Best Practices in Capstone Projects

Prepared for Northwest Independent School District

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In the following report, Hanover Research explores the use of capstone projects in high schools by reviewing the literature and considering best practices for capstone timelines, participation, and content. The report further profiles several school districts that use capstone requirements.

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EXECUTIVE SUMMARY AND KEY FINDINGS

INTRODUCTION

In this report, Hanover Research explores the use of capstone projects in high schools by reviewing the literature and considering best practices for capstone timelines, participation, and content. We conclude by profiling six school districts that have successfully implemented capstone project graduation requirements.

KEY FINDINGS

- **Schools often implement capstone programs to support students' transition from high school to college or the workforce**. Research indicates that students are less academically invested during their senior year because most of the work that dictates their postsecondary options (e.g., SAT exams, submitted grades, extracurricular activities) has already been completed, and this "senior slump" is associated with negative postsecondary outcomes. Capstone projects engage seniors during their last semesters, maintaining the academic rigor needed to ensure postsecondary success.

- **While education advocacy groups recommend focusing the formal elements of capstone projects in the junior and senior years, they also recognize that preparation for the capstone project can begin as early as eighth grade**. The majority of capstone projects are completed during students' senior year, but some schools do require students to maintain portfolios or journals throughout all four years of high school.

- **Capstone programs generally emphasize the importance of student interest, integration of acquired knowledge, and real world applications to any relevant culminating experience**. While different programs may require various types of projects (e.g., portfolio, research paper, community service project), they all expect students to apply their talents toward a project that is relevant outside of the classroom.

- **Most districts or schools that offer capstone projects require them for graduation**. However, there are schools for which capstone projects are optional. Many of the schools that require capstone projects are in states that encourage or require such projects for students throughout the state. While some schools require individual completion of the project, others allow for group work in certain areas. Some experts suggest that group work is beneficial, as it encourages the development of communication and other 21st century skills.

SECTION I: LITERATURE REVIEW

In this section, Hanover Research briefly reviews the literature on capstone projects in high schools, exploring their history and definition, trends, aims, and components.

DEFINITION AND TRENDS

The use of capstone projects (also called culminating projects) has its origins in higher education, particularly in the fields of science, technology, engineering, and mathematics, to prepare for the complex problems graduates face in the workforce. From there, the use of capstone projects spread to other areas in higher education. High school capstone courses appeared in school reform programs beginning in the 1990s, intended as culminating projects for high school seniors. Recent focus on college and career readiness has brought renewed attention to capstone programs in high schools.[1]

Definitions of "capstone project" and "culminating project" vary among different regions and organizations. The Connecticut SERC (formerly the State Educational Research Center) describes capstone projects as a "culminating activity" that students complete in their senior year that "synthesizes classroom study and real world perspective" through a project that focuses on a student's personal interest.[2] The State of Washington Office of the Superintendent of Public Instruction provides three specific goals for culminating projects in state high schools:[3]

- Encourage students to think analytically, logically and creatively and to integrate experience and knowledge to solve problems.

- Give students a chance to explore a topic in which they have a great interest.

- Offer students an opportunity to apply their learning in a "real world" way.

These definitions and many others may differ slightly in the language used and method advocated (e.g., research paper, community service project, or work portfolio), but they generally all emphasize the importance of **student interest, integration of acquired knowledge, and real world applications** to any relevant culminating experience.

Capstone projects are a component of graduation requirements for students in high schools across the country, and some state governments dictate that all students complete a culminating project. A 2012 report from the Appalachia Regional Comprehensive Center (ARCC) details five such state-led initiatives, focusing on graduation requirements or

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[1] "High School Capstone Courses: A Review of the Literature." Appalachia Regional Comprehensive Center at Evantia, April 2012. pp. 1-3. http://sites.edvantia.org/publications/arcc/ARCC_Capstone_Lit_Review.pdf

[2] "Capstone." State Educational Resource Center. p. 2. http://www.ctserc.org/ssr/downloads/capstone.ppt

[3] Bulleted points taken verbatim from: "Complete a Culminating Project (Senior Project)." State of Washington Office of Superintendent of Public Instruction. http://www.k12.wa.us/graduationrequirements/Requirement-CulminatingProject.aspx

guidelines in Connecticut, Kentucky, North Carolina, Rhode Island, and Tennessee. Connecticut's capstone experience, which is currently in the pilot phase, will be mandatory for all high school graduates by 2020, with specific requirements to be determined locally. Kentucky has a performance-based credit requirement, requiring either 120 hours of instructional time in one subject or performance-based credits defined at the local level. North Carolina does not require that schools have a graduation project, but the North Carolina Graduation Project provides guidance for districts and schools that wish to have such a requirement. Since 2005, Rhode Island has required an applied learning component for graduation, which a capstone project satisfies. Tennessee recommends, but does not require, a capstone project for students enrolled in high school in 2009 or after.[4]

COLLEGE AND CAREER READINESS

States, schools, and districts that implement capstone or senior projects typically do so with the expressed aim of increasing student college and career readiness. The Connecticut Plan, for example, explains that, "[A capstone project] engages students in a project/experience that focuses on an interest, career path or academic pursuit that synthesizes classroom study and real world perspective."[5] Similarly, the ARCC notes, "**Capstone courses, then— broadly defined—are designed to prepare students for college and the workforce**."[6]

A capstone project teaches and demonstrates many skills needed for college and career readiness. For instance, according to the Tennessee Department of Education, a capstone project allows students to:[7]

- Learn about themselves by moving an idea or dream toward a topic of interest, specialization, community need, or career choice;
- Develop their leadership skills, sense of character, and self-esteem;
- Locate the right people (advisors and mentors) to help them and to link them with community resources;
- View society and the issues within a community in new ways;
- Demonstrate their abilities to apply what they have learned during twelve years of study;
- Synthesize previous learning; and
- Explore their readiness for college and the workplace.

