Iowa End-of-Course
Assessment Program

Technical Documentation

Online Administration

Spring 2018 Results

Iowa End-of-Course Assessments (IEOC)

Development Process for Iowa End-Of-Course Assessments
The Iowa End-of-Course (IEOC) assessments are developed to measure how well students have met the academic standards required for the most frequently offered courses in language arts, mathematics, science, and social studies. The assessments provide diagnostic information to help students identify strengths and weaknesses in specific content areas found in the Iowa Core. The test items, which are also aligned to the Common Core State Standards, reflect educator input and a rigorous quality-control process to ensure appropriateness, content accuracy, and clarity.

Content Development
The content standards are the foundation for every IEOC assessment. These standards are the result of a thorough and collaborative process. High school teachers across the state of Iowa were surveyed to document the exact subject matter they taught in the courses assessed on the IEOCs. This information, in addition to the Iowa Core and other national standards, led to the creation of the content standards for the assessments.

Once the content standards were determined, a test blueprint was created to outline the number of items from particular content area domains and cognitive levels that will appear on the test. These test specifications assisted item development and served as a guide for building the operational test forms.

Item Development
The item development process for IEOC assessments involved both Iowa Testing Programs (ITP) content area specialists and high school teachers. ITP test development staff convened item writing workshops across the state and trained educators on sound item writing practices. Using the content standards and test blueprint as a guide, educators drew upon their experiences in the classroom to write items that would be engaging to today's students and representative of today's curriculum. ITP content experts, copyeditors, and test development experts then reviewed these items for content accuracy, adherence to item development guidelines, fairness, and universal design. The items were also copyedited for clarity of expression as well as grammar and spelling.

Once the items were reviewed internally, ITP convened a panel of educators to evaluate the items. The educators reviewed the items for grade level appropriateness, content relevance, and accuracy. The goal of the educator panels was to confirm that the items were appropriate for the intended students and content area. Items were then edited and refined by ITP as necessary.

Field-testing and Data Analysis
Once items passed through the review process, ITP collected data on the performance of the items by conducting field tests to determine how well the items were likely to perform when administered operationally. In order to conduct the field test, ITP created test booklets that had the newly developed items embedded within. Students who had completed the appropriate coursework took the exams under the same conditions as operational tests (scores on the new

items were not provided to examinees and were not used in the calculation of student scores). Approximately 250 students responded to each test item.

The analysis of the data collected during field-testing helped to determine whether the items were appropriately measuring students' knowledge and thus should contribute to student scores. Items that performed acceptably were eligible to appear on operational forms and became part of a pool of items eligible for selection.

Test Assembly
Test forms were built from the pool of eligible items according to the test specifications. ITP development staff reviewed each test form to make certain that the individual items on the forms were appropriate and error free. Educators and other content experts were convened to conduct another review of the test forms for content accuracy, fairness, and universal design. At this stage in the process, reviews focused not only on individual items, but also on how the items functioned together on a test form.

Online EOC
Beginning in the Spring 2011 administration, the EOC assessment was administered online.

Spring 2018 Administration Results

All Iowa school districts were invited to administer the assessments. Results are reported for the 16 participating public schools, representing 11 districts. Table 1 displays the distribution of district enrollment size.

Table 1
Distribution of District Size

Enrollment Category	Number of Districts
<400	2
400-599	1
600-999	4
1000-2499	2
2500-7499	2
7500+	0

Table 2 describes the student level characteristics of the spring 2018 End-of-Course (online) administration.

The range of performance, mean, standard deviation, and quartile values for each subject area are provided in Table 5.

Each end-of-course form consists of 28-30 total items in three to eight content strands. Descriptive information by test and content strand is provided in Table 6.

Table 2

Student-level Characteristics

Students by: Grade	Algebra 1	Algebra 2	Biology	Chemistry	English Language Arts	Geometry	Physical Science	U.S. History
7th	7.82%	0.00%	0.00%	0.00%	0.00%	0.14%	0.00%	0.00%
8th	21.95%	0.00%	2.43%	0.00%	0.00%	7.77%	0.00%	0.00%
9th	55.79%	11.52%	17.41%	0.00%	80.17%	26.19%	98.98%	0.00%
10th	12.93%	37.58%	77.33%	0.00%	19.41%	43.60%	1.02%	1.16%
11th	1.35%	45.76%	2.43%	100.00%	0.42%	20.58%	0.00%	98.84%
12th	0.15%	5.15%	0.40%	0.00%	0.00%	1.73%	0.00%	0.00%

