Quality Education Model

Final Report
October 2010

Quality Education Commission

Quality Education Model
Final Report

Revised October 2010*

The Quality Education Commission
255 Capitol Street NE
Salem, OR 97310
Office: 503-947-5679
Fax: 503-378-5156

*This report, first released in August 2010, was revised in October 2010 to reflect more recent data and forecasts of state revenue and education funding. The revisions are reflected in Exhibit 14 on page 29.

Quality Education Commission

Susan Massey, Chair
Retired Member and Chair, State Board of Education

Vic Backlund
Retired Oregon Legislator

Beth Gerot
President, Oregon School Boards Association
Eugene School Board

Lynn Lundquist
Crook County Commissioner
Retired Speaker of the House

Frank McNamara
Retired President/CEO, Willamette View Inc.
Retired Director, Confederation of Oregon School Administrators

Mark Mulvihill
Superintendent, Umatilla-Morrow ESD

Gail Rasmussen
President, Oregon Education Association

Maryalice Russell
Superintendent, McMinnville School District

Peter Tromba
Principal, Monroe Middle School

Duncan Wyse
President, Oregon Business Council
State Board of Education

Oregon Department of Education Staff

Brian Reeder
Oregon Department of Education Advisor to the Commission

Diane Rush
Oregon Department of Education Support to the Commission

Ashlee Davis
Oregon Department of Education Student Intern

Table of Contents

Topic

Exhibits

Appendices

Preface

What is a quality education for Oregon's students and how much does it cost? The Quality Education Model is the innovative tool that Oregon has created to answer that question. Its purpose is to depict the K-12 education system with sufficient detail and accuracy so that policymakers can better understand how schools allocate their resources, how various policy proposals affect funding needs, and how decisions about resources can be expected to impact student achievement. While the QEM does not perfectly capture every aspect of Oregon's education system—no model can do that—it does describe the system well enough to serve as a powerful tool to guide decision-making at the school, district, and state levels.

Oregon was one of the first states in the nation to craft a reliable school finance model using a "professional judgment" approach combining research, practical experience, and a set of assumptions about what comprises a quality education at the elementary, middle, and high school levels. These assumptions are captured in the three prototype schools (elementary, middle, and high) and the Quality Indicators around which the model is built. The prototypes demonstrate how schools of certain sizes and characteristics can be designed to implement best practices that have been shown in research and experience to improve student achievement. The Quality Education Model is both a framework and an interactive tool for analyzing the dynamic interplay between education policies intended to raise academic standards and achievement, instructional best practices carried out in local schools, funding resources, and student performance.

In line with its responsibility to refine and update the Quality Education Model, the Quality Education Commission focused its recent work on the elements of a high-quality math education, examining best practices which promote math achievement and equip students to fulfill the requirements of the Oregon Diploma. Adopted in 2007-08, the new graduation requirements established by the Oregon Diploma raise expectations for what students should learn and be able to do by the end of high school. Additional credit requirements, demonstration of proficiency in essential skills, and personalized learning requirements will be phased in over the course of several years, beginning with the graduating class of 2010. These new standards have significant implications for the entire school system, including how Oregon schools structure and deliver math education. To ensure that all students stay on track to meet the new graduation requirements, lessons can be learned from high-performing schools about aligning coursework and assessments, improving student achievement in the early grades, and utilizing other strategies for boosting student success.

This report summarizes the findings and recommendations of the panels established by the Commission, which examined how high-performing schools deliver and structure math education and estimated the costs of operating a system of schools that can accomplish Oregon's ambitious educational goals. This report also includes current information about school funding and student achievement in the state and discusses alternatives to full implementation of the Quality Education Model.

The Commission thanks all of the educators, school board members, parents, and community leaders across the state who contributed their time, expertise, and insights to this report. Additional information about the Commission, the Quality Education Model, best practices, and the Oregon Diploma is available on the Oregon Department of Education website at *www.ode.state.or.us*.

Executive Summary

The Quality Education Model (QEM) was initially developed in 1999 to establish an objective and research-based connection between the resources devoted to schools and levels of student achievement and to guide efforts to fund Oregon schools adequately. In 2001, the Legislative Assembly created the Quality Education Commission (QEC) to serve as a permanent body to regularly update and improve the original QEM. The Commission's work in 2010 is linked to the changes and challenges for K-12 schooling associated with the ongoing implementation of the Oregon Diploma. The Best Practices Panel examined successful math programs in Oregon schools, building on an Oregon Department of Education (ODE) analysis of math course-taking patterns in Oregon high schools. The Cost Panel updated the QEM with the most recent data, evaluated the cost implications of the Best Practices Panel recommendations, and estimated the costs of fully implementing the QEM.

Panel Recommendations

Best Practices: Given that mathematics skills and knowledge are increasingly in demand in higher education and the workplace, ensuring that students have sufficient math preparation by the time they leave high school is an important goal for Oregon schools. Based on the observations and interviews conducted in schools throughout the state, the Best Practices Panel recommends that the following components of successful math programs be reflected in the Quality Education Model:

1) Include time for new teacher induction programs and job-embedded professional development that is directly related to the curriculum and building goals. Investing in the development of teachers as effective instructional leaders promotes student success.
2) Provide adequate resources and staff so that schools can offer Algebra courses for high school credit in the 7th or 8th grade, with teachers who hold advanced math endorsements. There is evidence that introducing algebra concepts at this stage may foster higher levels of math achievement in high school.
3) Include adequate classroom spaces, smaller class sizes, early identification of struggling students, and additional instructional time with licensed math teachers.
4) Allocate time and resources for districts to develop frameworks for the articulation of math programs for 4th grade through high school. Such articulation will help schools to provide continuous instruction that builds skills and knowledge cohesively over time.

Course-Taking: As the phase-in of the Oregon Diploma continues (See Appendix B for the timeline and phase-in of new requirements), schools and districts must carefully consider how to best prepare students to meet high school graduation requirements. The ODE analysis of course-taking patterns in Oregon high schools helped the Commission to develop an understanding of how students can be kept on track to meet math graduation requirements throughout the grades. The following recommendations can be applied to other subject areas as well:

1) Develop a strategic focus on practices that build a solid academic foundation in the early grades. Excellent preparation in the early grades will equip students to achieve the standards established by the Oregon Diploma when they reach high school. If students are not at grade level when they reach high school, they will be unable to take full advantage of the rigorous coursework required to meet the new diploma requirements.
2) Align the timing of student course-taking with the timing of state assessments to avoid the problem that many Oregon students currently face: state assessments test them on content that they have not yet learned. The State Board of Education has already taken a critical first step by moving the high school assessments from the 10th to the 11th grade. This will give schools more time to fully prepare students for the state assessments, while still leaving sufficient time for students to earn all the credits required for graduation.

Costs: The Commission's Cost Panel updated the Quality Education Model to include the most current data (school finances, enrollment and other student information, and economic and price information) and for the first time incorporated information about the capital costs associated with providing and maintaining school buildings and facilities. The Cost Panel also carefully evaluated the recommendations of the Best Practices Panel to determine if additional resources were needed in the QEM in order to implement these recommendations. The Cost Panel concluded that the QEM already contains sufficient resources to implement the Best Practices Panel recommendations.

Exhibit 1 shows the Commission's estimates of state funding levels required to maintain the current service level in Oregon schools (the Baseline) and to fully fund a system of highly effective schools as recommended by the Quality Education Commission (the Fully Implemented Model).

Exhibit 1: QEM Funding Requirements

Millions of Dollars	2009-11	2011-13	2013-15
State Funding Requirement for the Baseline	$5,981.1	$6,710.9	$7,410.1
Percent Change from Prior Biennium		12.20%	10.42%
State Funding Requirement for Fully Implemented Model	$7,879.1	$8,747.7	$9,626.5
Percent Change from Prior Biennium		11.02%	10.04%
Funding Gap: Fully Implemented Model minus Baseline	$1,898.0	$2,036.8	$2,216.5
Percent Change from Prior Biennium		7.28%	8.82%

The Commission recognizes that under Oregon's current economic circumstances, state revenue is unlikely to be sufficient in the 2011-13 biennium to fund schools much, if at all, above the baseline level unless significant additional federal revenue is made available to the states. The Commission recommends, however, that the Governor and Legislature adopt a long-range funding plan that will move Oregon's schools toward the full QEM funding levels presented in this report.

Alternatives to Full Implementation of the Quality Education Model

Part of the Quality Education Commission's charge (ORS 327.506) is to present two alternatives to full implementation of the Quality Education Model. The following proposals represent ways to move Oregon's education system forward through partial implementation of high-leverage strategies that have the greatest positive impact on student achievement or through developing funding targets that gradually implement the QEM over several years. Undoubtedly, Oregon's current budget crisis limits what steps can reasonably be taken in the short-term, but the following proposals are viable options for making progress toward the long-term quality education goals.

Alternative 1: Based on the 2010 recommendations of the Best Practices Panel and the course-taking patterns analysis, identify and implement practices and programs that are most likely to prepare the largest proportion of Oregon students to achieve the state's academic goals and graduation standards.

Key examples of research-based strategies for boosting student achievement throughout the K-12 system include:

- Investing in focused professional development and teacher collaboration, new teacher induction programs, and pre-service training that emphasize methods and pedagogical content knowledge that increase teachers' instructional effectiveness.
- Developing strong district frameworks for the articulation of academic content throughout the grades and the alignment of coursework with state assessments.
- Providing targeted interventions (such as smaller classes, individualized instruction, and additional instruction with a licensed teacher) for students most at-risk of not meeting academic standards.
- Developing methods to promote high levels of academic performance in the early grades and sustaining those skills in the middle and upper grades.

Alternative 2: Establish a timeline for phasing-in all components of the Quality Education Model. The idea of gradual implementation, over five biennia, was first proposed in the 2006 QEM Report. Oregon's 2007 Legislature made some progress in closing the funding gap by appropriating funds above the level needed to simply continue current programs. The economic downturn that began in 2007, however, undid that progress and the Oregon education system will likely face a funding gap of more than $2.0 billion in the 2011-13 biennium. Despite this setback, the Commission recommends the Governor and Legislature adopt a long-term strategy for closing the funding gap by setting specific funding targets over a five biennia time frame.

In the current economic environment, even the long-term phase-in approach to funding described in Alternative 2 represents a tremendous challenge for Oregon. With the prospect of an extended period of slow state revenue growth, Oregon needs fundamental reform of the state's revenue system, budgeting processes, and service delivery in its three core functions: education, human services, and public safety. Without such changes, Oregon may find itself in an unsustainable situation even after the economy begins to recover.

Introduction

Mission and Purpose of the Oregon Quality Education Commission

The Oregon Legislative Assembly established the Quality Education Commission in statute in 2001. Under Oregon law (ORS 327.500 and ORS 327.506), the Commission's responsibilities are to:

1) Determine the amount of monies sufficient to ensure that the state system of kindergarten through grade 12 public education meets the quality goals established in statute.
2) Identify best practices based on education research, data, professional judgment, and public values, and the cost of implementing those best practices in K-12 schools.
3) Issue a report to the Governor and Legislative Assembly in even-numbered years that identifies:
    - Current practices in the state's system of K-12 public education
    - Costs of continuing those practices
    - Expected student performance under those practices
    - Best practices for meeting the quality goals
    - Costs of implementing the best practices
    - Expected student performance under the best practices
    - Two alternatives for meeting the quality goals

Oregon's History of High Education Goals

Even as academic standards have changed over time, Oregon's philosophy of setting high goals for its schools and students has been maintained. In the 1991 Oregon Education Act for the 21st Century, legislators outlined challenging goals for the state's K-12 system of education. They called for a world-class school system in which all students are challenged by rigorous academic content standards and have the opportunity to gain knowledge and skills to reach their full potential. The State Board of Education has developed standards—guidelines for what students should know and be able to do at the benchmark level in grades 3, 5, 8, and 10—to implement these legislative goals. The target adopted in 1999 as part of the Quality Education Model is that 90 percent or more of Oregon's students should meet all of the state's academic performance goals. Further, the state strives to meet the federal standards established in the No Child Left Behind Act of 2001 (NCLB), which mandates that all students meet state-defined academic benchmarks by 2014.

Oregon is also in the process of phasing-in the new standards established by the Oregon Diploma, which were adopted in 2007-08. The new diploma provides greater clarity about what students in public schools are expected to learn and be able to do by the end of high school and sets higher academic standards for students, beginning with the graduating class of 2010. By 2014, when all of the new requirements have been introduced, Oregon students will be required to complete more credits—in math, English/language arts, and science—demonstrate proficiency in nine essential skills, and meet personalized learning requirements in order to earn the Oregon Diploma.

As Oregon's student population grows, additional support and resources are needed to help all students meet these high academic standards and graduation requirements. Despite a slowing in the growth of total students, the number of special education students, English as a Second Language students, and students in poverty continues to rise. As illustrated in Exhibit 2, these groups of students are growing at faster rates than the general student

population. Further, Oregon's schools are becoming more diverse. In the 2009-10 school year, students from minority backgrounds accounted for 31.6 percent of statewide enrollment.

Exhibit 2: Student Growth Trends in Oregon School Districts

	Special Education		English as a Second Language		Students in Poverty		
	Number of Students	Share of Total	Number of Students	Share of Total	Number of Students	Share of Total	All Students (ADM*)
2000-01	67,768	13.0%	42,104	8.1%	78,452	15.0%	522,752
2001-02	69,201	13.1%	47,912	9.1%	78,964	14.9%	528,346
2002-03	70,204	13.2%	50,276	9.5%	79,024	14.9%	530,694
2003-04	69,149	13.1%	53,272	10.1%	82,376	15.6%	528,186
2004-05	69,816	13.2%	54,438	10.3%	82,212	15.6%	528,139
2005-06	70,196	13.2%	54,670	10.3%	82,440	15.5%	533,311
2006-07	70,591	13.2%	53,448	10.0%	82,456	15.5%	533,216
2007-08	70,736	13.2%	53,504	10.0%	83,548	15.6%	534,284
2008-09	71,530	13.4%	53,464	10.0%	83,244	15.6%	535,089
Average % Change	**0.7%**		**3.0%**		**0.7%**		**0.3%**
Forecast							
2009-10	72,178	13.5%	53,444	10.0%	83,480	15.6%	533,891
2010-11	72,399	13.6%	54,194	10.2%	82,248	15.4%	533,325
2011-12	72,879	13.6%	55,580	10.4%	82,640	15.5%	534,394
2012-13	73,363	13.7%	57,000	10.6%	83,032	15.5%	535,465

*Average Daily Membership

Previous Commission Recommendations

Since 2000, the Quality Education Commission's biennial reports have provided an objective analysis of instructional best practices, school funding, and Oregon's quality education goals. The reports' recommendations reflect findings about student performance, per-student spending, demographic trends and resulting resource needs, class size, curriculum, and PK-20 alignment. The 2008 report made the following recommendations:

- Phase-in implementation of the Oregon Diploma over several biennia.
- Continue to review best instructional practices in terms of the national research literature as well as practical lessons drawn from Oregon's schools.
- Invest in high-leverage strategies and allocate additional resources where they will have the greatest impact on student performance. Time and leadership are priority investment targets.
- Strengthen professional development to support teachers and build local school leadership capacity.
- Increase opportunities for teacher collaboration, review of student achievement data, and planning of targeted interventions and additional learning opportunities.

- Extend time available for quality instruction and extra student assistance through before/after-school and summer programs.
- Build school capacity to use classroom assessment data and adapt instruction to address student needs, especially those struggling to meet Oregon's standards.
- Strengthen communication and relationships with parents and other community partners.

The recommendations above continue to be worthy goals, even in a time of economic limitations. The Commission hopes that schools and districts continue to incorporate these recommendations in order to improve educational opportunities for all Oregon students.

THE WORK OF THE 2010 QUALITY EDUCATION COMMISSION PANELS

Oregon's Quality Education Model incorporates assumptions about school size, demographics, staffing, professional development, technology, supplies, and other factors in order to estimate the costs of a quality education. These assumptions are also used to predict the effects of supplying resources at different levels. In this way, the QEM is a powerful and straightforward tool that can be used to examine a variety of "what-if" policy questions and scenarios. For instance, what are the cost implications of raising or reducing class sizes, providing additional reading and math specialists, offering more professional development and collaboration time for teachers, or hiring more high school counselors? And how might student achievement outcomes change in such scenarios? The Quality Education Model allows policymakers to evaluate various policy scenarios in terms of their financial implications and compare them with the costs of providing the current level of services in Oregon schools.

Every two years the Quality Education Commission conducts an extensive, broad-based review process to examine and update the Quality Education Model. Prior reports have focused on the K-12 system's progress toward the goal of 90 percent of Oregon students meeting the state's academic performance benchmarks. In 2006, the Commission carefully examined the relationship between school funding and student achievement. The introduction of the Oregon Diploma oriented the 2008 report around the practices, resources, accountability, and systems improvement associated with implementing the new graduation standards.