The College Board and University of Cambridge International Examinations are collaborating to offer an AP Cambridge Capstone Program and Credential for high school students based on feedback from higher education institutions requesting that high school students have

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[4] "High School Capstone Courses: A Review of the Literature," Op. cit., pp. 4-6.
[5] "Capstone Projects: About." State Educational Resource Center. http://ssr.ctserc.com/capstone/
[6] "High School Capstone Courses: A Review of the Literature," Op. cit., p. 1.
[7] "The Capstone Project: State of Tennessee." Tennessee Department of Education, 2008. p. 2. Downloaded from
   http://www.seviercountysped.com/high-school-diploma-project.html

"stronger backgrounds in independent research, collaborative teamwork, and 21st-century knowledge and skills now essential for success on college campuses and in today's global marketplace." The College Board and University of Cambridge International Examinations designed the program to develop the college and career readiness skills and knowledge students will need through a combination of "AP courses and exams with the interdisciplinary global seminar curricula and the assessment of research projects and presentations offered by University of Cambridge International Examinations."[8]

COMPONENTS

According to the literature, the **three general types of capstone or culminating experiences include projects, exhibitions, and courses**, all of which may overlap with one another.[9] There are various formats that a student might use for a capstone project. The following is a suggested list compiled from literature on capstone programs in high schools throughout the country:[10]

- Portfolio of best work

- Curriculum-based research project

- Set of experiments organized around a central problem

- Community service project or service learning activity

- Internship in a local business or organization

- Designing a product, service, or system

- Planning and organizing an event or activity

- Job shadowing

- Apprenticeships

- Simulations

Generally, capstone requirements include multiple items such as a research paper, a project completed with the guidance of an advisor and/or mentor, self-reflection, or a presentation. For example, the Connecticut Plan requires research, written and presentation components, and a critical role played by an advisor/mentor.[11]

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[8] "The College Board and University of Cambridge International Examinations Announce New Education Program for High School Students." College Board, March 5, 2012. http://press.collegeboard.org/releases/2012/college-board-and-university-cambridge-international-examinations-announce-new-education-pro

[9] Roy, A. "High School, the Principal, Public Policy, and the Senior Capstone Project: Foundations, an Implementation Model, and Effects." Central Connecticut State University. April 7, 2010. p. 27. http://content.library.ccsu.edu/cdm/singleitem/collection/ccsutheses/id/1317/rec/13

[10] [1] "High School Capstone Courses: A Review of the Literature," Op. cit., p. 3.
[2] "The Capstone Project: State of Tennessee," Op. cit., p. 8.
[3] "The Connecticut Plan: Academic and Personal Success for Every Middle and High School Student." Connecticut State Department of Education. p. 3. http://www.sde.ct.gov/sde/lib/sde/pdf/pressroom/TheConnecticutPlan.pdf

[11] "The Connecticut Plan: Academic and Personal Success for Every Middle and High School Student," Op. cit., p. 3.

SECTION II: BEST PRACTICES

In this section, Hanover Research explores capstone project best practices, particularly the issues of capstone timelines, participation, and contents. The body of research about best practices in capstone projects is limited, perhaps due to their relatively recent introduction to many schools across the country. Our research suggests that thorough studies of the impacts of capstone projects on postsecondary success have not been conducted, and the variety of project models complicates any comprehensive analysis of capstone projects. Some state governments and education advocacy groups have, however, published recommendations for capstone requirement design.

TIMELINE

Many schools design their capstone projects to be completed during the senior year of high school because research shows that **senior year rigor and productivity are important predictors of postsecondary success.** A 2000 study by Stanford University found that seniors are studying less and taking less-demanding courses. This is due in part to the fact that college admission frequently does not depend on second semester courses or grades from the senior year. Research indicates that this decrease in academic rigor can have negative postsecondary impacts. Michael Kirst, the author of the Stanford study, reports that even for students who enrolled in challenging courses during the rest of their high school career, a wasted senior year increases the likelihood a student will drop out of college early. In addition, Kirst links lack of senior engagement to an increased need for remedial classes in the first year of college.[12]

The National Commission on the High School Senior Year finds that there is a disconnect between secondary and postsecondary education that leaves many high school graduates unprepared for higher education. In particular, student motivation drops during the senior year of high school, since, "Short of a miserable failure in the senior year, practically every college-bound student knows that what they have accomplished through Grade 11 will largely determine whether or not they attend college, and if so, which college."[13] The same can be said for students entering the workforce. The Commission argues, however, "the senior year does not stand in isolation. Everything that leads up to the final year helps contribute to its success (or failure) and everything that follows, either in education or work, should lead out of it." In response, the Commission recommends that high schools require

> *"[T]he senior year does not stand in isolation. Everything that leads up to the final year helps contribute to its success (or failure) and everything that follows, either in education or work, should lead out of it."*

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[12] Kirst, M. W. "Overcoming the High School Senior Slump: New Education Policies." Stanford University, August 24, 2000. http://www.stanford.edu/group/bridgeproject/seniorslump/seniorslumpold.pdf
[13] "The Lost Opportunity of Senior Year: Finding a Better Way Summary of Findings." National Commission on the High School Senior Year, January 2001. p. 6. http://inpathways.net/lostopportunity.pdf

that seniors complete a capstone project, perform an internship, complete a research project, or take college-level courses. [14] Conversations with experienced school administrators led one Central Connecticut State University researcher to conclude that,

> Without the capstone, seniors reflect the traditional "learned helplessness of the system." They are accepted into colleges and then spend the remainder of senior year waiting for graduation, not producing the quality of work of which they are capable. Instead, participation in the capstone helps students to "stand out at college interviews," recounting their capstone experiences and all of the effects. Participation also helps students by giving them a college essay topic about which they have passion.[15]

