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ABSTRACT

This booklet provides parents and students with answers to their questions about ISTEP+ (Indiana Statewide Testing for Educational Progress-Plus), which measures tenth-grade student achievement in English/language arts and mathematics. After a letter from Suellen Reed, Indiana's Superintendent of Public Instruction, the booklet discusses what ISTEP+ is and what it tests, and presents answers to 10 frequently asked questions. It then discusses how to read and interpret the detailed information about student performance included in the ISTEP+ report; what to do if test scores do not seem to match classroom performance; additional resources for information about ISTEP+; English/language arts proficiency content standards tested on the tenth-grade ISTEP+; and the Mathematics Proficiency Content Standards tested on the tenth-grade ISTEP+. A 14-item glossary of assessment terms is attached. (RS)

A Descriptive Guide to the 10th Grade ISTEP+ and High School Graduation Qualifying Exam for Indiana Parents and Students

Indiana Statewide Testing For Educational Progress

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This comprehensive guide was produced by the Indiana State Government with special assistance from the Indiana Commission for Higher Education, the Indiana Department of Education, CTB/McGraw-Hill, and Indiana University.

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Dear Indiana 10th grade students and parents:

Soon Indiana students will receive the results of ISTEP+ (Indiana Statewide Testing for Educational Progress-Plus) and the 10th grade Graduation Qualifying Exam. We hope this guide will answer questions you may have about ISTEP+ and the graduation examination requirement.

ISTEP+ represents the best ideas in testing incorporated in a program that will help students achieve the high levels needed for success in the workplace and in college or vocational school. ISTEP+ serves several purposes for Indiana school administrators, teachers, students, and parents. These purposes include:

- ISTEP+ is designed specifically for **Indiana** students. The test reflects the Indiana *Proficiency Content Standards* in English/language arts and mathematics that Indiana teachers use to guide their teaching. ISTEP+ tests what students are actually doing in their classes and provides clear standards toward which Indiana students can strive. When provided with these standards and information about how these standards are being met, Indiana students have the opportunity to perform at their highest levels.
- Test score reports provide feedback to students, families, and teachers. These reports give a clear picture of how well students are meeting Indiana's educational standards. This information will enable educators to help students meet the standards necessary for success in the workplace and in college or vocational school.
- Student scores provide important information for school systems to determine if they have met their goals and developed effective educational programs. In this way, the statewide assessment program can stimulate school improvement.

ISTEP+ allows Indiana's educational community to demonstrate its achievements, explore its options, and make decisions. ISTEP+ connects student achievement, classroom instruction, school improvement, and state educational goals.

We are enthusiastic about the prospect of continued improvement by Indiana's students and schools. We believe ISTEP+ is an important step toward continuing improvement and hope this booklet will provide you with answers to your questions about ISTEP+.

Sincerely,

Dr. Suellen Reed

Dr. Suellen Reed, Superintendent of Public Instruction

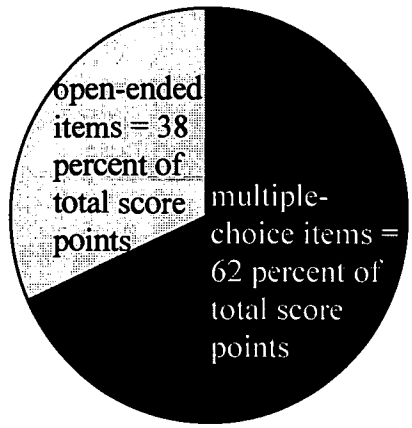
What is ISTEP+ and how is ISTEP+ different from ISTEP?

ISTEP was revised in 1995 by the Indiana General Assembly. This revision mandated the inclusion of short answer and essay questions, the high school graduation qualifying exam, and the remediation of students who do not meet the state standards. ISTEP+ was first administered to schools in the 1995-1996 academic year. The Graduation Qualifying Exam for students in the graduating class of 2000 was administered for the first time in the fall of 1997.

What does ISTEP+ look like?

ISTEP+ includes both multiple-choice and open-ended questions—essay questions, short answer questions, and mathematics questions that require a written explanation. These open-ended questions ask students to apply their knowledge and solve real-life problems similar to those they will encounter after they leave school. In this way ISTEP+ tests students not just on *what* they know, but on how well they *use* what they know to solve problems and *explain* their solutions.

Format of 10th Grade ISTEP+



What does ISTEP+ test?

ISTEP+ measures student achievement in English/language arts and mathematics. The test was written to reflect the Indiana *Proficiency Content Standards* in English/language arts and mathematics in order to ensure a match between what is taught and what is tested. A summary of these *Proficiency Content Standards*, with an explanation of how they are tested through ISTEP+, is included in this document.