Students by: Race	Algebra 1	Algebra 2	Biology	Chemistry	English Language Arts	Geometry	Physical Science	U.S. History
African American	5.71%	5.15%	0.81%	0.00%	1.69%	2.73%	2.04%	1.16%
American Indian/Alaskan Native	0.00%	0.91%	0.40%	0.00%	0.00%	0.43%	0.00%	0.00%
Asian	4.36%	7.58%	1.21%	0.00%	0.00%	4.46%	0.00%	0.00%
Hawaiian/ Pacific Islander	0.45%	0.00%	0.00%	0.00%	0.84%	0.14%	1.02%	0.00%
Multiple	2.86%	5.76%	2.02%	3.39%	1.27%	3.60%	0.00%	2.33%
White	86.62%	80.61%	95.55%	96.61%	96.20%	88.63%	96.94%	96.51%

Students by: Ethnicity	Algebra 1	Algebra 2	Biology	Chemistry	English Language Arts	Geometry	Physical Science	U.S. History
Hispanic	6.32%	5.45%	4.86%	1.69%	7.59%	6.33%	7.14%	3.49%
Not Hispanic	93.68%	94.55%	95.14%	98.31%	92.41%	93.67%	92.86%	96.51%

Students by: Gender	Algebra 1	Algebra 2	Biology	Chemistry	English Language Arts	Geometry	Physical Science	U.S. History
Female	50.53%	49.70%	43.72%	42.37%	48.52%	47.91%	42.86%	43.02%
Male	49.47%	50.30%	56.28%	57.63%	51.48%	52.09%	57.14%	56.98%

Reliability Coefficients and Standard Error of Measurement

Reliability refers to the degree of consistency among test scores across replications, and it is generally measured with a reliability coefficient. These indices quantify the extent to which score differences among individuals are attributable to true differences in the construct measured or attributable to chance errors. In numerical value, the reliability coefficient is bounded by .00 and .99, though generally for standardized tests it is between .60 and .95. The closer the coefficient is to the upper limit, the more likely it is that the test scores are free from the influence of factors that obscure real differences in achievement. Comparisons of reliability coefficients, when made against equally valid and equally practical alternative tests, can be useful in determining the relative stability of the test scores.

The standard error of measurement is a measure of the net effect of the factors that contribute to the inconsistency in student performance. It communicates the variability in the scores of students who have the same actual ability, and it refers to the degree of precision in the test score. For example, suppose students with the same ability were to take a reading test. It is likely that some would score above their ability, some would score below their ability, and most would receive scores very near to their actual ability. Such variation could be attributed to a variety of factors, including motivation, attentiveness, student health, etc. The standard error of measurement (SEM) helps to quantify this variation and assists in the proper use and interpretation of test scores. Standard errors of measurement and reliability coefficients have been provided in Table 3. In Table 3, the SEMs are reported for raw scores, which range from 0-30 on the EOC assessments.

Table 3

Reliability (Coefficient Alpha) and Standard Error of Measurement (SEM)

	Coefficient Alpha	SEM
Algebra I	0.85	2.39
Algebra II	0.84	2.40
Biology	0.72	2.47
Chemistry	0.67	2.48
English Language Arts	0.84	2.24
Geometry	0.86	2.27
Physical Science	0.79	2.37
U.S. History	0.84	2.41

Item Difficulty and Discrimination

Item statistics can be used to determine the difficulty and discrimination capabilities of the items. P-values communicate the percent of examinees who answered the item correctly and therefore reflect the average item difficulty. A high p-value indicates that many students answered the item correctly. Item difficulty can be used to determine whether students have learned the concept being tested. Average p-values and minimum and maximum p-values have been provided for each subject on the EOC assessments in Table 4.

Item discrimination values communicate the correlation between the scores on a particular item with the scores on the total test. These indices reflect the ability of an item to differentiate among students based on how well they know the material being tested. An item with a high discrimination value indicates that a student who answered this item correctly also likely scored high on the total test, and a student who answered this item incorrectly likely scored lower on the total test. Discrimination indices range from -1.0 to 1.0, as they are correlations. Generally, items with discrimination values above .30 are considered good and have the capability to discriminate between students who know the tested material and students who do not. Average discrimination values and the number of items with discrimination values exceeding .30 are provided for each EOC assessment in Table 4.