As an extension of the work completed in 2008, this year's Commission chose to examine the challenges for math education presented by the new Oregon Diploma requirements. In order to answer questions about how to provide a high-quality math education and keep students on track to earning their diplomas, the Commission called on the Best Practices and Cost Panels to perform research, make recommendations, determine what resources are needed, and estimate the costs of those resources. Panel members included teachers, principals, superintendents, community members, school board members, and other experts and stakeholders representing higher education, business/industry, government, and professional associations.

The Best Practices Panel members conducted interviews with principals and teachers at 12 high schools around the state and received responses to web questionnaires from an additional 15 schools as they distinguished between the practices and characteristics of schools that exhibited high and low performance on the 10th grade math assessment. The Cost Panel updated the Quality Education Model with the most recent data available and gathered information about construction and lifetime maintenance costs for Oregon school facilities in order to develop a capital cost model. Detailed information about the work of the panels, their findings, and recommendations can be found in the Best Practices and Cost Panel sections of this document. But first, a description of the prototype schools—which possess the indicators, characteristics, and resources assumed in the Quality Education Model to represent a quality education for Oregon students—is provided in the following section.

The Prototype Schools

In the Quality Education Model, the school serves as the unit of analysis. In order to determine the impact of statewide increases or decreases in funding, it is necessary to understand the effects on an individual school's operations and student academic performance. As such, the Quality Education Model is structured around a prototype elementary, middle, and high school, each designed to help students meet Oregon's high academic standards and performance goals. Each prototype school reflects best practices and research associated with effective and high-performing schools and serves as a mechanism by which to evaluate the resource and cost implications of proposed education programs, policies, and strategies. While the prototype schools are not intended to be prescriptive, they can assist educators, policymakers, and citizens in understanding and making informed decisions about school resources and funding.

Quality Indicators

Schools
- Leadership that facilitates student learning
- Parental/community involvement
- Organizational adaptability
- Safe and orderly learning environment
- District policies to support learning

Teachers
- Teacher and teaching quality
- Professional development program
- Teacher efficacy

Classrooms
- Effective instructional programs and methods
- School database collection and analysis to improve instructional programs

Students
- Readiness to learn
- Connectedness to school and engagement in academics and extra-curricular programs

Quality Indicators are non-fiscal traits that indicate organizational functioning and efficiency, which the prototype schools are assumed to possess. These twelve indicators are based on research about effective schools and serve as measures of whether a school employs effective practices and uses resources efficiently. The Quality Indicators fall into four broad categories: school-level, teacher-related, classroom-focused, and student-centered factors.

Best Practices are strategies and programs that have been demonstrated in research and experience to be effective in promoting high levels of student achievement. The prototypes demonstrate how schools of certain sizes and characteristics can be designed to implement the best practices. The Quality Education Commission identified the following essential characteristics that support best practices:

- Each student has a personalized education program.
- Instructional programs and opportunities are focused on individual student achievement of high quality standards.
- Curriculum and instructional activities are relevant to students' lives.
- Each student has access to a rich and varied elective co-curricular and extra-curricular program.
- The school creates small learning environments that foster student connection.
- The school provides and encourages connections with significant adults, including parents, mentors, and other advisors to ensure that each student develops a connection to the greater community, along with a strong sense of self.

- The school makes data-informed decisions about the capability of programs to foster individual student achievement.
- The school at upper grade levels uses community-based and worksite learning as integral components of its instructional program.
- The school has a comprehensive staff induction program that guides recruitment and employment and provides ongoing professional development programs.
- Cost-effective management of resources allows school districts to better meet the needs of the greatest number of students.

The **Individual Prototype Schools** incorporate what research and best practices have shown to be most important in improving student achievement and provide a level of resources that adequately promotes and sustains that goal. Each prototype school includes:

- Adequate staffing
- Added instructional time and activities for students having trouble meeting standards
- Curriculum development and technology support
- On-site instructional improvement
- Professional development for teachers and administrators
- Collaboration time for teachers
- Adequate classroom supplies
- Adequate funds for building maintenance

Prototype Schools

Elementary School—340 Students

- All-day kindergarten
- Class size average of 20 in primary grades
- Class size of 24 in grades 4-5
- 4.5 FTE for specialists in areas such as art, music, PE, reading, math, TAG, library, ESL, child development/counselor

Middle School—500 Students

- Class size average of 22
- 1.5 additional teachers for math, English, and science
- Alternative programs for special needs and at-risk students
- Volunteer coordinator and community outreach worker
- One counselor for every 250 students
- Adequate campus security

High School—1,000 Students

- Class size average of 21
- 3.0 additional teachers for math, English, and science
- Alternative programs for special needs and at-risk students
- Volunteer coordinator and community outreach worker
- One counselor for every 250 students
- Adequate campus security
- School-to-work coordinator

Prototype Resource Assumptions are incorporated into each prototype school in the Quality Education Model. The basic assumptions include:

- The size of each school is within a range that research literature recognizes as efficient.
- The assumed level of teacher experience is about average for schools in Oregon.
- Each school has Internet access.
- Teachers are using technology in the design and delivery of instruction.
- The schools are located in close proximity to an urbanized area.
- The schools are slightly below the state median in socioeconomic status (40^{th} percentile).
- The schools have approximately 13 percent of their students identified for special education.
- Eleven percent of the students are recognized as speaking English as a second language.
- The principal is knowledgeable about reform requirements and is supportive of the reform goals.
- The principal is skilled as a leader and a manager.
- Teachers are open to reform goals and the training necessary to support the reform requirements.
- Teachers possess content knowledge necessary to teach to applicable state standards.

CHANGES IN THE QUALITY EDUCATION MODEL 2010

The following exhibits depict the Commission's 2010 prototype elementary, middle, and high school. They illustrate characteristics of the Baseline Prototypes and the changes that would occur under full funding of the Quality Education Model. The changes that have been incorporated are those recommended by the Commission's Best Practices and Cost Panels.

The Baseline Prototypes represented in Exhibits 3-5 show the characteristics of schools under current funding levels, based on actual spending patterns in Oregon schools. The Fully-Funded Prototypes show the Commission's recommended level of funding required to implement a comprehensive Quality Education Model, including all relevant resources and education programs. The Baseline and Fully-Funded Prototypes illustrate the differences between current education practices and funding in Oregon schools and those needed to achieve the state's goals for education.

Exhibit 3: Prototype Elementary School–340 Students

	Baseline Prototype	Fully-Funded Prototype	Difference
Kindergarten	Half-day	**Full-day**	**Doubles learning time**
Average class size	23 for grades K-3 25 for grades 4-5	**20 for grades K-3** **24 for grades 4-5**	**Cuts class size by 3 for grades K-3 and by 1 for grades 4-5**
K-5 classroom teachers	13.7 FTE	**16.0 FTE**	**Adds 2.3 FTE**
Specialists for areas such as art, music, PE, reading, math, TAG, library/media, second language, or child development	3.5 FTE	**5.0 FTE**	**Adds 1.5 FTE**
Special education licensed staff	2.5 FTE	**3.0 FTE**	**Adds 0.5 FTE**
English as a second language licensed staff	0.5 FTE	**1.0 FTE**	**Adds 0.5 FTE**
Licensed substitute teachers	$93 per student	$93 per student	
On-site instructional improvement staff	None	**0.5 FTE**	**Adds 0.5 FTE**
Instructional support staff	5.0 FTE	**6.0 FTE**	**Adds 1.0 FTE**
Additional instruction time for students not meeting standards: 20% of students	Limited	**Summer school, after-school programs, Saturday school, tutoring, etc.**	**Additional programs for 20% of students**
Professional development time for teachers	3 days	**Equivalent of 7 days**	**Equivalent of 4 additional days**
Dedicated Teacher Collaboration Time	Limited	**2 hours per week**	**Additional 2 hours per week**
Leadership development training for administrators	Limited	**Equivalent of 4 days**	**4 additional days**
Students per computer	6	6	
Textbooks	$64 per student	**$95 per student**	**$31 per student**
Classroom materials & equipment	$76 per student	$85 per student	**$9 per student**
Other supplies	$91 per student	**$99 per student**	**$8 per student**
Operations and maintenance	$754 per student	$779 per student	**$25 per student**
Student transportation	$418 per student	$418 per student	
State-level special education fund	$32 per student	**$85 per student**	**$53 per student**
Centralized special education services	$101 per student	$101 per student	
Technology services	$185 per student	**$195 per student**	**$10 per student**
Other centralized support	$345 per student	**$360 per student**	**$15 per student**
District administrative support	$295 per student	$295 per student	
Education Service District Services	$725 per student	$725 per student	
Total Expenditure per Student in 2008-09	**$9,744**	**$11,712**	**$1,968**
Percent of students meeting standards in 2008-09			
Reading	3rd grade=83% 5th grade = 76%	n/a	
Math	3rd grade=77% 5th grade = 77%	n/a	
Percent of students expected to meet standards by 2013-14			
Reading	3rd grade=87% 5th grade = 83%	3rd grade=91% 5th grade = 87%	
Math	3rd grade=84% 5th grade = 82%	3rd grade=88% 5th grade = 86%	

Exhibit 4: Prototype Middle School–500 Students

	Baseline Prototype	Fully-Funded Prototype	Difference
Class size in core subjects of math, English, science, social studies, second language	23	**22, with maximum class size of 29 in core academic subjects**	**Cuts average class size by 1 in core subjects**
Staffing in core subjects	20.0 FTE	**21.0 FTE**	**Adds 1.0 FTE**
Extra teachers in math, English, and science	0.5 FTE	**1.5 FTE**	**Adds 1.0 FTE**
English as a second language licensed staff	0.5 FTE	**0.75 FTE**	**Adds 0.25 FTE**
Special education and alternative education licensed staff	4.0 FTE	**4.5 FTE**	**Adds 0.5 FTE**
Media/Librarian	1.0 FTE	1.0 FTE	
Counselors	One for every 333 students	**One for every 250 students**	**Adds 0.5 FTE**
Licensed substitute teachers	$93 per student	$93 per student	
On-site instructional improvement staff	None	**1.0 FTE**	**Adds 1.0 FTE**
Instructional support staff	10.0 FTE	10.0 FTE	
Additional instruction time for students not meeting standards: 20% of students	Limited	**Summer school, after-school programs, Saturday school, tutoring, etc.**	**Additional programs for 20% of students**
Professional development time for teachers	3 days	**Equivalent of 7 days**	**Equivalent of 4 additional days**
Dedicated Teacher Collaboration Time	Limited	**2 hours per week**	**Additional 2 hours per week**
Leadership training for administrators	Limited	**Equivalent of 4 days of training**	**4 additional days**
Students per computer	6	6	
Textbooks	$51 per student	**$95 per student**	**$44 per student**
Classroom materials & equipment	$72 per student	$90 per student	**$18 per student**
Other supplies	$83 per student	**$94 per student**	**$11 per student**
Operations and maintenance	$804 per student	$831 per student	**$27 per student**
Student transportation	$420 per student	$420 per student	
Centralized special education services	$101 per student	$101 per student	
State-level special education fund	$32 per student	**$85 per student**	**$53 per student**
Technology Services	$185 per student	**$195 per student**	**$10 per student**
Other centralized support	$333 per student	**$348 per student**	**$15 per student**
District administrative support	$295 per student	$295 per student	
Education Service District services	$725 per student	$725 per student	
Total Expenditure per Student in 2008-09	**$9,971**	**$11,272**	**$1,301**
Percent of students meeting standards in 2008-09			
Reading	70%	n/a	
Math	71%	n/a	
Percent of students expected to meet standards by 2013-14			
Reading	76%	**81%**	
Math	76%	**81%**	

Exhibit 5: Prototype High School–1,000 Students

	Baseline Prototype	Fully-Funded Prototype	Difference
Class size in core subjects of math, English, science, social studies, second language	23	**21, with maximum class size of 29 in core academic subjects**	**Cuts average class size by 2 in core subjects**
Staffing in core subjects	42.0 FTE	**44.0 FTE**	**Adds 2.0 FTE**
Extra teachers in math, English, and science	1.0 FTE	**3.0 FTE**	**Adds 2.0 FTE**
English as a second language licensed staff	0.5 FTE	0.5 FTE	
Special Education and alternative education licensed staff	5.0 FTE	**5.25 FTE**	**Adds 0.25 FTE**
Alternative education and special programs	2.5 FTE	2.5 FTE	
Media/Librarian	1.0 FTE	1.0 FTE	
Counselors	One for every 333 students	**One for every 250 students**	**Adds 1.0 FTE**
Licensed substitute teachers	$93 per student	$93 per student	
On-site instructional improvement staff	None	**1.0 FTE**	**Adds 1.0 FTE**
Instructional support staff	20.0 FTE	**20.5 FTE**	**Adds 0.5 FTE**
Additional instruction time for students not meeting standards: 20% of students	Limited	**Summer school, after-school programs, Saturday school, tutoring, etc.**	**Additional programs for 20% of students**
Professional development time for teachers	3 days	**Equivalent of 7 days**	**Equivalent of 4 additional days**
Dedicated Teacher Collaboration Time	Limited	**2 hours per week**	**Additional 2 hours per week**
Leadership training for administrators	Limited	**Equivalent of 4 days**	**4 additional days**
Students per computer	6	6	
Textbooks	$56 per student	**$124 per student**	**$68 per student**
Classroom supplies and materials	$110 per student	$124 per student	**$14 per student**
Other supplies	$110 per student	**$126 per student**	**$16 per student**
Operations and maintenance	$863 per student	$891 per student	**$28 per student**
Student transportation	$435 per student	$435 per student	
Centralized special education services	$101 per student	$101 per student	
State-level special education fund	$32 per student	**$85 per student**	**$53 per student**
Technology Services	$178 per student	**$195 per student**	**$17 per student**
Other centralized support	$331 per student	**$363 per student**	**$32 per student**
District administrative support	$295 per student	$295 per student	
Education Service District services	$725 per student	$725 per student	
Total Expenditure per Student in 2008-09	**$10,103**	**$11,384**	**$1,281**
Percent of students meeting standards in 2008-09			
Reading	66%	n/a	
Math	54%	n/a	
Percent of students expected to meet standards by 2013-14			
Reading	74%	**79%**	
Math	61%	**67%**	

Best Practices Panel Report

In the past decade, the Quality Education Commission has taken a number of approaches to updating the Quality Education Model and the Prototype Schools to include current best practices in teaching and learning. It has looked at national and international research. It has looked at research-based best practices in Oregon-developed data. It has used focus groups of Oregon teachers, principals, and superintendents. In each approach, observations were refined to include as best practices in the Quality Education Model. This year the Commission determined it would study math performance in the 10th grade. Specifically, the Commission charged the Best Practices Panel to "look at the relationship between course-taking patterns in high school and performance on state assessments."

The Best Practices Panel based its work on an analysis of high school course-taking patterns by the Oregon Department of Education. Given that performance on the 10th grade math assessment has consistently lagged behind math performance in other grades, the ODE was interested in the factors that might influence 10th grade math achievement. The results of the analysis suggested that improving the quality of preparation in the early grades and aligning the math curriculum with the timing of state assessments will yield more accurate estimates of student achievement and also increase the percentage of students meeting state standards. A full discussion of the analysis and its implications is included below.

Math Course-Taking Patterns of High School Students

In 2008-09, just 54 percent of Oregon high school students passed the state's 10th grade mathematics assessment. While that represents a dramatic improvement over the 33 percent passing 15 years earlier, it also represents a disappointing level of achievement in a world where knowledge and skills in mathematics are increasingly in demand. Clearly, if Oregon's high school graduates are to succeed in higher education and the workplace, a larger number need to be better prepared in mathematics by the time they leave high school.

One explanation offered for the disappointing performance on the state's 10th grade math assessment is that it tests students on subject matter that they have not yet studied. For example, if the 10th grade math assessment tests students on geometry (it does), but students have not yet taken a Geometry class (many haven't), then it is unlikely that students will do well on the assessment.

