GED grade level reference - SEE REFERENCE D

National Occupational
Information Coordinating
Committee

VOCATIONAL PREPARATION AND OCCUPATIONS

Third Edition

VOLUME 1

Educational and Occupational
Code Crosswalk

DEPARTMENT OF LABOR

Commissioner
Bureau of Labor Statistics

Assistant Secretary
Employment and Training Administration

DEPARTMENT OF EDUCATION

Administrator
National Center for Education Statistics

Assistant Secretary
Office of Vocational and Adult Education

REFERENCE D

Relating General Education Development (GED) to Career Planning

Each occupation in the DOT has been assigned a series of subcodes which provide supplementary information about the occupation. One of these subcodes is for General Education Development (GED). The GED code is a three-digit number which indicates the reasoning (R), mathematical (M) and language (L) development levels that a worker should possess upon entering a given job.

GED levels range from one (1), the lowest level of complexity, to six (6), the highest level of complexity. The GED levels are cumulative; that is, each ascending level indicates a set of abilities and knowledges which are required in addition to all the abilities described at the lower levels. For example, a GED level of (R) 3, (M) 3, and (L) 3 means that a person must possess all the abilities listed in GED levels 1, 2 and 3 for reasoning, mathematics and language.

The following charts, taken from Relating General Educational Development to Career Planning,[41] further detail each of the GED's six levels for each factor (reasoning, mathematics and language) in terms of a composite of what is currently being taught in traditional academic settings in the United States. These charts do not address experimental or highly specialized training programs; therefore, the mathematical and language terminology may differ from that utilized in nontraditional settings.

It should be noted that the descriptions of the GED levels associated with the educational achievement composites differ from those in the GED scale on page 41. This difference is due to the fact that the publication which contained the educational composites was published in 1971 while the revised GED scale was issued one year later. The Department of Labor, at the present time, does not have any plans to revise the publication, Relating General Educational Development to Career Planning, in which the educational attainment composites are related to the GED levels. However, the basic principles and concepts remain the same and educators have found that they are still useful. Therefore, the charts relating educational attainment and GED levels are being included in this publication.

The information contained on the following pages can aid in the development of a curriculum which is reflective of occupational requirements in terms of levels of reasoning, mathematics and language needed for successful performance on the job. Pages 17 and 18 of this publication provide additional information about and specific examples for the utilization of GED levels for curriculum development.

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41 U.S. Department of Labor, Relating General Educational Development to Career Planning (Washington: U.S. Government Printing Office, 1971).

(Grades 1-3)

GED level I

REASONING DEVELOPMENT:	MATHEMATICAL DEVELOPMENT:	LANGUAGE DEVELOPMENT:
Apply common sense understanding to carry out simple one- or two-step instructions. Deal with standardized situations with occasional or no variables in or from these situations encountered on the job.	Counting and addition and subtraction of two-place numbers. Develop familiarity with standard units of measurement, and with basic measuring equipment, such as clocks, rulers, and scales.	Read, speak and print simple sentences containing subject, verb, and object, using present and past tenses.

MATHEMATICS CURRICULUM

Counting: By twos, threes, fours, and fives.

Space Value: Understanding the principle of place value of whole numbers. Column value (in multiples of 10) in a series of digits: the number 6437 presents 7 ones; 3 tens; 4 hundreds; and 6 thousands. Value of zero as placeholder; difference between 470, 407, 47.

Roman Numerals: Understanding principles of notation. Symbol to right, add: XI = 10+1. Symbol to left, subtract: IX = 10-1.

Ordinal Numbers: To 31st. Learning proper endings: 1st; 2nd; 3rd; 4th.

Addition: 3-place numbers:
$$\begin{array}{r} 567 \\ +642 \\ \hline \end{array}$$
Decimal as ¢:
$$\begin{array}{r} 1.25 \\ +\ .35 \\ \hline \end{array}$$

Subtraction: 3-place numbers:
$$\begin{array}{r} 359 \\ -216 \\ \hline \end{array}$$
Decimal as ¢:
$$\begin{array}{r} 3.27 \\ -1.16 \\ \hline \end{array}$$

Multiplication: 1-digit multiplier:
$$\begin{array}{r} 2.05 \\ \times\ .3 \\ \hline \end{array}$$

Division: 1-digit divisor: $2 \overline{)\,426}$

Fractions: Addition of simple fractions.