ISTEP+ is designed also to allow students, teachers, parents, and schools to compare Indiana students' scores to both national norms and to Indiana standards.

Frequently Asked Questions about ISTEP+ and the Graduation Qualifying Exam

- **What is the High School Graduation Qualifying Exam?**

Starting with the graduating class of the year 2000, Indiana high school students must achieve basic standard levels on the 10th grade assessment in order to earn a diploma. The Indiana State Board of Education has designated the 10th grade ISTEP+ exam as the High School Graduation Qualifying Exam.

- **When does the High School Graduation Qualifying Exam go into effect?**

The graduating class of the year 2000, who took the test in the fall of 1997, is the first class required to pass the Graduation Qualifying Exam as part of the requirements for graduation.

- **Why does Indiana have a High School Graduation Qualifying Exam?**

This graduation exam became part of Indiana Law in 1992 by an act of the Indiana General Assembly. The test was mandated in response to the concerns of parents, employers, and the higher education community who wanted to ensure that Indiana students would graduate and enter the workforce and postsecondary education with the skills they need for success. By receiving a passing score on the High School Graduation Qualifying Exam, Indiana students can demonstrate their mastery of basic proficiency in reading, writing, and mathematics. By incorporating this standard as a component of an Indiana high school diploma, the value of the diploma is strengthened.

By adopting this important graduation requirement, Indiana joins 22 other states across the United States where basic skills testing programs exist.

- **What is tested on the 10th grade ISTEP+?**

At the 10th grade level, ISTEP+ consists of two separate parts:

- The first part is the Graduation Qualifying Exam that includes both multiple-choice and open-ended items. This section consists of questions based on the Indiana *Proficiency Content Standards* in English/language arts and mathematics (listed as essential skills on the 10th grade ISTEP+ report, a sample of which is provided on page 8 of this guide). These standards were recommended to the Indiana State Board of Education for adoption by the State Standards Task Force, a task force made up of teachers, parents, business and community leaders, administrators, and students.
- The second part consists only of multiple-choice items based on a set of objectives and standards compiled by CTB/McGraw-Hill, one of the nation's leading test development companies. This part of the test compares students to a national sample of students.

- **How is ISTEP+ scored?**

The multiple-choice questions on the test are machine-scored by CTB/McGraw-Hill, as tests of this nature have been scored for many years. The open-ended questions are scored by trained scorers using previously established scoring rules. The short answer and essay responses are scored in Indiana by college graduates who are carefully trained in how to score the tests reliably.

If you have additional questions about how ISTEP+ is scored, please contact your school. Scoring guides for the English/language arts and mathematics components of the test will be sent to every Indiana school with the 1997 ISTEP+ reports.

- **When are scores reported?**

Test results are provided in January of the same school year the test was administered. Written response portions of the test are returned to the schools to allow teachers and parents to see how students are performing on these types of items. Individual student reports are also issued that show a student's score in math and English, as well as a national percentile score that reflects how a student scored compared to national norms.

- **How is a passing grade established?**

Minimum performance standards are established by the Indiana State Board of Education, based upon recommendations by math and English teachers and the State Standards Task Force.

- **Does a student have only one chance to pass the Graduation Qualifying Exam?**

No. Students who do not pass the Graduation Qualifying Exam in their sophomore year will have four more opportunities to take the test – in the fall and spring of their junior and senior years.

- **What type of help is available to students who do not pass the Graduation Qualifying Exam?**

ISTEP+ is administered in the fall to allow more time during the academic year for schools to provide assistance to students who have been identified as needing extra help. Remedial assistance is required for all students who do not meet the academic standards required to pass the 10th grade Graduation Qualifying Exam. The type of assistance is determined by the student's school system and may include summer school and before and/or after school instruction. If you have questions about this, please contact your school.

- **What if a student completes other requirements for graduation, but does not pass the Graduation Qualifying Exam?**

State law provides that a student may graduate without passing the Graduation Qualifying Exam if the student has successfully completed one of the two following options:

a.) if the principal of the school the student attends certifies that the student will, within one (1) month of the student's scheduled graduation date, complete the components of the Core 40* curriculum with a grade of "C" or higher in each required and directed elective course

or

b.) if the student successfully appeals the test results under the criteria adopted by the State Board. These criteria specify that the student must have done the following:

- Taken the test at least once every year during his or her sophomore, junior, and senior years in the subject areas in which the student did not achieve a passing score;
- Completed all remediation opportunities provided by the school;
- Maintained a minimum attendance rate of 95 percent;
- Completed the 22 credit hours of required courses for graduation with a "C" average;
- Obtained a written recommendation supporting the request for the appeal from the student's teacher(s) in the subject area(s) in which the student has not achieved a passing score; and
- Otherwise satisfied all state and local graduation requirements.