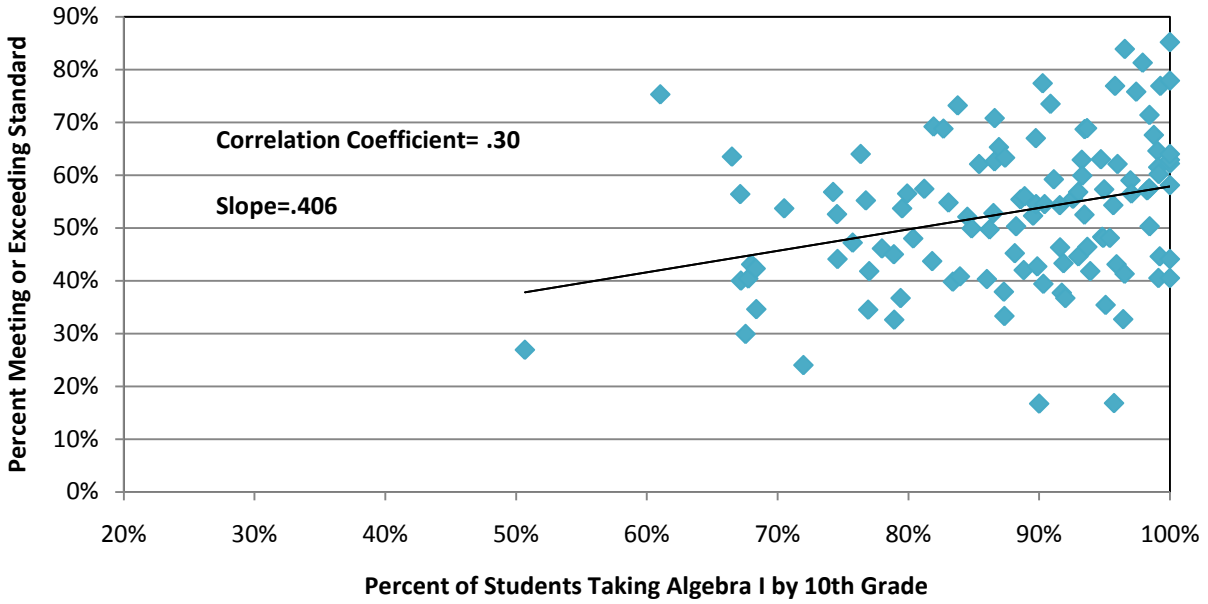
An alternative explanation is that many students are coming out of middle school with inadequate preparation in mathematics so that, even if they have studied the appropriate subject matter prior to taking the 10th grade assessment, they do poorly because they were not adequately prepared to fully benefit from the higher-level coursework.

It is important for policymakers to understand which of these explanations is more accurate because they call for different policy prescriptions. If students are well-prepared but have not yet been exposed to the material on which they are tested, then delaying the assessment until a later grade is an appropriate policy prescription. If, on the other hand, students are not adequately prepared prior to entering high school and do poorly on the assessment even after having the appropriate coursework, then better preparation in elementary and middle school is called for.

To better understand which explanation may be more accurate, the Commission analyzed the math course-taking patterns of Oregon high school students. The goal was to see if schools with more students taking higher-level math by the 10th grade also had more students passing the 10th grade assessment. The results clearly show that to be the case. In particular, high percentages of students having had Geometry or above by the 10th grade was strongly associated with higher percentages of students passing the state assessments.

As Exhibit 6 illustrates, a relatively weak association (correlation of 0.30) exists between the percentage of students taking Algebra I by 10th grade and the proportion of students passing the 10th grade math assessment. The graph shows that a large share of students in many Oregon high schools have taken Algebra I by 10th grade, but the percentage of those students who meet or exceed the 10th grade standard on the state assessment varies a great deal from school to school. This indicates that whether students have taken Algebra I does not greatly influence performance on the math assessment. In other words, having Algebra I is not sufficient to prepare students for the state math assessment.

Exhibit 6: Algebra I by 10th Grade



A stronger association (correlation of .46) exists between the share of students taking Algebra II by 10th grade and the percentage who pass the 10th grade assessment, as shown in Exhibit 7. Although these data indicate that having more students taking this course by 10th grade will generally result in more students passing the high school math assessment, the graph also shows that in most Oregon schools a relatively small percentage of students take Algebra II by the 10th grade. If this is an indication of the proportion of students who are actually prepared to study Algebra II by this time, then rushing students who are not prepared to take this course will not greatly improve results on the state assessment.

Exhibit 7: Algebra II by 10th Grade

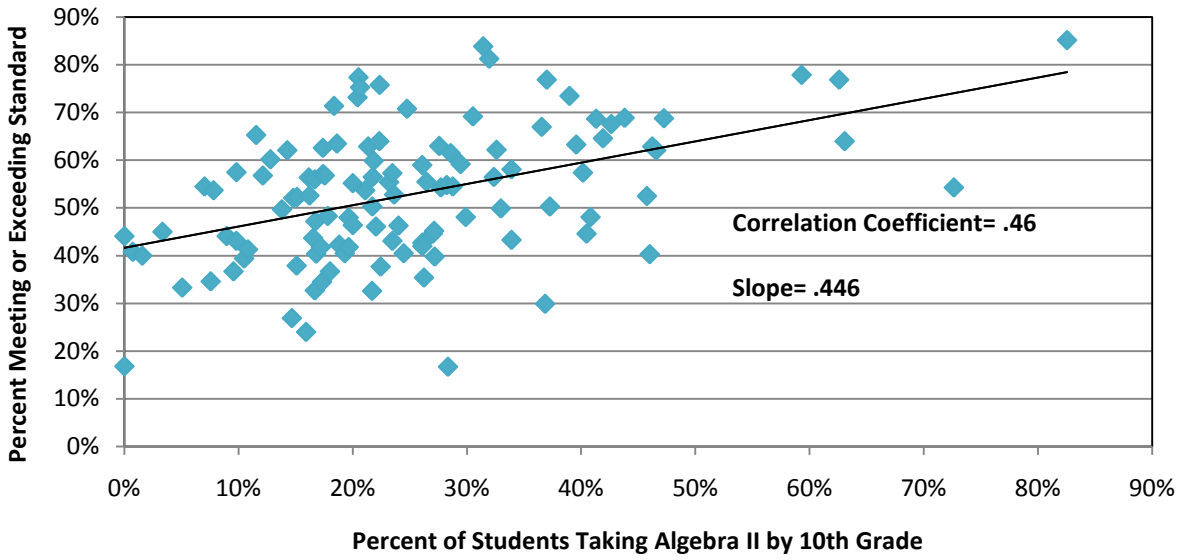
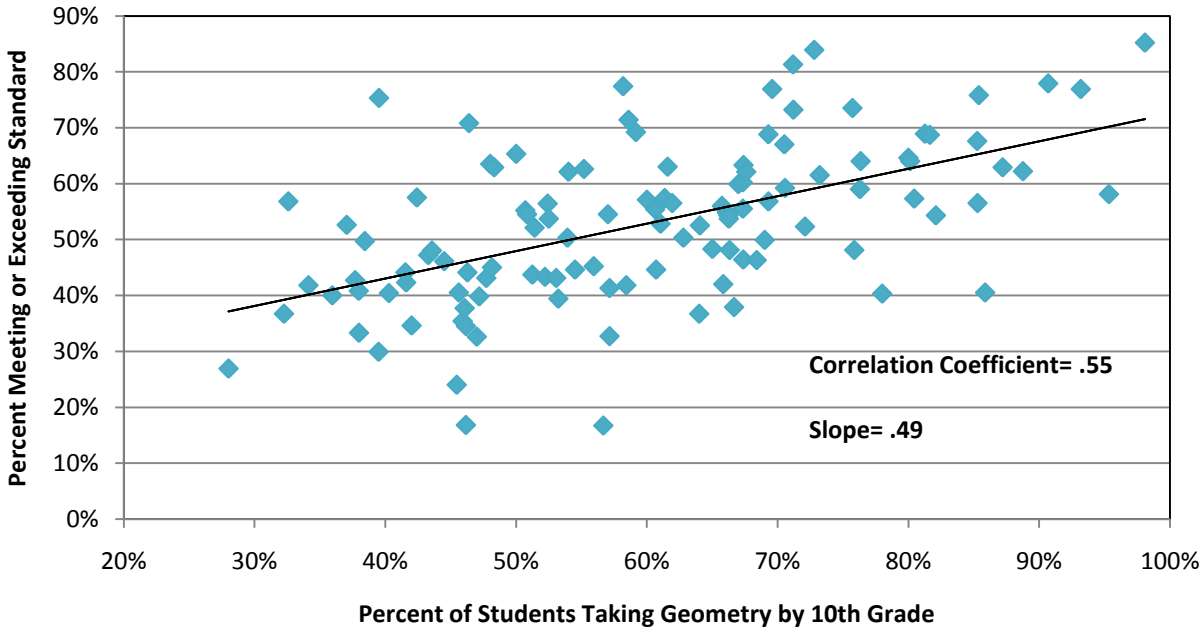


Exhibit 8 shows that the strongest association (correlation of .55) exists between the percentage of students taking Geometry by 10th grade and the proportion passing the assessment. This indicates that whether students have been introduced to geometry concepts by the time they take the 10th grade math assessment has a greater influence on their performance on that test.

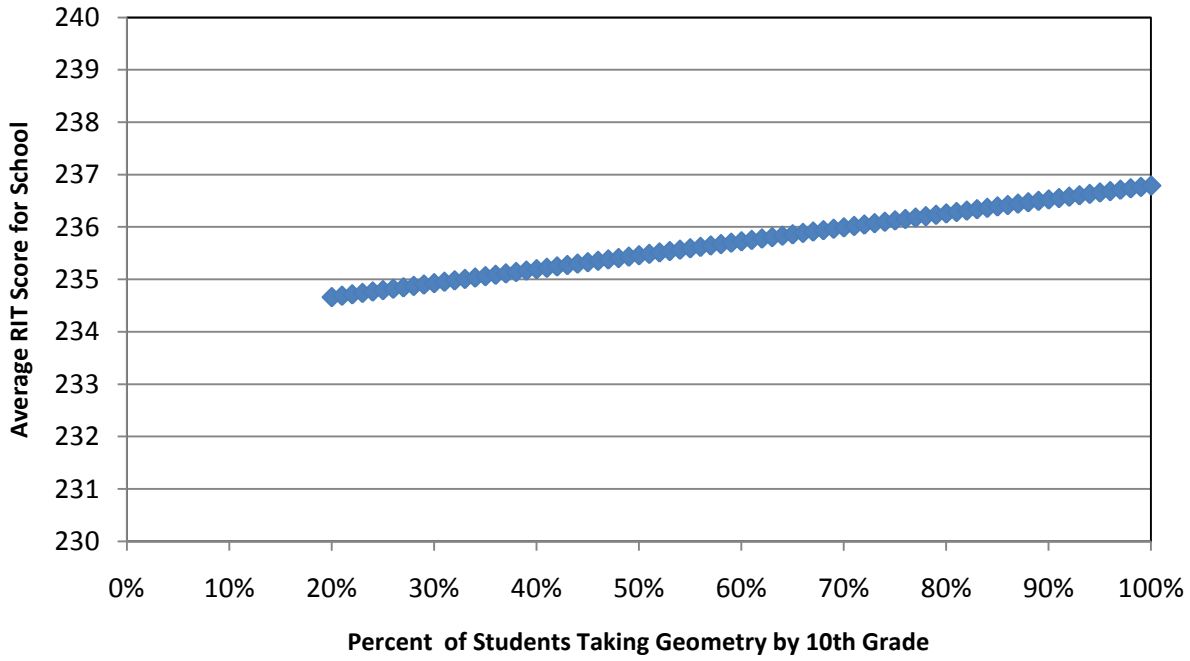
Exhibit 8: Geometry by 10th Grade



While informative, this analysis doesn't by itself fully answer our question: is poor performance on the 10th grade math assessment due primarily to lack of adequate preparation in earlier grades, or is it due primarily to lack of exposure to the needed coursework? It's conceivable that students who had Geometry or above by the 10th grade did better on the state math assessment not so much because they already studied geometry concepts, but because they were better math students in general—that is, because they were better prepared in the earlier grades and were simply "better at math." To better answer the question, it was necessary to look simultaneously at both course-taking patterns and how well students had been prepared in earlier grades (as measured by their 8th grade math assessment scores). By looking at both factors at the same time, it was possible to separate the two effects to determine the degree to which each influences 10th grade math assessment scores. This approach, using a statistical technique called multiple regression analysis, allows us to control some factors (i.e., hold them constant) in order to evaluate the impact of a change in a single factor of interest, which in this case was the level of math courses taken prior to administration of the 10th grade math assessment.

Exhibit 9 illustrates that even when controlling for students' prior preparation (measured by performance on the 8th grade math assessment) as well as demographic factors, the percentage of students taking Geometry by 10th grade in a given school influences performance on the 10th grade math test. As the proportion of a school's 10th graders taking Geometry increases, so does that school's average score on the math test.

EXHIBIT 9: EXPECTED PERFORMANCE ON 10TH GRADE MATH ASSESSMENT, BY PERCENT OF STUDENTS TAKING GEOMETRY



The results of this more complex analysis indicate that even after controlling for how well students are prepared in earlier grades, being exposed to higher-level math courses in high school results in better performance on the state math assessment. It also indicates, however, that higher-level coursework alone—without a solid foundation in earlier grades—has a much smaller payoff in terms of improved achievement. Given the strong association between good preparation in earlier grades and achievement in high school, the finding of the importance of coordination

between high school coursework and the timing of the assessment suggests some basic principles for guiding policy:

- Solid preparation in elementary and middle school math is essential if students are to benefit fully from the higher-level math they will encounter in high school.
- Rushing students through the math curriculum so that they have taken geometry and higher-level algebra by the 10th grade (when the assessment is given) is an ineffective strategy.
- Assessing students on subject matter they have not yet been taught is unfair (and discouraging) to students and is also a waste of school resources (in the form of lost instruction time) and state assessment system resources.

These principles suggest two policy prescriptions that should improve student achievement and will also make the results of Oregon's assessment system more representative of students' true level of knowledge and skills.

1. It is important that Oregon schools carefully coordinate the timing of coursework and the state assessment so they are consistent with each other and so they are also aligned with the requirements of Oregon's new high school diploma. Currently, the subject matter tested in Oregon's 10th grade math assessment appears to create an incentive for schools to rush students into higher-level math courses earlier than necessary given the state's math graduation requirements and earlier than is appropriate for some students. The State Board of Education has already moved Oregon's high school math assessment from the 10th grade to the 11th. That is an extremely important first step, as it will give students more time to take the needed coursework while still providing sufficient time to meet graduation requirements by the end of 12th grade.

2. Oregon schools should have a clear focus on improving early grade math achievement so that students are better prepared when they reach high school. Without solid preparation in the earlier grades, students will not be in a position to fully benefit from the more rigorous courses that they will encounter in high school, will be less likely to pass the state assessment, and will face a bigger challenge in meeting Oregon's new graduation requirements.

Best Practices Panel Approach

To expand on the findings of the ODE course-taking analysis, the Best Practices Panel studied high school math programs around the state more closely in order to identify characteristics and practices that promote high levels of student achievement. First, using the extended statistical analysis described above, a "predicted" rate of performance on the 10th grade assessment was calculated for the high schools. This predicted rate was compared to the actual rate of performance to establish which schools had a positive (higher performance than predicted) or negative (lower performance than predicted) difference between actual and predicted rates of students meeting or exceeding the 10th grade math assessment standard.

Then the Best Practices Panel paired schools with positive and negative differences and selected seven pairs for interview. An interview schedule was devised to allow Panel members to solicit analogous data from the selected schools, and 12 schools (85 percent) were available for interview on mutually acceptable dates. Fifty-two schools (those with a positive 10 percent or better and a negative 10 percent or worse) were asked to complete a web-based questionnaire. Ten days after sending the invitation to take the survey, a reminder was sent out to those that had not yet taken it, and seven days after that another reminder was sent. In the end, 15 of the 52 schools (29 percent) completed the survey. The interview questions used by the Best Practices Panel can be found in Appendix C.

Complications: The sample of 27 high schools (out of 279 in Oregon) that the panel interviewed and surveyed was too small to confidently make any definitive judgments. Nonetheless, the input from this set of schools has been

distilled in this report. Further, the original data for each school used in the analysis were from the 2007-08 school year, but when the interviews were held in late March and early April of the 2009-10 school year, schools had received results from their 2008-09 assessments and were well into their 2009-10 assessments. So, the panel updated the data as interviews began and found that a number of schools had improved in their results. Still, the schools' "difference" percentages remained about the same.

It became clear that schools are dynamic institutions. Even stable school situations tend to change year to year in small, but sometimes significant, ways. Small schools, in which there are only one or two math teachers, are subject to momentous change if even one teacher leaves due to illness or retirement. In larger schools, with eight to fourteen math teachers, such changes do not have the same impact. However, in any school where the administrative leadership changed, the impact on goals, stated objectives, and priorities tended to be noticeable.

Findings on Best Practices

Continuity of instruction, staff, and relationships matter. Changes in teaching staff and building administration have immediate effects on student outcomes. Schools that utilize some version of looping (continuing a cohort of students through several courses), and maintain the same teacher or teacher team with a cohort of students, either through looping or bookending (the same teacher has a cohort of students in an early level math subject and again for a higher level math subject) were more likely to have higher student achievement and improved assessment results. Research suggests that such practices can raise student achievement for a variety of reasons. As a result of spending more than one school year in the classroom together, teachers get to know students' academic strengths and weaknesses better and can tailor instruction to students' unique needs. Additionally, instructional time is gained because an orientation and transition period is not necessary when students and teachers begin their second year together.