Terms and Symbols: Knowledge of signs such as −, +, =, x, $\overline{\quad}$. Introduction to terms such as sum, remainder, difference, multiplier, divisor.

Measurement: Read clock, calendar, thermometer, yardstick, scales. Knowledge of units such as teaspoon, tablespoon, cup, pint, quart, inch, foot, yard, dozen, ounce.

Geometric Concepts:	Recognize geometric forms such as line, square, triangle, rectangle, cube, cylinder, sphere. Understand meaning of terms such as "volume" and "perimeter."
Practical Applications:	Perform the four basic arithmetic operations with parts of dollar.

LANGUAGE CURRICULUM

Punctuation:	Use of period, question mark, comma, exclamation point, quotation marks.
Capitalization:	Names of places, persons, days, months, years, titles.
Grammar:	Rote learning of correct usage of present and past tenses of common verbs, such as: run, do and go; and pronouns, such as: I, me, he, him, they, them.
Reference Works:	Introduction to the use of the dictionary and encyclopedia.
Spelling:	Learning to spell, through repetition and correction, words which are part of everyday vocabulary. Learning phonetic and structural principles.
Reading:	Introduction to the printed word. Emphasis placed on relating written word to spoken word; acquisition of vocabulary; reinforcing correct grammatical usage; stimulating thought.
Composition:	Emphasis on legibility, spelling punctuation and initial capitalization, word order, and forming complete sentences and paragraphs.
Speaking:	Learning to participate in conversations and discussions. Emphasis on clarity, enunciation, pronunciation, grammar, and voice modulation. Oral reports, such as "Show and Tell," including information such as "who, what, where, when, why."
Handwriting:	Mainly manuscript printing; introduction to cursive writing in 2nd or 3rd grade.

(Grades 4-6)

GED level 2

REASONING DEVELOPMENT:	MATHEMATICAL DEVELOPMENT:	LANGUAGE DEVELOPMENT:
Apply common sense understanding to carry out detailed but uninvolved written or oral instructions. Deal with problems involving a few concrete variables in or from standardized situations.	Perform the four basic arithmetic operations, using whole numbers, and common and decimal fractions. Develop knowledge of standard units of measure, and their interrelationships.	Read, write, and speak compound and complex sentences using adjectives and adverbs, and varying word order in phrases, clauses and sentences. Discern and organize facts and opinions for written and oral communication.

MATHEMATICS CURRICULUM

Numbers:	Read and write 7-digit numbers. Learn ordinals through "thousands."
Counting:	By fractions and decimal fractions.
Place Value:	Place values of numbers to left and right of decimal point.
Addition:	Multi-digit columns.
Subtraction:	Multi-digit columns.
Multiplication:	Two or three-digit multipliers.
Division:	Two or three-digit divisors.
Fractions:	Add, subtract, multiply, and divide common and decimal fractions, mixed numbers, improper fractions. Introduction to ratio and rate, percent; change fractions to decimal fractions and to percent.
Part-Whole Relationships:	Introduction to reasoning and analysis of problems such as finding a part of a number; finding the whole when a part is given.
Geometric Concepts:	Learning meanings of terms such as radius, diameter, perimeter, circumference, area of rectangle and volume. Construct graphs, charts, and tables. Construct simple geographic forms such as arcs, triangles and perpendiculars.
Measurement:	Learn relationships of standard units of measurement to each other. Convert units of measure to smaller or larger units, such as inches to feet, acres to square miles, hours to days, minutes to seconds, or ounces to pounds.