However, other groups argue that capstone projects are more valuable when completed in advance of graduation. The State of Tennessee Department of Education (TDOE) *2008 Capstone Project Manual* suggests that **seniors will achieve maximum benefit from the project if they complete it by December of the senior year, as they can refer to their project in the college admission process**. Figure 2.1 displays the TDOE recommended capstone project timeline, which can begin as early as grade 8. English teachers may work with 9th and 10th grade students to prepare preliminary portfolios, and the formal Capstone Project begins in 11th grade. The suggested timeline also allows for projects to begin in the fall of senior year, although the delay may preclude students from using their project in the college admissions process.[16]

Figure 2.1: Tennessee Capstone Project Suggested Overall Timeline

YEARS	SCHEDULE
Grade 8	Counselors introduce the opportunity of the capstone project to students and parents
Grades 9 and 10	Through English classes: Teachers help students organize a capstone portfolio. The portfolio inclusions should be established by individual school faculties to provide sufficient guidance so that they will not be too inflexible or concrete. Some schools may initiate a portfolio process in 9th or 10th grade, accommodating the catch-up needs of transfer students in later grades.
Grade 11	Some schools begin The Capstone Project process in the junior year, continue it over the summer, and end it by the conclusion of the fall semester of the senior year.
Grade 12	Other schools begin the process with a proposal submitted by the end of August and the work to be completed by April.

Source: Tennesse Department of Education[17]

Educate Texas, a public-private education advocacy group, supports beginning capstone project exploration as early as freshman year. Education Texas recommends that the formal capstone project process be completed during the senior year[18] and encompass only one to

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[14] "Raising Our Sights: No High School Senior Left Behind," Op. cit., p. 11.
[15] Roy, Op. cit., pp. 113-114.
[16] "The Capstone Project: State of Tennessee," Op. cit., pp. 6-7.
[17] Ibid., p. 7.
[18] "T-STEM Capstone Project Handbook 2013-2014," Op. cit., p.16.

two semesters of work. According to the organization, students should complete capstone projects in four phases:[19]

- Proposal

- Research paper

- Project creation

- Culminating defense and presentation

Some schools require formal four-year capstone projects that progress as students move from one grade to the next. Schools such as Vashon Island High School (VHS) in Vashon, Washington, Mount Tahoma High School (MTHS) in Tacoma, Washington, and Bethel High School in Bethel, Connecticut mandate capstone projects that progress throughout high school. Students at VHS assemble a portfolio beginning with a freshman essay and culminating in a community service project during the senior year.[20] At MTHS, students compose a portfolio during their freshman year that includes a personal statement and a five-year academic plan. Throughout high school, MTHS students revisit their freshman work and revise it to reflect their changing goals and accomplishments.[21] Students at Bethel High School favor a proposed four-year capstone project because it encourages students to start contemplating their future, including their postsecondary goals, affording them sufficient time to make plans before graduation. One school counselor explained that the "program evolves into a transition plan for students to prepare for career or college."[22] **The four-year projects used in Vashon, Tacoma, and Bethel, however, are exceptions to the norm of capstone projects – most of the schools examined in this report rely on capstone projects that are completed entirely during the junior or senior years**.

PARTICIPATION

The majority of schools with capstone projects require them for graduation. Many of these schools, are located in states with a required capstone project, such as Connecticut, or a required "performance assessment" such as in Rhode Island.[23]

Capstone projects may also be voluntary, however. At the state level, the Hawaii Department of Education (HDOE) differentiates between students that have completed a culminating project and those that have not through differentiated degrees. HDOE does not require all graduates to complete a senior project, but completion of a four-part culminating

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[19] "T-STEM Capstone Project Handbook 2013-2014." Educate Texas. p. 3. Downloaded from http://t-stemcapstone.weebly.com/index.html

[20] "Culminating Project Guide." Vashon Island High School. Downloaded from: http://www.vashonsd.org/index.php?/district2/vhs-pages/C263/

[21] "Guide to Culminating Project and High School & Beyond Plan." Mount Tahoma High School, 2007. p.3. http://www.tacoma.k12.wa.us/information/departments/summerschool/Documents/Mt_Tahoma_Culminating_Project.pdf

[22] FitzGerald, E. "Area schools use 'Capstone' to teach lessons." *The News-Times*, August 21, 2012. http://www.newstimes.com/local/article/Area-schools-use-Capstone-to-teach-lessons-3805061.php

[23] "Performance Assessments." Rhode Island Department of Education. http://www.ride.ri.gov/StudentsFamilies/RIPublicSchools/PerformanceAssessments.aspx

project is, however, required to earn the state's Recognition Diploma.[24] At the school level, capstone projects may be offered to students as a privilege. Newton North High School in Newton, Massachusetts, for instance, only offers the opportunity to complete a senior year project to seniors in good standing, who may choose to sign up in the spring of junior year or fall of senior year.[25] Additionally, culminating projects may be offered to all students on a purely voluntary basis. The O.P.T.I.O.N.S. program at North Salem Middle/High School in North Salem, New York, for example, encourages seniors to explore career interests, use community expertise to enhance their learning, and apply their knowledge and skills to a senior project.[26]

Culminating projects may be completed individually or as a group. Many examined programs did not specify that students could not work in groups, while some schools, such as Clayton High School, detailed in Section III in this report, require students to work independently. However, Educate Texas suggests that as part of a 21st Century learning experience, students should be able to work independently or collaboratively, although reflective journals should be completed independently.[27] Weymouth High School, also profiled in Section III, allows students to work individually or as a group.