One advantage of small schools is that they have positive effects on relationships and seem to correlate to better student performance. Teachers and students know each other well and have multiple opportunities to interact. Small schools are also more likely to promote personalized programs and tailored math skill component inclusions. Whether a school is small or large, the Best Practices Panel observed that schools whose staff members have knowledge of their subject areas, positive relationships with students, collaborative interactions with colleagues, and supportive administration and policies demonstrate the strongest continuing improvement programs.

Some evidence suggests that providing Algebra I concepts *for credit* in the 8th grade improves outcomes in the 10th grade assessments. This finding relates directly to the panel's charge concerning test outcomes and the course-taking sequence. A higher percentage of the high-performing schools (57 percent vs. 37 percent) offer Algebra for high school credit in 7th and/or 8th grade. Additionally, as mentioned in the ODE analysis, high 8th grade math scores were correlated with high performance on the 10th grade test. This supports feedback the panel received from high school principals and math teachers suggesting that a deeper exposure to math and grounding in math basic skills in early grades are prerequisites to success in high school math.

It is important that the for-credit 8th grade Algebra class be equivalent to a high school Algebra course in its rigor and requirements for passing. The Best Practices Panel also believes that it is important that such a course be taught by a teacher with an advanced math endorsement. Certainly, some teachers with basic math endorsements who can relate to students and effectively teach concepts might have high levels of success in the classroom, and teachers with higher level math endorsements who cannot connect with students might not. But, the panel believes that higher level math endorsements are most likely to support the best practices.

A strong district framework for math and articulation through the grades is important. Because basic skills are important building blocks for higher math skills, the panel feels that articulation down to the 4th grade is a precursor

to good performance in high school. Such articulation requires an elevated level of trust between grade levels, excellent communication, and a shared strategy among the teachers from 4th grade through high school. Time is needed for teams of teachers to meet and discuss their approaches.

The Best Practices Panel's work also suggested that differences in course-taking structure in the high school setting might impact student achievement. All of the high-performing schools interviewed used an Algebra I/ Geometry/Algebra II/Pre-Calculus sequence, while 75 percent of the low-performing schools used that sequence. Having students take Geometry by 10th grade seems to have a positive effect on the proportion of students meeting or exceeding 10th grade assessment benchmarks. In high and low-performing schools, there were a myriad of math course offerings at varying levels of difficulty and challenge. It does appear that schools which offered more opportunities were generally more successful.

A foreseeable problem with the three-credit math requirement in high school is the "lay off" that can occur in the upper grades. That is, in the best circumstance a student passes Algebra I for credit in the 8th grade, passes Geometry and Algebra II in 9th and 10th grade, has achieved the three required math credits and takes no more math in 11th or 12th grade. If that student goes on to a post-secondary program, they will not have had any math practice or exposure for two full years upon entering the next level of education. The panel believes that it may be important for students to continue with math throughout high school and is pleased that the State Board of Education increased the number of required high school math credits from two to three.

Class size appears to have some positive results for performance. High-performing schools had lower maximum class sizes than low-performing schools in Algebra (25 vs. 40) and slightly lower average sizes (22.6 vs. 25.1). These differences were not as great for Geometry (maximum class sizes of 27 vs. 35 and average class sizes of 21.6 vs. 25.5), although it is still probably significant. Although research varies about how small a class must be for students to benefit most, smaller class sizes are generally perceived to increase student learning because they allow teachers to spend more time working one-on-one with students. The advantages of individual academic attention may be particularly important for students who need remedial help, students living in poverty, and students of minority racial and ethnic backgrounds.

It is also noted by the panel that another type of size matters: the physical size of a classroom. A classroom needs to be large enough to accommodate appropriate furnishings and technology that can be used in presenting material—projectors, document cameras, response units, and computers. Effectiveness is considerably limited when classes are housed on stages, in large closets, and in hallways. When "value engineering" is done for new and refurbished schools, it must account for newer teaching strategies and equipment so that there is sufficient space for teacher and student mobility.

Schools that provide extra attention to math, give a clear priority to math assessment, offer instructional help to those performing below standard on entry to high school, and provide encouragement and recognition for student achievement have more successful programs. Successful schools provide early identification of trouble and offer well-timed and suitable interventions. The panel also noted the difference between schools that offered actual *extra instruction by a teacher with a math endorsement* and those that just provided extra seat and study time. There may be value in focused study halls and similar activities, but added instruction time is more effective. Instruction by a highly qualified instructor, not just exposure, counts.

We could discern little difference based on class schedules – semesters, trimesters, 60, 75, and 90 minute blocks or 4 x 4. Yet, block scheduling was cited as a way to give teachers more student placement knowledge, more time to build relationships, and more ability to focus with individual students. A few schools also reported concerns about the amount of time a student can productively focus on one subject, suggesting that 90 minute blocks are too long and that periods less than 60 minutes are too short.

Controlled, focused professional development was present in schools with the highest levels of student success. To promote success, professional development must be tied to the curriculum and to district and building goals in each subject. The professional development should be job-embedded, ongoing, and on-site. Articulation of content is fostered when teachers have time and the opportunity to score assessments together, to calibrate the learning goals, to develop (or buy) formative and summative testing tools, and to access the technology that supports their work. This sort of professional development—that is both standards-based and data-driven—is most likely to have a direct, positive impact on teacher effectiveness in the classroom. If math and assessment are a priority, there will be continuity of instruction tied to a guaranteed and viable curriculum, with cohorts of teachers working across grade levels and subjects, evident in the culture of the school.

Learning is iterative. Because what is learned in one course is used as the base for learning at the next level, time lost between courses, weaknesses in skill development, or gaps in concepts learned at one level affect learning at the next level. That is part of the reason why looping and bookending, with continuity, make a difference. Teachers know the students, what was learned, and what still needs to be learned. Students' skill levels are better known, gaps are more easily focused on, and special attention is more focused and timely.

Funding and building resources drive the staffing in a building, and staffing changes can make a momentous difference in program delivery. One larger school the panel visited had a student population of about 1,000. The district had spent several years protecting building instructional funding with cuts in other areas of operations. This reached an end – a cliff – and without a student population change between the 2008-09 year and the 2009-10 school year, funding was reduced by more than $900,000 and a full FTE was lost in *each* subject area of Science, Math, Language Arts, Counseling, Social Studies, and Art, plus one administrator, and one secretary. The results were increased class sizes, loss of some subject offerings, more pressure on remaining staff, a shuffling of schedules, and loss of some of the extra interventions for struggling students.

Well-articulated priorities in the building and in the district make a difference. If math and its assessment are known to be a priority, improved student performance follows.

Good teaching comes from good teachers. And what makes a teacher "good?" While defining precisely which characteristics make a teacher effective is not an exact science, current educational research clearly indicates that teachers are the single most influential factor in student success. This notion was recently explored in an article in *The Atlantic,* which suggested that important characteristics are *a history of perseverance,* teachers who *score high in "life satisfaction,"* and teachers who *have other evidence of success*. Angela Duckworth of the University of Pennsylvania says, "the two best metrics of previous success tend to be grade-point average and 'leadership achievement'—a record of running something and showing tangible results." Although the Best Practices Panel suggests that good teaching improves student results, there is no way to statistically validate that statement since ODE does not collect data that associates student test results and specific classes the students have taken. This omission prevents the panel from evaluating whether students who might take courses in a non-standard order have different results than the norm and from examining the correlation between teachers, curricula, and test results.

The panel believes there is evidence that a teacher's commitment to the student, not *just* to subject content, is important. Teachers who come into the profession through a subject area degree or even an MAT (Master of Arts in Teaching) program may teach because they love their subject and want others to love it too. But to be successful, they must be teachers of the student, not just teachers of the subject. The panel recognizes the importance of the subject area endorsement but wants to note that, particularly for a complex subject like math, teachers need to be trained in methods. This is often missed or only lightly treated in university teacher requirements and preparation, but methods credits should be obligatory for a teaching certificate to be awarded.

Research on teacher-effectiveness suggests that teacher training that is directly linked to classroom practice is essential. Particularly for math teachers, subject-specific training (whether through the coursework associated with attaining a math degree or through content-focused professional development) appears to increase student and teacher success in the classroom. But content knowledge alone will not render a teacher effective; pedagogical content knowledge is also necessary. Teachers must understand the subject matter they teach in a conceptual sense, understand how students learn and think about the content, and be able to provide multiple explanations or representations of the material to help students learn.

Further, the panel feels that universities should offer continuing education programs in methods that are accessible to teachers who are teaching full-time and cannot attend daytime classes. On-line courses, while of some benefit, are most often asynchronous, individual, and without supports. Research supports the idea that the best teacher training comes through synchronous offerings with cohort groups, working at the same rate, in the same time period, on the same issues, and offering mutual feedback.

There is an art phase to being a good instructor. Some form of "induction" would be helpful for all teachers who are new to the field, grade level, or school. Learning the culture of the school, forming relationships with students and colleagues, developing collaborative methods, and getting acquainted with the expectations of the school should all be part of the induction process. Some research suggests that induction programs can increase effectiveness and reduce attrition rates of novice teachers. The most successful induction programs are comprehensive, involving carefully selected mentors, standards-based assessment of teaching, collaborative networks for learning, and structured mentoring activities that are classroom and content-focused. There are significant educational and financial costs of high rates of teacher turnover, making induction programs valuable investments if they are designed and proven to be effective in reducing turnover.

Finally, there was a lot of comment from those interviewed about the state's protection of test questions. Most feel this is overdone, even though they understand the importance of guarding the security of the tests. It is felt that the state (perhaps with or through the education service districts) could do two things that would be helpful to math (and other subject area) teachers. First, while the Oregon Department of Education does provide sample OAKS tests on its website, the ODE should work with teachers to make sure that they are aware of the sample tests and that these materials are meeting their needs. Second, detailed sample lesson plans could be produced for use in the classroom. Having examples of well thought out, well articulated lesson plans would model the activities as an exemplar of classroom work.

Cost Panel Report

The primary charge of the Cost Panel is two-fold. First, the panel updates the Quality Education Model's cost calculations with the most recent data available and forecasts how costs will change over time. And second, the panel incorporates into the QEM's cost calculations any changes in resource requirements that the full Quality Education Commission adopts. In addition to these two activities, this year the Cost Panel also built a capital cost model to be included in the QEM. The purpose of the capital cost model is to provide estimates of the annualized costs of constructing and maintaining school buildings and other capital infrastructure.

Data Update

In each two-year round of the Quality Education Commission's work, the Cost Panel updates all of the model's data and forecasts with the most recent information available. For this round of the Commission, the most recent expenditure data comes from school district and education service district (ESD) audited financial statements for the 2008-09 school year. Similarly, the latest data for wages and salaries, from Department of Education data collections, are for 2008-09. Enrollment data and student demographic data, because they are collected earlier than the financial data, are available for the 2009-10 school year.

Changes in Resource Requirements

In addition to updating the data in the model, the Cost Panel also revises the cost calculations in the model, if necessary, to reflect any cost increases or decreases that would result from recommendations adopted by the Commission.

The recommendations from the Best Practices Panel adopted by the full Commission include the following:

- Improve the continuity of staff within schools to help strengthen relationships between teachers and students.
- Develop a strong district framework, and articulation through the grades, for math instruction.
- Keep class sizes down for courses, such as math, where students are likely to need individual attention.
- Give a clear priority to improving math achievement, and offer additional help to students who are falling behind.
- Improve the effectiveness of teacher professional development by tying it to the curriculum and to specific school and district goals.

The Cost Panel determined that implementing these recommendations **would not** change the cost of fully implementing the provisions of the Quality Education Model. Rather, the recommendations can be implemented by more effectively using resources already included in the model.

Capital Cost Model

From its inception in 1999, the Quality Education Model has focused solely on the **operating** costs of a system of highly effective schools—the **capital** costs of providing the buildings and related facilities in which those schools operate have not been evaluated. This year the Quality Education Commission has developed a capital cost model that estimates the lifetime costs, expressed on an annual per student basis, of building and maintaining the physical infrastructure for each of the three prototype schools.

The capital cost model, based on both national and Oregon-specific data on building and maintenance costs, estimates costs for the initial construction of school buildings, the costs of land on which they sit, and the costs for repair and replacement of major systems such as roofs and HVAC systems. (Day-to-day maintenance costs such as custodial, heating and cooling, supplies and minor repairs are included in the operating side of the QEM.) Exhibit 10 shows the estimates for the three prototype schools.

Exhibit 10: QEM Capital Cost Model

QEM Capital Cost Model Annualized Financing Costs			
	Elementary School	Middle School	High School
Number of Students	340	500	1000
Building Square Footage	42,500	75,000	160,000
Construction Cost per Square Foot	$278	$284	$285
Total Construction Cost	$11,815,000	$21,300,000	$45,600,000
Land Costs	$1,000,000	$1,500,000	$3,000,000
Total Initial Costs	$12,815,000	$22,800,000	$48,600,000
One-Time Major Remodel Costs	$1,181,500	$2,130,000	$4,560,000
Lifetime Re-Roofing Costs	$276,250	$487,500	$1,040,000
Lifetime HVAC Replacement Costs	$595,000	$1,050,000	$2,240,000
Total Costs	$14,867,750	$26,467,500	$56,440,000
Total Annualized Cost	$657,182	$1,169,912	$2,494,752
Total Annualized Cost per Student	$1,933	$2,340	$2,495

These estimates are based on the following assumptions:

- The buildings have a useful life of 60 years.
- Roofs must be replaced every 20 years.
- HVAC systems must be replaced every 25 years.
- Each building will need a one-time major remodel during its useful life that costs 10% of the initial construction costs.
- Borrowing costs are 4% per year.

This model also assumes that school districts devote sufficient resources to ongoing day-to-day maintenance so that the buildings are kept in a sound, safe condition for their full 60-year lives.

Although relatively simple, this model captures the basic structure of school capital funding. The estimates of the annualized per student costs from the model—$1,933 for elementary schools, $2,340 for middle schools, and $2,495 for high schools—are consistent with national averages for capital spending for school districts in the United

States as well as with actual capital spending in Oregon school districts. Future enhancements to the model will include feedback loops so that the model can be used to evaluate the tradeoffs between ongoing maintenance spending and the consequences of deferred maintenance on long-term life-cycle costs.

The State of School Funding in Oregon

The Quality Education Commission is assigned the task of calculating the appropriate level of funding to ensure that Oregon's K-12 education system meets its quality goals. In this way, the QEM illustrates how educational spending is linked to student performance and how resource levels impact overall achievement. For two decades, though, Oregon has been forced to reconcile ambitious educational goals with resource limitations.

Ballot Measure 1, which was passed by Oregon voters in November 2000, was intended to increase education funding levels in Oregon. Still, the state continues to struggle with budgetary shortfalls and education funding levels generally regarded as inadequate. In each of its constitutionally mandated reports since the measure was passed, the Legislature has acknowledged that the level of state resources devoted to K-12 education has been insufficient to meet the quality education goals established in Oregon law. In general, declining revenues and the increasing cost of educational service delivery are the causes of this funding shortfall. Specifically, the legislative reports cite the following factors:

- Declines in local resources available for schools due to cuts in property taxes required by Ballot Measure 5 (1990) and Ballot Measure 50 (1997)
- State revenue declines resulting from the economic recession starting in the 2001-03 biennium
- New federal mandates not accompanied by sufficient federal funding
- Large increases in required contribution rates to the Public Employees Retirement System (PERS)
- Rapid growth in health insurance premiums paid by school districts
- Higher transportation costs faced by school districts due to increases in fuel prices

Trends in School Funding

Understanding the state of school funding in Oregon today requires a review of the property tax limitation measures passed in the 1990s. Ballot Measure 5, passed in 1990, cut school property taxes dramatically by capping the school property tax rate at $5 per $1,000 of market value. Rapidly growing real estate market values in the early and mid-1990s caused property tax bills to continue to grow, and in response Oregon voters passed Measure 50 in 1997, further cutting property taxes. As a result, the amount of funding for schools has been decreasing in inflation-adjusted dollars. Prior to the passage of Measures 5 and 50, school district and education service district combined property tax rates in Oregon averaged $16.53 per $1,000 of market value. For the 2009-10 tax year, they averaged $4.03 per $1,000 of market value, a tax rate cut of 76 percent since 1990-91. As a result of the dramatic decline in local property tax funding available for schools, more responsibility shifted to the state, with state general fund dollars becoming the primary source of funding for Oregon schools.

