all provide an array of elective coursework to support students’ in their exploration of personal interests. Two of the three schools integrate a coherent STEM curriculum, developed by Project Lead the Way, to build student competencies in STEM areas and prepare them for more rigorous STEM studies in high school.
SECTION I: MIDDLE SCHOOL ORGANIZATION

Research suggests that, in middle school, students undergo developmental changes that require unique educational structures and support. Indeed, the Association for Middle Level Education (AMLE) asserts that “the desire for developmental responsiveness was what set the middle school apart from its predecessor, the junior high.” As a result, experts posit a number of specific strategies for organizing a middle school in order to best meet the needs of students. This section reviews the literature on best practices in middle school organization, focusing specifically on staffing, student organization, scheduling, and support services.

CLASSROOM STAFFING

Experts recommend that school staffing for middle level education reflect the developmental needs of young adolescent learners. Current theories of child development assert that young adolescents’ self-perception and beliefs about their ability are largely tied to whether or not they feel a sense of connection to the adults in their lives. A study conducted by the Centers for Disease Control and Prevention asserts that “children and adolescents who feel supported by important adults in their lives are likely to be more engaged in school and learning.” To this end, experts cite school staffing as a critical component of fostering a sense of connectedness among students.

In its best practice guide for effective schools, the Johns Hopkins Urban Health Institute recommends that middle schools reduce student to teacher ratios in order to facilitate school-student connectedness. The Institute specifically cites the First Things First program, a whole-school reform model, one of whose central tenets is low student to teacher ratios in core content classes. A 2004 study of the program implemented in Minnesota, Missouri, and Texas found that student to teacher ratios ranged from 16:1 to 22:1.

Indeed, academically successful schools often implement a substantially lower student to teacher ratio. The Pennsylvania Schools to Watch program awards high-achieving middle schools based on a rigorous set of 37 criteria developed by the National Forum to Accelerate Middle Grades Reform. Figure 1.1 highlights the student to teacher ratios

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3 Ibid.


among the 2015 award winning schools that serve students in Grades 6 through 8. The average student to teacher ratio among these seven schools is 14.07, with the range spanning 11.67 to 16.24.

**Figure 1.1: Staffing of Pennsylvania Middle Schools to Watch**

<table>
<thead>
<tr>
<th>SCHOOL</th>
<th>COUNTY</th>
<th>ENROLLMENT</th>
<th>FTE TEACHERS</th>
<th>STUDENT TO TEACHER RATIO</th>
</tr>
</thead>
<tbody>
<tr>
<td>Central Valley Middle School</td>
<td>Beaver County</td>
<td>527</td>
<td>45.15</td>
<td>11.67:1</td>
</tr>
<tr>
<td>Cambria Heights Middle School</td>
<td>Cambria County</td>
<td>348</td>
<td>25.59</td>
<td>13.60:1</td>
</tr>
<tr>
<td>Titusville Middle School</td>
<td>Crawford County</td>
<td>472</td>
<td>34.55</td>
<td>13.66:1</td>
</tr>
<tr>
<td>Wilson West Middle School</td>
<td>Berks County</td>
<td>720</td>
<td>51.00</td>
<td>14.12:1</td>
</tr>
<tr>
<td>Pleasant Hills Middle School</td>
<td>Allegheny County</td>
<td>668</td>
<td>45.90</td>
<td>14.55:1</td>
</tr>
<tr>
<td>Kennett Middle School</td>
<td>Chester County</td>
<td>1,033</td>
<td>70.5</td>
<td>14.65:1</td>
</tr>
<tr>
<td>Avonworth Middle School</td>
<td>Allegheny County</td>
<td>367</td>
<td>22.60</td>
<td>16.24:1</td>
</tr>
</tbody>
</table>

Source: Schools to Watch, National Center for Education Statistics

**STUDENT ORGANIZATION**

Research suggests that the majority of middle schools serving students in Grades 6 through 8 implement some form of team teaching. This is a departure from the departmental model of student organization, a practice that closely mirrors the ubiquitous high school model.

**TEAMS VERSUS DEPARTMENTS**

In the departmental structure, teachers are grouped into subject area-specific departments (e.g., social studies, mathematics, science). They may share planning periods with others in their department to collaborate on instructional strategies and materials for their subject. Students are assigned to teachers for individual subjects based on the school's grouping model (e.g., heterogeneous, tracking). Heterogeneous grouping creates mixed-ability classrooms in which teachers differentiate instruction to meet individual student needs. In contrast, tracking places students in a multi-year course sequence based on prior academic performance, test scores, or perceived abilities. Teachers mostly use whole-group instruction in tracked classrooms with homogeneous groups of students.

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8 Public information for Beaty-Warren Middle School, another recipient of the award, is not available.
13 Ibid.
Primary criticisms of the departmental model assert that it prohibits close student-teacher relationships as teachers’ instruct several classes each day and may find it difficult to forge meaningful connections with such a large number of learners.\(^{15}\)

Teaming teaching – or “teaming” – on the other hand, aims to foster greater social connectivity and facilitate cooperative planning among teachers.\(^{16}\) Research suggests that “as a result of improved self-concept and sense of school membership, students show increases in academic achievement, conduct, and peer relationships.”\(^{17}\) Experts posit team teaching as an effective strategy for building this atmosphere of support and facilitating a sense of connection to school, teachers, and peers among young adolescents.\(^{18}\) Teaming can benefit teachers as well as students, as it can contribute to a positive and rewarding work climate, thereby increasing job satisfaction.\(^ {19}\)

According to a National Association of Secondary School Principals (NASSP) survey of 1,400 middle school principals, 84 percent of middle schools serving students in Grades 6 through 8 implement teaming.\(^{20}\) A more recent study comparing a sample of highly effective middle schools to a random sample of middle schools found that the highly effective schools were more likely to use some form of interdisciplinary teaming (90 percent versus 72 percent), and were more likely to provide common planning periods for interdisciplinary teacher teams (94 percent versus 77 percent).\(^{21}\)

**Considerations for Implementation**

Teacher compatibility is crucial to team function and effectiveness. To foster healthy working relationships, principals may consult with teachers for input on the team creation.\(^ {22}\) Additionally, the NASSP survey suggests that teams with identified leaders that serve as coordinators of team activities and liaisons to other teams and building administrators were more likely to report benefits from teaming.\(^ {23}\) The survey results also emphasize the importance of common planning time for team teachers.\(^ {24}\) A study of 155 middle schools in Michigan determines that teams with high levels of team preparation time experience the

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\(^{17}\) Ibid., p. 3.