CONTENT

Capstone program design recommendations often emphasize the importance of real-world preparation for students' postsecondary success. Content suggestions generally reflect that emphasis, stressing the need for projects to be applicable outside of the classroom. For example, ARCC asserts that an effective capstone project:[28]

- Engages students as active participants in the learning process;
- Centers on students rather than teachers;
- Promotes the development of higher-order thinking and problem-solving;
- Emphasizes making connections across disciplines;
- Bridges theory with practice;
- May be completed in student teams;
- Involves teachers as advisors and community members as mentors; and
- Involves a final presentation before a panel that evaluates the project.

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[24] Matayoshi, K.S. "Senior Project Revised Guidelines." Hawaii Department of Education. http://graduation.k12.hi.us/senior_project/Memo.pdf

[25] "Frequently Asked Questions." Newton North High School. http://newtoncaps.org/about-caps/frequently-asked-questions/#4

[26] "Senior O.P.T.I.O.N.S." North Salem Middle/High School. http://www.northsalemschools.org/schools/options

[27] "T-STEM Capstone Project Handbook 2013-2014," Op. cit., p. 16.

[28] Bullet points taken verbatim from: "High School Capstone Courses: A Review of the Literature," Op. cit., p. 3.

Likewise, the Capstone Project of Tennessee recommends that any capstone project, regardless of type or structure, incorporate the following key components to help students develop skills in a real-world setting:[29]

- Technology
- Hands-on approaches
- Reflective journals
- In-depth research
- Design
- Production
- Presentation

Educate Texas recommends that the students focus on designing a product, service, or system, improving a system, or planning and organizing an event or activity.[30] After deciding which core question to address, the student then:[31]

- Selects or is assigned a problem related to his or her career pathway;
- Conducts research related to the problem;
- Identifies teachers, business and postsecondary education partners/mentors with relevant expertise of the problem and its solution;
- Analyzes and synthesizes information to solve the problem;
- Maintains periodic reflective journals;
- Establishes with teacher checkpoints for assessment to ensure the project time line is on track and he or she is meeting the standards for the project;
- Develops a multimedia presentation to adult partners/mentors and panel committee detailing what he or she has learned; and
- Creates e-portfolio of Capstone Project.

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[29] "The Capstone Project: State of Tennessee," Op. cit., p. 8.
[30] "T-STEM Capstone Project Handbook 2013-2014," Op. cit., p. 6.
[31] Bullet points taken verbatim from: Ibid., p. 3.

SECTION III: CAPSTONE PROJECTS IN PRACTICE

In this section, Hanover Research profiles six school districts with established capstone experience programs. For profile selection, Hanover chose districts or schools that published significant detail regarding their capstone or senior project. Profiled features include a significant description of the rationale for the program, the particular concrete educational aims, the assignments or projects that the institution required of students in order to satisfy those goals, and a detailed timeline for those elements. In addition, Hanover sought programs with a timeline beginning prior to the senior year, of which there are relatively few examples, or programs whose description explicitly discusses timeline rationale.

JOHNSTON COUNTY SCHOOLS, JOHNSTON COUNTY, NC

Johnston County Schools, a rural school district in central North Carolina, encompasses 44 total schools, including 10 high schools.[32] All high school students must successfully complete a Graduation Project in accordance with the North Carolina Graduation Project guidelines.[33] Clayton High School (CHS), a member of Johnston County Schools, has required a Graduation Project for graduating seniors since 2000. The school explains that:

> As a result of Graduation Projects at CHS, students have received job offers, internships and scholarships. Students have volunteered, built, designed, written. The Faculty at Clayton High School believes that Graduation Project allows students to excel in areas necessary for success in their lives after high school.[34]

The rationale behind the Graduation Project is that it provides a "multi-faceted, multi-disciplinary performance assessment completed over time." It provides the opportunity to connect knowledge, skills, and work habits to the real world, including computer knowledge, employability skills, information-retrieval skills, language skills in reading and writing, teamwork, and thinking/problem-solving skills:[35]

The CHS Graduation Project consists of a research paper, a product, an oral presentation, and a digital portfolio.[36] To complete the Graduation Project requirement, students must:[37]

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[32] "Public School Districts." National Center for Education Statistics.
http://nces.ed.gov/ccd/districtsearch/district_detail.asp?Search=2&details=1&ID2=3702370&DistrictID=3702370

[33] "High School Course Catalog 2012-2013." Johnston County Schools. p. 1.
http://www.johnston.k12.nc.us/education/page/download.php?fileinfo=ekhTX0NvdXJzZV9DYXRhbG9nXzIwMTIt
MTMuSkNTUFMucGRmOjo6L3d3dzEwL3NjaG9vbHMvbmMvam9obnN0b25jb3VudHkvaW1hZ2VzL2RvY3nci9BTE
xmaWxlOTM0MTkucGRm

[34] "Clayton High School Graduation Project." Clayton High School.
http://www.johnston.k12.nc.us/education/staff/staff.php?sectiondetailid=74609&linkid=nav-menu-container-1-
553461

[35] Ibid.

[36] Ibid.

[37] Bulleted points taken verbatim from: Ibid.

- Identify a viable project;

- Successfully complete all components on the NC Graduation Project: research paper, portfolio, product, and oral presentation;

- Work Individually on the culminating project;

- Submit all letters, forms, and paperwork by designated deadlines;

- Seek advice and assistance when needed;

- Maintain documentation of completed tasks and timelines;

- Identify and maintain regular contact with academic advisors and project mentors as the graduation project is created and developed;

- Employ a variety of communication techniques, such as letters, interviews, phone calls, and electronic communications, as project work progresses;

- Research and write a paper on a topic of interest;

- Complete and document a minimum of 15 hours of verifiable work outside the regular school day on the product component;

- Prepare a reflective portfolio documenting work completed; and

- Make a presentation to the review panel that is judged as acceptable by the panel.

