

PBS LiteracyLink®

PROGRAM SYNOPSES

for GED Connection™

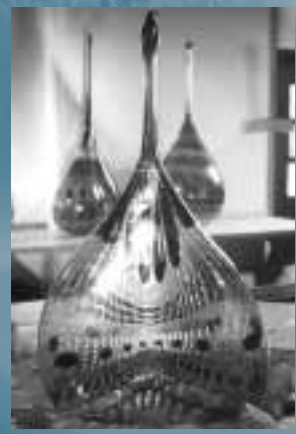
SOCIAL STUDIES

READING

WRITING

SCIENCE

MATHEMATICS



GED 2002

Online Professional Development

KET's GED 2002 Professional Development materials give teachers an opportunity to practice what they will be teaching. The five GED content areas have been combined into three training strands:

- **Math** (with instruction on the Casio fx 260 calculator and the new grid answer formats)
- **Writing** (with extra help on the essay)
- **Critical Thinking & Graphic Skills** (covers Social Studies, Science, and Reading)

Each strand is presented three ways:



Self-Study Guides

Three self-study guides give instructors an in-depth look at the GED 2002 exam, with self-tests, sample questions similar to those students will encounter on the GED exam, effective skill-development strategies, copy masters for classroom, and plenty of teaching tips. (\$10/each, or all three for \$25)



Workshop Trainer's Manual

This handy three-ring binder provides everything trainers need to organize and present workshops for the new GED 2002 test, with a comprehensive overview of each new GED test, sample test questions, discussion questions, reproducible handouts, and activities for all five content areas. (\$25)

Online

This lively interactive site, at www.ket.org/GED2002, features an orientation to web-based training, an overview of the GED 2002 Tests, and information, quizzes, and games covering all five GED subject areas. (Free!)



Contents

GED Connection Learning Units

Program 1: Orientation Program.....	2
-------------------------------------	---

Language Arts, Writing

Program 2: Passing the GED Writing Test	2
Program 3: Getting Ideas on Paper	3
Program 4: The Writing Process	3
Program 5: Organized Writing	4
Program 6: Writing Style and Word Choice	4
Program 7: Effective Sentences	5
Program 8: Grammar and Usage.....	5
Program 9: Spelling, Punctuation, and Capitalization	6
Program 10: The GED Essay	6

Language Arts, Reading

Program 11: Passing the GED Reading Test	7
Program 12: Nonfiction.....	7
Program 13: Fiction.....	8
Program 14: Poetry	8
Program 15: Drama	9

Social Studies

Program 16: Passing the GED Social Studies Test.....	9
Program 17: Themes in U.S. History	10
Program 18: Themes in World History	10
Program 19: Economics	11
Program 20: Civics and Government.....	11
Program 21: Geography	12

Science

Program 22: Passing the GED Science Test	12
Program 23: Life Science.....	13
Program 24: Earth and Space Science	13
Program 25: Chemistry	14
Program 26: Physics.....	14

Mathematics

Program 27: Passing the GED Math Test	15
Program 28: Number Sense	15
Program 29: Problem Solving.....	16
Program 30: Decimals.....	16
Program 31: Fractions	17
Program 32: Ratio, Proportion, and Percent	17
Program 33: Measurement	18
Program 34: Formulas.....	18
Program 35: Geometry	19
Program 36: Data Analysis	19
Program 37: Statistics and Probability.....	20
Program 38: Introduction to Algebra	20
Program 39: Special Topics in Algebra and Geometry.....	21

PROGRAM 1 ■ GED Connection™ Orientation

Major Ideas in the Video Program

- The PBS LiteracyLink® system has three components:
 - 38 instructional videotapes and this Orientation Tape
 - 3 workbooks
 - An online component
- This system has these advantages for GED learners:
 - **Convenience** – Learners can watch lessons in learning centers, on television, or on tapes at home.
 - **Flexibility** – Learners can move among the three media as needed.
 - **High interest** – The materials are based on the content knowledge and skills needed to pass the GED Tests, and they concern real-life issues.
- This Orientation tape also provides:
 - Video highlights from each test area
 - Motivational statements from GED learners, graduates, and instructors
 - Information about using online modules
 - Contact information for PBS LiteracyLink and KET

People and Ideas to Watch For

- Dorothy Barksa, a 63-year-old GED graduate, says the keys to passing the GED Tests are “practice and perseverance.” She also explains that taping the videos and watching them several times was key to her success.
- Kim Leigh Smith and Pearce Bunting describe *GED Connection* components and present the following information:
 - There are *Passing the Test* programs for each of the five content areas
 - Students can learn more on the LiteracyLink® website at: www.pbs.org/literacy.
 - Workbooks can be purchased by calling: 1-800-354-9067.
- Joan Auchter, Director of the GED Testing Service, and a variety of GED students and teachers encourage students to
 - Use their real-world experiences and common sense during the GED Tests.
 - Answer every question because a question with no response will be marked incorrect, but an answer based on a reasonable guess may be correct.

PROGRAM 2 ■ Passing the GED Writing Test

Major Ideas in the Video Program

- **Multiple Choice and Essay** – In Part I, students answer multiple-choice questions; in Part II, students write an essay.
- **GED Content Areas** – Part I involves applying rules to make writing clearer:
 - **Organization** (15%) – ordering ideas, topic sentences, relevance, paragraphing
 - **Sentence Structure** (30%) – run-ons, fragments, parallel structure
 - **Usage** (30%) – subject-verb agreement, pronoun agreement, tense
 - **Mechanics** (25%) – capitalization; punctuation (commas); spelling of homonyms, contractions, possessives
- **Types of Questions** – Multiple-choice questions have three formats—correction, revision, and construction shift. Students are given a topic for the essay.
 - **Contexts** – Multiple-choice questions come from how-to documents, informative writing, and workplace correspondence.
 - **Scoring** – If an essay is scored “inadequate,” the

multiple-choice part will not be scored. The student will not pass the Writing Skills Test. Wrong answers on multiple-choice questions do not count against a student.

People and Ideas to Watch For

- GED Testing Service Director Joan Auchter says students will be told to begin writing the essay when 45 minutes remain in the test time.
- Host Martin Mapoma explains that in Part I students revise and improve existing texts. In Part II, students show that they can use these same skills.
- Jan Isenhour shows why a run-on sentence is hard to follow and encourages students to focus on clear writing.
- Tom Sant, writer and CEO of The Sant Corp., explains *KISS—Keep It Short and Simple*.
- Joan Auchter says skills needed for the GED Writing Test are skills that we use all the time in writing.
- GED graduates advise staying on topic with a main idea, supporting it with organized ideas, and finishing with a conclusion.