\(^{18}\) Ibid., p. 3.


\(^{20}\) Ibid., p. 35.


\(^{23}\) Ibid., p. 38.

\(^{24}\) Ibid., p. 38.
largest gains in student achievement scores as well as teacher job satisfaction. Experts recommend that team planning time be used to:

- Design integrated curricular units,
- Engage in mutual problem solving,
- Conduct student-parent conferences,
- Determine how the interdisciplinary blocks will be scheduled,
- Discuss and resolve student needs, and
- Reinforce the sense of unity among teachers and students.

Teams often include between 100 and 125 students and four teachers with specializations in each of the four core subjects (i.e., math, language arts, science, social studies). A comparison study of 10 Grade 6 teaching teams, five with four teachers and 100 students and five with two teachers and 50 students, indicates a statistically significant correlation between smaller team size and higher levels of student social bonding. The Turning Points reform model from the Center for Collaborative Education recommends academic teams of no more than 50 to 100 students per teacher. Indeed, the source suggests creating teams of two to four teachers and 50 to 100 students.

**MIDDLE SCHOOL SCHEDULING**

Traditional middle school scheduling, comprising six or more class periods that typically last for less than one hour, has been the subject of considerable scrutiny over the past several decades. Critics cite frequent class changes, fragmented instruction due to insufficient class time, and lack of community-building with fewer quality opportunities to get to know teachers and classmates as key drawbacks of the traditional schedule.

Experts posit block scheduling as a solution to the most pressing problems with the traditional middle school schedule. Indeed, the literature suggests that block schedules are particularly well-matched for middle schools with team teaching models, as block schedules allow more flexibility for teachers to implement interdisciplinary activities and modify individual student schedules based on learning needs.
Within the block scheduling model, the typical school day consists of four or five 85 to 100 minute periods. The Center for Public Education (CPE), an initiative of the National School Boards Association that serves as a resource on education topics, provides descriptions of four commonly implemented block scheduling models: the 4x4 block, the alternating (A/B) plan, the trimester plan, and the 75-75-30 plan. The definitions of each of these models for block scheduling, as provided by the CPE, are set forth in Figure 1.2 below.

<table>
<thead>
<tr>
<th>MODEL</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>The 4x4 Block</td>
<td>The school day is divided into four blocks, with classes lasting anywhere from 85 to 100 minutes with additional time for lunch and transitions. Students complete in one semester what would have taken them a full year in traditional schedules.</td>
</tr>
<tr>
<td>The Alternating Plan</td>
<td>Also known as the 8-block plan or the A/B plan. Using this format, students attend eight blocks of classes (again, typically 90 minutes long) over two days.</td>
</tr>
<tr>
<td>The Trimester Plan</td>
<td>The school year is organized into three sessions (trimesters), with students attending two core classes per trimester. These core classes can be coupled with up to three other year-long elective classes. Students complete the core classes in 60 days and then move on to another two core classes.</td>
</tr>
<tr>
<td>The 75-75-30 Plan</td>
<td>This scheduling plan is one in which students take three classes each for two 75-day terms, followed by a 30-day intensive course or enrichment program. Variations include placing the 30 days between the two 75-day terms, having three long classes and one short class, or changing the configuration to 75-15-75-15.</td>
</tr>
</tbody>
</table>

Source: Center for Public Education

Block scheduling allows teachers to use time-intensive instructional techniques such as collaborative group work and debates. These teaching techniques align with many best practice instructional strategies, facilitating deeper levels of student engagement and learning. However, critics of block scheduling note increased tiredness, boredom, and less attentiveness among students in longer class periods than in shorter class periods. To address this issue, teachers should aim to vary instructional activities throughout the class period and utilize active learning techniques as much as possible.

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36 Ibid., p. 15.
RESEARCH SUPPORT

Supporting the use of block scheduling, the 2009 AMLE survey of highly effective middle schools determines that highly effective schools are more likely to use a flexible block schedule than their randomly selected counterparts (30 percent versus 14 percent). In addition, highly effective schools are less likely to use daily uniform periods (72 percent versus 45 percent).\(^{38}\) Furthermore, a study of nearly 500 middle school students enrolled in language arts and science classes determines that students in both full (4x4) and alternate day (A/B) block scheduling outperform students in traditional scheduling on end-of-course exams.\(^{39}\)

Additional support for block scheduling comes from a six-year study of 8,737 students in Grade 6, which reveals “significant increases in the mathematics achievement scores of students enrolled in middle schools that transitioned from traditional to block schedules.”\(^{40}\) The five schools in the sample exhibit widely varying characteristics in regards to enrollment, student demographics, and teacher qualifications. Grade 6 students in all five schools achieved higher scores on state standardized end-of-grade tests in mathematics in the years after the schools transitioned to block schedules.\(^{41}\)

Some studies do not show conclusive results in favor of block scheduling, however. As an example, a 2005 study assesses the degree of standards-based math instruction in block schedule and traditional schedule middle schools. The study asked 156 Grade 8 math teachers to indicate how often their students engaged in 17 types of best practice instructional activities. The study finds little difference in the types and use of instructional activities for teachers in block schedule schools versus traditional schedule schools. These results suggest that professional development may be needed to further drive instructional change beyond the structural change of schedules.\(^{42}\)

SUPPORT SERVICES

The AMLE enumerates several best practices for middle grades education in its 2010 position paper *This We Believe: Keys to Educating Young Adolescents*. According to this document, a key characteristic of developmentally responsive middle schools is that each adult serves as an advocate and mentor for students.\(^{43}\) Similarly, the Turning Points program asserts that, “one of the most important ways to ensure student success in middle


\(^{41}\) Ibid., p. 8.


\(^{43}\) “This We Believe: Keys to Educating Young Adolescents.” National Middle School Association, 2010. p. 35. http://8461cuttingedgetechteam.wikispaces.com/file/view/22605279-This-We-Believe-Keys-to-Educating-Young-Adolescents.pdf
schools is for each student to have a close, personal relationship with at least one adult in the school. Advisory periods, extended homerooms, and team-based mentorships foster these relationships by helping to support students with academic and non-academic challenges.