Exhibit 11: Total Operating Revenue

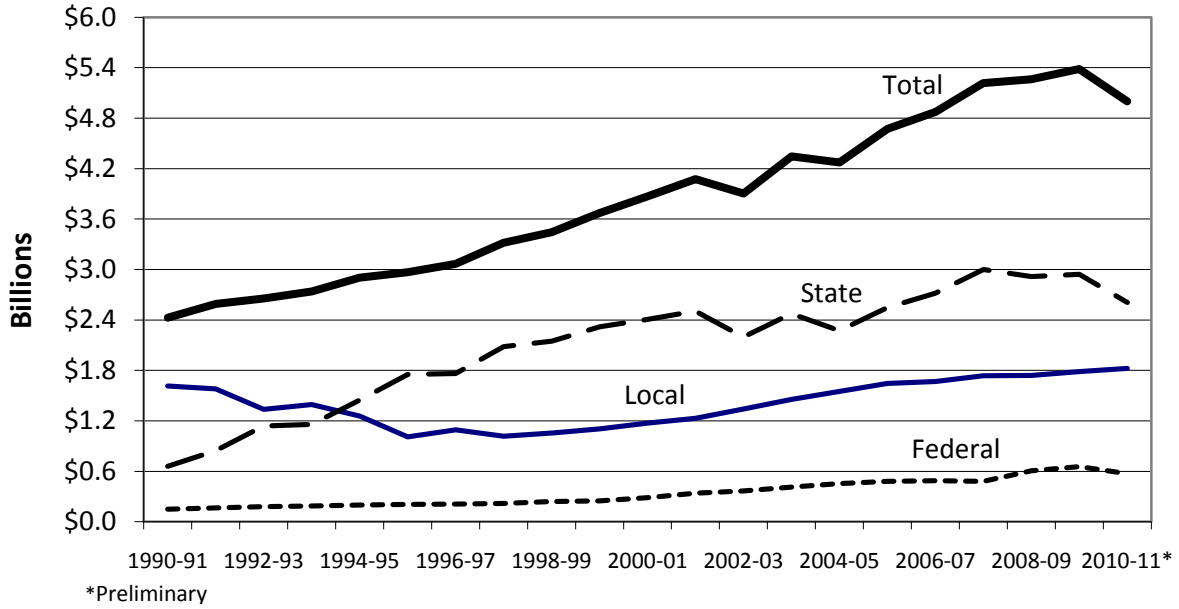
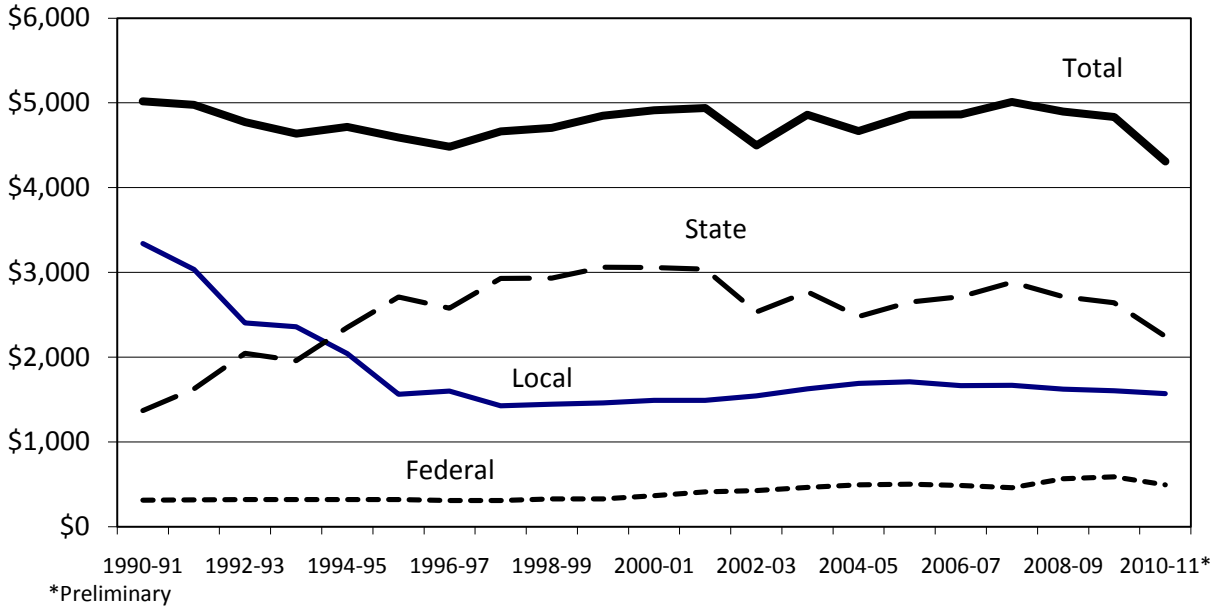


Exhibit 11 illustrates recent trends in local, state, and federal funding for Oregon's schools. After the 1990 passage of Measure 5, schools began to rely heavily on state funding. Although state income tax revenue was able to make up for lost property tax revenue throughout a period of economic growth in the 1990s, state revenue declined substantially in 2001 and again in 2008 with the onset of economic recessions. With less financial support from the state and a limited ability to raise local property tax revenues, Oregon school districts had to balance their budgets; in some cases this meant cutting staffing levels and shortening the school year. At the same time, fixed costs were on the rise. The result was that fewer resources were reaching classrooms around the state.

Exhibit 12: Inflation-Adjusted Revenue per Student



Despite declines during economic downturns, K-12 total operating revenue has generally increased over time. However, it has not kept pace with inflation or the rising costs of education associated with higher student enrollment and changing demographics. Exhibit 12 shows that inflation-adjusted revenue per student has actually declined over time. The Education Price Index, the measure of inflation used in this exhibit, is a weighted average of teacher salary and health insurance premium increases that more accurately reflects price increases in the education sector than the Consumer Price Index (CPI) does. The graph illustrates that $5,019 was available per student in Oregon school districts in 1990-91, but an estimated $4,309 will be was available in 2010-11.

The Funding Gap

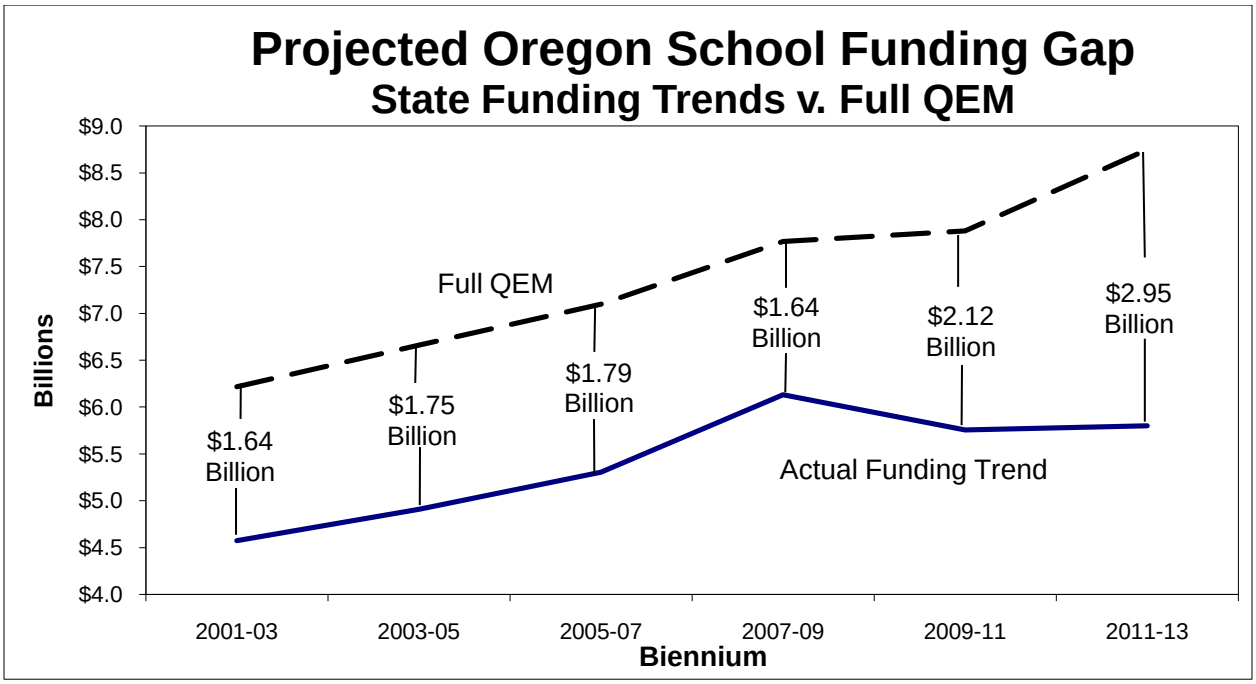
For the 2011-13 biennium, the Quality Education Model estimates that state funding of $8.75 billion is necessary to reach the goal of at least 90 percent of students meeting established academic standards and graduation requirements. Given the Current Service Level estimate (the amount required to fund the same level of services provided in the prior biennium), a funding gap of $2.04 billion will remain if the Legislature adopts the Current Service Level for the 2011-13 biennium, as show in Exhibit 13.

Exhibit 13: State Portion of K-12 Education Funding

State Portion of K-12 Education Funding (Billions of Dollars)	
	2011-13 Biennium
Current Service Level*	$6.71
Fully-Funded Quality Education Model	$8.75
Funding Gap	$2.04
* Funding required to maintain level of services provided in 2009-11.	

The effect of the Oregon Legislature's inability to appropriate adequate state funding for the public education system has been a continuing gap between the resources available and the resources needed to achieve the educational goals established in law. As Exhibit 14 shows, the funding gap narrowed to $1.64 billion in 2007-09, down from $1.79 billion in 2005-07. However, the gap widened again in 2009-11 and, because the revenue shortfall will likely prevent the legislature from funding even the Current Service Level, the gap is expected to rise to $2.95 billion in the 2011-13 biennium.

Exhibit 14: Projected Oregon School Funding Gap



A strategy to eliminate the funding gap must be based on two components: increased levels of funding available to schools and increased efficiency in educational service delivery. For more than a decade, education funding per student provided by the state has not kept up with educational cost increases, which have risen faster than commonly used measures of inflation like the Consumer Price Index. Further, Oregon has experienced substantial growth in its population of students with special needs. Although the share of students meeting state academic standards has continued to increase under these circumstances, the rate of achievement growth is slowing. Unless the state can provide additional resources and districts can maximize efficiency, progress in student achievement is unlikely to continue. Particularly in a period of economic downturn and higher academic standards, Oregon faces a steep challenge.

The State of Student Achievement in Oregon

The goals established by the Oregon Education Act for the 21st Century, the federal No Child Left Behind Act, and the Oregon Diploma set high expectations for schools and students. Schools are called on to provide a world-class education and high academic standards, while students must demonstrate the essential knowledge and skills needed to fulfill their potential in advanced learning, work, and citizenship. Because the results of state standardized assessments are a commonly used and relatively consistent measure of student performance, the Quality Education Commission utilizes them to understand trends in student achievement over time. However, the Commission also recognizes that standardized assessments are just one measure, and no single measure can adequately reflect all dimensions of student learning and achievement. In past reports the Commission has encouraged the development of broader measures of student performance that are consistent with the QEM's Quality Indicators.

This year's report includes statewide data on student performance on the Oregon Assessment of Knowledge and Skills (OAKS) tests for reading, math, science, and writing. OAKS tests for reading and math are administered in grades 3-8 and 10. Scientific inquiry is assessed in grades 5, 8, and 10 and writing tests are given in grades 4, 7, and 10. This report also presents information about the high school graduation rate, including the recently released cohort graduation rate for 2008-09.

Exhibit 15: Percent Meeting Math Standard

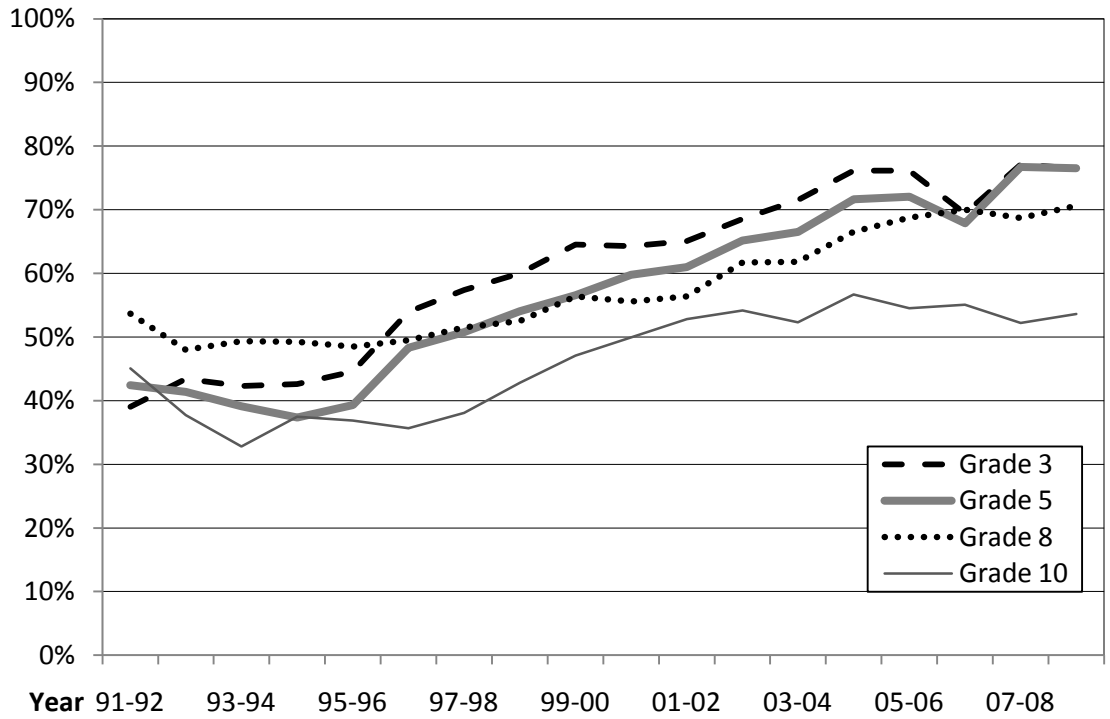


Exhibit 16: Percent Meeting Reading Standard

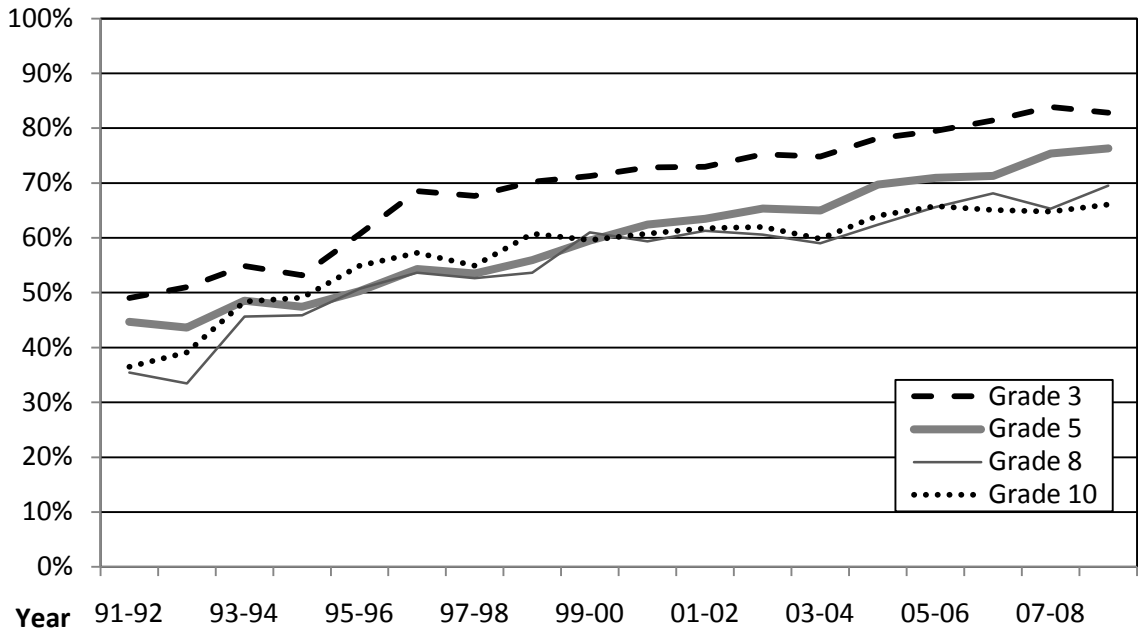
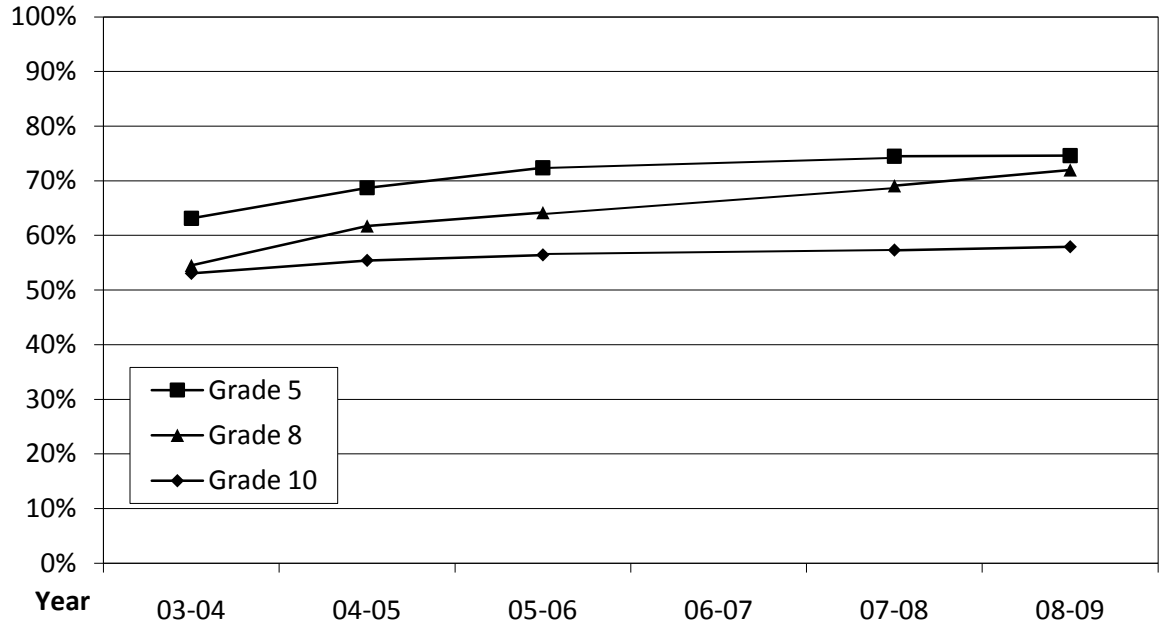