PROGRAM 3 ■ Getting Ideas on Paper

Major Ideas in the Video Program

- **Express Yourself** – Everyone has his or her own story to tell—even inexperienced writers can find things to write about.
- **Generating Ideas** – Students can use the same techniques as professional writers to explore ideas.
- **Freewriting** – Write whatever comes into your head, without stopping for a certain length of time. Don't review or edit—just keep writing until the time is up.
- **Journals and Diaries** – A journal or a diary is a safe place to write personal thoughts, to articulate beliefs, to record materials you want to remember.
- **Practice** – The more you write, the better you become. Write letters, short stories, e-mail, memos, poems.
- **Observations and Experience** – Write about things you know or care about. Draw on your personal observations and experiences—even for the GED essay.
- **Writing as Communication** – Read your writing aloud.

People and Ideas to Watch For

- Writer Natalie Goldberg talks about freewriting. She says that people have to write a lot of junk in order to write anything good.
- Marty Lopinto says it's more important to keep a paragraph moving than to spell everything right the first time.
- Goldberg explains that people get torn between the Creator and Editor sides of themselves.
- Writers Frank X Walker and Denise Chavez talk about keeping journals—to keep private notes on your life, to write to make sense of experience, to record beliefs.
- Chavez says that everyone has a story to tell. If you list what makes you who you are, you realize you are unique—and you have something to write about.
- Student Pam Fiore talks about having her writing published, and her teacher reads her essay.

PROGRAM 4 ■ The Writing Process

Major Ideas in the Video Program

- **Problem Solving** – Writing is like problem-solving; people go through steps to create a piece of writing.
- **Purpose and Audience** – First think of why you are writing and for whom you are writing.
- **Steps in the Process** – There are three major stages in the writing process: prewriting (brainstorming), writing, and revising.
- **Brainstorming** – Brainstorming is used to generate ideas which can be evaluated and grouped later.
- **Writing** – In the writing stage, don't think about grammar, usage, and spelling. Concentrate on introducing your main idea, supporting it, and drawing a conclusion.
- **Revising** – Reconsider the audience and purpose, evaluate what you've written, rewrite, rearrange, and add and take out text.
- **Checking** – After revising, look for and correct errors.
- **Recursive and Flexible** – Stages in the writing process overlap and repeat.

People and Ideas to Watch For

- Writer Joan Fiset says that there is a “huge myth” that the first time you write something, it should be perfect.
- Phyllis MacAdam, Carnegie Center for Literacy and Learning, talks about the back-and-forth nature of the writing process and its basis in problem-solving research.
- The host talks about how steps in problem solving (think-try-evaluate) become steps in the writing process (brainstorm-write-revise).
- MacAdam uses a concept web to organize ideas about buying a car. She discusses writing a thesis statement, supporting it, and concluding by restating the lead with a new twist.
- Andrew Fitzgerald, a student tutor at Highline Community College, remarks that writers who say they don't *need* to revise are writers who don't *want* to revise.
- Crystal Wilkinson, writer, checks her work for technical errors by looking at her paragraphs and sentences.

PROGRAM 5 ■ Organized Writing

Major Ideas in the Video Program

- **Organization** – Structure is critical to how a writer communicates with a reader.
- **Three-Part Structure** – Effective organization involves writing an introduction, a body, and a conclusion.
- **Introduction** – The introduction (lead) sets up the main idea (thesis). In the lead, students can restate the topic in a topic sentence (also called a thesis statement) and relate it to their experiences.
- **Body** – The body must provide convincing support for the thesis by presenting specific and appropriate details. GED students can develop their essays using their own experiences, observations, and beliefs.
- **Methods of Organization** – Ways to organize the body include sequence, comparison and contrast, and cause and effect. Organization can be conveyed to the reader by transitional words and phrases.
- **Conclusion** – The conclusion sums up an essay or restates the main idea. It may also offer a twist on the main idea.

People and Ideas to Watch For

- Phyllis MacAdam explains that readers know how different kinds of writing are usually organized. When we write, we can reach our readers better by following these well-known organizational structures.
- Several writers and teachers talk about the importance of the introduction, or lead. Writer Shawn Wong suggests that GED candidates restate the essay prompt but make it specific to their own experience.
- Frances McCue of Richard Hugo House improvises a wonderful description of her yellow truck to illustrate the classic writing advice “Show; don’t tell.”
- Sportswriter Darrell Fry asks himself questions to come up with specific details.
- Teacher Helen Sablan suggests that students generate ideas in ways that help them organize their essays. She describes “the guiding hand” to help in staying on topic.

PROGRAM 6 ■ Writing Style and Word Choice

Major Ideas in the Video Program

- **Style** – Style is the “feel” of a piece of writing. Writing gets its style from sentence structure, word choice, tone, level of formality, and other dimensions.
- **Choosing Style** – Writers can make style decisions that relate to the audience, purpose, and format of the piece they are writing.
- **Audience** – Writers consider the people who will be reading their material.
- **Formality** – Writers use more formal styles when they do not know their readers or when they want to appear professional. Casual styles are more personal.
- **Word Choice** – A writer must select the right word for the context and meaning. The GED essay generally requires a certain type of language—“familiar” language.
- **Language to Avoid** – Slang is informal language that is inappropriate for all but personal writing. Jargon is specialized language used by a particular group, so it excludes general audiences.

People and Ideas to Watch For

- Don Mortland describes his weekly “featured pet” newspaper columns. Through careful word choice and use of the first person, he has developed a style that creates sympathy for the animals.
- Entertainment critic Ken Tucker talks about tailoring his style to his audience. He uses an informal style in his reviews for *Entertainment Weekly* and a formal style when writing for *The New York Times*.
- Denise Mitchell, Marketing Director for Girl Scout Cookies, explains a subtle difference in meaning between two possible themes: “catch the wave” and “ride the wave.”
- Aaron Counts helps neighborhood youth publish a magazine. He describes how his young writers achieve different styles for different audiences and purposes.
- Professor Scott Rice talks about “overdone” writing, in which a fussy, elaborate style calls attention to itself and fails to communicate clearly. Rice also explains the pitfalls of jargon and clichés.