*Core 40 is a set of essential high school courses that will prepare students for work or for more education after high school. If you have any questions about courses at your school that satisfy the Core 40 requirements, please contact your school.

After ISTEP+ results are received . . .

ISTEP+ reports provide you with detailed information about student performance. ISTEP+ reports show student performance in relation to Indiana's curriculum and to national norms. The reports show:

- How a student performs in relation to the Indiana Academic Standards defined by the State Board of Education and to what extent a student has mastered Essential Skills in English/language arts and mathematics (as defined by the *Proficiency Content Standards* that are described starting on page 10 of this guide).
- How the achievement of a student compares to that of a representative sample of students nationwide.

"Improved reports show the extent to which students have mastered the skills for future success more clearly than ever before"

Department of Education
March 1997

Reproduced on page 8 is a sample of a 10th grade student's ISTEP+ score report with some of the reported information described in more detail. The information provided below and on the next two pages should help you to interpret the student report.

The ISTEP+ student report provides information about how a student performed on the High School Graduation Qualifying Exam and information about how a student did on ISTEP+ compared to a sample of students nationwide. How a student performs in relation to Indiana's curriculum is shown in two sections of the report:

1. The **Indiana Essential Skills** section of the report shows how a student performed in each of the skill areas defined by the Indiana State Board of Education as skills essential for success at the current grade level.
2. The **Indiana Academic Standards** section of the report shows how well a student achieved on the Essential Skills measured against the performance standards adopted by the Indiana State Board of Education, based on recommendations by math and English teachers and the State Standards Task Force. **These standards represent the scores needed to meet the graduation requirement.**

Student performance in relation to national norms is shown in another section of the report:

3. The **National Percentiles** section of the report shows how this student performed on ISTEP+ compared to the performance of a representative sample of students tested nationwide.

1. The **Indiana Essential Skills** section of the report is in the upper left-hand portion of the report. This section of the student report shows how the student did in *each* of the **Essential Skill** areas. This breakdown by skill area makes it easier for students and teachers to work together to determine students' areas of strength and help students improve in their areas of weakness.

2. A student's scores on the High School Graduation Qualifying Exam are given in the **Indiana Academic Standards** section in the upper right-hand portion of this report. This section shows the student's scores in English/language arts and mathematics, along with the English Standard and the Math Standard.

ISTEP+ INDIANA STATEWIDE TESTING FOR EDUCATIONAL PROGRESS

Student Report For
TOM ZIRKLE GRADE: 10

TEST DATE: 10/01/97 SCHOOL: NEW HAVEN HS 513
QUARTER MONTH: 08 CORPORATION: EAST ALLEN
CORP-SCH: 0255-0297 COUNTY: 02 ALLEN
CLASS: MASTERY OBJ STATE: ISTEP + 1997

Indiana Essential Skills

English/language arts	Points Obtained	Points Possible	Percent of Points Possible
Construct Meaning (mc only)	2	4	50
Compare/Predict (mc only)	0	1	0
Textual Clues (mc only)	2	4	50
Writing Development (writing)	7	10	70
Language-in-Use (writing)	5	8	63
Punct/Capitalize (mc only)	2	4	50
Usage (mc only)	2	4	50
Spelling (mc only)	2	4	50
Revise Written Text (mc only)	2	4	50
Make Inferences (mc & oe)	11	14	79
Cause/Effect (mc & oe)	2	4	50
Purpose/Perspective (mc & oe)	7	10	70
Compare/Contrast (mc only)	1	3	33
Influence/Persuade (mc only)	3	5	60
Fact/Opinion (mc & oe)	4	7	57
Literal Meaning (mc only)	3	5	60
Genres/Conventions (mc & oe)	4	7	57

Mathematics	Points Obtained	Points Possible	Percent of Points Possible
Problem Solving (mc & oe)	9	14	64
Communicate/Reason (mc & oe)	8	15	53
Algebra (mc & oe)	4	6	67
Functions (mc & oe)	5	8	63
Geometry (mc & oe)	3	7	43
Statistics (mc & oe)	5	8	63
Probability (mc & oe)	4	6	67
Computation (mc only)	6	10	60

mc: Multiple-choice items
oe: Open-ended items

Indiana Academic Standards

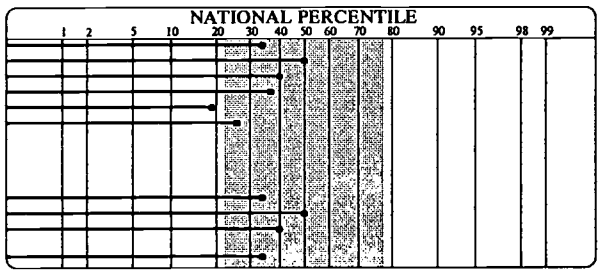
Indiana Academic Standards define student achievement based on the Essential Skills and are expressed as scale scores. The standard for English/language arts is 469 and the standard for mathematics is 478. Your scores are 431 in English/language arts and 498 in mathematics, indicating that you are BELOW the English/language arts standard and ABOVE the mathematics standard.