LANGUAGE CURRICULUM

Punctuation:	Apostrophe, hyphen, colon.
Grammar:	Learn to use mature sentence forms (compound and complex) with variation of word order in phrases, clauses, and sentences. Introduction to comparison of objectives and adverbs; compound subject and predicate; agreement of subject and verb; common and proper nouns; personal pronouns; singular and plural forms.
Reference Works:	Study of the dictionary to learn syllabication accent and diacritial marks such as macron (-), breve (v), double dot and single dot as an aid to pronunciation. Study of road maps, time tables, and entertainment guides to determine distances between cities, report on transportation schedules and discuss merits of available entertainment. Obtain library card and locate books, using index file.
Reading:	Learn roots, prefixes, and suffixes. Learn to read discriminately, distinguishing between essential and unessential material. Enrich vocabulary with wide selection of reading material. Introduction to magazines, newspaper, bulletins, etc.
Composition:	Write reports on class discussions, hobbies, and trips, with emphasis on variety of sentence structure, grammar, selection of words to clearly express thought, and reinforcing and increasing vocabulary. Make outlines; practice techniques of letter writing and news writing.
Speaking:	Practice reading aloud to improve enunciation, pronunciation, inflection, and phrasing. Play part in a skit, or act out a scene based on own experience to learn to express feelings vocally. Learn and practice courtesies in social situations such as allowing others to express their viewpoints without interruption or ridicule. Relate personal experiences to group.
Handwriting:	Cursive writing; emphasis on legibility and facility in writing.

(Grades 7-8)

GED level 3

REASONING DEVELOPMENT:	MATHEMATICAL DEVELOPMENT:	LANGUAGE DEVELOPMENT:
Apply common sense understanding to carry out instructions furnished in written, oral, or diagrammatic form. Deal with problems involving several concrete variables in or from standardized situations.	Compute discount, interest, percentage, surface areas, values, weights, and measures, using four basic arithmetic operations.	Selective reading of text books, and other material to extract essential theme or idea. Compose themes, reports and essays following rules of grammar, spelling, neatness and format.

MATHEMATICS CURRICULUM

Whole Numbers: Mastery of the four basic arithmetic operations. Emphasis on speed and accuracy in computation. Extension to 4- and 5-digit multipliers and divisors.

Fractions: Mastery of the four basic arithmetic operations in common, decimal and improper fractions and mixed numbers. Apply knowledge to solve "story problems." Develop speed and accuracy in changing fractions into percent and percent into fractions. Memorize most common equivalents, such as halves, quarters, eighths, fifths, thirds, sixths, and twelfths, and mentally convert time to decimal fractions and percents.

Percentage Formulas: Memorize and apply formulas to solve "story problems," as:

$$P = RB \qquad R=\frac{P}{B} \qquad B=\frac{P}{R}$$

Measurements: Perform the four basic arithmetic functions to solve problems involving different units of same type of measurement, as:

Time: 4 wks. 6 days 32 hrs.
+2 wks. 3 days 25 hrs.

Graphs: Learn to construct and interpret line, bar, and picture graph. Convert degrees to percent to draw circle graphs.

Percentage Apply knowledge of percentage to compute interest, discount, etc.

Geometry:	Recognize and understand meanings of terms such as horizontal, vertical, perpendicular, oblique and obtuse. Learn number of degrees in a circle, relationship between angles and degrees, types of triangles: equilateral, isosceles, right and obtuse. Types of parallelograms: oblong, square, rhomboid, and rhombus. Learn formulas for finding area of geometric figures.
Algebra:	Learn use of symbols for numbers, terms such as exponent and power. Learn to find square roots.
Ratio & Proportion:	Learn to use ratio and proportion to solve problems.

LANGUAGE CURRICULUM

Punctuation:	Comma, colon, semi-colon, dash, parentheses, quotation marks, hyphen, abbreviations.
Reference Works:	Utilize dictionary to learn alphabetical order, guide works, diacritical marks, synonyms and antonyms. Use encyclopedia, atlases, magazines, and source books to perpare class assignments.
Handwriting:	Develop individualized style of writing.
Grammar:	Learn concepts of person, gender, number, case, tense, mood, and voice. Learn kinds of verbs, nouns, pronouns, adjectives, adverbs, conjunctions, prepositions. Learn to diagram sentences. Learn normal inverted word order, contractions, agreement of subjects and verbs, pronouns, and antecedents.
Reading:	Read to find main thought or idea of a paragraph. Locate topic and summary sentence, and identify details and relate them to central thought.
Composition:	Prepare themes, reports, and essays, with greater emphasis placed on punctuation, spelling, grammar, format, style, neatness, arrangement, and comprehensive coverage of subject matter.
Speaking:	Practice speaking before an audience to acquire poise, self-control, and confidence. Participate as group leader or group member in planned informal discussion. Participate in class elections and persuade others to vote for him or his candidate.