PROGRAM 7 ■ Effective Sentences, Parts One and Two

Major Ideas in the Video Program

- **Sentences** – A sentence has a subject and a predicate, and expresses a complete thought.
- **Fragments** – A fragment is an incomplete thought. Fragments may sometimes be appropriate for effect, but generally they confuse readers and are considered errors.
- **Run-ons** – A run-on sentence joins two or more complete thoughts without appropriate punctuation or conjunctions.
- **Types of Sentences** – Writers create a pleasing rhythm by varying sentence structure.
 - A **compound sentence** contains more than one independent clause connected by a comma and coordinating conjunction.
 - A **complex sentence** contains a dependent clause, headed by a subordinating conjunction, and an independent clause.
- **The GED Writing Test** – Students will need to be able to correct sentence problems such as fragments and run-ons as well as write effective sentences in their essays.

People and Ideas to Watch For

- Jan Isenhour contrasts speaking and writing. When you speak, you get cues that tell you if you are being understood. Writing, however, has to stand on its own.
- Entertainment critic Ken Tucker describes how he likes to build sentences around catchy phrases. He talks about the effort he puts into making sentences work.
- Isenhour discusses the confusion caused by run-ons and states that readers need sentence structure and punctuation to show them where ideas begin and end.
- Tucker talks about sentence variety and rhythm.
- Scott Rice and Jan Isenhour present compound and complex sentences as ways of combining ideas and conveying the relationships between them. Isenhour discusses coordinating conjunctions (using the mnemonic device BOYSFAN) and subordinating conjunctions.

PROGRAM 8 ■ Grammar and Usage, Parts One and Two

Major Ideas in the Video Program

- **Correct Grammar and Usage** – Correctness in writing is important for two reasons: errors distract the reader, and they leave a negative impression of the writer.
- **Parts of Speech** – The video emphasizes three aspects of grammar:
 - **Nouns and Pronouns** – agreement between a pronoun and its antecedent, use of the subjective and objective cases, and use of an apostrophe in possessive nouns and contractions
 - **Verbs** – regular and irregular verb forms, subject-verb agreement, and consistency of tense
 - **Adjectives and Adverbs** – uses of each type of modifier and their placement in the sentence
- **Editing** – One way to locate errors in writing is to read it aloud to “hear” the mistakes, but students should also ask questions and use references when checking their work.
- **The GED Test** – Grammar and usage are important on both parts of the GED Writing Test.

People and Ideas to Watch For

- Entertainment critic Ken Tucker, a television and music critic, describes how an error distracts him from the writer’s message.
- Jan Isenhour, Carnegie Center for Literacy and Learning, defines nouns and explains the relationship between them and pronouns.
- Mindy McAdams, a professor of journalism, advises students to keep three categories in mind when dealing with nouns, pronouns, and apostrophes: possessives, plurals, and contractions.
- Isenhour gives an overview of several issues related to verbs, including tense shifts.
- Jennifer McCarthy, a writer at the Sant Corp., reads the opening line from Lewis Carroll’s poem *Jabberwocky*. Though the poem is written with nonsense words, our knowledge of the structure and word order of English tells us what parts of speech those words must be.
- The host explains that grammar and usage are important on both parts of the GED Writing Test.

PROGRAM 9 ■ Spelling, Punctuation, and Capitalization

Major Ideas in the Video Program

- **Punctuation** – Punctuation is a tool writers use to help communicate their meaning. Different punctuation marks carry different meanings.
- **Commas** – Four basic comma rules cover the great majority of situations where commas are needed:
 - in compound sentences
 - in series
 - after long introductory material
 - around interrupting material
- **Run-ons** – Run-ons can be fixed with commas and coordinating conjunctions, semicolons, or end punctuation.
- **Capitalization** – Writers tend to capitalize words more often than necessary.
 - **Common nouns** name people, places, and things in general and are not capitalized.
 - **Proper nouns** name specific people, places, and things and are capitalized.
- **Spelling** – Dictionaries and spellcheckers are helpful,

however, spellcheckers don't catch all errors. Students can keep lists of troublesome words.

People and Ideas to Watch For

- Writer Denise Chavez says punctuation is like a spice for writing—and it's possible to have too much.
- Jan Isenhour explains that commas are used in four basic situations. She also shows how a semicolon is used in a compound sentence without a coordinating conjunction.
- Marty Lopinto takes a class through various ways of fixing a run-on with punctuation.
- Mindy McAdams, professor of journalism, and others explain why spellcheckers can't catch all spelling errors.
- Isenhour suggests that students try to identify patterns in their spelling errors so that they know which words to check.
- Several speakers offer examples of mnemonic devices for spelling tricky words.
- Human resources professional Janis Garr confides that, even after 15 years on the job, she still asks others to check her writing.

PROGRAM 10 ■ The GED Essay

Major Ideas in the Video Program

- **Topic** – For the GED Essay, you are given a general interest topic as a one-line question or statement.
- **Response to the Topic** – There is no right or wrong answer. You should simply state your opinion or belief and support it with your experience and knowledge.
- **Writing the Essay** – During the test, you will have enough time for generating ideas, writing a draft, and doing some revision. Include an introduction, a body with two or three paragraphs of support, and a conclusion.
- **Scoring** – Essays are scored on a scale of 1 to 4. A score of 1 means “inadequate.” A score of 4 means “effective.” The scorers are looking to see if they understand your main point. Organization and development are key.
- **Practice** – Students should practice writing on a variety of general topics, in the test format under the time restrictions of the GED test.

People and Ideas to Watch For

- Marty Lopinto, GED teacher, discusses the GED essay; GED graduates share the topics they wrote about on the test.
- GED Testing Service Director Joan Auchter explains the importance of reading the essay prompt carefully.
- Lopinto advises students to spend 15 minutes on planning—generate ideas; then look for two or three themes to develop as body paragraphs in the essay.
- Arthur Holbrook reviews two sample essays. The first essay—scored 1, or “inadequate”—is not developed. The second essay—scored 4, or “effective”—is very well organized and developed with examples and details.
- GED graduates share their experiences of preparing for and writing GED essays.
- Auchter describes the testing center and reminds students to get enough sleep, to eat before the test, and to ask questions of the staff at the center.

PROGRAM 11 ■ Passing the GED Reading Test

Major Ideas in the Video Program

- **Reading Passages** – Each test has questions based on four types of reading passages:
 - **Fiction** – Three of the passages are fiction (one from before 1920, one from 1920 – 1960, and one since 1960).
 - **Drama** – one passage in script or screenplay form
 - **Poetry** – one poem
 - **Nonfiction prose** – two passages. These may be excerpted from biographies, reviews, or articles.
- **Purpose Questions** – Each passage is headed by a question which is intended to engage the student and give some direction to aid reading comprehension.
- **Thinking Skills** – Questions require the skills of:
 - **Comprehension** – understanding what the passage says
 - **Analysis** – examining how and why details are used
 - **Application** – transferring ideas from one context to another
 - **Synthesis** – putting ideas together to understand a larger meaning. Inference requires synthesis.