Table 4

Item Difficulties (P-values) and Discriminations

Subject	No. of Items	Avg P-value	P-value range		Avg Discrimination	No. of Items with Discrimination >.30
			Min	Max		
Algebra 1	30	0.50	0.20	0.87	0.56	30
Algebra 2	30	0.56	0.25	0.86	0.54	29
Geometry	30	0.63	0.25	0.92	0.59	30
Physical Science	30	0.54	0.20	0.93	0.50	28
Chemistry	30	0.48	0.10	0.90	0.41	23
Biology	30	0.58	0.28	0.86	0.44	23
US History	30	0.58	0.28	0.84	0.54	28
English Lang Arts	28	0.62	0.32	0.88	0.58	27

Table 5

Raw Score Descriptive Information by Test

	Algebra 1	Algebra 2	Biology	Chemistry	English Language Arts	Geometry	Physical Science	U.S. History
N	665	330	247	59	237	695	98	86
Score Range	0-30	2-30	0-27	5-27	0-28	4-30	5-27	2-28
Mean	15.13	16.83	17.29	14.32	17.38	18.97	16.10	17.50
SD	6.16	5.92	4.66	4.32	5.52	6.05	5.14	6.02
90^{th} percentile	23	25	23	20	24	27	23	25
75^{th} percentile	19	21	21	17	22	24	20	23
50^{th} percentile	15	17	17	14	18	19	16	17
25^{th} percentile	10	12	14	11	14	14	13	14
10^{th} percentile	8	9	12	9	9	11	9	9

Table 6

Descriptive Information by Test and Content Strand

Algebra 1	Seeing Structure in Expressions	Reasoning with Equations and Inequalities	Interpreting Functions	Arithmetic with Polynomials and Rational Expressions	Building Functions	Creating Equations
Number of Items	6	10	2	8	3	1
Score Range	0-6	0-10	0-2	0-8	0-3	0-1
Mean	3.86	4.57	1.04	3.62	1.42	0.63
Median	4	4	1	4	1	1
SD	1.41	2.35	0.72	2.18	0.95	0.48

Algebra 2	Interpreting Functions	Seeing Structure in Expressions	Building Functions	Reasoning with Equations and Inequalities	Linear, Quadratic and Exponential Models	The Complex Number System	Arithmetic with Polynomials and Rational Expressions	The Real Number System
Number of Items	6	4	7	5	1	3	3	1
Score Range	0-6	0-4	0-7	0-5	0-1	0-3	0-3	0-1
Mean	3.46	2.68	3.84	3.12	0.60	1.14	1.44	0.55
Median	3	3	4	3	1	1	1	1
SD	1.57	1.12	1.67	1.36	0.49	0.99	0.97	0.50

Biology	Molecular Basis of Heredity	Behavior of Organisms	Interdependence of Organisms, Matter, Energy, and Organization in Living Systems	Biological Evolution	The Cell
Number of Items	8	5	4	4	9
Score Range	0-8	0-5	0-4	0-4	0-8
Mean	4.52	3.38	2.36	2.58	4.45
Median	5	3	2	3	5
SD	1.57	1.29	1.01	1.11	1.71

Descriptive Information by Test and Content Strand

Chemistry	Conservation of Energy and Increase in Disorder	Structure of Atoms	Structure and Properties of Matter	Chemical Reactions
Number of Items	2	3	14	11
Score Range	0-2	0-3	1-12	2-11
Mean	1.08	1.41	6.22	5.61
Median	1	1	6	6
SD	0.68	0.85	2.50	1.81

English Language Arts	Craft and Structure	Key Ideas and Details	Integration of Knowledge and Ideas
Number of Items	12	10	6
Score Range	0-12	0-10	0-6
Mean	7.72	6.08	3.58
Median	8	6	4
SD	2.59	2.21	1.55

Geometry	Interpreting Functions	Congruence	Similarity, Right Triangles, and Trigonometry	Geometric Measurement and Dimension	Circles	Modeling with Geometry
Number of Items	2	10	7	6	4	1
Score Range	0-2	1-10	0-7	0-6	0-4	0-1
Mean	1.09	7.20	4.35	3.37	2.22	0.74
Median	1	8	4	3	2	1
SD	0.79	2.05	1.95	1.46	1.18	0.44