English Standard: 469
Your Score: 431
Math Standard: 478
Your Score: 498

There is no relationship between these scores and the norm-reference scores reported below.

National Percentiles
(1996 Norms)

Reading/language arts	NP
Reading Comprehension	35
Reading Vocabulary	49
Total Reading	41
Language Expression	37
Language Mechanics	19
Total Language	25
Mathematics	
Math Concepts & Applications	35
Math Computation	49
Total Math	39
Total Battery	35



National Score Comparisons

Your test performance may be compared with that of the National Norm Group by referring to the National Percentile. The length of each bar shows your National Percentile score on each test. The Percentile scale is shown at the top. For example, the graph shows that you achieved a National Percentile of 41 in Reading. This means you scored higher than approximately 41 percent of the students in the 1996 norming study.

CTBID: 87275M0060002001-05-00017-000194

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3. The **National Percentiles** section of the student report is in the bottom half of the score report. These percentiles show how a student's performance in reading/language arts and mathematics compares to the performance of a sample of students.

Interpreting the Information Included on the ISTEP+ Student Report

1. The **Indiana Essential Skills** section: This first section of the student report provides information about the types of items, the points possible, the points obtained, and the percent of possible points the student received in the Indiana Essential Skills areas. For example, using the report on page 8, you can see that the *constructing meaning* items were all multiple-choice items. These items measure a student's ability to read a passage and understand the meaning of what was written. The student received 2 of the 4 points possible on the questions that tested the skill of *constructing meaning*. This means that the student received 50 percent of the possible points on these items.

2. The **Indiana Academic Standards** section: The second section of the student report provides information about the student's performance on the Indiana Essential Skills against the established performance standard. **This section of the report shows the results of the High School Graduation Qualifying Exam and whether the student passed the English/language arts and the math portions of the exam.** For example, from the score report on the previous page:

   - This fictitious student received a 498[1] on the mathematics section of the High School Graduation Qualifying Exam and the math standard was 478[1]. Therefore, the student passed that section of the High School Graduation Qualifying Exam.
   - The student received a 431[1] on the English/language arts section of the High School Graduation Qualifying Exam and the English standard was 469[1]. As a result, the student did not pass this section of the exam. This student will be given the opportunity to work on improving basic skills in English/language arts and will take the English/language arts section of the High School Graduation Qualifying Exam for a second time during the fall of his junior year.

3. The **National Percentile** section: The third section of the report describes student performance in comparison to the performance of students in a nationwide sample. The numbers listed under the **NP** column indicate the percentage of students in the nationwide sample whose scores fell at or below this student's score. As the sample report indicates, for example, that in *Total Reading* this student scored higher than approximately 41 percent of students in the nationwide sample.

[1] These numbers are examples only and do not represent the Indiana standard.

What do I do next?

Once parents and students have read through the score reports and believe that they have a clear understanding of the reports and student performance on ISTEP+, the question arises: "*What should I do next?*"

Students and parents should discuss their concerns regarding the score reports with the student's classroom teachers. Teachers have the best idea of whether ISTEP+ scores confirm the student's classroom performance or whether there seems to be a mismatch between classroom abilities and test performance.

What should parents and students do if test scores do not seem to match classroom performance?

Parents and students who feel that performance on ISTEP+ does not match classroom performance may want to consider the following:

- Was there an isolated physical or emotional problem on test day? In this case, parents and students should recognize the influence this had on performance and discuss this with the student's teacher. If the performance affected the student's scores on the Graduation Qualifying Exam, students should discuss with their teachers the opportunities for remediation available in the school and the opportunities for retesting that will be available to students during their junior and senior years.
- Did the student suffer from general test anxiety? If this seems to be the problem, the student should work to build confidence through daily reading, writing, and group discussion of texts. In addition, each Indiana school has received or will receive a copy of the scoring guide and open-ended items from this year's and the previous year's administration of ISTEP+. Students can work with their teachers to develop techniques for responding to constructed-response items and to learn more specifically how their responses are evaluated on ISTEP+. In this way, students can lower their anxiety by building their confidence on activities like those on ISTEP+.
- Are there any discrepancies between local curriculum and state proficiencies? No matter how carefully designed and selected, textbooks may not cover all of the proficiencies as completely as needed. If students feel that they do not have a complete enough background in one area of the proficiencies, they should seek assistance from their teachers and school administrators.

