

# Course Outline

REVISED: July/2006



## Course Description:

This competency-based course introduces the following Geometry concepts and applications; area, surface area and volume, relationships within triangles, the Pythagorean theorem, right angle trigonometry, and circles and transformations. The competencies in this course are aligned with the Geometry Content Standards for California Public Schools. This course has been approved to satisfy the "c" (mathematics) subject area of the UC/CSU "a-g" requirements for freshman admission.

## Program:

Adult Literacy/High School Diploma

## Course of Study:

High School Diploma

## Course:

1:2006 Mathematics

**31-03-72**

**Geometry/1B**

**Credits:** 5

**Hours:** 60

## Prerequisites:

1. A minimum reading level of 9.0 as measured by the TABE D9/10 reading comprehension test
2. Successful completion of (31-03-71) Geometry /1A
3. Recommendation of an instructor and/or a counselor

After a student has completed this course, he/she may not be allowed to re-enroll in the course.

## *A MESSAGE to COMPETENCY-BASED COURSE OUTLINE USERS*

This competency-based course outline is for use by students, teachers, counselors and school administrators, advisory committees, and all others having interest in the course.

Before enrolling, students can read the course competencies listed to help them (students) decide whether or not the course will meet their needs. After enrolling, a copy of the competencies can help a student track his/her progress through the course.

Teachers can use competency-based areas and statements to gain an overview of the course. The competencies can be used to develop lesson plans and teaching strategies. The Instructional Materials and Other Resources page provides teachers with instructional support in the form of textbook titles, media and technology options, as well as the names of advisory personnel. Many course outlines provide sample lesson plans written by experienced teachers of the course.

Counselors can use the course outline to explain course purpose, goals and content to students. Sharing competency lists with students will make the students aware of the minimal skills and knowledge they need to demonstrate after taking the course. This process can identify potential candidates for a course.

Principals can scan the competency-areas and statements to decide if the content of a course should be offered at their school in order to meet the needs of the community which it serves.

Competencies can be used to generate relevant questions and items for tests. The writing of individualized instructional contracts also needs to reflect the competency-based course outline components.

Clearly defined competency-based areas, statements, and minimal competencies are the points upon which curriculum, instruction, and assessment focus.

## *THE DEVELOPMENT of a COMPETENCY-BASED COURSE OUTLINE*

Every approved CBE course outline is written by Los Angeles Unified School teachers who teach the course. All teacher/writers have been inserviced and certified by the Adult Curriculum Office to learn about competency-based education and the outline format.

New courses and course revisions are initiated by school and/or central office subject area departments. The schools and the subject area departments share the responsibility for approving the subject content, hours, credits, etc. Teacher/writers submit their first draft to the appropriate central office subject area supervisor, specialist, consultant or adviser.

Course outline draft copies are next submitted to the curriculum office. The information required by the District and the State is verified. The outlines are edited and entered into the course outline computer data base. One formatted copy of an outline, with every page stamped "Draft Copy Only", is either approved by the curriculum office or returned for clarification or improvement.

Once signed off by the curriculum office an outline is routed back to the department that submitted it. When approved there, it is routed to the office of the Director of Instructional Services and finally to the Division's Assistant Superintendent for approval. The curriculum office then requests the required approvals by the LAUSD Board of Education.

The curriculum office sends master file copies of every approved CBE outline to principals of all Community Adult Schools and Employment Preparation Centers. These masters are used to reproduce copies for counselors and teachers. Students, community members, and other interested parties may also request copies. The curriculum office maintains a limited inventory of all outlines for additional distribution.

Changing needs are reflected in the constant development and revision of course outlines. It is an ongoing process designed to support the various demands of students, teachers, and the communities we serve.

TOM CALDERON  
Adult Curriculum Office  
Instructional Support Services

# *CBE*

## *COMPETENCYBASEDEDUCATION*

### Course Outline Competency-Based Component Definitions

Course descriptions state the major emphasis and content of the course.

Competency areas are units of instruction based on related competencies.

Competency statements are competency area goals that together define the framework and purpose of the course.

Competencies fall on a continuum between goals and performance objectives and denote outcome of instruction.

### Competency-Based Philosophy Overview

Competency-based instruction tells a student before instruction what skills, or knowledge he/she will demonstrate after instruction.

A competency is stated as a minimum. This is the least a student has to demonstrate or know to be judged as competent. Stating competencies as minimums does not mean minimum instruction. Activities and opportunities should be provided for students to achieve maximum potential.

Competency-based education provides instruction that enables each student to attain individual goals as measured against pre-stated standards.