Descriptive Information by Test and Content Strand

Physical Science	Motion and Forces	Structure and Properties of Matter	Chemical Reactions	Conservation of Energy and Increase in Disorder	Structure of Atoms	Interactions of Energy and Matter
Number of Items	11	5	2	6	3	3
Score Range	2-11	0-5	0-2	0-5	0-3	0-3
Mean	7.20	1.95	1.16	2.89	1.49	1.41
Median	7	2	1	3	2	1
SD	2.03	1.35	0.74	1.36	0.86	0.92

U. S. History	Building a Powerful Nation (1870-1920)	From Prosperity to Depression and Recovery (1920-1941)	U.S. Foreign Policy: WWII to the Cold War (1941-1980)	Domestic Policy (1941-1980)
Number of Items	8	8	8	6
Score Range	0-8	0-8	0-8	0-6
Mean	4.50	4.67	4.65	3.67
Median	4	5	5	4
SD	1.90	1.82	2.03	1.59

Algebra I Strand Descriptions

Algebra

Seeing Structure in Expressions

Topics may include interpreting the structure of expressions and writing expressions in equivalent forms to solve problems.

Arithmetic with Polynomials and Rational Expressions

Topics may include performing arithmetic operations on polynomials, understanding the relationship between zeros and factors of polynomials, using polynomial identities to solve problems, and rewriting rational expressions.

Creating Equations

Topics may include creating equations or inequalities in one or two variables, graphing equations on a coordinate axis, and solving literal equations.

Reasoning with Equations and Inequalities

Topics may include solving linear equations and inequalities, quadratic equations, rational equations, and radical equations in one variable; solving systems of equations; and graphing linear equations and inequalities, and polynomial, rational, absolute value, exponential, and logarithmic functions.

Functions

Interpreting Functions

Topics may include using function notation and analyzing linear, quadratic, square root, cube root, piecewise-defined, polynomial, rational, exponential, and logarithmic functions.

Building Functions

Topics may include creating functions describing relationships between quantities, using arithmetic operations on functions, composing functions, translating between explicit and recursive forms of sequences, understanding the effects of function transformations, finding inverse functions, and understanding and using the inverse relationship between exponents and logarithms to solve problems.

Algebra II Strand Descriptions

Number and Quantity

The Real Number System

Topics may include using properties of rational exponents and using properties of rational and irrational numbers.

The Complex Number System

Topics may include performing arithmetic operations with complex numbers, representing complex numbers and their operations on the complex plane, and using complex numbers in polynomial identities and equations.

Algebra

Seeing Structure in Expressions

Topics may include interpreting the structure of expressions and writing expressions in equivalent forms to solve problems.

Arithmetic with Polynomials and Rational Expressions
Topics may include performing arithmetic operations on polynomials, understanding the relationship between zeros and factors of polynomials, using polynomial identities to solve problems, and rewriting rational expressions.

Reasoning with Equations and Inequalities
Topics may include solving linear equations and inequalities, quadratic equations, rational equations, and radical equations in one variable; solving systems of equations; and graphing linear equations and inequalities, and polynomial, rational, absolute value, exponential, and logarithmic functions.

Functions
Interpreting Functions
Topics may include using function notation and analyzing linear, quadratic, square root, cube root, piecewise-defined, polynomial, rational, exponential, and logarithmic functions.

Building Functions
Topics may include creating functions describing relationships between quantities, using arithmetic operations on functions, composing functions, translating between explicit and recursive forms of sequences, understanding the effects of function transformations, finding inverse functions, and understanding and using the inverse relationship between exponents and logarithms to solve problems.

Linear, Quadratic, and Exponential Models
Topics may include constructing and comparing linear, quadratic, and exponential functions; interpreting different representations of linear and exponential functions, including the parameters of the functions in terms of the context represented; and evaluating logarithms as solutions of exponential functions.

Biology Strand Descriptions

The Cell
Topics may include cell types, cell components and their functions, cell membranes (absorption and transport), the cell cycle, mitosis, cell differentiation, photosynthesis, cellular respiration, and enzymes as catalysts of biological reactions.

Molecular Basis of Heredity
Topics may include DNA, RNA, DNA replication, transcription, translation, sexual reproduction, gametes, meiosis, fertilization, genes, alleles, Mendel's laws, Punnett square, genotype, phenotype, and mutations.

Biological Evolution
Topics may include diversity of organisms, descent from common ancestors, natural selection, survival and reproductive success, genetic variation, biological classification, and binomial nomenclature.