Additional Resources for Information about ISTEP+

By now, you have heard a lot about ISTEP+ and the 10th grade Graduation Qualifying Exam. However, you may still have some remaining questions about ISTEP+. Your school will be the best resource for materials related to ISTEP+. Each accredited high school in Indiana has received a more detailed version of this descriptive guide and more detailed versions of the state proficiencies and content standards in English/language arts and mathematics. Each high school will receive detailed ISTEP+ scoring guides.

If you have checked with your local school and still need additional information about ISTEP+ and the 10th Grade Graduation Qualifying Exam, please consult the following:

- Visit the ISTEP+ site on the World Wide Web**: http://doe.state.in.us/istep/istep.html
- Visit the Indiana Department of Education's general information site on the World Wide Web**: http://doe.state.in.us/
- Visit the Department of Education's Graduation Qualifying Exam site on the World Wide Web**: http://doe.state.in.us/special/gradtest.html
- Visit the Indiana Career and Postsecondary Advancement Center's ISTEP+ site on the World Wide Web**: http://istepplus.indiana.edu
- Call the Indiana Career and Postsecondary Advancement Center's (ICPAC) toll free hotline at 1-800-992-2076
- Call the Indiana Department of Education's toll free hotline at 1-888-54ISTEP (1-888-544-7837)
- Call the Indiana Department of Education at (317) 232-6611
- E-mail the Indiana Department of Education at istep@doe.state.in.us

***Note*: If you do not have access to a computer at home, please visit your local library to access the World Wide Web.

English/Language Arts *Proficiency Content Standards* Tested on 10th Grade ISTEP+

The table below should give you a clearer picture of *what* is tested on the Grade 10 ISTEP+ Graduation Qualifying Exam and *how* it is tested. The two columns on the left contain the Indiana *Proficiency Content Standards* in English/language arts. The column at the right includes information on how those standards are tested on ISTEP+.

Language Arts Fundamentals	*Proficiency Content Standard*	Description of how tested on ISTEP+
I. Select and apply effective strategies for reading.	• **10.1** Use meaning (semantic), structural (syntactic), and sound (phonetic) clues to construct meaning. • **10.2** Make comparisons and predictions. • **10.3** Use headings, pictures, captions, and other textual clues. • **10.4** Read from and understand different points of view. • **10.5** Make and defend judgments about quality and content of material.	Reading skills are important in all areas of life. On ISTEP+, items measure students' basic reading skills (such as whether students can determine the meaning of a word from the content of what they are reading) as well as assessing whether students are able to comprehend a wide variety of reading selections. **Example**: (*After reading a passage.*) When the author writes that "the world of work has undergone a *sea change* with the advent of new technologies," the expression *sea change* means . . . **Example**: (*After reading a passage.*) Which of the following things will the boy in the passage probably do next? **Example**: (*After reading a poem.*) Which of the following words best describes the child in the poem you just read?

II. Select and use developmentally appropriate strategies for writing.	• **10.6a** Use the writing process – prewriting, drafting, and revising. • **10.6b** Use the writing process – editing. • **10.7** Edit and proofread for selected punctuation and capitalization. • **10.8** Edit and proofread for usage. • **10.9** Edit and proofread for spelling. • **10.10** Revise written text for clarity, coherence, economy, and voice.	Writing skills are essential to success in all walks of life. On ISTEP+, students demonstrate their knowledge of the conventions of writing, such as spelling, grammar, and punctuation, through their responses on multiple-choice and short answer items, and demonstrate their writing abilities through their responses on longer, open-ended responses. **Example**: Identify which of the following five words is spelled correctly. **Example**: Choose the sentence that is written most clearly. **Example**: Write an essay on the impact of technology on society. Your response will be scored on your ability to address the task, use conventions of language, and write clearly and coherently. When you are finished writing, check your response for grammar, spelling, and punctuation.
III. Use prior knowledge and content area information to make critical judgments.	• **10.11** Make inferences from what is read and heard. • **10.12** Identify cause and effect relationships. • **10.13** Identify author's/writer's purpose and perspective including main idea/theme. • **10.14** Compare and contrast presented material. • **10.15** Understand how language is used to influence and persuade. • **10.16** Distinguish between fact and opinion. • **10.17** Determine the literal meaning of written text.	Good readers are able to judge critically what they read. This ability is essential to good citizenship and to success in postsecondary education and in the workplace. **Example**: (*After reading a selection.*) Which of the following sentences best describes the central theme of the passage? **Example**: (*After reading a selection – possibly an advertisement.*) What is the main idea of the passage you just read? **Example:** (*After reading two letters to the editor.*) Use the chart below to make a comparison between the views expressed in the two letters to the editor that you just read. **Example**: (*After reading a selection.*) Identify the statements in the chart below as either fact or opinion.