Exhibit 17: Percent Meeting Science Standard



*Science test was not given in 2006-07

Exhibit 18: Percent Meeting Writing Standard

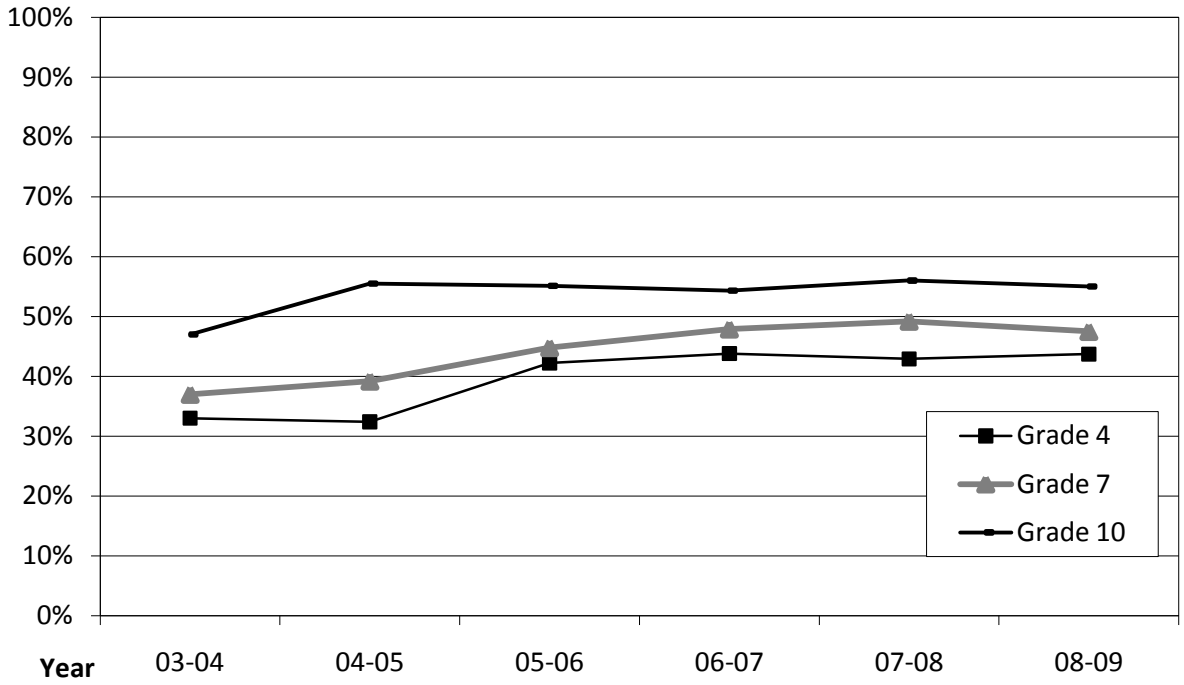
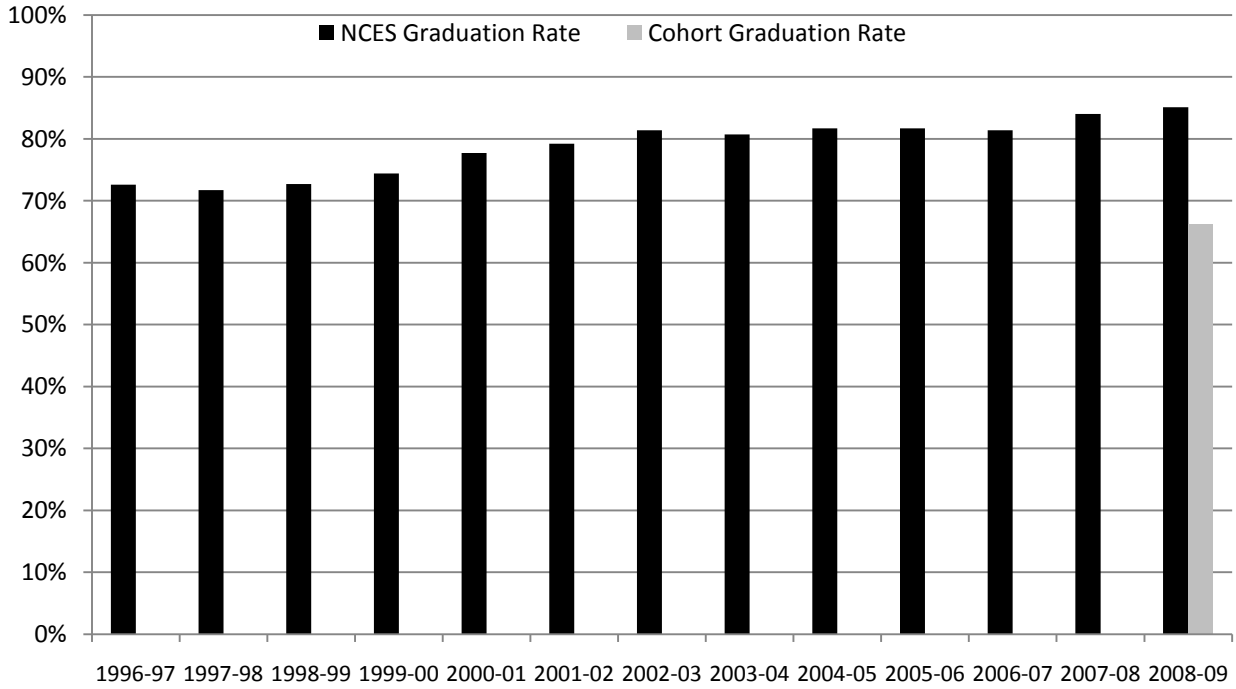


Exhibit 19: Oregon Graduation Rates



Until 2008-09, Oregon only calculated graduation rates using the formula developed by the National Center for Education Statistics (NCES). This formula was approved by the U.S. Department of Education for calculating Adequate Yearly Progress (AYP) under NCLB. As Exhibit 19 illustrates, Oregon's graduation rate showed steady improvement from 1997-98 until 2002-03. Although improvement leveled off from 2002-03 until 2006-07, the graduation rate increased for the following two school years, reaching a new high of 85% in 2008-09.

In addition to the traditional graduation rate, the Oregon Department of Education calculated the cohort rate for 2008-09. The cohort graduation rate tracks groups of students beginning in the 9th grade to provide a more accurate picture of student outcomes after four years of high school. Students who take longer than four years to graduate, receive a modified diploma, GED, adult high school diploma, or alternative certificate are considered non-graduates in the cohort method. Although the cohort graduation rate appears to represent a decline in Oregon's graduation rate (66 percent compared to the NCES rate of 85 percent), this only reflects changes in the method of calculation, not a decline in the actual number of students graduating from high school.

General Conclusions

- In principle, the Quality Education Commission supports the goals of the federal No Child Left Behind Act of 2001 and recognizes that Oregon has made strides toward raising student achievement and closing the achievement gap. However, it is undeniable that certain conditions limit Oregon's ability to fully achieve those aims. The goals of NCLB are unlikely to be completely realized until all schools and districts utilize education best practices that are supported by extensive research and experience; accountability structures are in place to ensure efficient resource use; and state, local, and federal funding—the resources needed to sustain improvement—are adequate and stable.

- As Exhibits 15 and 16 (above) indicate, the proportion of Oregon students who meet or exceed benchmark standards in math and reading has generally risen over time. Assessment results show that math performance in the 3rd and 8th grades decreased for the first time in many years in 2006-07, but rebounded the following year.[1] The percentage of both 8th and 10th graders meeting the state standard rose in 2008-09. The percent of students meeting the state reading standard for 5th, 8th, and 10th grade increased in 2008-09. Except for a minor decrease in the most recent round of assessments, 3rd reading performance has been gradually improving since 2003-04. In general, the elementary grades have exhibited greater and more consistent growth in the proportion of students meeting state benchmarks, whereas improvement has been less consistent for middle and high school students.

- Predictions about the impact of fully funding the QEM suggest that the goal of 90% or more of Oregon students meeting or exceeding benchmark standards is still attainable by 2012-13 for 3rd grade reading, 2014-15 for 3rd grade math, and 2015-16 for 5th grade reading. However, achieving this goal in the middle and high school grades is expected to take longer. Without increased funding levels and continued improvement in educational practices, there is a great deal of uncertainty about when Oregon students will accomplish this goal at all grade levels. The graphs that illustrate predicted student performance can be found on pages 37-40 of this report.

- Predictions about future levels of student achievement are based on the assumption that additional funding will be supplied for schools and practices that are aligned with the Quality Indicators will be adopted by Oregon schools. Because neither increased funding nor best practices alone can be expected to significantly boost student achievement, effecting positive change during a time of economic uncertainty is a daunting task.

[1] In 2006-07 most Oregon students were assessed using a paper and pencil test because the state's computer-based testing system was shut down. Because of the different testing method, the scores for 20067-07 are not comparable to other years.

- Applying best practices and investing resources in all grades, K-12, will promote student achievement of Oregon's high standards and new diploma requirements. Additionally, better preparation in the lower grades will allow academic success to trickle up, as groups of students will enter the upper grades with more of the skills and knowledge they need to succeed there. For instance, establishing strong mathematics skills in a group of students at the elementary level will boost their readiness for middle school math concepts; in turn, well-prepared middle-school students will enter high school equipped to complete all components of the Oregon Diploma. Further, appropriately timing academic coursework and aligning it with state assessments will keep students on track for success and high school graduation.

- Disparities in student achievement continue to exist for certain segments of the student population; students of minority ethnic and cultural backgrounds, students with disabilities, those who have limited English proficiency, and those of low income status have historically exhibited lower levels of performance on state assessments. As these segments of the student population continue to grow, it is increasingly important to invest in the targeted resources and strategies suggested by the Quality Education Model in an effort to close the achievement gap.

Oregon in a National Context

- Oregon's average reading and math scores on the National Assessment of Educational Progress (NAEP) or "the Nation's Report Card," have followed a generally upward trend in recent years and have been slightly higher than the national average in many categories. NAEP results from 2007 and 2009 show that Oregon's fourth graders have fallen slightly below the national average for both reading and math. Oregon's eighth graders scored above the national average for both reading and math in 2009, as they have consistently since 1998.

- Oregon students have historically outscored U.S. students on the SAT test. In 2008, Oregon's average SAT scores exceeded the national average in the reading, writing, and mathematics sections. Just 33 percent of Oregon's graduating seniors took the ACT in 2009, compared to 45 percent nationally, and the state's average ACT score was slightly higher than the national average.

- Whereas 26.5 percent of graduating seniors in the United States took at least one Advanced Placement (AP) exam during high school, 21.2 percent of Oregon's 2009 graduating class did. The proportion of Oregon students who earned a score of three or higher on an AP exam in 2009 was slightly below the national average. However, the percentage of Hispanic or Latino, African American, and low-income students in Oregon who scored three or higher on an AP exam was greater in 2009 than in previous years.

- After increasing slightly, to 4.2 percent, in the 2006-07 school year, Oregon's high school dropout rate improved for the following two consecutive school years. The dropout rate fell to 3.7 percent in 2007-08 and to 3.4 percent in 2008-09. Additionally, the state's graduation rate has been on the rise since 2006-07. According the National Center for Education Statistics (NCES), Oregon's 2007-08 average cohort graduation rate (the number of graduates divided by the estimated count of freshman four years earlier) was 76.7 percent, above the national average of 74.9 percent. Still, Oregon students from minority racial and ethnic backgrounds continue to have lower average freshman graduation rates and are disproportionately represented among the dropout population of the state.

Quality Education Model Impact Analysis and Student Performance Expectations

As indicated by the previous section of this report, the Commission recognizes that the allocation of additional resources to Oregon's K-12 school system is necessary if student performance is expected to continue improving. It is important to consider both the level of resources required to fully fund the Quality Education Model and the impact this level of funding is expected to have on student achievement in the coming years.

Quality Education Model Estimates for the 2011-13 Biennium

Prior to the beginning of each legislative session, the Commission updates the Quality Education Model to include the most recent data available. The Commission also reviews the assumptions in the model to ensure that they are consistent with current research. Once the updates are complete, the Commission uses the model to estimate the level of funding required to meet Oregon's educational goals as established in law.

As in past Commission reports, the Cost Panel reviewed the technical aspects of the Quality Education Model this year. In general, the panel's responsibility is to make recommendations for improving the QEM as a tool to support policy decisions regarding school funding in Oregon. In order to do this, the panel performed the following tasks:

- Updated the Quality Education Model to reflect the most recent data available and to refine the cost estimates so they are as accurate as possible. The data used in this report are from the 2008-09 and 2009-10 school years, including expenditures by category, wages, and salaries of school personnel, retirement system and health care costs, and class size.
- Made the model as comprehensive as possible by including all relevant resources and education programs.
- Calibrated the model so that the Baseline estimate is consistent with current spending in Oregon schools and with the Current Service Level amount estimated by the School Revenue Forecast Committee for the 2011-13 biennium. The Baseline scenario represents the starting point for evaluating policy proposals within the model.

The model was updated using the most current available data, including the school district audited financial information available through the Database Initiative Project (DBI), enrollment and other student data from the Oregon Department of Education, and economic and price data from the Office of Economic Analysis (Oregon Department of Administrative services).

Exhibit 20: Quality Education Model Impact Analysis for the 2011-13 Biennium

Quality Education Model Impact Analysis for the 2011-13 Biennium Baseline (Current Service Level) Funding Compared to Full Funding of the QEM	Baseline Funding Level Scenario	Fully Funded Policy Scenario	Funding Gap	Percent Difference
Estimated District Operating Expenditures for 2011-12	$5,560,369,937	$6,528,841,523	$968,471,586	17.4%
Estimated District Operating Expenditures for 2012-13	$5,770,346,367	$6,778,055,748	$1,007,709,380	17.5%
2011-13 Biennium Total	**$11,330,716,304**	**$13,306,897,270**	**$1,976,180,966**	**17.4%**
Plus: 2011-13 ESD Expenditures	$907,266,818	$907,266,818	$0	0.0%
Plus: High-Cost Disabilities Fund	$36,000,000	$96,000,000	$60,000,000	166.7%
Equals: Total 2011-13 Funding Requirement	**$12,273,983,122**	**$14,310,164,088**	**$2,036,180,966**	**16.6%**
Less: Local Revenue not in Formula*	$889,935,068	$889,935,068	$0	0.0%
Less: Federal Revenue To School Districts and ESDs	$1,317,321,153	$1,317,321,153	$0	0.0%
Less: Food Service Enterprise Revenue	$125,243,114	$125,243,114	$0	0.0%
Equals: Total Formula Funding Requirement	**$9,941,483,787**	**$11,977,664,753**	**$2,036,180,966**	**20.5%**
Less: Property Taxes and other Local Resources	$3,230,614,547	$3,230,614,547	$0	0.0%
Equals: 2011-13 State Funding Requirement	**$6,710,869,240**	**$8,747,050,207**	**$2,036,180,966**	**30.3%**

* Local option taxes, fees, and donations.