Interdependence of Organisms/Matter, Energy, and Organization in Living Systems
Topics may include cycling of materials, symbiotic interactions, competition, predation, population, community, food chains, food webs, energy flow through trophic levels, effects of environmental factors and finite resources, impact of human activities on ecosystems, the Sun as the primary source of energy for life, energy aspects of photosynthesis and cellular respiration, ATP, conservation of matter and energy, and levels of biological organization.

Behavior of Organisms
Topics may include nerve cell structure and function, neurotransmitters, CNS and PNS, ectothermy and endothermy, innate behavior, learning, behavioral responses to external and internal stimuli, plant behavior, human immune system, and human endocrine system and hormones.

Chemistry Strand Descriptions

Structure of Atoms
Topics may include masses, charges, and locations of protons, neutrons, and electrons in an atom; atom volume; atomic number; mass number; isotopes; decay; half-life; nuclear forces; and fission and fusion.

Structure and Properties of Matter
Topics may include atomic mass, valence electrons, periodic table and trends, ionic and covalent bonding, mole, molar mass, physical and chemical properties of substances, states of matter, and gas laws.

Chemical Reactions
Topics may include reaction components, writing and balancing chemical equations, types of chemical reactions, thermochemistry, conservation of mass, acids and bases, electrochemistry, radical reactions, kinetics and equilibrium, stoichiometry, and catalysts.

Conservation of Energy and Increase in Disorder
Topics may include work and energy, conservation of energy, types of energy, heat and temperature, thermal properties of matter, kinetic theory of gases, entropy, energy transformations, energy transfers, and thermodynamics.

English Language Arts Strand Descriptions

Key Ideas and Details

Items may ask students to examine how individuals, events, and ideas develop and interact; to discern central ideas or themes and their development in a variety of literary texts; and to demonstrate that they can summarize key ideas and supporting details; draw conclusions, make logical inferences and predictions; and understand explicit meaning.

Craft and Structure

Items may ask students to interpret aspects of text structure and author's craft, including the use of literary devices (e.g., simile, personification, alliteration) and literary elements (e.g., setting, theme, tone); assess how point of view and purpose shape the content and style of the text; analyze how specific portions of text relate to each other and the text as a whole; and to demonstrate that they understand the meaning of specific words and phrases in the text, including connotative and figurative language; and how language and word choices affect overall meaning.

Integration of Knowledge and Ideas

Items may ask students to demonstrate that they can synthesize ideas from multiple texts; analyze how these texts address similar topics and themes; evaluate specific claims, the author's reasoning, and the validity of the author's arguments; judge the relevance and sufficiency of evidence provided; and make connections that integrate texts with external ideas.

Geometry Strand Descriptions

Functions

Interpreting Functions

Topics may include using function notation and analyzing linear, quadratic, square root, cube root, piecewise-defined, polynomial, rational, exponential, and logarithmic functions.

Geometry

Congruence

Topics may include representing and analyzing transformations in the coordinate plane; understanding congruence in terms of rigid motions; proving geometric theorems, including theorems about lines and angles, triangles, and parallelograms; and making geometric constructions.

Similarity, Right Triangles, and Trigonometry

Topics may include understanding similarity in terms of similarity transformations, using congruence and similarity criteria to solve problems and prove relationships in geometric figures, defining trigonometric ratios and solving problems involving right triangles, and applying trigonometry to general triangles.

Circles

Topics may include understanding and applying theorems about circles and finding arc lengths and areas of sectors of circles.

Geometric Measurement and Dimension

Topics may include understanding the origins of formulas, including circumference and area of a circle and volumes of cylinders, pyramids, cones, and spheres; using formulas to solve problems; and visualizing relationships between two-dimensional and three-dimensional objects.

Modeling with Geometry

Topics may include applying geometric concepts to model real-world phenomena.

Physical Science Strand Descriptions

Structure of Atoms

Topics may include masses, charges, and locations of protons, neutrons, and electrons in an atom; atom volume; atomic number; mass number; isotopes; decay; half-life; nuclear forces; and fission and fusion.

Structure and Properties of Matter

Topics may include atomic mass, valence electrons, periodic table and trends, ionic and covalent bonding, mole, molar mass, physical and chemical properties of substances, states of matter, and gas laws.

Chemical Reactions

Topics may include reaction components, writing and balancing chemical equations, types of chemical reactions, thermochemistry, conservation of mass, acids and bases, electrochemistry, radical reactions, kinetics and equilibrium, stoichiometry, and catalysts.