Approximately 53 percent of schools responding to the AMLE’s 2009 survey employ advisory periods, during which students meet individually or in small groups with teachers. Notably, a higher percentage of schools deemed “highly successful” by the AMLE have advisory periods (65 percent). According to a 2008 Southern Regional Education Board survey of 136 middle schools, half of the most improved schools match teachers with a core group of students for advising.

Formal advisory programs with regular interaction between students and mentors may help students “develop respect for self and others; compassion; a workable set of values; and the skills of cooperation, decision making, and goal setting.” The AMLE recommends that advisory periods meet at least twice per week to be most effective.

Experts also recommend providing middle school students comprehensive guidance and counselling services. The AMLE notes that school counsellors serve to provide a coordinated program of services and supports to meet the needs of individual students. They can assist teachers in conducting advisory programs and provide a higher level of personalized support for students who need it.

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45 “This We Believe,” Op. cit., p. 36.
47 Ibid., p. 54.
49 “This We Believe,” Op. cit., p. 35.
52 Ibid., p. 37.
SECTION II: MIDDLE SCHOOL CURRICULUM

This section reviews the literature on best practices in middle school curriculum, focusing on curricular features, pedagogical methods, and professional development to support the transition from the junior high school to middle school model.

CURRICULAR FEATURES

In the organization’s position paper on middle level education, the AMLE outlines four key elements of an effective middle school curriculum. According to the group, middle school curricula should be:

- **Challenging** – marshalling their sustained interests and efforts, challenging curriculum actively engages young adolescents. It addresses substantive issues and skills, is geared to their levels of understanding, and increasingly enables them to assume control of their own learning.

- **Exploratory** – the general approach for the entire curriculum at this level should be exploratory. Exploration, in fact, is the aspect of a successful middle school curriculum that most directly and fully reflects the nature and needs of the majority of young adolescents, most of whom are ready for an exploratory process.

- **Integrative** – effective middle grades schools provide experiences, studies, and units, directed either by individual teachers or preferably by teams, that are specifically designed to be integrative; for that is how learning is maximized. Reading, writing, speaking, and listening should be advanced and practiced wherever they apply, rather than taught in isolation.

- **Relevant** – Curriculum is relevant when it allows students to pursue answers to questions they have about themselves, the content, and the world. When teachers help them see the many connections that link various topics and subjects, students recognize the holistic nature of all knowledge.

This subsection profiles two approaches to curriculum design – 21st Century learning and science, technology, engineering, and mathematics (STEM) – that incorporate the above guiding principles.

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**21st Century Learning**

Experts recommend that middle school curricula promote independent learning and exploration of potential career and enrichment opportunities. The 21st Century learning movement is a recent curricular innovation that addresses these criteria. The Partnership for 21st Century Skills (P21), an initiative of the U.S. Department of Education and a group of private companies, advocates for curricular changes to equip students with the knowledge and skills they need for college and the workplace.

The organization recommends that schools emphasize core subject instruction (English, reading or language arts, world languages, arts, mathematics, economics, science, geography, history, government and civics) while integrating cross-subject, 21st Century themes into all areas of instruction. Themes include:

- Global awareness;
- Financial, economic, business and entrepreneurial literacy
- Civic literacy
- Health literacy
- Environmental literacy

21st Century curricula should also address the non-academic skills necessary for success outside of school. Specific areas included in P21’s Framework for 21st Century Learning include learning and innovation skills; information, media, and technology skills; and life and career skills.

**Science, Technology, Engineering, and Math**

As the United States grows increasingly dependent on STEM subject areas to develop a competitive economy and workforce, proponents of STEM education assert the importance of exposing students to these disciplines early. Early exposure to STEM in middle school can serve as an effective foundation for pursuing more rigorous STEM education in high school and college.

STEM curricula reflect many of the considerations for effective curricula outlined by the AMLE. The primary goals of an integrated STEM curriculum are to develop STEM literacy and workforce preparedness, 21st Century competencies, engagement and interest in STEM, and ability to make connections across STEM fields. Figure 2.1 presents an overview of the National Academy of Engineering and National Research Council’s framework for integrated

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54 Ibid., p. 18.
57 Ibid., p. 2.
58 Ibid., p. 2.
STEM education. The framework emphasizes integrating instruction across content areas, providing students with opportunities to explore their interests, and making course content relevant to real-world applications.  

### Figure 2.1: Framework for Integrated STEM Education

<table>
<thead>
<tr>
<th>GOALS</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goals for Students</strong></td>
<td><strong>Outcomes for Students</strong></td>
</tr>
<tr>
<td>▪ STEM literacy</td>
<td>▪ Learning and achievement</td>
</tr>
<tr>
<td>▪ 21st Century competencies</td>
<td>▪ 21st century competencies</td>
</tr>
<tr>
<td>▪ STEM workforce readiness</td>
<td>▪ STEM course taking, educational persistence, and graduation rates</td>
</tr>
<tr>
<td>▪ Interest and engagement</td>
<td>▪ STEM-related employment</td>
</tr>
<tr>
<td>▪ Making connections</td>
<td>▪ STEM interest</td>
</tr>
<tr>
<td><strong>Goals for Educators</strong></td>
<td>▪ Development of STEM identity</td>
</tr>
<tr>
<td>▪ Increased STEM content knowledge</td>
<td>▪ Ability to make connections among STEM disciplines</td>
</tr>
<tr>
<td>▪ Increased pedagogical content knowledge</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NATURE AND SCOPE OF INTEGRATION</th>
<th>IMPLEMENTATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>▪ Type of STEM connections</td>
<td>▪ Instructional design</td>
</tr>
<tr>
<td>▪ Disciplinary emphasis</td>
<td>▪ Educator supports</td>
</tr>
<tr>
<td>▪ Duration, size, and complexity of initiative</td>
<td>▪ Adjustments to the learning environment</td>
</tr>
</tbody>
</table>

Source: The National Academies Press

**Elective Offerings**

Experts emphasize the importance of exploratory learning, especially for middle level learners. The AMLE asserts that “young adolescents, by nature, are adventuresome, curious explorers” and, as such, should be offered frequent opportunities to engage with new topics and activities.  