Exhibit 20 provides estimates of the resources needed to fully fund the Quality Education Model in the 2011-13 biennium. To allow for comparison, it also shows the estimated level of funding required to provide the same level of education services provided in 2009-11 (the Baseline or Current Service Level). As the table shows, the Fully Funded Quality Education Model for 2011-13 would require $2.04 billion above the Current Service Level funding amount.

Student Performance Expectations: Baseline and Fully Funded Models

The Quality Education Model allows policymakers to examine the links between education policy, finances, and expected student performance. The following graphs show estimates of student achievement outcomes, measured as the percentage of students meeting the state's benchmark standards in reading and mathematics, for both the baseline level of funding and the fully funded Quality Education Model. As Exhibits 21-28 clearly suggest, there are notable differences between student performance expectations under the Baseline and Fully Funded scenarios. Reaching certain goals—such as 90% of Oregon students meeting state standards—will be more feasible with full funding of the QEM.

Exhibit 21: 3rd Grade Reading Forecast

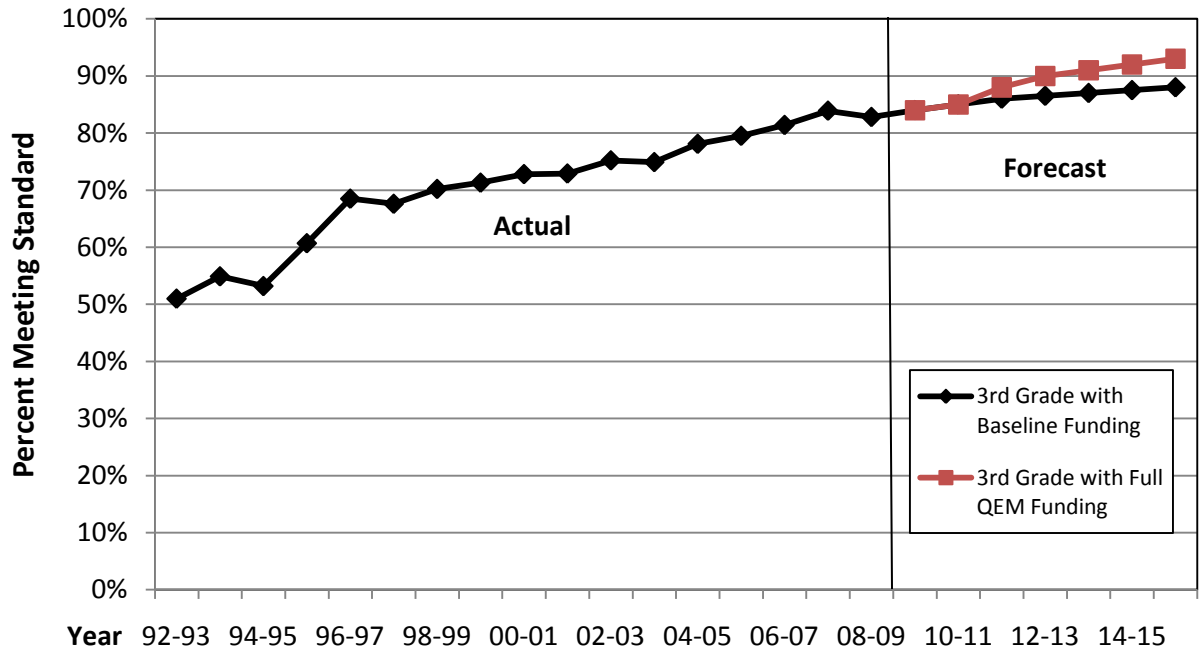


Exhibit 22: 5th Grade Reading Forecast

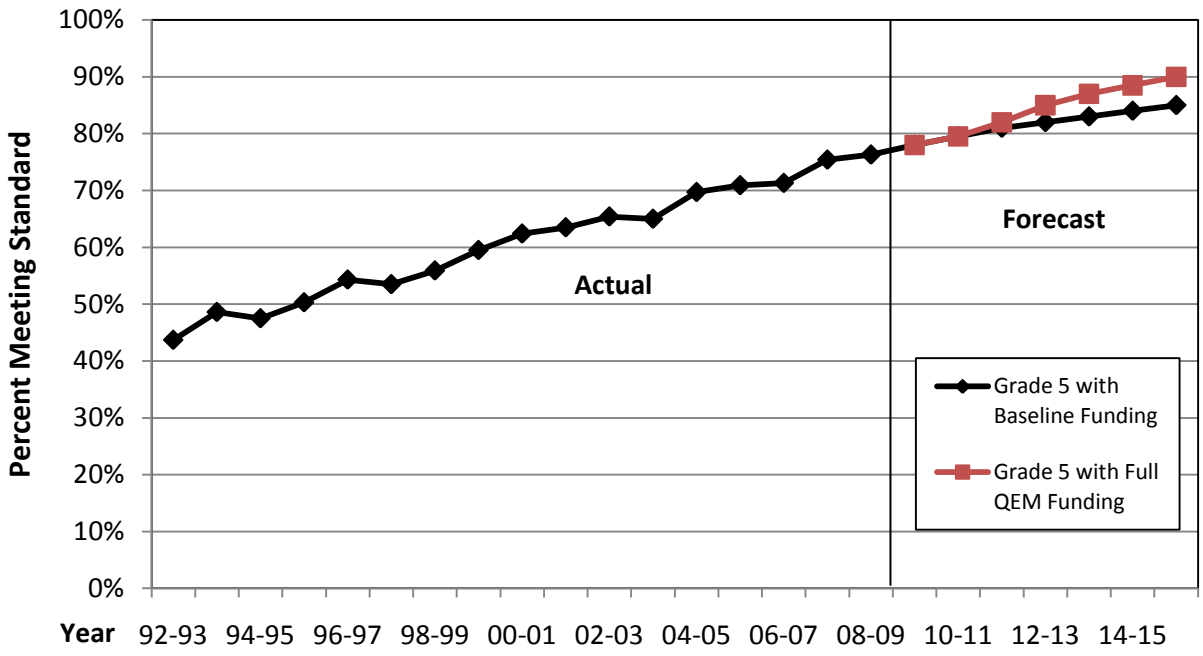


Exhibit 23: 8th Grade Reading Forecast

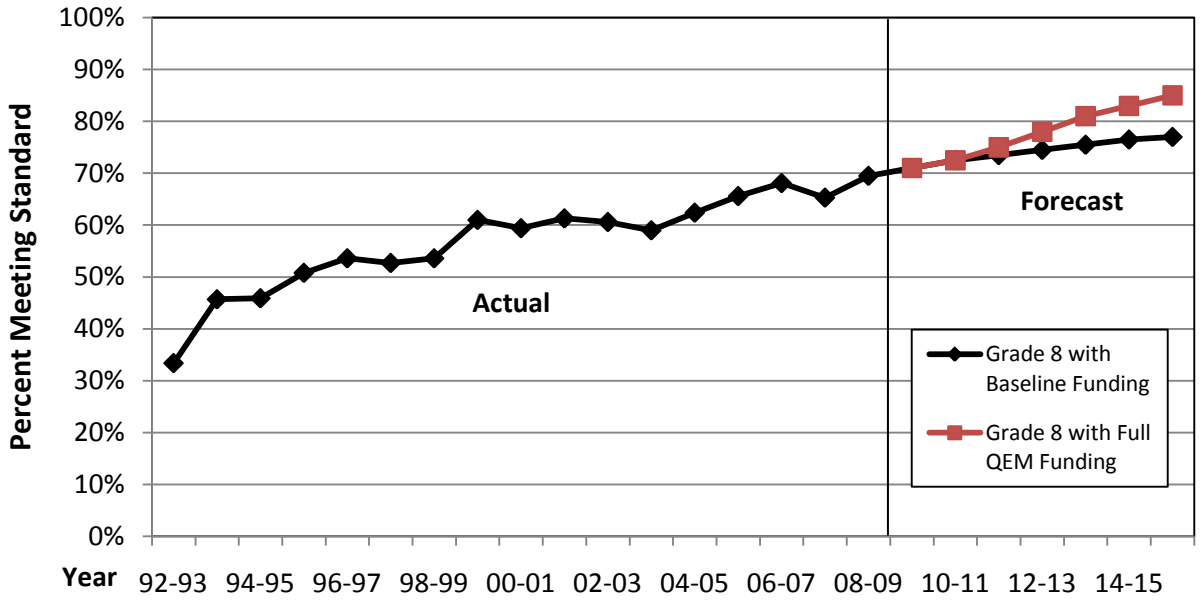


Exhibit 24: 10th Grade Reading Forecast

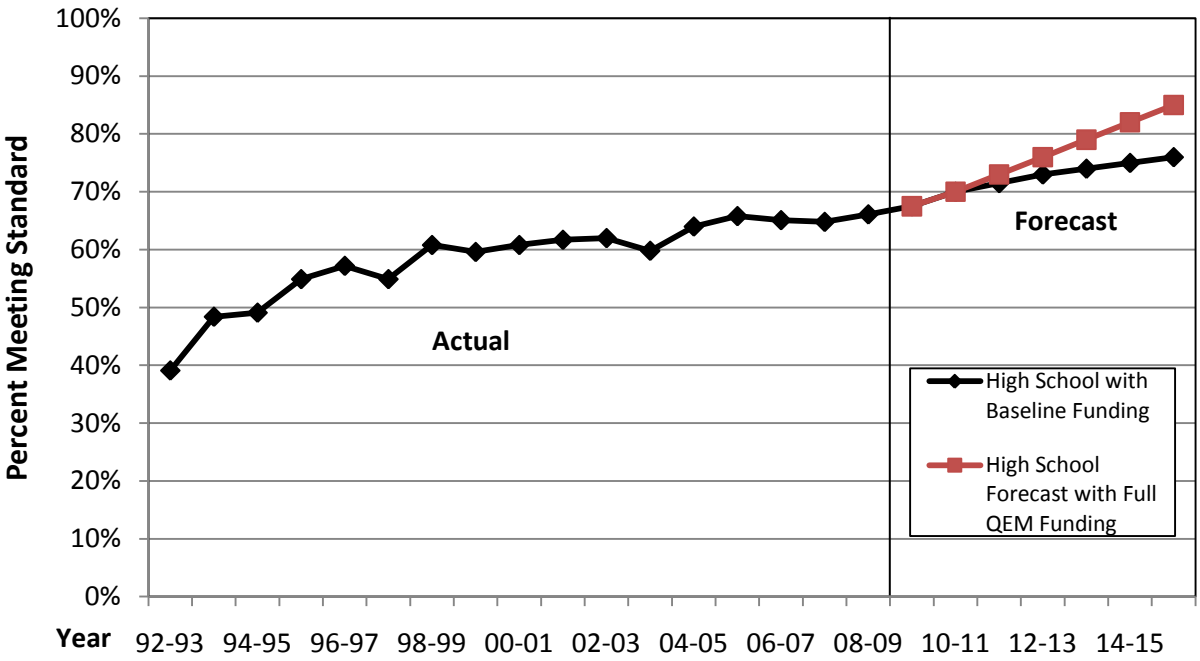


Exhibit 25: 3rd Grade Math Forecast

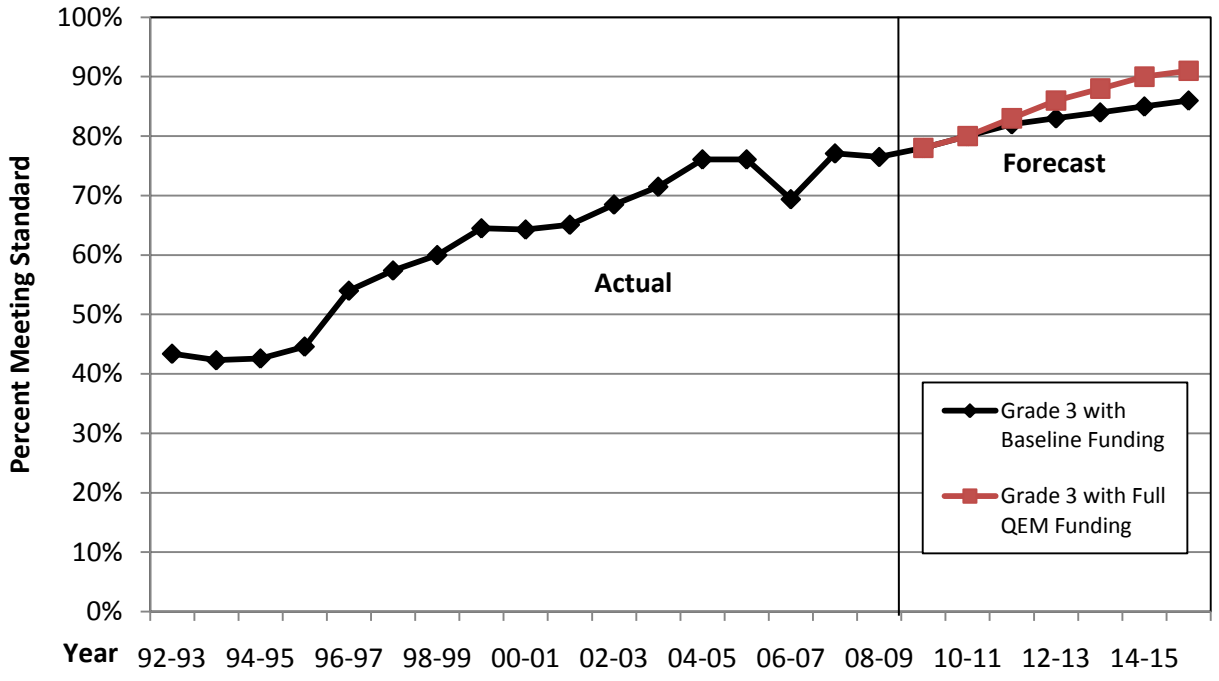


Exhibit 26: 5th Grade Math Forecast

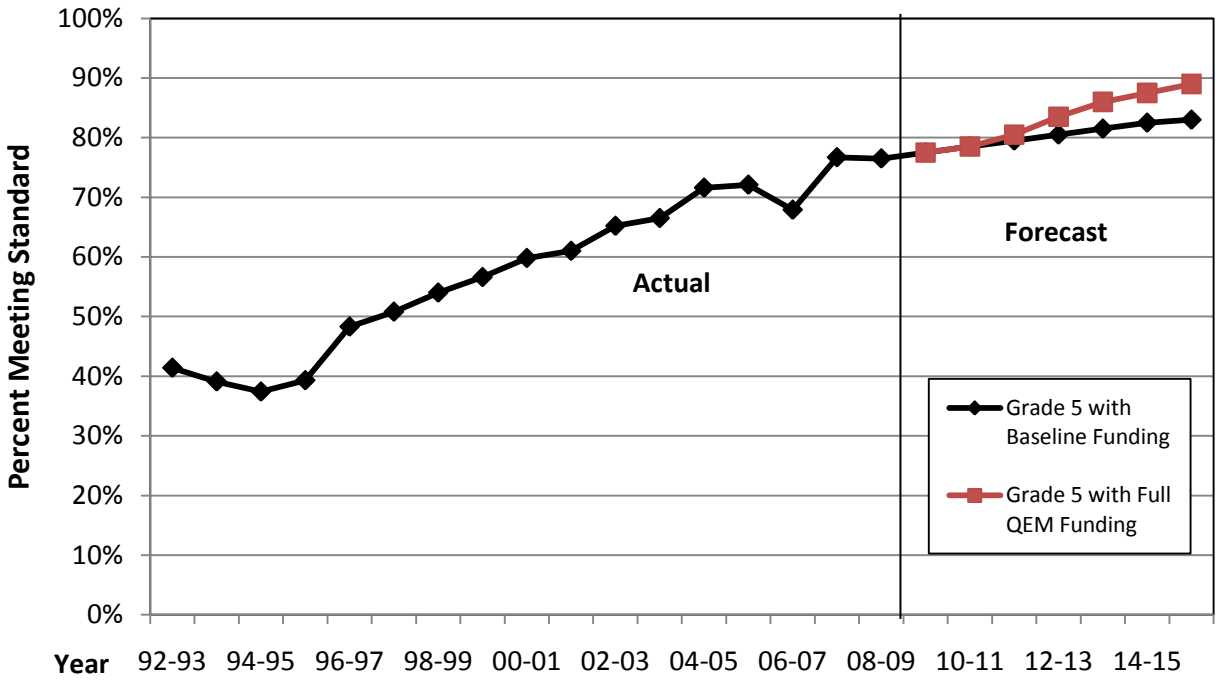


Exhibit 27: 8th Grade Math Forecast

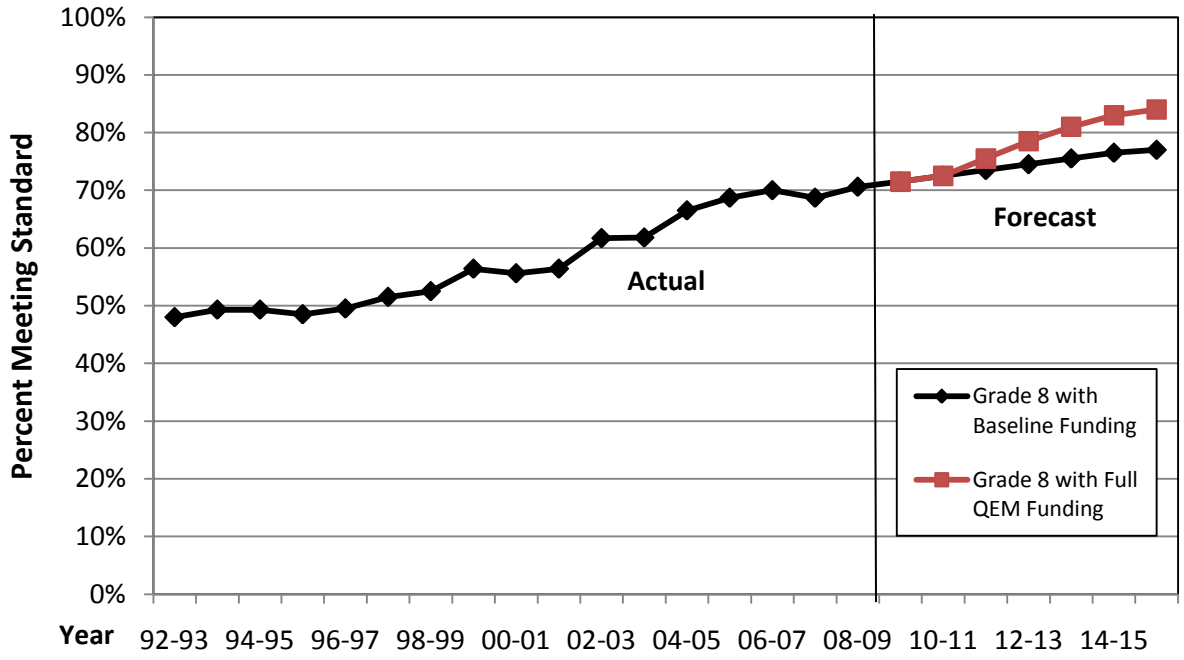
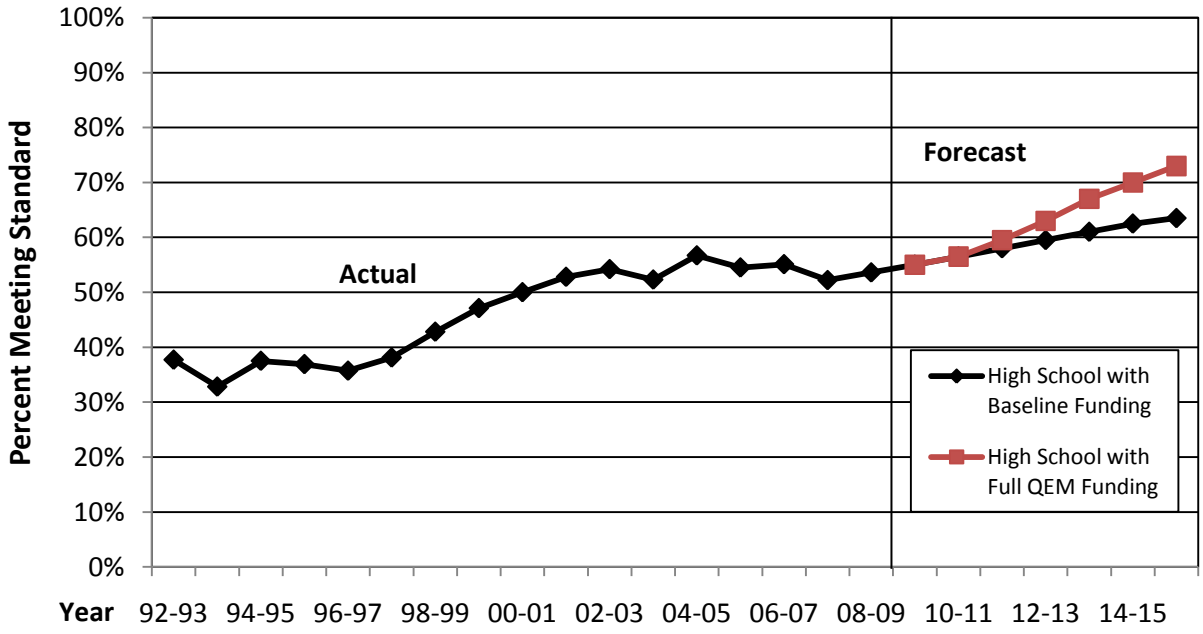


Exhibit 28: 10th Grade Math Forecast



Alternative Strategies for Implementing the Quality Education Model

The Quality Education Model is Oregon's tool for determining the costs associated with and resources required to carry out major education policy initiatives in the state. The 2010 Quality Education Model estimates the level of resources that will be needed to prepare all students to meet the state's academic performance benchmarks and the new graduation standards set out in the Oregon Diploma, with particular attention to mathematics achievement. While the proposed changes to practices and resources are grounded in both research and practical experience, the changes cannot be expected to take effect immediately.

Given the current financial uncertainty and capacity constraints in school districts throughout Oregon, it is necessary to consider options that will move Oregon's education system towards its goals without requiring full implementation and funding of the Quality Education Model. The Commission still recognizes the urgency and importance of improving the state's education system, but offers the following alternative proposals in light of statewide resource limitations. Phasing-in the full provisions of the Quality Education Model over an extended period of time and focusing on high-leverage practices that will have the greatest positive impact on student achievement in the short-term are both viable alternatives for advancing education in Oregon.

Alternative 1: Invest in High Leverage Strategies

One alternative to full implementation of the 2010 Quality Education Model is to invest limited resources in high-leverage strategies that can help move Oregon students toward the state's achievement and graduation standards. This proposal suggests the implementation of practices which are most likely to assist the greatest number of students in achieving the state's educational goals, providing suggestions for how to use school resources most efficiently and effectively. Identifying and adopting practices that have the greatest impact on student achievement becomes increasingly important in the type of funding environment that Oregon now finds itself: one where state revenue is expected to grow relatively slowly for an extended period of time. In such an environment, a more efficient use of resources is critical.

In 2008, the Commission proposed strategic goals for partial implementation of the Model that addressed the entire K-12 system. The recommendations included increasing time for teacher collaboration, improving school leadership through professional development, establishing communication and partnerships with parents and the community, and providing the resources necessary to increase instructional time and implement targeted interventions for Oregon students.

Again this year, the Commission recognizes that helping Oregon students meet the state's rigorous academic standards and graduation requirements will require investing in strategies that impact students at all points on the K-12 continuum. Further, national research and the work of this year's panels focus the Commission's recommendations around the idea that both how concepts are taught (teachers' instructional effectiveness) and when they are taught (course-taking patterns) play a crucial role in student achievement. As such, the Commission encourages the adoption of the following research-based, high-leverage, promising strategies as an alternative to full funding of the QEM:

- **Invest in job-embedded professional development for teachers to increase instructional effectiveness in the classroom.** Such professional development should be collaborative, on-site, and ongoing. It is most effective when directly tied to the curriculum and materials teachers use, guided by the standards students must meet, and informed by student achievement data. Teachers are a vital, if not the most influential, factor in student achievement. Investing in them is investing in student learning.

- **Develop strong district frameworks for the articulation of academic content throughout the grades and the alignment of coursework and state assessments.** A clear roadmap for what students should know and be able to do in the core subjects as they move through the grades will help to ensure that students are prepared to meet state graduation requirements by the time they reach high school. Additionally, aligning coursework and the subject matter tested in the OAKS tests will set students up for higher levels of performance on those assessments.
- **Provide targeted interventions for students most at-risk of not meeting academic standards.** Early identification of struggling students, additional instruction time, and individualized academic attention are all suitable practices for boosting student achievement.
- **Develop methods to promote high levels of academic performance in the early grades and sustaining those skills in the middle and upper grades.** Practices such as looping, bookending, and reducing class sizes might be especially important to include in the early years of school.

Alternative 2: Ten-Year Phase-In of the Quality Education Model

Another alternative to immediate introduction of all components of the Quality Education Model is to gradually phase in its provisions and funding requirements over a longer period of time. Spreading these changes out over ten years (five biennia) is particularly advantageous in the current economic climate in Oregon, as it allows the Legislature time to develop funding strategies that can provide stable resources for education. Additionally, a more gradual influx of additional funding and introduction of new requirements and practices will give school districts the time they might need to make adjustments and to learn how to most effectively and efficiently utilize new resources.

Exhibit 29 illustrates how the funding gap could be closed gradually through a multi-year approach. In this way, full QEM funding could be provided by the 2019-21 biennium. This type of phase-in approach represents a realistic option for moving forward with Oregon's education goals and the ideals of the Quality Education Model without expecting drastic funding changes to occur immediately. Additionally, the phase-in approach provides opportunities for school districts to learn from successes and failures as they integrate additional resources, best practices, and the new graduation standards. As such, this alternative to full implementation of the QEM may actually help to foster efficient resource use at the school and district levels.

The world currently is in the worst economic downturn since the Great Depression, so even the long-term phase-in approach to funding described in Alternative 2 represents a tremendous challenge for Oregon. With the very real prospect of an extended period of state revenue growth below historical trends, Oregon's policymakers need to fundamentally reform the state's revenue system, its budgeting processes, and service delivery in its three core functions: education, human services, and public safety.