Motions and Forces

Topics may include Newton's laws, gravity, mass versus weight, force, speed, velocity, acceleration, momentum, buoyancy, and electricity and magnetism.

Conservation of Energy and Increase in Disorder
Topics may include work and energy, conservation of energy, types of energy, heat and temperature, thermal properties of matter, kinetic theory of gases, entropy, energy transformations, energy transfers, and thermodynamics.

Interactions of Energy and Matter
Topics may include light, sound, wave properties, wave phenomena, electromagnetic spectrum, conductors and insulators, electrical circuits, and spectroscopy.

U.S. History Strand Descriptions

Building a Powerful Nation (1870 – 1920)
Topics may include rise of corporations; industrialization; urbanization; immigration; progressive reforms; cultural diffusion; cause and effect relationships; role of innovation; role of individuals and groups within society; and causes and outcomes of the Spanish-American War and WWI.

From Prosperity to Depression and Recovery (1920 – 1941)
Topics may include causes of economic prosperity, the stock market crash, and the Great Depression, and their effects on politics and society; and the transformation of politics and society through New Deal programs.

U.S. Foreign Policy: WWII to the Cold War (1941 – 1980)
Topics may include changing role of the U.S. in world affairs, including the causes, course, and effects of WWII; effects of geographic factors and historical patterns on the Cold War and the conflicts in Korea and Vietnam; and political, economic, and social consequences of these wars.

Domestic Policy (1941 – 1980)
Topics may include effects of individuals and groups, historical patterns, geographic factors, and innovation on economic, political, social, and cultural developments in contemporary American society; the post-war period; New Frontier; Great Society; struggle for civil rights; civil liberties; and immigration.

Validity Evidence

Correlation with Iowa Assessments

The Iowa Assessments are aligned to the common core and are designed to measure broad objectives toward which all students are expected to make progress. These assessments measure general progress in certain subject areas and can help schools monitor student growth and readiness. In addition to the Iowa Assessments, the IEOC assessments measure essential content and skills found in the Iowa Core. The IEOC assessments offer complementary information and measure content mastery in specific courses that are frequently offered to students.

A pilot study conducted by ITP (Cunningham, Fina, Adams, & Welch, 2011) suggests that when the IEOC tests are incorporated into a composite score with the general assessment, there is an increase in information about student achievement and the determination of proficiency. The correlations between 2011 IEOC and Iowa Assessments are .50 for Algebra 1 and .67 for Biology. These modest correlations indicate that while these tests are certainly related, they measure somewhat different constructs and together can serve to provide a more detailed and informed picture of student achievement.

Correlation with Course Grades

Teachers often combine many different sources of information into a course grade for students. Attendance, quizzes, class participation, unit tests, homework and in-class assignments are often cited as relevant information contributing to course grades. In fact, it is not surprising that IEOC scores have a higher correlation with course grades since IEOC is based on the curriculum covered in the course. The IEOC assessment would provide yet another source of information that could be used in the calculation of course grades. Correlations of 2011 IEOC scores with Iowa Assessment scores and course grades for Algebra and Biology are provided in Table 7.

Common Core Standards Alignment

The Common Core State Standards are a robust framework that outlines what students are expected to learn in grades K-12. The IEOC assessments have been closely aligned with the Common Core standards and effectively measure the outlined content. Using the IEOC assessments as a way to measure student achievement and proficiency will also support measurement of the content students are expected to learn based on the Common Core standards. Table 8 provides a comparison of the Common Core standards and the IEOC content strand descriptions.

Table 7

Correlations of 2011 IEOC Scores with Iowa Assessment Scores and Course Grades

	Iowa Assessment-Math	IEOC Algebra I
IEOC Algebra I	0.50	
Course Grades	0.31	0.44
	Iowa Assessment-Science	IEOC Biology
IEOC Biology	0.67	
Course Grades	0.49	0.53

Table 8

IEOC and Common Core Alignment

Algebra I		*Common Core*	*IEOC*
Content Strand	*Seeing Structure in Expressions*	Interpret structure of expressions	X
		Write expressions in equivalent forms to solve problems	X
	Arithmetic with Polynomials and Rational Expressions	Perform arithmetic operations on polynomials	X
		Understand relationship between zeros and factors of polynomials	X
		Use polynomial identities to solve problems	X
		Rewrite rational expressions	X
	Creating Equations	Create equations that describe numbers or relationships	X
	Reasoning with Equations and Inequalities	Understand solving equations as a process of reasoning and explain the reasoning	
		Solve equations in one variable	X
		Solve systems of equations	
		Represent and solve equations and inequalities graphically	X
	Interpreting Functions	Understand the concept of a function and use function notation	X
		Interpret functions that arise in applications in terms of the context	