People and Ideas to Watch For

- Renee Shea, language arts expert, says the GED exam tests reading skills we use in our daily lives.
- Barbara Consorto, an English teacher, points out that students don't have to memorize facts or identify authors. What matters is that they can read.
- Jean Fleschute, a learning center director from Philadelphia, talks about the special effects of literary language. She asks *why* the author chose a particular word.
- George Ella Lyon, a poet herself, reads and interprets “One Art,” a poem by Elizabeth Bishop. She explains how the poem means the opposite of what it appears to say.
- GED instructors give advice on what to do during the test. “Test tips” are featured at several points in the video.
- GED Testing Service Director Joan Auchter emphasizes the importance of reading the directions.

PROGRAM 12 ■ Nonfiction

Major Ideas in the Video Program

- **Definition of Genre** – Nonfiction is writing based on real life—real people, places, events, ideas.
- **Types** – The GED Reading Test draws on a variety of nonfiction, including biography, reviews, magazine articles, and business writing. Two reading passages on each test are nonfiction.
- **Purposes** – We read nonfiction to find specific information, to solve problems, to learn. Know when to read carefully and when to simply skim.
- **Skills** – The video discusses some important skills for reading nonfiction:
 - Recognizing the main idea, even when it is only implied.
 - Noting how the main idea is supported by details.
 - Distinguishing fact from opinion.
- Other skills for reading nonfiction on the GED include the following:
 - Understanding how ideas are organized or related: sequence, cause/effect, comparison/contrast, and so on

- Recognizing the author's bias and tone
- Drawing conclusions

People and Ideas to Watch For

- Day care owner Christine Day talks about all the reading she has done in learning how to operate her business and making sure she complies with state regulations.
- Sam Adams, film critic for the *Philadelphia City Paper*, explains that writing a review helps him understand a movie and why he likes it. He points out shifts between fact and opinion in a film review.
- Luis Rodriguez, author of the memoir *Always Running*, explains how much writing and reading have always meant to him, even when he was involved in gangs or in prison.
- In a short excerpt from Rodriguez's memoir, we learn how the image of a bouncing ball conveys the central idea of instability in the passage.
- Rodriguez speaks of the need for details to bring a story to life and to “anchor” the main idea.

PROGRAM 13 ■ Fiction

Major Ideas in the Video Program

- **Elements of Fiction** – Fiction is a story invented by a writer. The key elements of fiction are character, plot, and setting.
- **Conflict** – The conflict in fiction may be within a person or between people.
- **Theme** – The theme of a story is the idea about life that the story conveys.
- **Point of View** – Point of view is the perspective that a story is told from—a person in or outside the story.
- **Mood and Tone** – The mood is the feeling of a piece, often conveyed through the details of the setting. The tone is the overall attitude the piece conveys—happiness, fear, and so on.
- **Style and Word Choice** – The distinctive sound of a story is created through the author’s sentence structure and word choice.

People and Ideas to Watch for

- Edwidge Danticat, author of *Breath, Eyes, Memory*, talks about how she used writing to understand her life as an immigrant. This segment introduces the elements of fiction—character, plot, and setting.
- Kenneth McClane uses James Baldwin’s story *Sonny’s Blues* to introduce the concepts of conflict and theme. The themes of *Sonny’s Blues* deal with communication and relationships.
- A discussion by George Ella Lyon of Flannery O’Connor’s “A Good Man Is Hard to Find” focuses on how the author uses dialogue, description, and pacing to create an overall emotional impression.
- Martha Womack discusses Edgar Allan Poe’s “Tell-Tale Heart,” bringing together some of the major points about mood and point of view—emphasizing the power of the first-person point of view and Poe’s choice of words to create a mood of suspense.

PROGRAM 14 ■ Poetry

Major Ideas in the Video Program

- **The GED Reading Test** – The test has one poem, which was chosen to be accessible to contemporary readers.
- **Skills** – The video discusses some important skills for reading poetry:
 - Identifying the speaker of the poem
 - Recognizing the tone, or feeling, of the speaker
 - Using sound as a cue to meaning in the poem. **Rhyme** occurs when end sounds are the same. **Rhythm** is the pattern of stresses. Students should read poems aloud to help themselves hear rhyme and rhythm.
 - Recognizing how a poet uses images to convey ideas and feelings. When a poet paints pictures with words, these pictures add to the overall meaning.
 - Understanding literal and figurative language. When do words mean exactly what they say, and when are they used to mean something else?

People and Ideas to Watch For

- Poets Sonia Sanchez and Robert Pinsky urge learners to pay attention to the sounds of poetry. Pinsky says to read a poem aloud first without even thinking about the meaning—he refers to Robert Frost’s expression “the sound of meaning.”
- Sonia Sanchez reads “Those Winter Sundays” with a GED class. She says that the poem compresses meaning so that each line is like a chapter. She points out words that carry special emotional power.
- Pinsky introduces the Favorite Poem Project, in which readers from different backgrounds read their favorite poems. Pinsky says each reader and each reading is a different experience of the poem.
- Two readers relate poems to their own lives. Jessie Alpaugh, a disabled student at UC-Berkeley, reads Robert Frost’s “Stopping by Woods on a Snowy Evening.” Yina Liang, a Chinese-American high school student, reads Emily Dickinson’s “I’m Nobody!”

PROGRAM 15 ■ Drama

Major Ideas in the Video Program

- **Definition of Genre** – Plays, television programs, and films are all forms of drama, based on scripts. A script lists the characters, describes the settings, and describes the action of a drama through dialogue and stage directions.
- **The GED Reading Test** – Each GED Reading Test has one passage of drama, chosen to be accessible to contemporary readers.
- **Skills** – The video discusses some important skills for reading drama:
 - Understanding the format and elements of a script, especially dialogue and stage directions
 - Identifying the conflict—whether external or internal—that drives the plot
 - Analyzing the characters’ motivations
 - Identifying the author’s theme by synthesizing plot, conflict, and character motivations
 - Imagining what the script would look like as a performance: hearing the dialogue in your head and visualizing actors in costume, moving around a stage set

People and Ideas to Watch For

- Jon Jory and Michael Dixon of the Actors Theatre of Louisville talk about how masterful storytellers write drama that we can identify with, even if they wrote their plays centuries ago.
- We meet Milagros Vega, a GED student playwright whose script was performed at a literacy event sponsored by the Philadelphia mayor’s office. Vega talks about how she finds ideas by watching how people act and talk.
- Larry Moses, of the Philadelphia Young Playwrights Festival, teaches a GED class some of the basic elements of a dramatic script. He says students can bring their life experiences to the conflicts and the characters’ actions.
- Moses advises trying to visualize the action when you read a script. He leads his class through a scene from Vega’s play, *Consequences*. Although Vega uses material from everyday life, the conflict she introduces has enormous significance for her characters.