CBE instruction provides immediate and continual repetition and remediation. A student repeats tasks until achieving competence.

In competency-based education the curriculum, instruction, and assessment share common characteristics based on clearly stated competencies.

Curriculum, instruction and assessment in CBE are: explicit, known, agreed upon, integrated, performance-oriented, and adaptive.

## *COURSE OUTLINE COMPETENCY-BASED COMPONENTS*

A course outline reflects the essential intent and content of the course described. Acceptable course outlines have six components. (*Education Code* Section 52506). Course outlines for all apportionment classes, including those in jails, state hospitals, and convalescent hospitals, contain the six required elements:

(EC 52504; 5CCR 10508 [b]; Adult Education Handbook for California [1977], Section 100)

Course Outline Components

Location

GOALS AND PURPOSES

Cover

*The educational goals or purposes of every course are clearly stated and the class periods are devoted to instruction. The course should be broad enough in scope and should have sufficient educational worth to justify the expenditure of public funds.*

The goals and purpose of a course are stated in the COURSE DESCRIPTION. Course descriptions state the major emphasis and content of a course, and are written to be understandable by a prospective student.

PERFORMANCE OBJECTIVES OR COMPETENCIES

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*Objectives should be delineated and described in terms of measurable results for the student and include the possible ways in which the objectives contribute to the student's acquisition of skills and competencies.*

Performance Objectives are sequentially listed in the COMPETENCY-BASED COMPONENTS section of the course outline. Competency Areas are units of instruction based on related competencies. Competency Statements are competency area goals that together define the framework and purpose of a course. Competencies fall on a continuum between goals and performance objectives and denote the outcome of instruction.

Competency-based instruction tells a student before instruction what skills or knowledge they will demonstrate after instruction. Competency-based education provides instruction which enables each student to attain individual goals as measured against pre-stated standards.

Competency-based instruction provides immediate and continual repetition and In competency-based education the curriculum, instruction, and assessment share common characteristics based on clearly stated competencies. Curriculum, instruction and assessment in competency-based education are: explicit, known, agreed upon, integrated, performance oriented, and adaptive.

*COURSE OUTLINE COMPETENCY-BASED COMPONENTS  
(continued)*

INSTRUCTIONAL STRATEGIES

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*Instructional techniques or methods could include laboratory techniques, lecture method, small-group discussion, grouping plans, and other strategies used in the classroom.*

Instructional strategies for this course are listed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructional strategies and activities for a course should be selected so that the overall teaching approach takes into account the instructional standards of a particular program, i.e., English as a Second Language, Programs for Older Adults, Programs for Adults with Disabilities.

UNITS OF STUDY, WITH APPROXIMATE HOURS ALLOTTED FOR EACH UNIT

Cover

*The approximate time devoted to each instructional unit within the course, as well as the total hours for the course, is indicated. The time in class is consistent with the needs of the student, and the length of the class should be that it ensures the student will learn at an optimum level.*

pp. 9-11

Units of study, with approximate hours allotted for each unit are listed in the COMPETENCY AREA STATEMENT(S) of the course outline. The total hours of the course, including work-based learning hours (community classroom and cooperative vocational education) is listed on the cover of every CBE course outline. Each Competency Area listed within a CBE outline is assigned hours of instruction per unit.

EVALUATION PROCEDURES

p. 16

*The evaluation describes measurable evaluation criteria clearly within the reach of the student. The evaluation indicates anticipated improvement in performances as well as anticipated skills and competencies to be achieved.*

Evaluation procedures are detailed in the TEACHING STRATEGIES AND EVALUATION section of the course outline. Instructors monitor students' progress on a continuing basis, assessing students on attainment of objectives identified in the course outline through a variety of formal and informal tests (applied performance procedures, observations, simulations), paper and pencil exams, and standardized tests.

REPETITION POLICY THAT PREVENTS PERPETUATION OF STUDENT ENROLLMENT

Cover

*After a student has completed all the objectives of the course, he or she should not be allowed to reenroll in the course. There is, therefore, a need for a statement about the conditions for possible repetition of a course to prevent perpetuation of students in a particular program for an indefinite period of time.*

## *ACKNOWLEDGMENTS*

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Appreciation is extended to MARIZA ALBERS, MELISSE BOUZIANNE, TONY DIANGELIS, AIDA HOVHANNISYAN, and SARA MUNSHIN for their contribution to this course outline.

Thanks to TOM CALDERON for editing and preparing this course outline as competency-based.