CHS requires that students work on the Graduation Project during their junior and senior years. Figure 3.1 displays the CHS Graduation Project timeline for the junior and senior years in 2013. The junior component of the Graduation Project is the research paper, which may be "career-focused or passion-based" depending on students' individual interests. Students must successfully complete the research paper before progressing on to English IV and eventually to graduation[38]

Figure 3.1: CHS Graduation Project Paper Timeline-Spring 2013

TO BE COMPLETED BY	ITEMS	DUE DATE
JUNIOR YEAR TIMELINE		
Week 1	Introduction to research paper	January 23-25
	Submit plagiarism policy and graduation Project proposal form	January 24 January 31
Week 5	Note cards due	February 28
Week 6	Outline	March 7
	Works Cited Page (including interview citation)	March 7

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[38] "Graduation Project Handbook." Johnston County Public Schools. p. 3.
http://www.johnston.k12.nc.us/education/page/download.php?fileinfo=SkNTIEdyYWR1YXRpb24gUHJvamVjdCBI
YW5kYm9vay5wZGY6Ojovd3d3MTAvc2Nob29scy9uYy9qb2huc3RvbmvdW50eS9pbWFnZXMvYXR0YWNoLzc0NjE
2LzUzMzM0Xzc0NjE2X2F0dGFjaF8zNjE0My5wZGY=

TO BE COMPLETED BY	ITEMS	DUE DATE
Week 7	First draft of research paper due	March 14
Week 9	Submit final paper	April 27
SENIOR YEAR TIMELINE		
Week 4	Product proposal	January 30
	Product plan	February 6
	Mentor contract form	February 20
Week 13	Product/mentor log (1/2 hours complete)	March 11
	Product reflection	March 18
	Personal statement	March 27
	Resume	March 27
	Product and portfolio due (final)	April 24
	Letter to judges	April 30
Week 15	In-class presentation	May 2-10
	Presentation for judges; senior boards	May 13
Week 16	Mentor thank you letter/note	May 17

Source: Clayton High School[39]

WEYMOUTH PUBLIC SCHOOLS, WEYMOUTH, MA

Students graduating from Weymouth High School (WHS), a suburban high school with around 2,100 students in Weymouth, Massachusetts,[40] are required to complete a Capstone Project.

WHS's capstone requirement is designed to allow students to demonstrate 21st century skills and knowledge.[41] The school assesses the project as evidence of a student's proficiency in each of the core skills in the capstone rubric. The school assesses the student's work at the end of each of three terms based on progress and work done. At the end of the third term, the final grade is assessed according to the rubric shown in Figure 3.2 below.

Figure 3.2: Weymouth High School Capstone Project Rubric

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[39] "CHS Graduation Project Paper Timeline-Spring 2013." Clayton High School.
    http://www.johnston.k12.nc.us/education/components/docmgr/default.php?sectiondetailid=74616&
[40] "Search for Public Schools." National Center for Education Statistics.
    http://nces.ed.gov/ccd/schoolsearch/school_detail.asp?Search=1&DistrictID=2512840&ID=251284002123
[41] "Capstone Project." Weymouth High School. http://www.weymouthschools.org/whs_sub.aspx?id=9310

SKILL SCORE	ADVANCED	PROFICIENT	NEEDS IMPROVEMENT	INADEQUATE	SCORE
Strategic Reading	16-14	13-10	9-6	5-0	
Problem Solving	16-14	13-10	9-6	5-0	
Research (10-20 sources)	16-14	13-10	9-6	5-0	
Collaboration (meeting with advisor)	20-17	16-12	11-7	6-0	
Technology	16-14	13-10	9-6	5-0	
Written Communication (3-5 Page Reflection)	16-14	13-10	9-6	5-0	
Oral Communication (Presentation)	16-14	13-10	9-6	5-0	
Capstone proficiency rating (Sum)	116-101	100-70	69-43	42-0	

Source: Weymouth High School[42]

The school allows students to complete the Capstone Projects individually or in a group. Work on the Capstone Project begins junior year and is completed senior year. During the work on the project, students regularly meet with an advisor and maintain a journal of progress with bi-weekly entries. In addition, students are required to write a self-reflection assessment upon completion of the project. At the end of the senior year, students showcase their projects in an open house. Figure 3.3 below details the Capstone Project timeline.

Figure 3.3: Weymouth High School Capstone Project Timeline

PROBLEM SOLVING STEP	DUE DATES	SUB-GOALS
Define the problem	Mid-May junior year	1. Capstone assignment assembly with advisers
	Late May junior year	2. Selection of Topic
	June junior year	3. Capstone Proposal – Groups should be chosen
Identify and implement a strategy	Late September	4. Exploratory research - What Is Your Working Central Question? – Last day to finalize groups
	Late October	5. Selection of presentation method(s) - Last day to switch groups. Last day to change topic
Evaluate progress toward the goal	Late November	6. Researching and creating (stage 1)
	Mid-December	7. Researching and creating (stage 2)
Solution and Reflection	Mid-February 10th Early March 3rd	8. a. Preliminary presentation b. Preliminary portfolio
	Late March	9. Make the presentation
	Early April	10. Write the self-assessment reflection and submit the final capstone portfolio

Sourece: Weymouth High School[43]

The Weymouth High School Capstone Handbook offers quotes from students regarding their experiences with the capstone project, including:[44]

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[42] "Capstone Rubric." Weymouth High School. http://www.weymouthschools.org/uploadedFiles/Weymouth_High_School/Teaching_and_Learning/Capstone%20Rubric.pdf

[43] "2013-2014 Capstone Handbook." Weymouth High School. p. 3. http://www.weymouthschools.org/uploadedFiles/Weymouth_High_School/Teaching_and_Learning/Capstone%20Handbook2013-2014%20Final.pdf

"Capstone actually does teach you a lot and when you mention it while doing an interview with college, they really are interested in learning more about it. It sets you a little bit apart from the thousands of other applicants."