(Grades 9-12)

GED level 4

REASONING DEVELOPMENT:	MATHEMATICAL DEVELOPMENT:	LANGUAGE DEVELOPMENT:
Apply principles of rational systems to solve practical problems and deal with a variety of concrete variables in situations where only limited standardization exists, interpret a variety of instructions furnished in written, oral, diagrammatic or scheduled form.	Perform arithmetic, algebraic and geometric operations as applied to standard situations; perform shop mathematics operations in practical application to the manual arts.	Speak on a variety of subjects, or compose business letters, reports, summaries or expositions conforming to rules of grammar, continuity, diction, coordination, length of harmony and sequences of sentences and paragraphs.

MATHEMATICS CURRICULUM

Algebra: Formal study of number systems; sets, and set operation. Operations on polynomials and rational expressions; solution of equations and inequalities; use of deduction and proof. Study of the systems of real numbers; linear, quadratic, rational, exponential, logarithmic, angle, and circular functions; inverse functions; related algebraic functions, limits and continuity, probability, and statistical inference.

Geometry: Study of deductive axiomatic geometry, plane, and solid, using the properties of real numbers; the introduction and use of rectangular coordinates. Extension of trigonometry and solid geometry.

Technical/Vocational School

Shop Math: Review and extension of principles of common and decimal fractions, percentage, ratio, and proportion. Practical computation, logarithms, slide rule. Practical algebra. Metric geometry. Essentials of trigonometry. Formulas for computing ratios of pulleys and gears. Practical physics: formulas for work and power, etc.

LANGUAGE CURRICULUM

Punctuation: Review and mastery of all rules of punctuation and capitalization.

Reference Works: Dictionary, encyclopedia, atlas, thesaurus, manuals, periodicals, newspapers, journals, books, and play reviews.

Grammar:	Mastery and facility in the use of the rules and concepts of person, gender, number, case, tense and mood.
Parts of Speech:	Verbs: Strong and weak, transitive and intransitive, auxiliary, regular. Conjugation.
	Nouns: Common and proper, collective, concrete and abstract inflections; gender.
	Pronouns: Personal, demonstrative, relative, numerical, reciprocal.
	Adjectives: Common, proper, descriptive, limiting, articles position in sentence; comparative degrees.
	Adverbs: Simple, conjunctive; forms; comparison.
	Conjunctions: Coordinating, subordinating.
	Interjections.
	Prepositions.
Reading:	Variety of textbooks; fiction and non-fiction; newspapers; magazines.
Compositions:	Preparation of outlines; preparation of themes, emphasizing length, harmony, sequence, and variety of sentences and paragraph structure. Selection of wordage according to subject matter and audience. Coordination, subordination and parallelism of thoughts.
Speaking:	Participation in panel discussions and dramatizations. Practice of social introductions and other amenities. Presentation of impromptu speeches to develop skill in extemporaneous speaking.

GED level 5

REASONING DEVELOPMENT:	MATHEMATICAL DEVELOPMENT:	LANGUAGE DEVELOPMENT:
Apply principles of logical or scientific thinking to define problems, collect data, establish facts and draw valid conclusions. Interpret an extensive variety of technical instructions, in books, manuals, or mathematical or diagrammatic form. Deal with several abstract or concrete variables.	Apply knowledge of established statistical and mathematical techniques in the analysis and evaluation of data.	Read or write speeches, book and play reviews, scientific and technical materials, abstracts, financial reports and legal documents. Be conversant in the theory principles and methods of effective and persuasive speaking including voice, diction and phonetics, in discussion and debate.

MATHEMATICS CURRICULUM

College Algebra:	Exponents and logarithms; linear equations, quadratic equation, mathematical induction, and binomial theorem.
General Math:	General introduction to the concepts of algebra, plane geometry, trigonometry, and calculus.
Calculus:	Elementary concepts of analytic geometry; differentiation and integration of algebraic functions and transcendental functions with application. Vector concepts; improper integrals, polar coordination and infinite series. Integration and partial differentiations; solid geometry; differential equation.
Introduction to Mathematical Logic:	Development of propositional and predicate calculi, basic sematic concepts and elementary intuitive set theory.
Introduction to Matrix Theory:	Elementary theory of finite vector spaces, determinates, equivalence, matrices with polynomial elements, similarity of matrices.
Statistics:	Graphic presentations illustrating average, dispersions, quartiles and percentiles, frequency distribution, reliability, and validity of tests. Applied to psychology and education, analysis of variance, correlation techniques, chi-square, and sampling techniques. Applied to busienss and economics, introduction to the principles and use of linear programming, game theory and queuing theory.