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*STUDENT LEARNING STANDARDS  
for the Geometry/IB Courses*

Upon completion of the course, the following State of California Learning Standards for Geometry will have been addressed in this course:

- 4.0 Students prove basic theorems involving congruence and similarity.
- 5.0 Students prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles.
- 6.0 Students know and are able to use the triangle inequality theorem.
- 7.0 Students prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles.
- 8.0 Students know, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.
- 9.0 Students compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders.
- 10.0 Students compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.
- 11.0 Students determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.
- 12.0 Students find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems.
- 14.0 Students prove the Pythagorean Theorem.
- 15.0 Students use the Pythagorean Theorem to determine distance and find missing lengths of sides of right triangles.
- 17.0 Students prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles.
- 18.0 Students know the definitions of the basic trigonometric functions defined by the angles of a right triangle. They also know and are able to use elementary relationships between them. For example,  $\tan(x) = \sin(x)/\cos(x)$ ,  $(\sin(x))^2 + (\cos(x))^2 = 1$ .
- 19.0 Students use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side.

*STUDENT LEARNING STANDARDS  
for the Geometry/IB Courses (continued)*

- 20.0 Students know and are able to use angle and side relationships in problems with special right triangles, such as  $30^\circ$ ,  $60^\circ$ , and  $90^\circ$  triangles and  $45^\circ$ ,  $45^\circ$ , and  $90^\circ$  triangles.
- 21.0 Students prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles.
- 22.0 Students know the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections.

*CBE*  
*Competency-Based Education*

**COMPETENCY BASED COMPONENTS**  
*for the Geometry/IB Course*

COMPETENCY AREAS AND STATEMENTS	MINIMAL COMPETENCIES
<p>A. INTRODUCTION</p> <p>Understand how personal skill development- including positive attitude, honesty, self-confidence, time management, and other positive traits- contribute to academic success.</p> <p>(1 hour)</p>	<ol style="list-style-type: none"> <li>1. Demonstrate an understanding of classroom policies and procedures.</li> <li>2. Discuss competency areas and minimal competencies for the course.</li> <li>3. Discuss assignment grading and scoring policy.</li> <li>4. Discuss importance of the following personal skills in the classroom/lab environment:               <ol style="list-style-type: none"> <li>a. positive attitude</li> <li>b. self-confidence</li> <li>c. honesty/perseverance</li> <li>d. self-management/work-ethic</li> <li>e. pride in product/work</li> <li>f. dependability</li> </ol> </li> <li>5. Prioritize tasks and meet deadlines.</li> <li>6. Describe the importance of initiative and leadership.</li> </ol>
<p>B. AREA</p> <p>Understand the derivation and application of formulas for areas of triangles, quadrilaterals, regular polygons and circles.</p>	<ol style="list-style-type: none"> <li>1. Compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids. (10.0)</li> <li>2. Prove the Pythagorean theorem.(14.0)</li> <li>3. Use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles. (15.0)</li> <li>4. Find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems. (12.0)</li> <li>5. Use angle and side relationships in problems with special right triangles, such as 30°, 60°, and 90° triangles and 45°, 45°, and 90° triangles. (20.0)</li> <li>6. Derive and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures. (8.0)</li> </ol>

7. Prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles. (17.0)

(11 hours)

<p>C. RELATIONSHIPS WITHIN TRIANGLES</p> <p>Understand segments in triangles, including altitudes, medians, angle bisectors, perpendicular bisectors and their points of concurrency. Understand and use the Triangle Inequality Theorem.</p> <p>(8 hours)</p>	<ol style="list-style-type: none"> <li>1. Prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles. (17.0)</li> <li>2. Write geometric proofs, including proofs by contradiction. (2.0)</li> <li>3. Use the triangle inequality theorem. (6.0)</li> </ol>
<p>D. RIGHT TRIANGLES AND TRIGONOMETRIC RATIOS</p> <p>Understand sine, cosine and tangent ratios; and use trigonometric ratios to solve distance and height problems.</p> <p>(9 hours)</p>	<ol style="list-style-type: none"> <li>1. Identify the basic trigonometric functions defined by the angles of a right triangle.</li> <li>2. Use elementary relationships between the angles of a right triangle (e.g., <math>\tan(x) = \sin(x)/\cos(x)</math>, <math>(\sin(x))^2 + (\cos(x))^2 = 1</math>). (18.0).</li> <li>3. Use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side. (19.0)</li> <li>4. Derive and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures. (8.0)</li> <li>5. Compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids. (10.0)</li> </ol>
<p>E. SURFACE AREA AND VOLUME</p> <p>Use two dimensional representations of three-dimensional figures to apply formulas for volume and surface area of prisms, pyramids, cylinders, cones and spheres.</p> <p>(12 hours)</p>	<ol style="list-style-type: none"> <li>1. Derive and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures. (8.0)</li> <li>2. Compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres; and students commit to memory the formulas for prisms, pyramids, and cylinders. (9.0)</li> <li>3. Determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids. (11.0)</li> </ol>