Language Arts Applications	*Proficiency Content Standard*	Description of how tested on ISTEP+
IV. Comprehend developmentally appropriate materials.	• Read a broad variety of literature, magazines, and newspapers written for a general adult audience; technical procedures, as in computer use; and routine business documents.	Graduates of Indiana schools should be able to read the wide variety of reading selections that they will encounter throughout their lives. **Example**: Use the following page from a bus schedule to answer the following questions. **Example**: (*After reading an article.*) Choose the sentence below that best expresses the main idea of the newspaper article you just read.
V. Write for different purposes and audiences.	• **10.18** Produce a variety of forms including persuasive writing; synthesis and analysis of information from a variety of sources; and complex forms, procedures, and directions.	Effective citizens must be able to use writing for such needs as stating a position, arguing about a proposed set of regulations, or informing someone about how to do something. **Example**: The principal at your school is deciding on a dress code policy and wants advice from students about whether or not students should have to wear school uniforms. Write to your principal explaining whether you think school uniforms are a good or a bad idea for your school and why you think so. **Example**: There is a new student at your school who is having some trouble studying for class tests. Your teacher asks you to help him with this. In the space below, write a set of directions to this new student describing the best way to prepare for a test.
VI. Recognize the interrelatedness of language and literature.	• **10.19** Develop criteria for judging the quality of literary works including literary genres, literary conventions, and story structure.	An educated citizen is one who has learned to appreciate and judge all sorts of literature. The criteria for judging and the ability to apply the criteria are both important. **Example**: (*After reading a short story.*) Why does the setting play such an important role in the short story you just read? **Example**: (*After reading a selection.*) From whose point of view is the story told? Would the story change if it were told from a different perspective?

Mathematics *Proficiency Content Standards* Tested on 10th Grade ISTEP+

The table below should give you a clearer picture of *what* is tested on the Grade 10 ISTEP+ Graduation Qualifying Exam and *how* it is tested. The two columns on the left contain the Indiana *Proficiency Content Standards* in mathematics. The column at the right includes information on how those standards are measured on ISTEP+.

Proficiency Content Standards	Essential Skills	Description of how tested on ISTEP+
Mathematics Fundamentals ***10.4 Algebra:*** ***Develop an understanding of basic algebraic concepts and skills, and apply those skills requiring algebraic manipulation to solve equations and inequalities.***	• 10.4.1 Evaluate simple algebraic expressions for given values of the variable. • 10.4.2 Write an equation (using one variable) which represents a realistic problem. • 10.4.3 Write an inequality (using one variable) which represents a realistic problem. • 10.4.4 Solve equations in one variable by use of trial and error or by algebraic methods. • 10.4.5 Solve one-step inequalities in one variable.	Equations are needed in many real-life situations to solve problems. On ISTEP+, students need to know how to write equations and inequalities in one variable, and how to solve them. **Example**: An electrician charges $29 to come to your house and $19 for each hour worked. Write an equation for the total charge, *C*, for *h* hours of work. Later, you receive a bill for $105. Find how many hours the electrician worked.
Mathematics Fundamentals ***10.5 Functions:*** ***Develop an understanding of elementary functions, their graphs, and their applications to the real world.***	• 10.5.1 Make a table or graph from realistic data. • 10.5.2 Interpret phenomena from a graphic or tabular representation. • 10.5.3 Translate among tables, equations, verbal rules, and graphs. • 10.5.4 Recognize when a table, equation, rule, or graph represents the same data. • 10.5.5 Use a graph, table, equation, or rule to predict the outcome of an unobserved value of a variable in a function.	Mathematical functions can often be used to represent real-life situations. On ISTEP+, students need to know how to show functions in tables, graphs, and equations, and how to interpret them. **Example**: A table shows the maximum temperature for several days and the number of people at the local swimming pool on those days. Construct a graph of the table. **Example**: A graph shows the amount of money in a savings account for each month of one year. Predict the amount in the account three months into the next year. Explain how you got your answer.