Elective courses are a clear venue for providing students with such opportunities. Electives supplement the core curriculum and help students identify and pursue interests outside of core academic subjects. They also allow students to begin to develop a sense of

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61 Ibid., pp. 40, 42.
62 Figure adapted from: Ibid., p. 32.
64 “Electives and Exploratory Courses (Interest Based),” California Department of Education. http://pubs.cde.ca.gov/tcsii/ch4/elctvexptrycrs.aspx
These courses reveal student strengths and provide outlets for different peer interactions than students may experience in their academic classes.

A 2009 survey of middle schools by the AMLE notes that commonly offered elective subjects include band, chorus, art, computer, and foreign language courses. Highly successful middle schools are less likely to offer electives in band, chorus, art, and creative writing and more likely to offer electives in orchestra, physical education, industrial arts, health, family and consumer science, and computers than a randomly selected comparison group.

In addition to general exploratory course offerings, a number of exemplary middle schools utilize electives to build upon and deepen the core curriculum. In these instances, the school may offer electives that integrate into a core theme or goal of the school. For instance, Kennett Middle School promotes a focus on STEM education through its Automation and Robotics course, in which students study the history and development of automation, energy transfer, structures, machine automation, and computer control systems. Such a course integrates mathematics instruction and demonstrates the real-world implications of mathematics course content.

**PEDAGOGICAL METHODS**

The AMLE’s analysis of successful middle schools determines that high performing schools are more likely to engage in student-centered instructional strategies such as collaborative projects and inquiry-based and project-based teaching than the random comparison sample of middle schools. According to the AMLE, effective teaching approaches for middle school students:

- Capitalize on the skills, abilities, and prior knowledge of young adolescents;
- Use multiple intelligences;
- Involve students’ individual learning styles; and
- Recognize the need for regular physical movement.

The following subsection reviews two specific pedagogical approaches of particular interest to Boyertown Area School District – namely, embedded technology and blended learning.

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65 Ibid.
When implemented properly, both of these strategies can adhere to AMLE’s best practices outlined above.

**Embedded Technology**

Embedded technology has become a popular method for delivering instruction, in part due to increasing labor market demands for technologically literate workers. A report prepared for the U.S. Department of Education describes the prevalence of information and communication technologies in the modern workplace and the clear need for students to develop proficiency with these tools during their K-12 education and beyond. According to the report, students need to learn how to use 21st Century tools, including computers and audio, video, and multimedia instruments, “beginning in elementary school to take full advantage of the vast array of research and multimedia resources, digital content and communications options available to them.”

The International Society for Technology in Education’s National Educational Technology Standards for Students define embedded technology, or technology integration, as follows:

> Effective integration of technology is achieved when students are able to select technology tools to help them obtain information in a timely manner, analyze and synthesize the information, and present it professionally. The technology should become an integral part of how the classroom functions — as accessible as all other classroom tools.

A U.S. Department of Education report on the subject notes that, by integrating technology into classroom instruction, educators allow students to play an active role in their learning. Embedded technology promotes active thinking, decision-making, and skill building among learners. Technology can play a particularly important role in facilitating student-centered instructional techniques such as project-based learning. Indeed, a report from the North Central Regional Educational Laboratory and the Metiri Group asserts that students learn more when engaged in “meaningful, relevant, and intellectually stimulating schoolwork,” and that technology can facilitate this type of learning.

Preliminary research on the use of technology in the classroom suggests positive impacts on student learning. In a landmark study published by the Educational Testing Service, researchers examine data from the 1996 National Assessment of Educational Progress (NAEP) to determine the relationship between educational technology and student learning.

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The report found that, for students in Grade 8, providing professional development in technology integration as well as using computers for higher-order thinking skills produced sizeable improvements in achievement on the NAEP math section.\(^7\)

Several techniques exist for integrating technology into the curriculum. Examples of different ways to integrate technology include:\(^7\)

- Online learning and blended classrooms
- Game-based learning and assessment
- Learning with mobile and handheld devices
- Instructional tools like interactive whiteboards and Student response systems
- Student-created media like podcasts, videos, or slideshows
- Collaborative online tools like wikis or Google Docs
- Social media used to engage students

Embedded learning is a resource-intensive pedagogical method. Some programs require districts to purchase devices for each student (e.g., one-to-one device initiatives). On the other hand, if the district implements a Bring Your Own Device (BYOD) program, not all students may have access to or be able to afford the appropriate devices. Therefore, potentially prohibitive factors to implementing embedded technology include cost and lack of affordability for all students.\(^8\)

Additionally, professional development is required to get teachers comfortable with using technology in the classroom. The ACT suggests that teachers using integrated technology in the classroom should be able to:\(^8\)

- Use technology for personal productivity;
- Use technology to support learning in a subject area;
- Design or adapt technology-supported learning activities;
- Manage student-centered, technology-supported activities; and
- Assess student skills within the context of technology-supported activities.


\(^8\) Ibid., pp. 3-4.


BLENDED LEARNING

Teachers who integrate technology into their classrooms through blogs, online research, and other internet-based activities start the shift toward a blended learning environment. According to Innosight Institute, a think tank specializing in education and healthcare research in the framework of Harvard Business School Professor Clayton Christensen’s theories of “disruptive innovation,” blended learning is defined as:82

“Any time a student learns at least in part at a supervised brick-and-mortar location away from home and at least in part through online delivery with some element of student control over time, place, path, and/or pace.”

In 2010, the U.S. Department of Education published a meta-analysis on the relative efficacy of online, face-to-face, and blended instruction. The authors caution that many of the studies included in the analysis are not conducted in the K-12 setting, but note that the results of the analysis lend valuable insight into the role of blended instruction in K-12 education.83 Results suggest that online instruction is as effective as face-to-face instruction. Furthermore, the meta-analysis reveals that students taking blended learning courses outperform their peers receiving purely face-to-face or online instruction.84

To implement a blending learning model, administrators must decide whether to create course content or purchase curriculum from an external vendor. Although self-designed curricula are better able to adhere to local standards, the process requires teacher time and expertise.85 Purchased content may be more expensive, but is likely developed by a team with high levels of expertise in online curriculum creation.86 Regardless of the type of curriculum, professional development must accompany shifts to blended learning models.87

PROFESSIONAL DEVELOPMENT

Little research has been conducted into effective professional development for teachers transitioning from a junior high school model to a traditional middle school model. However, the available literature suggests a three-step process that may be helpful for managing the transition, presented in Figure 2.2 on the following page.