<p><b>F. CIRCLES</b></p> <p>Understand the properties of circles and parts of circles, including properties of arcs, chords, tangents and secants. Understand the circle as the locus of points equidistant from a point.</p> <p>(12 hours)</p>	<ol style="list-style-type: none"> <li>1. Find and use measures of sides and of interior and exterior angles of triangles and polygons to classify figures and solve problems. (12.0)</li> <li>2. Prove that triangles are congruent or similar, and they are able to use the concept of corresponding parts of congruent triangles. (5.0)</li> <li>3. Prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles. (7.0)</li> <li>4. Prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles. (21.0)</li> <li>5. Prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles. (17.0)</li> </ol>
<p><b>G. TRANSFORMATIONS</b></p> <p>Identify, name and perform rotation, translation and reflection transformations on the coordinate plane. Use composition of reflections to study theorems of transformations. Identify types of symmetry and identify transformations and symmetries of tessellation.</p> <p>(7 hours)</p>	<ol style="list-style-type: none"> <li>1. Identify the effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections. (22.0)</li> <li>2. Determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids. (11.0)</li> </ol>

## *DEFINITIONS of SCANS COMPETENCIES and FOUNDATION SKILLS*

### Definitions of Competencies

- Resources
- Allocates Time: Selects goal-related tasks; prioritizes tasks; schedules work to meet deadlines.
  - Allocates Money: Uses or prepares budgets; forecasts costs; keeps records to track budget performance.
    - Allocates Material and Facility Resources: Acquires, stores, and distributes materials, supplies, equipment, parts, or products.
    - Allocates Human Resources: Assesses knowledge and skills and distributes work accordingly; evaluates performance; provides feedback.
- Information
- Acquires and Evaluates Information: Identifies need for data, acquires data or creates data sources, and evaluates relevance of information.
  - Organizes and Maintains Information: Organizes, processes, and maintains written or computerized records; sorts, classifies or reformats information.
  - Interprets and Communicates Information: Selects and analyzes information; communicates the results to others using oral, written, graphic, or multi-media.
  - Uses Computers to Process Information: Uses computers to acquire, analyze, organize, and communicate information, including entering, modifying, storing, retrieving, and verifying data.
- Interpersonal
- Participates as a Member of a Team: Works cooperatively with others; contributes ideas, suggestions and effort; encourages team members; listens and responds to contributions of others; resolves differences for the benefit of the team; takes responsibility for achieving goals and for doing own share of the work.
  - Teaches Others: Helps others learn by coaching or other means; conveys job information to others; provides constructive feedback.
    - Serves Clients/Customers: Works and communicates with clients and customers to satisfy their expectations; listens actively to determine needs; communicates in a positive manner; obtains additional resources to satisfy client or customer needs.
    - Exercises Leadership: Communicates to justify a position; encourages, persuades or motivates others; establishes credibility through competence and integrity; takes minority viewpoints into consideration.
  - Negotiates to Arrive at a Decision: Works toward agreement; clarifies problems and resolves conflicts; proposes and examines options; sets realistic goals; resolves divergent interests.
  - Works with Cultural Diversity: Works well with men and women and with a variety of ethnic and social groups; respects the rights of others; bases impressions on individual performance, not on stereotypes.

*DEFINITIONS of SCANS COMPETENCIES and FOUNDATION SKILLS  
(continued)*

- Systems
- Understands Systems: Knows how social, organizational, and technological systems work and operates effectively within them; knows who to ask for information and how to get resources.
  - Monitors and Corrects Performance: Monitors how procedures are working; predicts trends; diagnoses problems; takes action to maintain system performance.  
Improves and Designs Systems: Makes suggestions for improving products or services; recommends alternatives; responsibly challenges the status quo.
- Technology
- Selects Technology: Chooses procedures, equipment, or computer programs to produce desired results.
- Applies Technology to Task: Understands purpose and procedures for setting up and operating machines, including computers and their programs.
- Maintains and Troubleshoots Technology: Prevents, identifies, or solves problems in machines, computers, and other technologies.