Mathematics Fundamentals ***10.6 Geometry: Develop an understanding of two- and three-dimensional geometric figures as they apply to realistic problems.***	• 10.6.1 Represent problems with two- and three-dimensional geometric models. • 10.6.2 Solve problems using two- and three-dimensional geometric models. • 10.6.3 Using three-dimensional geometric models, explain the properties of three-dimensional shapes, and the relationships between two- and three-dimensional objects. • 10.6.4 Based on definitions and properties, draw specific two-dimensional figures. • 10.6.5 Perform basic transformations. • 10.6.6 Using manipulatives and/or formulas, find the linear and area measures associated with two-dimensional figures. • 10.6.7 Apply the Pythagorean Theorem to solve realistic problems.	In geometry, students will develop spatial skills that are fundamental to many careers and everyday life. On ISTEP+, students need to know how to work with two- and three-dimensional objects, and to calculate lengths, areas, and volumes. **Example**: The diagram above shows a tiled floor with one section colored white. Find the area of this section. **Example**: A boat has a mast 15 feet long. The distance from the base of the mast to the front of the boat is 17 feet. A rope reaches from the top of the mast to the front of the boat. How long is this rope?
Mathematics Fundamentals ***10.7 Statistics: Develop an understanding of descriptive statistics.***	• 10.7.1 Organize data collected from realistic situations. • 10.7.2 Construct frequency tables and histograms to represent realistic data. • 10.7.3 Use statistical data as a tool to make decisions. • 10.7.4 Calculate the common measures of central tendency (mean, median, and mode.) • 10.7.5 Choose the appropriate measure of central tendency (mean, median, and mode.) • 10.7.6 Use existing curve fits to predict outcomes and make decisions.	Statistics is important in our everyday lives because it allows us to use graphs, tables, and charts. On ISTEP+, students need to know how to organize data into tables, how to draw bar charts, and how to calculate averages. **Example**: A table shows the scoring statistics for a basketball team. Use the table to find out who is the best free throw shooter. Explain how you get your answer. **Example**: During one year, a student's test scores out of 10 are: 7, 8, 7, 6, 9, 10, 8, 8, 9, 5, 7, 6, 8, 10, and 9. Find the mean, median, and mode of these scores and explain which is the most suitable for describing the student's achievement.

Mathematics Fundamentals ***10.8 Probability: Develop an understanding of probability.***	• 10.8.1 Apply the counting principle to realistic applications. • 10.8.2 Assign probabilities to equally likely events. • 10.8.3 Interpret real-world probability.	Probability is important in our everyday lives because it allows us to work out how likely it is that certain events will happen. On ISTEP+, students need to know the counting principle and the basic laws of probability, and how to calculate simple probabilities. **Example**: An ice cream stall has five types of ice cream and three choices of toppings. An ice cream sundae has one type of ice cream with one topping. How many different sundaes can you get at the stall? **Example**: You buy 50 lottery tickets, and you know that altogether 10,000 tickets were sold. What is the probability that you will win the one Grand Prize?
Mathematics Fundamentals ***10.9 Computation: Use computational skills and concepts with the appropriate technology and/or paper and pencil to solve simple word problems.***	• 10.9.1 Estimate sums, differences, products, and quotients of whole numbers, fractions, decimals, and integers when solving simple word problems. • 10.9.2 Compute sums differences, products, and quotients of whole numbers, fractions, decimals, and integers when solving simple word problems. • 10.9.3 Use ratio and proportion in solving simple word problems. • 10.9.4 Use percentages in solving simple word problems. • 10.9.5 Convert any measurement to an equivalent one within a standard measurement system.	Skill in doing calculations is essential in our everyday lives. Computational skills also serve as a stepping stone essential for performing many other mathematical operations. On ISTEP+, students need to know how to add, subtract, multiply, and divide with whole numbers, fractions, and decimals, and how to work with ratios and percents. **Examples**: $-24 + -5 =$ $4 - 2.765 =$ $\frac{1}{2} \times \frac{3}{4} =$ **Example**: The ratio of boys to girls in a class is 1:2. There are 36 students in the class. How many girls are there? **Example**: A dress priced at $100 was marked down 20%. Then, in a sale, its price was reduced by an additional 15%. How much does the dress cost now?