PROGRAM 16 ■ Passing the GED Social Studies Test

Major Ideas in the Video Program

- **GED Content Areas** – U.S. History, World History, Government and Civics, Economics, Geography.
- **Types of Questions** – Multiple-choice questions based on reading passages and graphics.
- **Types of Graphics** – Maps, charts and graphs, political cartoons, diagrams, timelines, or photos may appear on the test.
- **Thinking Skills** – Questions draw on four cognitive skills:
 - **Comprehension** – understanding and being able to restate and summarize what is read
 - **Application** – transferring ideas from one context to another
 - **Analysis** – examining the logical structure of ideas; drawing conclusions from various types of data
 - **Evaluation** – judging fact vs. opinion and the reliability of information
- **Special Documents** – The test will include part of a key document from U.S. history, as well as a passage from a “practical document,” such as a job agreement.

- **Prior Knowledge** – Students must know general social studies concepts such as oceans, continents, U.S. states and regions.

People and Ideas to Watch For

- GED Testing Service Director Joan Auchter reassures students that people learn about social studies in their daily lives, and explains what to do if stumped by a question.
- Mary Winter, Joyce Hoover, and David Zurick explain how maps convey different information for different purposes. In a sample question, students must apply information from a map.
- Professor Mike Berheide discusses how different types of graphs convey information. A sample question based on a bar graph asks students to analyze and evaluate information based on a fact *not* represented on the graph.
- Nancy Mautz and Kristin Stapleton explain timelines and methods of dating events.
- Host Pearce Bunting explains how to find the main idea of a political cartoon.

PROGRAM 17 ■ Themes in U.S. History

Major Ideas in the Video Program

- **Themes** – Major themes in U.S. history include the mixing of cultures, the ideals of individual rights and freedoms, and the ever-changing nature of everyday life.
- **“New World”** – By 1500, Europeans explored and colonized America, in search of wealth. Colonists took over the lands and resources of the Native Americans who helped them.
- **American Revolution** – The colonists rebelled against laws and taxes forced on them by the British government.
- **Manifest Destiny** – The growing nation displaced native tribes, justifying the expansion by saying that it was destined by God.
- **Slavery** – Conflicts over economic power and slavery, integral to the South’s economy, led to the Civil War in 1861.
- **Immigration** – Immigrant groups provided labor for enormous economic expansion into the 1900s and added to the mix of cultures.
- **20th century** – A period of rapid industrial growth, social change, and urbanization with profound impact on daily life.

People and Ideas to Watch For

- William Kelso, Director of Archaeology, and Beverly Straube, Curator, tell the story of Jamestown as revealed through archaeological explorations.
- Historian Dr. Ed Ayers talks about the hardships the colonists endured to win their independence from the British.
- Freeman Owle, Cherokee historian, relates how his ancestors were pushed out of their home. His story underscores the tragic costs of the idea of Manifest Destiny.
- Charles Pace, Professor of Anthropology and American Studies, explains how Frederick Douglass’s writings helped counteract Southern propaganda about slavery as a “civilizing” institution.
- Teacher David Green and historians Patricia Cooper and Gregory Fitzsimons discuss the different immigrant experiences, including Irish labor in the Lowell textile mills.
- Historian Jim Klotter explains how all history is local and how historians decide what is important.

PROGRAM 18 ■ Themes in World History

Major Ideas in the Video Program

- **Early Civilizations** – Civilizations arose in river valleys in Mesopotamia, Egypt, India, and China, where people could grow a reliable food supply, settle, and work together. Trade routes arose.
- **The Classical World** – The ancient Greek and Roman empires spawned many of our western intellectual traditions, political systems, and arts and sciences.
- **Renaissance** – Another great flowering of intellectual and artistic activity, associated with artists such as Michelangelo and da Vinci, began in Europe in the 1300s.
- **Political Revolutions** – The availability of printed material and new ideas about human rights led to democratic revolutions.
- **Industrial Revolution** – Manufacturing technology stimulated economic and social changes. People left rural villages and crowded into cities to work in new industries. The middle class gained economic and political importance.
- **20th century** – These 100 years brought technology, political changes, mass communication, a focus on energy, and scientific advancement.

People and Ideas to Watch For

- Kristin Stapleton, Professor at the University of Kentucky, explains the importance of rivers to the development of civilization.
- History teacher Nancy Mautz explains how ancient Greece gave us the concept of democracy, and ancient Rome, the republic. Later she underscores the importance of the printing press and the new “vernacular literature”—writing in the common tongue.
- Janis Langis of the University of Toronto explains that humans have undergone two major changes: the Agricultural Revolution, 10,000 years ago, and the Industrial Revolution.
- Historians Ray Betts and Gregory Fitzsimons describe the changes in people’s working lives that resulted from the Industrial Revolution—particularly how time and work were controlled in order to ensure production for profit.
- Historians comment on what development they think was most significant in the 20th century.

PROGRAM 19 ■ Economics

Major Ideas in the Video Program

- **Economics** – Economics involves choices about earning, spending, and saving.
- **Opportunity Cost** – An opportunity cost is not being able to have one thing because you chose to have another.
- **Market Economy** – A system driven by supply and demand in which individuals can choose what they buy and sell.
- **Competition** – Occurs when producers vie for consumers or consumers vie for a product.
- **Consumer Economics** – Consumers earn interest if they save money and pay interest if they buy on credit. Paying the minimum balance makes items cost much more.
- **Labor Unions** – Organizations of workers that bargain with employers over working conditions and wages began because of the terrible conditions in early factories.
- **Government** – The U.S. government passes labor and environmental laws, regulates businesses, and sets fiscal and monetary policies to slow or speed up the economy.