"I am confident that I will be successful in the business world some day and the Capstone Project has given me that confidence."

"Learning to work independently allows students to become more self-motivated and prepares them for the future."

CENTRAL COMMUNITY SCHOOL SYSTEM, BATON ROUGE, LA

Central High School in Baton Rouge, Louisiana, a rural high school with around 1,230 total students,[45] requires all seniors to complete and pass a senior project. The *Senior Project Guide* emphasizes the benefits of a senior year project in terms of college and career readiness and 21st century skills, including:[46]

- Accountability and adaptability
- Communication skills
- Creativity and intellectual curiosity
- Critical thinking and systems thinking
- Information and media literacy skills
- Interpersonal and collaborative skills
- Problem identification, formulation, and solution
- Self-Direction
- Social responsibility

The project provides an opportunity for seniors to engage in real world activities that hone skills needed for the workforce and college. The school uses the culminating project to counter the negative effects of a wasted senior year on students' postsecondary success. A capstone project exceeds traditional graduation requirements to equip students with the

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[44] "2013-2014 Capstone Handbook." Weymouth High School. p. 2.
http://www.weymouthschools.org/uploadedFiles/Weymouth_High_School/Teaching_and_Learning/Capstone%20Handbook2013-2014%20Final.pdf

[45] "Search for Public Schools." National Center for Education Statistics.
http://nces.ed.gov/ccd/schoolsearch/school_detail.asp?Search=1&InstName=Central+High+School+&State=22&SchoolType=1&SchoolType=2&SchoolType=3&SchoolType=4&SpecificSchlTypes=all&IncGrade=-1&LoGrade=-1&HiGrade=-1&ID=220012500363

[46] Bullet points taken verbatim from: "Senior Project Guide 2012-2013." Central High School. p. 2.
http://centralhigh.centralcss.org/files/8813/4134/4586/packet20122013.pdf

skills colleges and employers seek. Central High School reported that more than half of seniors felt that the experience had "influenced their future careers or plans."[47]

The Louisiana Department of Education establishes guidelines for schools that implement a senior project, although implementation policy is developed locally. The Department of Education guidelines require senior projects to have the following elements:[48]

- A challenging topic of interest approved by the student's parents or guardians and the school-level Senior Project Committee

- A Senior Project mentor

- Students must earn a score of Satisfactory or higher on the following components, which are evaluated locally:
  o Research paper of 8 to 10 pages on an approved topic of the student's choice
  o Product or service related to the research requiring at least 20 hours of work
  o Portfolio that documents and reflects the Senior Project process
  o Presentation to a panel of three to five adults from the community and school

Students at Central High School must work individually and to find a community mentor to guide them on the project. The mentor must be at least 21 years old, and cannot be related to the student or have a relationship as their teacher, coach, or current employer. Further, the mentor must be knowledgeable about the field and must be available for consultations with the student.

The Central High School senior project includes the following elements:[49]

- Commitment form

- Letter of intent

- Five-year plan

- Resume

- Product service agreement

- Research paper proposal

- Complete research for paper due

- First draft, revision, and final draft of research paper, including works cited

- Weekly time log

- Completed product rubric

- Letter to judges indicating stretch commitment

- Mentor verification sheet

- Copy of thank you notes

- Letter of recommendation

- Portfolio assembly (with sheet protectors and "stretch artifacts")

- Classroom presentations

- Final presentations to judges

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[47] "The Capstone Project." Central High School. pp. 1-2.
   http://centralhigh.centralcss.org/files/4112/7317/6607/Capstone3.pdf
[48] "Senior Project Guide 2012-2013," Op. cit., p. 2.
[49] Ibid., p. 3.

Students complete the project as part of their senior English course. Students complete the research paper and the first portion of the portfolio during the first half of the year. In the spring semester, they complete the portfolio, the product, and present the project.[50]

MIDDLETOWN PUBLIC SCHOOLS, MIDDLETOWN, RI

Middletown High School is a suburban school of around 700 students in Middletown, Rhode Island.[51] The school requires that students complete a capstone project for graduation, a requirement that meets Rhode Island's Proficiency-Based Graduation Requirements. From the 2008-2009 school year, the capstone project was embedded within junior English classes. In 2011-2012 and 2012-2013, the capstone project involved both the junior and senior years. In the spring of 2013, the school **moved the capstone project to the senior year to meet Rhode Island's requirements for implementing the Common Core State Standards.**[52] The various timetables of this evolving implementation are shown below.

Figure 3.4: Evolution of Middletown High School Capstone Project Timelines

COMPONENT	2009-2010 DUE DATES	2011-2013 DUE DATES	2013-2014 DUE DATES	ASSESSMENT
Proposal form	Junior year, mid-Oct.	Junior year, late Feb.	Senior year, mid-Oct.	Pass/Revise/Fail Committee Approval
Research paper	Junior year, early-Jan.	Junior year, mid-May	Senior year, mid-Dec.	Test grade and Portfolio Task
Reflective Essay	-	-	Senior year, mid-Jan.	Test grade
Project Completion Date (includes lesson plans, agenda, fieldwork log, mentor evaluation and verification)	-	Senior year, summer and early fall	Senior year, late March	No grade
Reflective Essay on the Project	Junior year, early April	Senior year, late Nov.	Senior year, early April	Test grade and Portfolio Task
PowerPoint and Speech in class	-	Senior year, late Dec.	Senior year, mid-April	Test grade utilizing Capstone Presentation Rubric
All Components Complete	-	Senior year, mid-Jan.	Senior year, late April	No grade
Presentation	Junior Year, early May	Senior year, mid-year exam week	Senior year, early May	Pass/Fail: Graduation Requirement