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83 Ibid., pp. 18-19.
84 Ibid., pp. 18-19.
86 Ibid., p. 8.
87 Ibid., p. 10.
Figure 2.2: Professional Development for Middle School Transitions

1. Conduct a climate survey among building staff to determine key areas of need.
2. Use the results of the survey to guide professional development initiatives.
3. Provide staff development opportunities both within teacher teams and within subject areas.

Source: UMI Dissertations Publishing

The transition from a junior high school to a middle school model necessitates a substantial shift in organizational structure and educational philosophy. Professional development should reflect this shift by addressing the anticipated and reported areas of change. For instance, a junior high school switching to a middle school with team teaching may consider training teachers in cooperative planning methods and interdisciplinary instruction. One way to pinpoint particular areas of need is a school climate survey. Administrators can analyze the results of the survey to determine where best to allocate professional development resources.

Experts also assert that professional development should be provided in both teacher teams as well as subject area-specific forums. This allows teachers facing common challenges to convene and share their experiences as well as potential solutions with each other. Other modes of delivery for professional development include instructional coaching, related university courses; observations in model schools; and workshops, conferences, or training sessions.

One study finds that, while 90 percent of teachers report participating in professional development, the majority of these teachers did not find the practice helpful. To deliver effective professional development, the CPE provides the following list of best practices:

- The duration of professional development must be significant and ongoing to allow time for teachers to learn a new strategy and grapple with the implementation problem.
- There must be support for a teacher during the implementation stage that addresses the specific challenges of changing classroom practice.

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Ibid., p. 32.
Ibid., p. 140.
Ibid., p. 140.
Ibid., p. 141.
Ibid., p. 19.
- Teachers’ initial exposure to a concept should not be passive, but rather should engage teachers through varied approaches so they can participate actively in making sense of a new practice.
- Modeling has been found to be a highly effective way to introduce a new concept and help teachers understand a new practice.
- The content presented to teachers shouldn’t be generic, but instead grounded in the teacher’s discipline (for middle school and high school teachers) or grade-level (for elementary school teachers).
SECTION III: BEST PRACTICE SCHOOL PROFILES

This section profiles three exemplary middle schools in Pennsylvania: Kennett Middle School (Kennett Consolidated School District), Titusville Middle School (Titusville Area School District), and Wilson West Middle School (Wilson School District). The schools were identified as 2015 Schools to Watch by the Pennsylvania Association for Middle Level Education. The award criteria include:

- **Academic excellence**: High-performing schools with middle grades are academically excellent. They challenge all students to use their minds well.
- **Developmental responsiveness**: High-performing schools with middle grades are sensitive to the unique developmental challenges of early adolescence.
- **Social equity**: High-performing schools with middle grades are socially equitable, democratic, and fair. They provide every student with high-quality teachers, resources, learning opportunities, and supports. They keep positive options open for all students.
- **Organizational structure**: High-performing schools with middle grades are learning organizations that establish norms, structures, and organizational arrangements to support and sustain their trajectory toward excellence.

KENNETT MIDDLE SCHOOL

Kennett Middle School, located in Chester County, Pennsylvania, was designated as a Pennsylvania School to Watch in 2012 and 2015. The school's stated mission is:

Kennett Middle School provides a safe, well-organized and nurturing environment for all students in grades 6-8. The Kennett Middle School is staffed with dedicated professionals who know and understand the adolescent student and who are committed to excellence in teaching and learning. There is an interesting and challenging curriculum enhanced by a wide variety of sports, music and activities for every student's interest.

Figure 3.1 presents several key descriptors for the school, including enrollment and student to teacher ratio.

**Figure 3.1: Kennett Middle School Profile**

<table>
<thead>
<tr>
<th><strong>STUDENTS</strong></th>
<th><strong>REDUCED-PRICE LUNCH</strong></th>
<th><strong>TEACHERS</strong></th>
<th><strong>STUDENT TO TEACHER RATIO</strong></th>
<th><strong>SETTING</strong></th>
<th><strong>TITLE I</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>1,033</td>
<td>60%</td>
<td>70.5</td>
<td>14.65:1</td>
<td>Large suburb</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: National Center for Education Statistics

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ORGANIZATION

Kennett Middle School follows a traditional schedule, with students attending nine classes per day plus a lunch period. Classes typically last for approximately 40 minutes. Figure 3.2 details the bell schedule for Grades 6, 7, and 8.

**Figure 3.2: Kennett Middle School Bell Schedule**

<table>
<thead>
<tr>
<th>TIME</th>
<th>GRADE 6</th>
<th>GRADE 7</th>
<th>GRADE 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:40-8:27</td>
<td>Period 1</td>
<td>Period 1</td>
<td>Period 1</td>
</tr>
<tr>
<td>8:27-9:09</td>
<td>Period 2</td>
<td>Period 2</td>
<td>Period 2</td>
</tr>
<tr>
<td>9:09-9:51</td>
<td>Period 3</td>
<td>Period 3</td>
<td>Period 3</td>
</tr>
<tr>
<td>9:51-10:33</td>
<td>Period 4</td>
<td>Period 4</td>
<td>Period 4</td>
</tr>
<tr>
<td>10:33-11:15</td>
<td>Period 5</td>
<td>Period 5</td>
<td>Lunch</td>
</tr>
<tr>
<td>11:15-11:47</td>
<td>Lunch</td>
<td>Period 6</td>
<td>Period 5</td>
</tr>
<tr>
<td>11:47-12:29</td>
<td>Period 6</td>
<td>Lunch</td>
<td>Period 6</td>
</tr>
<tr>
<td>12:29-1:11</td>
<td>Period 7</td>
<td>Period 7</td>
<td>Period 7</td>
</tr>
<tr>
<td>1:11-1:53</td>
<td>Period 8</td>
<td>Period 8</td>
<td>Period 8</td>
</tr>
<tr>
<td>1:53-2:35</td>
<td>Period 9</td>
<td>Period 9</td>
<td>Period 9</td>
</tr>
</tbody>
</table>

Source: Kennett Middle School

The school operates on a team-based structure, with two teams per grade level. Teams include one to two teachers per core subject, plus learning support staff. Based on enrollment data for the school and information about its organization, the student to team teacher ratios for Grades 6, 7 and 8 are 22:1, 20:1, and 18:1, respectively.