People and Ideas to Watch For

- Professor Gail Hoyt explains that market economies respond to consumers' choices by providing more of what people want to buy—not only bread and milk, but also Beanie Babies and Hollywood movies.
- Teacher Tamara Giecek explains the concept of supply and demand with the example of the price of a pizza.
- Robert Theiss of Papa John's, a pizza franchiser, discusses the challenges of international marketing in a global economy.
- Professor Patricia Cooper and historian Gregory Fitzsimons describe the brutal conditions in early factories, which led workers to organize labor unions.
- Giecek explains how fiscal and monetary policies are used to slow down or speed up the economy.
- Giecek and Professor William Hoyt define the uses of economic statistics such as the unemployment rate, the Consumer Price Index, and Gross Domestic Product.

PROGRAM 20 ■ Civics and Government

Major Ideas in the Video Program

- **U.S. Constitution** – The Constitution balances political power between the states and the federal government. It also provides checks and balances among the three branches of government:
 - **Legislative** – The two houses of Congress make laws. The Senate approves treaties, and the House of Representatives levies taxes. Members come from each state.
 - **Executive** – The president heads the executive branch, provides policy leadership, and appoints federal judges. The president may veto bills passed by Congress.
 - **Judicial** – The federal courts enforce the nation's laws. The Supreme Court may rule that a law violates the Constitution.
- **Bill of Rights** – The first 10 amendments to the Constitution establish fundamental freedoms for all U.S. citizens.
- **Juries** – Citizens have the right to a trial by jury if accused of a crime. Juries evaluate the evidence and decide guilt.
- **Amending the Constitution** – The Constitution cannot be changed without wide national consensus.

People and Ideas to Watch For

- Professor Michael Berheide and Dr. Sandra Ardrey explain how the Articles of Confederation were replaced by the Constitution, written by James Madison, because they did not give the federal government enough power.
- Professor Berheide explains that the two houses of the legislative branch help “cool down” the heat of debate. He notes that events in Washington labeled as “gridlock” are the result of our constitutional system.
- Judge Gary Payne and attorney Lou Anna Redcorn explain the significance of juries.
- Host Pearce Bunting tells the dramatic story of the “Little Rock Nine,” students who desegregated Arkansas's public schools, as an example of how the Constitution works.
- Professor Berheide discusses the importance of voting.
- The Jane Addams School for Democracy in St. Paul helps immigrants adjust to life in the U.S. and offers citizenship-test classes.

PROGRAM 21 ■ Geography

Major Ideas in the Video Program

- **Geography** – Geography is concerned with the nature of the earth (physical geography) and human habitation (cultural geography).
- **Geography and Identity** – People identify with places they feel connected to.
- **Human Activity** – People adapt to their physical environment, but they also try to make their lives easier by changing it.
- **Environmental Impact** – Human activity has results that we can't always predict. Ultimately, harming the earth harms humans.
- **Technology** – Geographers use tools such as Geographic Information Systems (GIS) computerized mapping, and the Global Positioning System (GPS) of satellites to find and record data.
- **Maps** – Topographic maps show the surface features of an area; thematic maps can display information related to geography, such as historic migration routes.
- **Latitude and Longitude** – The basic grid system for mapping positions on the earth. Longitude lines

run north-south; latitude lines circle the earth parallel to the equator.

People and Ideas to Watch For

- Cherokee historian Freeman Owle describes the sense of place felt by the Cherokee Indians in their native mountains—“This is where we should be.”
- Deborah Nordeen and Kurt Saari tell of the effects of human activity on the Florida Everglades ecosystem and of human efforts to restore the natural cycle of water levels.
- Professor Gary Shannon describes a classic example of medical geography in which a doctor plotted cases of cholera on a map, thereby discovering that a particular public water pump was contaminated.
- Geographer Matthew Rosenberg describes the Global Positioning System—24 satellites that orbit the earth and provide the position of anyone holding a GPS device.
- Deborah Lindsay and Alexander Jarrett talk about the Degree Confluence Project—an international, Internet-based effort to document the locations where all latitude and longitude lines meet.

PROGRAM 22 ■ Passing the GED Science Test

Major Ideas in the Video Program

- **GED Content Areas** – Life Sciences (45%), Earth and Space Science (20%), Physical Science (35%)
- **Types of Questions** – Multiple-choice questions are based on reading passages and graphics.
- **Contexts** – Questions are based on science topics in real world contexts. Students will not have to recall isolated facts.
- **Themes** – Many of the science items will be based on these general themes:
 - Science as Inquiry
 - Science and Technology
 - Science in Personal and Social Perspectives
 - History and Nature of Science
 - Unifying Concepts and Processes
- **Thinking Skills** – Questions will require these skills:
 - **Comprehension** – understanding what they read in text or see on a graphic
 - **Application** – using information in a concrete situation
 - **Analysis** – exploring relationships among ideas

- **Evaluation** – judging the soundness or accuracy of scientific information or methods

People and Ideas to Watch For

- GED Testing Service Director Joan Auchter explains that the Science Test evaluates critical thinking in real world contexts, rather than focusing on recall of facts.
- GED students and instructors discuss the Science Test. The students state that even though they are “rusty,” some science knowledge seemed to “come back” to them.
- Much of the information a student needs to answer a question is provided in a reading passage or graphic. Students will benefit from a fundamental knowledge of basic scientific concepts.
- Various scientists discuss how they do their work by using the Scientific Method:
 - Observe and ask questions
 - Hypothesize
 - Test, collect, and analyze data
 - Draw conclusions

PROGRAM 23 ■ Life Science

Major Ideas in the Video Program

- **Cells** – Cells have three main components: cell membrane, cytoplasm, and nucleus. Plant cells also have a cell wall and chloroplasts. Cells perform life functions such as releasing energy from food, growing, and reproducing.
- **Ecosystems** – The organisms in an ecosystem are dependent on one another and on their environment. A food web describes a set of energy relationships.
- **Photosynthesis** – The cells of green plants perform photosynthesis, capturing energy from sunlight and turning it into food that other organisms can eat.
- **Genetics** – The Human Genome Project is mapping human DNA. Treatments for genetic conditions may be developed.
- **Evolution** – Fossils provide evidence for evolution, the change in organisms over time.
- **Ecology** – Human activity has a great impact; a pesticide such as DDT can enter the food web and adversely affect organisms it was not meant to harm.

People and Ideas to Watch For

- Biochemist Maria Ghirardi explains cell structure and describes photosynthesis.
- Biology professor Wintfred L. Smith explains that the dependencies among organisms and between organisms and their environment in an ecosystem are complex.
- Elaine R. Mardis and Sandra W. Clifton of the Washington University School of Medicine describe DNA and the implications of the Human Genome Project.
- Farm manager Ralph E. Ward describes how for centuries farmers have bred desirable characteristics in domestic animals.
- Paleontologist Glenn W. Storrs explains that fossils provide evidence for evolution and give a historical perspective on life on Earth.
- Biology teacher Mark A. Smith and naturalist David Haggard explain the impact of human activity on ecosystems, as exemplified by the effect of DDT on the bald eagle population.