Funding for Oregon's public services depends on tax revenue generated by a robust economy, but at the same time a robust economy depends on a well-educated, productive workforce. The more innovative economy and higher incomes that come with a better-educated population are likely to be the keys to Oregon's long-term prosperity. To bring this about, education reform and education funding need to be given a higher priority. Without such changes, Oregon may find itself in an unsustainable situation even after the economy begins to recover from this downturn.

Exhibit 29: State School Funding Required to Fully Phase-In QEM by 2017-19

SSF Required to Fully Phase-in QEM by 2019-21 Billions of Dollars				
Biennium	**Current Service Level (CSL)**	**Percent of Gap to Close**	**Required Funding Above CSL**	**Total State Funding Required**
2011-13	$6.711	10%	$0.521	$7.231
2013-15		15%	$0.781	$8.012
2015-17		20%	$1.041	$9.053
2017-19		25%	$1.301	$10.354
2019-21		30%	$1.562	$11.916

Appendix A: Panel Members

Best Practices Panel

Chair: Frank P. McNamara
Quality Education Commission Member, Portland

Mark Coleman
High School Math Teacher, Century High School, Hillsboro

Aaron Cooke
Principal, Azalea Middle School, Brookings

Brian Gander
Superintendent, Jewell School District

Susie Garrison
Teacher, Humbolt Elementary School, John Day

Edward Jensen
Superintendent, Wallowa Education Service District

Teresa Ketelsen
Director of Curriculum and Instruction, Gresham-Barlow School District

David Krumbein
School Board Member, Pendleton School District

Lynn Lundquist
Quality Education Commission Member, Powell Butte

Michael Van Kleeck
Community Member, Portland

Cost Panel

Chair: Beth Gerot
Quality Education Commission Member
President, Oregon School Boards Association

Hilary Kittleson

Management Consultant, Eugene School District Finance Director, retired

Mark Mulvihill
Superintendent, Umatilla-Morrow Education Service District

Gail Rasmussen
President, Oregon Education Association

Maryalice Russell
Superintendent, McMinnville School District

Peter Tromba
Principal, Monroe Middle School

Staff Support

Brian Reeder, Assistant Superintendent, ODE

Diane Rush, Support Staff, ODE

Ashlee Davis, Student Intern, ODE

Appendix B: Timeline and Phase-In for Oregon Diploma Credit Requirements

Shading indicates when changes in the credit requirements first come into effect.

Credits by Subject	Graduating Classes of 2007, 2008, & 2009	Graduating Classes of 2010 & 2011	Graduating Classes of 2012 & 2013	Graduating Class of 2014
English/Language Arts	3.0	4.0	4.0	4.0
Mathematics	2.0	3.0	3.0	3.0-all at Algebra I level and above
Science	2.0	2.0	3.0-scientific inquiry (2 with lab experiences)	3.0
Social Sciences	3.0	3.0	3.0	3.0
Physical Education	1.0	1.0	1.0	1.0
Health	1.0	1.0	1.0	1.0
Second Language, The Arts, Career & Technical Education (CTE)	2.0	1.0	3.0	3.0
Electives	9.0	9.0	6.0	6.0
Total Credits	**22.0**	**24.0**	**24.0**	**24.0**

Additional information for educators, parents, students and the community is available at www.ode.state.or.us/go/diploma and www.GetReadyOregon.org .

Appendix C: Best Practices Panel Interview Questions

1. What is the type of class schedule is used in your school?
   a. 90 minute blocks on A / B or 4 by 4
   b. 70 minute blocks … trimesters
   c. 45 to 65 minutes all year (regular?)
   d. Other (specify):_____

2. What is the sequence for math classes taken at the high school prior to the junior year?
   a. Algebra, Geo, Algebra II, Pre-Calc
   b. Algebra, Algebra II, Geo, Pre-calc
   c. Other:_____

3. Do 7th and 8th graders take Algebra I or Geometry? Is high school credit available for these courses prior to 9th grade?

4. How many Algebra I teachers operate with a basic math certification?

How many Algebra I teachers operate with an advanced math certification?

How many Algebra I teachers are certified in other ways?

5. What is the average class size in your Algebra I and Geometry classes?

6. Is math progression based on proficiency or do students automatically move to the next level?
If based on proficiency, what grade must be earned?

7. Are there any "special factors" in your building, district or community that affect student achievement in math?

8. What are the 2 or 3 things you feel you (or your school) do well in mathematics?

9. What methods of interventions are used in your school to support students who are not yet successful in math?
   a. During the school day:
   b. Extended Learning Time:

10. When listing the priorities for your school, what is above improving student performance on the state math assessment?

11. What professional development has your school employed to help increase student achievement in math?

12. What professional development would you like to have access to within your building to increase student achievement in math?

13. Do you believe the state tests are given at the appropriate time (10th grade)?
   a. Yes
   b. No, too early (11th grade preferred)
   c. No, 9th grade would be better
   Explain answer please : _____

14. If you could change one thing in your school that would improve student achievement in math, what would it be?

15. What is the one thing you would never want to change in your school, because of its positive effect on student achievement in math?

16. What could "the state" do to help you (or your school) improve student successes in math?

17. If you had control of "extra monies," how would you spend it to improve math scores for students?

Appendix D: Glossary

Academic Content Standards: Statements of what students are expected to know in particular subjects and to be able to do at specified grade levels. Academic content standards are developed through the standards-setting processes established in ORS 329.045.

Assessment: Systematic gathering of data toward the purpose of appraising and evaluating students' social, emotional, physical, and intellectual development. Activities may include testing to obtain and organize information on student performance in specific subject areas.

Education Plan: A formalized plan and process in which students identify their academic, personal, and career interests and help connect school activities with their post-high school goals.

Essential Skills: Process skills that are foundational for learning and needed for success in college, the workplace, and community life. The essential skills include reading, writing, listening and speaking, applying mathematics, thinking critically and analytically, using technology, civic and community engagement, global literacy, personal management, and teamwork.

Formative Assessment: A type of classroom assessment used by teachers to help guide instruction by highlighting a student's academic strengths and weaknesses. Formative assessment is often referred to as "assessment for learning."

Oregon Assessment of Knowledge and Skills (OAKS): Official name of Oregon's statewide knowledge and skills tests in reading/literature, mathematics, science, and social sciences. OAKS also includes performance assessment in writing and English language proficiency, and work samples in writing, speaking, math problem solving, scientific inquiry, and social science analyses. OAKS provides comparable testing to students through online, paper and pencil, Braille or large print, and extended options. Operational use of OAKS informs decisions based on student test scores.

Personalized Learning: Processes schools develop to help each and every student create and pursue an increasingly clear purpose for learning. A personalized learning environment helps students to assess their own talents and aspirations, plan a pathway toward their goals, demonstrate learning against clear standards, and maintain a record of their accomplishments, all with the support of adult mentors and guides.

Proficiency: Demonstrated knowledge and skills which meet or exceed defined levels of performance. Proficiency can be measured through statewide assessments and/or classroom evidence. Districts must have defined proficiency levels for each learning option that is clearly reflective of state, local, or national criteria.

Quality Indicators: Intangible characteristics or traits that play a critical role in student achievement. Examples are instructional leadership, teacher quality, parent/community involvement, and student connectedness to school.

Standards-based: Curriculum and instruction that targets required student knowledge and skills as reflected in local, state, national, international, or industry standards.

Summative Assessment: A type of assessment that generally occurs after a period of instruction as a measure of learning. Examples of summative assessments are the Oregon Assessment of Knowledge and Skills tests and the National Assessment of Educational Progress (NAEP).