Mathematics Application ***10.1 Problem Solving: Select and apply problem-solving methods in a realistic context.***	• 10.1.1 Choose an appropriate method for solving problems. • 10.1.2 Identify and collect relevant data needed to solve problems. • 10.13 Apply an appropriate method to solve problems. • 10.1.4 Using technology whenever appropriate, solve problems that require strategies previously learned. • 10.1.5 Using technology whenever appropriate, solve problems related to basic living skills, including, but not limited to, personal finance, wages, banking and credit, home improvement problems, measurement, taxes, business situations, purchasing, and transportation. • 10.1.6 Recognize situations in which an estimate is the preferred answer. • 10.1.7 Solve a problem by changing conditions in a previously solved problem.	By solving real-world problems, students come to appreciate mathematics as a decision-making tool. On ISTEP+, students need to know how to choose appropriate methods for solving problems. These methods include drawing a diagram or table, writing an equation, working backwards, and guessing and testing. Questions on ISTEP+ that measure a student's ability to solve problems likely will measure other essential skills, since by definition these items require students to integrate several skills. **Example**: Your yard is 18 feet long and 12 feet wide. How many cubic feet of topsoil will be needed to put a two-foot thick cover over the whole yard? **Example**: Jessie starts a business selling cookies for 40¢ each. It costs 13¢ to make each cookie. How many cookies will Jessie have to sell to make a profit of $15?
Mathematics Application ***10.2 Communication: Communicate orally and in writing mathematical ideas, as well as their power and usefulness, as they apply to the real world.***	• 10.2.1 Explain in oral or written form the usefulness of mathematics as it applies to various aspects of one's daily life. • 10.2.2 Explain in oral or written form the process used in solving a problem.	An important part of mathematics is explaining what you are doing, in writing or by telling someone. On ISTEP+, students need to know how to explain their method of solving a problem or how to describe what extra information they may need to solve a problem. **Example**: Solve the equation $3x + 5 = 29$, and explain why you applied each step of your solution.

Mathematics Application ***10.3 Reasoning: Use inductive and deductive reasoning to solve problems.***	• 10.3.1 Given a generalization, solve a specific problem. • 10.3.2 Given a generalization, solve a realistic problem. • 10.3.3 Given a pattern of observations, make a generalization. • 10.3.4 Apply properties of number systems to facilitate mental computation. • 10.3.5 Determine the validity of a solution.	Reasoning is the foundation of mathematics, and is essential so that students can use mathematics as a way of making sense of the world. On ISTEP+, students need to know how to generalize from a set of observations and how to evaluate the accuracy of a solution to a problem. **Example**: The number of squirrels in a city was 1,000 in 1980, 2,000 in 1985, 4,000 in 1990, and 8,000 in 1995. Estimate the number of squirrels in the city in the year 2000. Explain how you obtained your answer and describe how accurate you think that answer will be.

A Glossary of Assessment Terms

- **Constructed-Response Item:** A test question/item that requires the test-taker to create his or her own response (for example, a short-answer, essay, pictorial, or graphic response).
- **Content Standard:** A statement of the knowledge and skills in a content area that should be learned. The criterion-referenced component of ISTEP+ is based on the Indiana *Proficiency Content Standards* in English/language arts and mathematics.
- **Criterion-Referenced Test:** An assessment that measures student achievement relative to specific content standards, rather than in comparison to other students.
- **Indiana Academic Achievement Standard:** An established criterion adopted by the Indiana State Board of Education against which the level and quality of a student's performance on a particular task or collection of tasks may be evaluated. The terms also mean the score on a state test demonstrating mastery of the *Proficiency Content Standards.*
- **Item:** One of the assessment units, often posed as a question or problem, on a test.
- **Mixed Format Test:** A test that uses different types of test items, that may include multiple-choice, short-answer, essay questions, and performance tasks.
- **Multiple-Choice Item:** A question or an incomplete statement that is followed by a set of possible answer choices, one of which is the correct answer. Multiple-choice items are also referred to as "selected-response" items.
- **Norm-Referenced Test:** An assessment that compares the performance of one test-taker with the performance of other test-takers who have taken the assessment under similar conditions.
- **Open-Ended Item:** A question or problem designed to require students to apply their knowledge.
- **Percentile Rank:** The percentage of scores for a particular testing group that fall at or below a given student's score. For example, a student score with a percentile rank of 90 indicates that 90 percent of the scores are at or below that score.
- **Performance Assessment:** An assessment activity that elicits a constructed response or activity. Typically, there are a number of ways to approach a performance assessment and more than one possible correct answer.
- **Performance Standard:** A level of performance, established by experts in the field, that is the goal level for student attainment. On the ISTEP+ 10th grade Graduation Qualifying Exam, the passing score is set by the Indiana State Board of Education, based on recommendations by the State Standards Task Force and by math and English teachers.
- ***Proficiency Content Standards*:** The Indiana statements of what knowledge and skills students at specific grade levels should have in English/language arts and mathematics. The *Proficiency Content Standards* were adopted by the Indiana State Board of Education for ISTEP+. Note: On the score report forms, these *Proficiency Content Standards* are listed as Essential Skills.
- **Standardized Test:** A large-scale assessment with consistent procedures for administration and scoring. These standard rules for test administration ensure a comparability of scores that is essential for any norm-referenced test.

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