PROGRAM 24 ■ Earth and Space Science

Major Ideas in the Video Program

- **Plate Tectonics** – Earth has an inner core, an outer core, a mantle, and a crust which is divided into rigid plates. Earthquakes and volcanoes usually occur along plate boundaries.
- **Changing Planet** – Earth formed along with the rest of the solar system, cooling and developing an atmosphere and conditions that could support life.
- **Rock Cycle** – Different types of rock—igneous, sedimentary, and metamorphic—form and reform. Rocks and fossils provide a record of Earth's history.
- **Water Cycle** – Fresh water moves through the environment, from the atmosphere to the land to the oceans and back.
- **Weather** – Weather conditions are caused by the movement of large air masses, which are influenced by the land and water over which they pass.
- **Resources** – Nonrenewable resources are extracted and used up. Renewable resources are in a virtually endless supply.

People and Ideas to Watch For

- Gary Patterson and Michael A. Ellis of the Center for Earthquake Research and Information describe a major earthquake of the past and explain plate tectonics.
- Chris Webb, a physics and astronomy teacher, explains the origin and early history of Earth, the conditions that made it possible for life to develop, and the rock cycle.
- Biology professor Wintfred L. Smith describes the water cycle. Host Aaron Freeman discusses graphics on the Science Test, using a water cycle diagram as an example.
- Meteorologist Kenny T. Priddy explains how air masses produce weather and climate. Collecting and sharing data help meteorologists predict weather more accurately.
- Carol Riordan of the National Renewable Energy Laboratory and Cecile Warner of the Renewable Energy Resources Center explain how solar and wind power are renewable.

PROGRAM 25 ■ Chemistry

Major Ideas in the Video Program

- **Matter** – Chemistry studies the composition and properties of matter. Matter takes up space and has mass. There are three states of matter: solid, liquid, and gas.
- **Element** – A basic substance that cannot be broken down and still be the same element.
- **Mixture** – A combination of substances without change in their composition.
- **Compounds** – Two or more elements that chemically combine.
- **Atoms** – All matter is made up of atoms. Within an atom protons carry a positive charge; electrons a negative charge. Neutrons have no charge.
- **Chemical Reaction** – Occurs when two or more elements or compounds combine, are broken down, or are rearranged.
- **Periodic Table** – A chart listing elements by atomic number. The table groups elements with similar properties.
- **Uses** – Chemists analyze matter to better understand and use substances around us. Chemicals can pollute the environment, but can often be cleaned up.

People and Ideas to Watch For

- Glassblower Stephen R. Powell demonstrates that glass has the properties of a liquid when heated and a solid when cooled.
- Chemistry teacher Charlotte Ray explains elements, mixtures, compounds, and atomic structure. She uses sulfuric acid to break down sugar into the element carbon and the compound water.
- Harold McGee shows two chemical reactions: (1) heating sugar to form caramel and (2) combining an acid and a base to produce carbon dioxide bubbles, making pancake batter light.
- Chemistry professors John P. Selegue and F. James Holler explain the periodic table. Host Aaron Freeman shows how to use information in the table to answer questions.
- Chemist Bonnie R. Hames explains how chemists analyze the properties of common materials such as wood.
- David Foster and Julie Gee of Hidden River Cave explain how chemical pollution of groundwater in the cave was cleaned up.

PROGRAM 26 ■ Physics

Major Ideas in the Video Program

- **Energy** – The law of conservation of energy states that energy is neither created nor destroyed; but converted from one form to another. Potential energy refers to position; kinetic energy refers to motion.
- **Newton's Laws of Motion** – (1) Objects in motion tend to stay in motion, and objects at rest tend to stay at rest, unless acted upon by an outside force. (2) Force = mass x acceleration. *Gravity is a force.* (3) Every action has an equal and opposite reaction.
- **Sound** – Sound is a wave traveling through matter. Wavelength is the distance between points on successive waves. Frequency measures how fast a medium vibrates. Pitch is the perception of frequency.
- **Electromagnetism** – Electricity and magnetism are related. The electromagnetic spectrum goes from radio waves through visible light to gamma rays.
- **Applications** – Space flight involves the laws of motion and thermodynamics. MRIs use electromagnetic pulses.

People and Ideas to Watch For

- Physics teacher Chris Webb takes his class on a roller coaster ride to demonstrate the law of conservation of energy, potential and kinetic energy, inertia, work, and gravity.
- Host Aaron Freeman summarizes Newton's laws of motion.
- NASA engineers Wendy Cruitt and Shawn Fears discuss the physics of space flight.
- Science teacher and entertainer Lynda Williams sings, dances, and talks her way through an explanation of sound waves.
- Lighting technician Craig King and sound engineer Jonathan Parke explain how light and sound are manipulated for the show *Annie*.
- Professor of electrical engineering Janet K. Lumpf explains the basics of electric currents and circuits, electromagnetism, and electromagnetic radiation.
- Radiologist Roy M. Waller and MRI technologist Mary Thomason explain how MRI machines produce images of the human body.

PROGRAM 27 ■ Passing the GED Math Test

Major Ideas in the Video Program

- **GED Content Areas** – Number Operations and Number Sense (20–30%); Measurement and Geometry (20–30%); Data Analysis, Statistics, and Probability (20–30%); and Algebra, Functions, and Patterns (20–30%).
- **Types of Questions** – 40 multiple choice and 10 alternate format (bubble grids and coordinate plane grids) based on readings, graphs, tables, and diagrams.
- **Contexts** – Most questions are based on common adult life experiences.
- **Themes** – The math items relate to the standards and themes of the National Council for Teachers of Mathematics (NCTM). Some of these standards are:
 - Problem Solving
 - Reasoning and Proof
 - Communication
 - Connections
 - Representation

- **Thinking Skills** – Students will answer questions that require:
 - **Procedural skills** – selecting and applying procedures.
 - **Conceptual skills** – recognizing and applying math concepts and principles.
 - **Application and Problem Solving** – using strategies to solve problems and judge the reasonableness of solutions.