		Analyze functions using different representations	
	Building Functions	Build a function that models a relationship between two quantities	X
		Build new functions from existing functions	X

Algebra II		*Common Core*	*IEOC*
Content Strand	*The Real Number System*	Extend the properties of exponents to rational exponents	X
		Use properties of rational and irrational numbers	X
	The Complex Number System	Perform arithmetic operations with complex numbers	X
		Represent complex numbers and their operations on the complex plane	X
		Use complex numbers in polynomial identities and equations	X
	Seeing Structure in Expressions	Interpret structure of expressions	X
		Write expressions in equivalent forms to solve problems	X
	Arithmetic with polynomials and Rational Expressions	Perform arithmetic operations on polynomials	X
		Understand relationship between zeros and factors of polynomials	X
		Use polynomial identities to solve problems	X
		Rewrite rational expressions	X
	Reasoning with Equations and Inequalities	Understand solving equations as a process of reasoning and explain the reasoning	
		Solve equations in one variable	X
		Solve systems of equations	X
		Represent and solve equations and inequalities graphically	X
	Interpreting Functions	Understand the concept of a function and use function notation	X
		Interpret functions that arise in applications in terms of the context	
		Analyze functions using different representations	
	Building Functions	Build a function that models a relationship between two quantities	X
		Build new functions from existing functions	X
	Linear, Quadratic, and Exponential Models	Construct and compare linear, quadratic, and exponential models and solve problems	X
		Interpret expressions for functions in terms of the situation they model	X

English Language Arts (ELA)		*Common Core*	*IEOC*
Content Strand	*Key Ideas and Details*	Determine explicit meaning	X
		Make logical inferences	X
		Cite specific evidence for conclusions	X
		Determine and analyze central ideas and their development	X
		Summarize key supporting ideas and details	X
		Analyze the how and why of interaction of events, ideas and individuals throughout text	X
	Craft and Structure	Interpret words and phrases in text—including technical, connotative, and figurative meanings	X
		Analyze how word choices shape meaning or tone	X
		Analyze structure, including how specific sentences, paragraphs, and larger portions of the text relate	X
		Assess how point of view or purpose shapes the content and style	X
	Integration of Knowledge and Ideas	Integrate and evaluate content in diverse formats and media visually and quantitatively, and in words	X
		Delineate and evaluate the argument and specific claims—validity of the reasoning and relevance and sufficiency of evidence	X
		Analyze how multiple texts address similar themes to build knowledge or compare the approaches of authors	X
	Range of Reading and Level of Text Complexity	Read and comprehend complex literary and informational texts independently and proficiently	

Geometry		*Common Core*	*IEOC*
Content Strand	*Congruence*	Experiment with transformations in the plane	X
		Understand congruence in terms of rigid motions	X
		Prove geometric theorems	X
		Make geometric constructions	X
	Similarity, Right Triangles & Trigonometry	Understand similarity in terms of similarity transformations	X
		Prove theorems involving similarity	X
		Define trigonometric ratios and solve problems involving right triangles	X
		Apply trigonometry to general triangles	X
	Circles	Understand and apply theorems about circles	X
		Find arc lengths and areas of sectors of circles	X
	Expressing Geometric Properties with Equations	Translate between the geometric description and the equation for a conic section	
		Use coordinates to prove simple geometric theorems algebraically	
	Geometric Measurement & Dimension	Explain volume formulas and use them to solve problems	X
		Visualize relationships between two-dimensional and three-dimensional objects	X
	Modeling with Geometry	Apply geometric concepts in modeling situations	X

Matrix Algebra		*Common Core*	*IEOC*
Content Strand	*Vector & Matrix Quantities*	Represent and model with vector quantities	X
		Perform operations on vectors	X
		Perform operations on matrices and use matrices in applications	X
	Reasoning with Equations and Inequalities	Understand solving equations as a process of reasoning and explain the reasoning	
		Solve equations in one variable	X
		Solve systems of equations	X
		Represent and solve equations and inequalities graphically	