Definitions of SCANS Foundation Skills

- Basic Skills
- Reading: Locates, understands, and interprets written information in prose and documents-including manuals, graphs, and schedules-to perform tasks.  
Writing: Communicates thoughts, ideas, information, and messages in writing; records information completely and accurately; checks, edits, and revises written material.  
Arithmetic: Performs computations; uses numerical concepts in practical situations; uses tables, graphs, and diagrams to obtain or convey numerical information.
  - Mathematics: Approaches practical problems by choosing from a variety of mathematical techniques.
  - Listening: Receives, attends to, interprets, and responds to verbal and non-verbal messages.
  - Speaking: Organizes ideas and communicates oral messages appropriately in conversation, discussion, and group presentations; asks questions when needed.
- Thinking Skills
- Creative Thinking: Uses imagination; combines ideas or information in new ways; reshapes goals in ways that reveal new possibilities.
  - Decision Making: Specifies goals and constraints, generates alternatives, considers risks, evaluates and chooses best alternative.
  - Problem Solving: Recognizes that a problem exists, devises and implements a plan to resolve it, evaluates and monitors progress, and revises plan as needed.  
Seeing Things in the Mind's Eye: Organizes and processes symbols, pictures, graphs; visualizes outcomes from blueprints, diagrams, flow charts, recipes, etc.
  - Knowing How to Learn: Can use learning techniques to apply and adapt new knowledge and skills in both familiar and changing situations.  
Reasoning: Uses underlying principles to solve problems; uses logic to draw conclusions.

*DEFINITIONS of SCANS COMPETENCIES and FOUNDATION SKILLS  
(continued)*

Personal  
Qualities

- Responsibility: Works hard to be excellent; sets high standards of attendance, punctuality, enthusiasm, and optimism in approaching tasks.  
Self-Esteem: Has a positive view of self; knows own skills and abilities; is aware of impact on others.  
Social: Demonstrates friendliness, adaptability, empathy and politeness; relates well to others; asserts self appropriately; takes an interest in others.  
Self-Management: Assesses own knowledge, skills, and abilities accurately; sets personal goals; responds to feedback unemotionally; is a "self-starter."  
Integrity/Honesty: Can be trusted; recognizes personal and societal values; chooses ethical courses of action.

## *SUGGESTED INSTRUCTIONAL MATERIALS and OTHER RESOURCES*

### TEXTBOOKS

Bass, et al. Prentice Hall Mathematics Geometry (Text, California Teacher's Edition and supplemental materials). Pearson/Prentice Hall, 2004.

### RESOURCE MATERIALS

compass, protractor, ruler, straightedge

Boyd, et al. Glencoe Geometry (Text and supplemental materials). Glencoe, 2004.

Larson, et al. McDougal Littell Geometry-Appling Reasoning Measuring (Text, California Teacher's Edition and supplemental materials). McDougal Littell, 2004.

Geometry to Go: A Mathematics Handbook. Great Source Education Group, Houghton Mifflin Company, 2001.

### MErnA and TECHNOLOGY

Texas Instruments® Graphing Calculator TI-83 Plus

Texas Instruments® Graph Link Connectivity Kit (USB)

Texas Instruments® Cabri® Jr. for TI-83 Plus

Key Curriculum Press Geometer's Sketchpad®

PLATO™ Pathways- Math Fundamentals, Applied Math, Geometry and Measurement 1-2

PLATO™ -Algebra 2, Part 1 and 2 Curriculum

Riverdeep™ Destination Math- Mastering Algebra: Course I

Riverdeep™ Destination Math- Mastering Skills and Concepts: Course III, Course V

### RESOURCE PERSONS

Adult Secondary Education Supervisor

Adult Secondary Education Teacher Advisors

## *TEACHING STRATEGIES and EVALUATION*

### **METHODS AND PROCEDURES**

- A. Manipulatives, pictures, computer programs, and written and oral presentation
- B. Student work in pairs and in small groups
- C. Portfolio of student work
- D. Individualized instruction

### **EVALUATION**

- A. 80% or higher on written examinations after each unit and at the end of the course.
- B. Teacher developed tests (pre-post tests can be based on the competencies in this outline) after each unit and at the end of the course.
- C. Teacher observation of work in pairs and small groups
- D. Teacher assessment of work in the student's portfolio
- E. Posttests to determine skills learned or needing further review

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### **Statement for Civil Rights**

All educational and vocational opportunities are offered without regard to race, color, national origin, gender, or physical disability.

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