Mathematics of Finance:	Interest and discount, annuities, valuation of stocks and bonds; sinking funds, amortization, valuation of depletable assets.
Factor Analysis:	Matrix theory as applied to factor analysis; introduction to concepts of factor analysis and their utility in phases of research.
Quality Control Techniques:	Application of probability and distribution theory to industrial control problems; use of quality charts; acceptance sampling plans.
Introduction to Mathematical Probability:	Probability distributions, Bayes' theorem and postulate Bernoulli's theorem and its experimental verification; mathematical expectation; laws of large numbers.

LANGUAGE CURRICULUM

Reading:	Literature, book, and play reviews, scientific and technical journals, abstract, financial reports, legal, historical and medical documents, periodicals.
Composition:	Analysis and practice of expository techniques with emphasis on organization of material and development of unity.
Logic:	Study of the principles of inductive and deductive reasoning such as testing evidence, validity of generalizations, and cause and effect relationships to detect fallacies in arguments and to avoid these errors in own writing.
Rhetoric:	Study of the collection, arrangement, and expression of subject matter to persuade or instill an acceptance of ideas in the mind of the reader.
Creative Writing:	Develop a free and independent skill in writing, based on own knowledge and experience.
Narrative Writing:	Develop a sequential and descriptive style of writing.
Playwriting:	Study and application of theory of dramatic writing.
Speaking:	Effective Speaking: Study in the selection, organization of material and delivery of speech. Development of voice control, poise, and confidence. Persuasive Speaking: Emphasis on composition of speech and principles of persuasion. Phonetics: Study and classification of sounds of speech.

Speaking:	Discussion and Debate: Study of types and principles of public and group discussions. Methods in leading discussion; practice in argumentation and debate. Voice and Diction: Study of standards of speech. Record speech and study recording to develop voice quality and control volume, pitch, and rate.

GED level 6

REASONING DEVELOPMENT:	MATHEMATICAL DEVELOPMENT:	LANGUAGE DEVELOPMENT:
Apply principles of logical and scientific thinking to a wide range of intellectual and practical problems. Deal with nonverbal symbolism (formulas, scientific equations, graphs, musical notes, etc.) in its most difficult phases. Deal with a variety of abstract and concrete variables. Comprehend the most abstruse classes of concepts.	Apply knowledge of established and theoretical mathematical and statistical concepts in the field of research and development.	Same as level V

MATHEMATICS CURRICULUM:

Advanced Calculus:	Limits, continuity, real number system, mean value theorems, partial differentiation, implicit function theorems, transformations, mappings, vector fields, multiple integrals, line and surface integrals, point set theory, theory of integration improper integrals.
Generalized Functions & Operational Methods:	Theory of generalized functions in one variable. Operational calculus of generalized functions. Applications to partial differential and convolution equations of applied mathematics.
Modern Algebra:	Fundamental concepts of theories of groups, rings, and fields, theory of finite fields, extension fields, Galois groups, factorization theory in Gaussian domains.
Topics in Matrix Theory:	Theory of linear transformations (vector spaces over a division ring), advanced classical theory, matrix representation of groups and rings.
Other:	Theory of linear transformations and equations; theory of numbers; infinite series; mathematical logic; theory of functions of a complex variable; differential geometry; introduction to algebraic geometry; calculus of variation; general topology; numerical analysis.
Mathematical Statistics:	Distribution theory, sampling theory, estimation, hypothesis testing, confidence methods, regression analysis, experimental design. Distribution functions; sequences of random variables and their analysis; characteristic functions, linear statistical estimation. Time series, multivariate theory, probability spaces, random variables.

Mathematical Probability and Application:	Combinatorial analysis, conditional probability and stochastic independence, probability distribution, laws of large numbers, recurrent events, random walks.
Statistical Inference:	Estimation: Methods in point estimation-moments, last squares, maximum likelihood, confidence and fiducial intervals, odds and odds ratio, Bayesian inference, ignorance and diffuse prior distributions.

LANGUAGE CURRICULUM

Same as level V