CURRICULUM

According to the school’s website, the curriculum “challenges a student’s intellectual potential, serves as preparation for high school, and provides an opportunity for growth and success for each student.” Core curricular offerings include math, reading, Language arts, science, and social studies. Grade 8 students also have a choice of four foreign languages: Latin, German, French, and Spanish.

In 2013, Kennett Consolidated School District began investigating an overhaul of middle and high school STEM offerings. District leaders expressed an interest in STEM’s ability to teach students mathematics and science principles through real-world applications. Ultimately, the district decided to implement the Project Lead the Way curriculum, a program that at the middle school level is designed to engage students’ curiosity and “imagination in

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104 Ibid.
creative problem solving,” providing a foundation for further STEM courses. Kennett Middle School employs a STEM specialist and all middle school students take three Project Lead the Way courses – Design and Modeling, Automation and Robotics, and Flight and Space. From this curriculum, district leaders expect that students “will benefit in all subject areas as they learn to problem solve, formulate, analyze, and use higher-thinking skills.”

In addition to core courses, Kennett Middle School students in all grades have access to the electives presented in Figure 3.3.

**Figure 3.3: Kennett Middle School Electives**

<table>
<thead>
<tr>
<th>COURSE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Computer Applications</strong></td>
<td>In grades 6, 7 and 8 there is a progression of skills and concepts taught to students in Excel, Power Point, MSWord and the Internet. In grade 6, keyboarding and basic MS Word is taught.</td>
</tr>
<tr>
<td>Family and Consumer Science</td>
<td>Students use the latest technology modules, and also learn the traditional skills of sewing and cooking.</td>
</tr>
<tr>
<td><strong>Technology Education</strong></td>
<td>Technology Education Life course provides students with the skills and opportunity to utilize and apply the various applications within the Apple iLife suite to produce and share authentic products focusing on current events of the time. Year One of the course consists of creating a Photo Essay book, multimedia slideshow presentation and a calendar. During Year Two students will then apply what they have learned about researching and photography to create a video podcast using iTunes and Garageband to publish and share. The final year of the course will be dedicated to facilitating the production of student movies using iMovie and iDVD applications.</td>
</tr>
<tr>
<td><strong>Music</strong></td>
<td>Students learn rhythm, melody and the basics of reading music in grades 6 and 7. In grade 8 students participate in a guitar lab.</td>
</tr>
<tr>
<td><strong>Art</strong></td>
<td>Students learn the techniques of pen and pencil, watercolor, and three-dimensional media. They also have the opportunity to create computer-generated art in the computer lab supported by Apple Software.</td>
</tr>
</tbody>
</table>

Source: Kennett Middle School

Middle school students may also elect to participate in a variety of extracurricular activities, including:

- Announcements
- After-the-Bell (free, community-based after-school program)
- Athletic teams (Grades 7 and 8)
- Jazz band
- Orchestra
- Literary magazine
- Spring musical

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109 Figure contents taken verbatim from: “School Profile,” Op. cit.
110 Ibid.
SUPPORT SERVICES

Kennett Middle School employs one instructional assistant for Grade 6, one for Grade 7, and two for Grade 8, as well as one unassigned to a specific grade. Additionally, the school employs a social services liaison, emotional support teacher, gifted student specialist, two English as a second language (ESL) specialists, and three special education staff members.111 The guidance department consists of three guidance counselors and one guidance secretary. The guidance department sends parents and staff a monthly newsletter “to support the academic, personal/social, and career growth” of students.112

TITUSVILLE MIDDLE SCHOOL

Titusville Middle School, located in Crawford County, Pennsylvania, was designated as a Pennsylvania School to Watch in 2011 and 2015.113 The school’s stated mission is “to inspire our students to learn, develop, and succeed in partnership with families and our community.”114 Figure 3.4 presents several key characteristics of the school, including enrollment and student to teacher ratio.

Figure 3.4: Titusville Middle School Profile

<table>
<thead>
<tr>
<th>STUDENTS</th>
<th>REDUCED-PRICE LUNCH</th>
<th>TEACHERS</th>
<th>STUDENT TO TEACHER RATIO</th>
<th>SETTING</th>
<th>TITLE I</th>
</tr>
</thead>
<tbody>
<tr>
<td>472</td>
<td>34%</td>
<td>34.55</td>
<td>13.66:1</td>
<td>Remote town</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Source: National Center for Education Statistics115

ORGANIZATION

Titusville Middle School operates on a traditional schedule, with eight classes per day plus an advisory period and lunch. Each class runs for approximately 40 minutes. Figure 3.5 shows the bell schedule for Grades 6, 7, and 8. According to Schools to Watch, the schedule at Titusville Middle School allows teachers the flexibility to meet students’ unique academic needs and provide interventions when necessary.116

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114 “Welcome to Titusville Middle School.” http://www.gorockets.org/titusvillemiddleschool_home.aspx
Figure 3.5: Titusville Middle School Bell Schedule

<table>
<thead>
<tr>
<th>TIME</th>
<th>GRADE 6</th>
<th>GRADE 7</th>
<th>GRADE 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00-8:45</td>
<td>Period 1</td>
<td>Period 1</td>
<td>Period 1</td>
</tr>
<tr>
<td>8:48-9:30</td>
<td>Period 2</td>
<td>Period 2</td>
<td>Period 2</td>
</tr>
<tr>
<td>9:33-10:00</td>
<td>Period 3: Advisory</td>
<td>Period 3: Advisory</td>
<td>Period 3: Advisory</td>
</tr>
<tr>
<td>10:00-10:45</td>
<td>Period 4</td>
<td>Period 4</td>
<td>Period 4</td>
</tr>
<tr>
<td>10:48-11:30</td>
<td>Period 5</td>
<td>Lunch</td>
<td>Period 5</td>
</tr>
<tr>
<td>11:33-12:15</td>
<td>Lunch</td>
<td>Period 6</td>
<td>Period 6</td>
</tr>
<tr>
<td>12:18-12:48</td>
<td>Period 7</td>
<td>Period 7</td>
<td>Lunch</td>
</tr>
<tr>
<td>12:51-1:33</td>
<td>Period 8</td>
<td>Period 8</td>
<td>Period 8</td>
</tr>
<tr>
<td>1:36-2:18</td>
<td>Period 9</td>
<td>Period 9</td>
<td>Period 9</td>
</tr>
<tr>
<td>2:21-3:04</td>
<td>Period 10</td>
<td>Period 10</td>
<td>Period 10</td>
</tr>
</tbody>
</table>