Source: Middletown High School[53]

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[50] "The Capstone Project," Op. cit., pp. 1-2.
[51] "Search for Public Schools." National Center for Education Statistics.
   http://nces.ed.gov/ccd/schoolsearch/school_detail.asp?Search=1&InstName=middletown&SchoolType=1&School Type=2&SchoolType=3&SchoolType=4&SpecificSchlTypes=all&IncGrade=-1&LoGrade=-1&HiGrade=-1&SchoolPageNum=2&ID=440063000147
[52] "Middletown High School Capstone Project Manual 2013-2014." Middletown High School. p. 3.
   http://www.mpsri.net/uploaded/documents/central_office/asstsuper/gradrequirements/capstone/20132014/2013-2014_Capstone_Manual_FINAL.pdf
[53] [1] "Middletown High School: Capstone Project Manual." Middletown High School. p. 8.
   http://www.ri.net/middletown/mhs/graduation/capstone_manual.pdf

Students must choose between designing a product, service, or system; improving a system; or planning and organizing an event or activity. The Middletown Senior Capstone includes the following elements:[54]

- Proposal
- Research paper
- Project
- Reflective essay about the research process

- Reflective essay about the project
- Fieldwork log
- Mentor evaluation
- Powerpoint and speech
- Presentation

The capstone project is designed to teach skills in "complex problem solving, evaluation and synthesis of research, writing, communication, organization, time management, knowledge of technology and how to use it in a presentation, and oral presentation skills." The explicit applied learning standards that students must demonstrate include critical thinking, problem solving, research, communication, and reflection and evaluation.[55]

NASH-ROCKY MOUNT PUBLIC SCHOOLS, NASHVILLE, NC

Nash-Rocky Mount Public Schools (NRMPS), which has four high schools and around 17,500 students,[56] requires the completion of a Graduation Project in accordance with the North Carolina Graduation Project requirement. The district encourages students to begin thinking about projects during their freshman and sophomore years. The project begins in junior year English and is completed in the senior year.[57]

The Graduation Project, according to NRMPS, demonstrates that a student can not only pass his or her classes, but can also apply the knowledge acquired in high school to real-world situations. The district describes the project as an authentic learning experience and performance assessment, of which there are four components: **paper, product, portfolio, and presentation**.[58]

The paper is a 7-10 page informational or persuasive research paper on the topic of interest. The product can be tangible or intangible, and consist of actual products made by the student or volunteer or internship work. The portfolio compiles and showcases the

[2] "Middletown High School Capstone Project Manual 2012-2013." Middletown High School. p. 10. http://www.mpsri.net/uploaded/documents/central_office/asstsuper/gradrequirements/capstone/20122013/2012-2013_Capstone_Manual.pdf

[3] "Middletown High School Capstone Project Manual 2013-2014," Op. cit., p. 10.

[54] "Middletown High School Capstone Project Manual 2013-2014," Op. cit., p. 4.

[55] Ibid., p. 4.

[56] "Search for Public School Districts." National Center for Education Statistics. http://nces.ed.gov/ccd/districtsearch/district_detail.asp?Search=2&details=1&ID2=3703270&DistrictID=3703270

[57] "NRMPS Capstone Project." Nash-Rocky Mount Public Schools. January 2013. p. 5. http://www.nrms.k12.nc.us/content/File/students_graduation_project/ncgp_handbook_nrmps_20122013_final.pdf

[58] Ibid., pp. 3-5.

student's work as it progressed through the project and is submitted before the presentation of the Graduation Project. These components are graded based on the process and the final products, which are assessed as Exemplary, Proficient, Developing/Emerging, or Insufficient, in accordance with the Common Core standards and the North Carolina revised Essential Standards.[59]

Students work with their junior and senior year English teachers, who serve as academic advisors on the projects. At Nash Central High School, for instance, students begin the graduation project in January of their junior year. During the spring semester, students perform research and write their research paper. Students begin work on the product component in the spring of their senior year and complete and present the project by the end of the school year.[60] Figure 3.5 provides a complete schedule for the Graduation Project.

Figure 3.5: Nash Central High School Graduation Project Schedules

WEEK	ACTIVITY
ENGLISH III (JUNIOR) SCHEDULE—SPRING 2013	
Week 1 (January 22-25)	Introduction to Capstone
	Topic exploration
	Begin daily logs
Week 2 (January 28-February 1)	Review handbook
	MLA format practice
	Set up email & introduce to Google Drive
	Topic Exploration
	Topic Approval Applications—Due February 1
Week 3 (February 4-8)	Research
	Begin outlines/first drafts
	Topic Approvals returned on February 8
	Statement of Purpose (Portfolio)—share with teacher by February 8 (save to Google Drive)
Week 4 (February 11-15)	Research
	Outlining/drafting
	Conferences
Week 5 (February 19-22)	Research
	Outlining/drafting
	Conferences
	First draft due to teacher (Google Drive) by February 22
Week 6 (February 25-March 1)	Conferences on first drafts
	Research and revision
Week 7 (March 4-7)	Research and revision
	Second draft due to teacher (Google Drive) by March 7
Week 8 (March 11-15)	Research and revision
	Conferences on second drafts
Week 9 (March 18-22)	Research and revision

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[59] Ibid., pp. 3-6.
[60] "Graduation Project Schedules." Nash Central High School. http://nrms.schoolwires.net/Page/15361