Source: Titusville Middle School

The school organizes teachers into grade-level teams. Each team includes two to three teachers per core subject. Based on NCES enrollment data and Titusville Middle School’s staff data, student to team teacher ratios for Grades 6, 7, and 8 are approximately 17:1, 16:1, and 16:1, respectively.

The teams have common planning time to discuss student needs and best practices. According to Titusville Middle School’s Schools to Watch report, “teams make effective use of this time and work collaboratively.” Non-core subject teachers serve students in all grades.

Curriculum

Titusville Middle School receives accolades for its integrative curriculum in which “teachers make connections across disciplines, including real world connections.” The school is also lauded for its use of student-centered teaching techniques and technology integration, both of which promote student engagement in learning.

In addition to strong core content, the middle school offers an array of elective courses, including the following:

- Art
- Computer applications
- Family and consumer science
- Library science
- Music
- Physical education
- Technology education
- Spanish

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120 Ibid.
121 Ibid.
SUPPORT SERVICES

Titusville Middle School employs two school counselors. The counseling department states the following mission:123

The Titusville Middle School counselors will facilitate a developmentally appropriate comprehensive school counseling program that addresses the academic, career and personal/social development of all students. In collaboration with families and our community we will strive to minimize barriers to learning and develop skills students need to be successful and productive citizens.

Counselors present in middle school classrooms on topics such as conflict resolution, tolerance, and bullying. They also help students develop organizational and study skills necessary for academic success. To help set future goals, counselors assist students in the creation of web-based portfolios chronicling their strengths and interests.124

All students in Grades 6 through 8 have access to a free after-school homework help program. Middle school teachers, YMCA staff, and other human service professionals are available to assist students until 5pm.125 Titusville Middle School also employs one Title I reading specialist to provide additional support to students.126

WILSON WEST MIDDLE SCHOOL

Wilson West Middle School, located in Berks County, Pennsylvania, was designated as a Pennsylvania School to Watch in 2015.127 The school’s stated mission is “to ensure all students have equal opportunity to acquire knowledge and skills for application to their present and future needs.”128 Figure 3.6 presents several key characteristics of the school, including enrollment and student to teacher ratio.

Figure 3.6: Wilson West Middle School Profile

<table>
<thead>
<tr>
<th>STUDENTS</th>
<th>REDUCED-PRICE LUNCH</th>
<th>TEACHERS</th>
<th>STUDENT TO TEACHER RATIO</th>
<th>SETTING</th>
<th>TITLE I</th>
</tr>
</thead>
<tbody>
<tr>
<td>720</td>
<td>18%</td>
<td>51.0</td>
<td>14.12:1</td>
<td>Rural fringe</td>
<td>No</td>
</tr>
</tbody>
</table>

Source: National Center for Education Statistics129

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124 Ibid.
**ORGANIZATION**

The school has a team-based structure, with two teams per grade level. Teams comprise one teacher per core subject.\(^\text{130}\) Wilson West Middle School operates on a traditional schedule, with seven 50-minute classes per day as well as a homeroom and advisory period. Figure 3.7 shows the bell schedule for Grades 6, 7, and 8.

**Figure 3.7: Wilson West Middle School Bell Schedule**

<table>
<thead>
<tr>
<th>TIME</th>
<th>GRADE 6</th>
<th>TIME</th>
<th>GRADE 7</th>
<th>TIME</th>
<th>GRADE 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>7:33-7:36</td>
<td>Homeroom</td>
<td>7:33-7:36</td>
<td>Homeroom</td>
<td>7:33-7:36</td>
<td>Homeroom</td>
</tr>
<tr>
<td>7:37-8:07</td>
<td>Advisory</td>
<td>7:37-8:07</td>
<td>Advisory</td>
<td>7:37-8:07</td>
<td>Advisory</td>
</tr>
<tr>
<td>8:08-8:58</td>
<td>Period 1</td>
<td>8:08-8:58</td>
<td>Period 1</td>
<td>8:08-8:58</td>
<td>Period 1</td>
</tr>
<tr>
<td>9:50-10:40</td>
<td>Period 3</td>
<td>9:50-10:40</td>
<td>Period 3</td>
<td>9:50-10:40</td>
<td>Period 3</td>
</tr>
<tr>
<td>12:54-1:44</td>
<td>Period 6</td>
<td>12:54-1:44</td>
<td>Period 6</td>
<td>12:54-1:44</td>
<td>Period 6</td>
</tr>
<tr>
<td>1:45-2:40</td>
<td>Period 7</td>
<td>1:45-2:40</td>
<td>Period 7</td>
<td>1:45-2:40</td>
<td>Period 7</td>
</tr>
</tbody>
</table>

Source: Wilson West Middle School\(^{131}\)

According to NCES and Wilson West Middle School data, student to team teacher ratios for Grades 6, 7, and 8 are approximately 22:1, 26:1, and 30:1, respectively.\(^{132}\)

**CURRICULUM**

Wilson West Middle School was selected as a School to Watch due to its strong leadership, teacher efforts to improve curriculum and instruction, and “commitment to assessment and accountability to bring about continuous improvement.”\(^{133}\) Students in each grade have a set of required courses that they attend every day. Additionally, students attend five special area classes (i.e., art, music, technology education, family and consumer sciences, computer technology) on a rotating basis. Learners may select elective courses based on their interests.\(^ {134}\) Figure 3.8 details the curriculum for Grades 6, 7, and 8.

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\(^{134}\) “Program of Studies.” Wilson West Middle School. http://www.wilsonsdb.org/domain/902
Figure 3.8: Wilson West Middle School Curriculum

<table>
<thead>
<tr>
<th>COURSE TYPE</th>
<th>GRADE 6</th>
<th>GRADE 7</th>
<th>GRADE 8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Required</td>
<td>▪ English</td>
<td>▪ English</td>
<td>▪ English</td>
</tr>
<tr>
<td></td>
<td>▪ Global Studies</td>
<td>▪ Global Studies</td>
<td>▪ Algebra I or Geometry</td>
</tr>
<tr>
<td></td>
<td>▪ Math</td>
<td>▪ Algebra I</td>
<td>▪ Science</td>
</tr>
<tr>
<td></td>
<td>▪ Reading Workshop</td>
<td>▪ Reading Workshop</td>
<td>▪ U.S. History</td>
</tr>
<tr>
<td></td>
<td>▪ Science</td>
<td>▪ Science</td>
<td>▪ Physical Education/Wellness</td>
</tr>
<tr>
<td></td>
<td>▪ Physical Education/Wellness</td>
<td>▪ Physical Education/Wellness</td>
<td></td>
</tr>
<tr>
<td>Rotating</td>
<td>▪ Introduction to Computers</td>
<td>▪ Web 2.0</td>
<td>▪ Exploring Technology and Engineering</td>
</tr>
<tr>
<td></td>
<td>▪ Science of Technology, Automation and Robots</td>
<td>▪ Design and Modeling, Magic of Electrons</td>
<td>▪ Business Multimedia</td>
</tr>
<tr>
<td></td>
<td>▪ Family and Consumer Science</td>
<td>▪ Family and Consumer Science</td>
<td>▪ Family and Consumer Science</td>
</tr>
<tr>
<td></td>
<td>▪ Music</td>
<td>▪ Music</td>
<td>▪ Music</td>
</tr>
<tr>
<td></td>
<td>▪ Art</td>
<td>▪ Art</td>
<td>▪ Art Exploration</td>
</tr>
<tr>
<td>Electives</td>
<td>▪ Band</td>
<td>▪ Band</td>
<td>▪ Band</td>
</tr>
<tr>
<td></td>
<td>▪ Chorus</td>
<td>▪ Chorus</td>
<td>▪ Chorus</td>
</tr>
<tr>
<td></td>
<td>▪ Orchestra</td>
<td>▪ Orchestra</td>
<td>▪ Orchestra</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ French</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ Spanish</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ Chinese</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>▪ Reading/Writing Workshop</td>
</tr>
</tbody>
</table>

Source: Wilson West Middle School

Rotating technology courses support a strong curricular emphasis on STEM. Wilson West Middle School implements Project Lead the Way’s middle school engineering curriculum. Course descriptions for each of these offerings are presented in Figure 3.9.

---

135 Ibid.
### Figure 3.9: Rotating Technology Courses

<table>
<thead>
<tr>
<th>COURSE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Grade 6</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Science of Technology</strong></td>
<td>Students will study how science has affected technology throughout history. They will explore concepts such as mechanics of motion, conversion of energy, and transportation. Students will build hands on projects such as a CO2 dragster and a mag-lev racer.</td>
</tr>
<tr>
<td><strong>Automation and Robotics</strong></td>
<td>Students will explore robotics by studying the history and development of automation, energy transfer, structures, machine automation, and computer control systems. Students will work with FischerTechniks to build a computer controlled assembly line.</td>
</tr>
<tr>
<td><strong>Grade 7</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Design and Modeling</strong></td>
<td>This unit introduces students to design and problem solving. Students will learn how to use Autodesk Inventor which is parametric 3-dimensional modeling software to solve problems. Students will also learn sketching techniques and use descriptive geometry as a component of design, measurement, and computer modeling.</td>
</tr>
<tr>
<td><strong>Magic of Electrons</strong></td>
<td>Students will explore the science of electricity, the movement of atoms, circuit design, and sensing devices. Students will explore many concepts of electronics through lab activities such as building an electric motor. Students will also have an opportunity to solder together an electronics project that incorporates transistors, resistors, capacitors, and LEDs.</td>
</tr>
<tr>
<td><strong>Grade 8</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Flight &amp; Space</strong></td>
<td>First, the Flight &amp; Space unit will allow students to learn about the history of aerospace while designing, creating and testing their own flying machines. This unit will cover the basics of aviation and space travel.</td>
</tr>
<tr>
<td><strong>Energy &amp; Environment</strong></td>
<td>Second, the Energy &amp; Environment unit will allow students to investigate alternative energy sources while creating vehicles that use those alternative methods. This unit will also allow students to dissect how energy affects the public’s daily lives and how energy sources impact the environment.</td>
</tr>
<tr>
<td><strong>Design &amp; Modeling</strong></td>
<td>Finally, the Design &amp; Modeling unit demonstrates the essence of Project Lead the Way. This unit will allow students to use the Autodesk Inventor program to create multiple projects. This unit will allow student to work in design teams to demonstrate how engineering affects everyone’s daily lives. The unit will conclude with the students putting all engineering concepts together in the design of the CO2 Dragster. Students will research the most effective dragster designs, brainstorm ideas, sketch chosen designs, create the design to scale on the 3D modeling software, develop a working model, test each student’s model as thoroughly as possible, and finally evaluate the results to determine if there would be a more efficient solution.</td>
</tr>
</tbody>
</table>

Source: Wilson West Middle School

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136 Figure contents taken verbatim from: Ibid.
Extra-curricular club offerings at Wilson West Middle School include:  

- Basketball  
- TV production  
- Historical movies  
- Dance team  
- Book club  
- Craft club  
- Helping hands  
- Art club  
- Newspaper  
- Walking  
- Flight simulator  
- Reading  
- Weightlifting  
- Dance  
- Board games  
- Chess  
- Guitar  
- Jewelry  
- Fitness

**SUPPORT SERVICES**

Wilson West Middle School employs two guidance counselors and one librarian. Additionally, all students have access to The Learning Center, which is open both during and after school. In this program, staff assist students with class assignments and homework, providing tutoring and study help.

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139 “The Learning Center at West Middle School.” Wilson West Middle School. http://www.wilonsd.org/domain/900
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