WEEK	ACTIVITY
Week 10 (March 25-28)	Final revisions/conferences
	First Submission due by March 28
Week 11 (April 8-12)	Scoring Committee
Week 12 (April 15-19)	Scoring Committee
	First Submission scores returned to teachers on April 19
Week 13 (April 22-25)	Conferences on First Submission papers/rubrics
	Revisions
Week 14 (April 29-May 3)	Revisions
	Conferences
Week 15 (May 6-10)	Revisions
	Second Submissions due by May 10
Week 16 (May 13-17)	2nd round Scoring Committee
Week 17 (May 20-24)	2nd round Scoring Committee
	Grades returned to teacher on May 24
Week 18 (May 28-31)	Exams begin
	Third submissions (if necessary)
Week 19 (June 3-7)	Third Submissions—All should be posted by June 4
ENGLISH IV (SENIOR) SCHEDULE—SPRING 2013	
Week 1 (January 22-25)	Review Statements of Purpose and Approval forms from English III
	Make sure students can access/retrieve copies of NCGP Paper (should be saved in Google Drive)
	Practice writing Product Approval forms
	Begin daily logs (can save in Google Drive or print hard copies)
Week 2 (January 28-February 1)	Product Approvals due February 1
Week 3 (February 4-8)	Product Approvals returned February 8
Week 4-9 (February 11-March 22)	Students should be working independently on their products with continued guidance from their teacher.
Week 10 (March 25-28)	Start training students on presentations
Week 11 (April 8-12)	Continue training students on presentations
Week 12 (April 15-19)	Begin Mock Presentations
Week 13 (April 22-25)	Mock Presentations
	April 25—Portfolio due to teacher for grading
Week 14 (April 29-May 3)	Mock Presentations—last week to practice
Week 15-19 (May 6-June 7)	Presentations

Source: Nash Central High School[61]

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[61] Ibid.

COVENTRY PUBLIC SCHOOLS, COVENTRY, RI

Coventry High School, which serves around 1,750 students, requires students to complete a graduation portfolio and Capstone Project to satisfy its Graduation by Proficiency requirements. Coventry High School asserts in its *2011-2012 Graduation by Proficiency* guide that completing the school's graduation requirements "will be a challenging and rigorous journey but the reward for undertaking a meaningful high school experience is incalculable and will undoubtedly give students a powerful start in whatever post-secondary plans they may choose."[62]

The graduation portfolio "contains a summative reflection" of the knowledge acquired during high school. Students maintain a proficiency based portfolio of tasks throughout high school, and the graduation portfolio incorporates work from the proficiency based portfolio to demonstrate achievement of Coventry's learner expectations. Students must submit the graduation portfolio to the Graduation Portfolio Review Committee and receive approval from the Committee to qualify for graduation.[63]

The Capstone Project allows a student to demonstrate "his or her ability to analyze information, create new solutions, and implement his or her ideas" by addressing a "core question of his or her choice." The Capstone Project must demonstrate a student's competency in at least one specific content area and meet the following Applied Learning Standards:[64]

- Problem solving
- Using communication tools and techniques
- Using information tools and techniques
- Applying self-management

Students choose a core question from which to explore a topic. The core question should align with one of the three categories depicted in Figure 3.6 on the following page.

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[62] "Graduation by Proficiency: A Guide for Students, Parents, and Teachers." Coventry High School. p. 1.
  http://schools.coventryschools.net/hs/PDF/PBGR%20Handbook_mar_rev2012.pdf
[63] Ibid., p.3.
[64] Ibid., p. 4.

Figure 3.6: CHS Core Question Categories

INQUIRY	PROBLEM SOLVING	CAREER EXPLORATION
• Poses a question and explores in-depth implications that bring understanding to a social, political, scientific, moral/ethical, or artistic condition	• States a problem, researches its cause and effect, proposes a solution, implements it, and evaluates its effectiveness	• Selects a career and mentor to shadow and presents the career specifications

Source: Coventry High School [65]

The 2008 Coventry High School Portfolio and Capstone Student Handbook lists the following capstone project requirements:[66]

- Topic and core question

- Proposal

- Product

- Written components

- Panel presentation

The *2011-2012 Graduation by Proficiency* guide indicates that students must take the Capstone Class in grade 10 or 11. However, the *2008 Coventry High School Portfolio and Capstone Student Handbook* contains a Capstone Project timeline which details elements of the project for all four years of high school. Figure 3.7 below displays the general timeline in the *2008 Portfolio and Capstone Student Handbook*.

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[65] Ibid., p. 4.

[66] "Graduation by Proficiency: Coventry High School Portfolio and Capstone Handbook." Coventry High School. pp. 11-12. February 2008. http://faculty.coventryschools.net/MarsellaAnthony/docs/Student_Handbook-Final_Edit_03-12-08.pdf

Figure 3.7: Coventry High School General Timeline for the Capstone Project

YEAR	REQUIREMENTS
Freshman	▪ Students will master content knowledge, understand the Grade Span Expectations and become familiar with the Applied Learning Standards ▪ Students will develop skills, explore personal and career-related interests, and obtain clear expectations of the Capstone Project ▪ Students are strongly encouraged to explore potential Capstone topics as they become more familiar with the requirements and demands of the Capstone.
Sophomore	▪ Students must take a capstone class in their sophomore year or junior year ▪ Students are strongly encouraged to complete the Capstone project by the end of the course. ▪ As Capstone requirements are imbedded in Career and Technical Programs, students may complete their capstone projects as part of their program.
Junior	▪ The Capstone must be completed and presented to a panel of judges in the semester following the capstone course
Senior	▪ If revisions to the Capstone Project are needed, these must be completed by the end of the FIRST semester of the senior year. A second review by a panel of judges will occur to insure that the student has met graduation proficiency.

Source: Coventry High School[67]

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[67] Ibid., p. 13.

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