People and Ideas to Watch For

- GED Testing Service Director Joan Auchter, explains the importance of good reading skills.
- GED students and instructors discuss the importance of hard work and motivation.
- Professor Zalman Usiskin explains how to analyze and eliminate wrong choices on multiple-choice problems.
- Kenneth Pendleton, GED Testing Service, explains the use of calculators on the GED Test and the different types of test items.
- GED instructors explain the steps in solving a problem.

PROGRAM 28 ■ Number Sense

Major Ideas in the Video Program

- **Number Sense** – Number sense is an idea of and a feeling for numbers; we use it to solve problems in our daily lives. For example, we use number sense when we decide whether we can afford to make a large purchase.
- **The Purpose of Numbers** – Numbers can be used to count, compare, measure, and combine quantities.
- **Operations** – The four operations are adding, subtracting, multiplying, and dividing.
- **Math as Language** – Numbers are a universal language. Take time to the terms used in mathematics in order to master the subject.
- **Linear** – Numbers are linear. A number can be greater than, less than, or equal to another number.
- **Estimation** – Some GED math problems can be solved by estimating. Estimation can also be used to check the reasonableness of an answer. Learn when to estimate and when to compute.

People and Ideas to Watch For

- GED instructors, shoppers, workers, and artists explain that number sense is needed to make everyday decisions.
- Keith Devlin, Dean of Science from St. Mary's College, compares numbers to shipping containers. With numbers, we work with symbols instead of actual objects.
- Professor Zalman Usiskin explains that numbers can be “synonyms,” or equivalent.
- Lane Alexander, dance teacher, and Frank Orrall, musician, explain that number sense can be developed; eventually people are able to feel or just “know” a count. James Edwards, instructor, says we all need to get to the point where we “feel” numbers.
- Teacher Billie Travis advises students to be aware of their learning style—whether they learn math best by reading (visual learners), hearing (auditory learners), or doing (kinesthetic learners).

PROGRAM 29 ■ Problem Solving

Major Ideas in the Video Program

- **The Problem-Solving Process** – Once you understand how to solve a particular type of problem, you can apply this five-step process to other problems:
 - Understand the question.
 - Find the facts you need.
 - Set up the problem with the correct operations.
 - Do the calculations.
 - Make sure your answer is reasonable.
- **Set Up** – Certain words in a problem tell you what operation to use. Some problems can be solved in more than one way.
- **Order of Operations** – When calculating a problem, operations must be performed in a certain order: (1) operations within parentheses, (2) exponents, (3) from left to right, multiplication and division, and (4) from left to right, addition and subtraction.
- **Role of Number Sense** – Once you have an answer, always ask, “Does my answer seem reasonable? Does it make sense?”

People and Ideas to Watch For

- Zalman Usiskin, Professor of Education from the University of Chicago, explains the importance of understanding a problem and the question you are trying to answer.
- Throughout the video, a customer is trying to buy a used car. The car dealer makes suggestions and tries to explain financing options. His explanations are not always correct.
- Dennis Puhr, a GED instructor, helps his students understand how to evaluate car deals and financing options. He explains how to estimate the interest for any large purchase.
- Keith Devlin, Dean of Science from St. Mary’s College, explains the importance of order in solving problems. Durrant Freeman and other GED instructors explain the order of operations.
- Credit counselors discuss the importance of making a budget to decide whether you can afford a large purchase.

PROGRAM 30 ■ Decimals

Major Ideas in the Video Program

- **Decimals as Fractions** – Decimals are one way to show part of a whole number just as cents show part of a dollar. Any fractional quantity can be represented by a decimal, a fraction, or a percent.
- **Place Value** – The position of each decimal digit indicates its value. Each position to the right is ten times smaller than the position to the left.
- **Comparing** – To compare decimal numbers, compare the place-value columns.
- **Adding and Subtracting** – Before adding and subtracting decimal numbers, you must write the numbers so that the decimal points are aligned.
- **Multiplying and Dividing** – When you multiply, you place the decimal point in the answer after you finish the operation. When you divide, you move the decimal point in both the divisor and the dividend and then place the decimal point in the answer before you do the operation.

People and Ideas to Watch For

- Teacher Billie Travis explains the meaning of written money amounts.
- Professor Zalman Usiskin, Professor of Education from the University of Chicago, explains that the decimal point means “plus.” For example, 2.5 means $2 + \frac{5}{10}$ or $2 + \frac{1}{2}$.
- A bank employee emphasizes the importance of correctly placing the decimal point when working with money and demonstrates how to fill out a deposit slip.
- Keith Devlin, Dean of Science from St. Mary’s College, shows how to interpret the numbers on an electronic gasoline pump.
- Throughout the video, instructors and students demonstrate decimal operations. Attention is given to the correct placement of the decimal point in the answer.
- Travis advises students not to be afraid of working with decimals and math.

PROGRAM 31 ■ Fractions

Major Ideas in the Video Program

- **Fractions** – A fraction compares a number of parts to a whole. However, fractions are also numbers themselves. As numbers, they represent values between whole numbers.
- **Parts of a Fraction** – The top number is the numerator; the bottom, the denominator. The bar represents division; the numerator is divided by the denominator.
- **Adding and Subtracting** – You must have a **common denominator** before you can add or subtract. A common denominator can be found among **multiples** of the denominators.
- **Multiplying and Dividing** – Because fractions are division, multiplying and dividing are easier than adding and subtracting when denominators differ.
 - Cancel if possible before multiplying.
 - To divide, invert and multiply.
- **Prime Factoring** – To reduce, list the prime numbers that, when multiplied, equal the numerator and denominator and then cancel.

People and Ideas to Watch For

- Patricia Duryea, a cooking instructor, explains how she helps her students understand fractional measurements.
- Frank Orrall, composer and musician, explains how beats of music are divided into halves, fourths, eighths, and sixteenths.
- Teacher Billie Travis explains how to borrow when working with mixed numbers and how to cancel using prime factorization.
- Patricia Wilkins, business manager of a stable, explains how she uses fractions to figure out vitamin supplements for the horses.
- Zalman Usiskin, Professor of Education from the University of Chicago, shows how dividing by a fraction results in a larger number.

PROGRAM 32 ■ Ratio, Proportion, and Percent

Major Ideas in the Video Program

- **Ratios** – A ratio uses division to compare numbers; ratios can be written as fractions and follow many of the same rules.
- **Unit Rates** – We often compare number of items to total price or miles to gallons. A unit rate compares an amount to 1.
- **Percents** – A percent is a ratio that compares a number with 100.
- **Benchmarks** – Use your number sense when dealing with percents. The fraction and decimal equivalents of 50%, 25%, 10%, and 1% are useful.
- **Proportions** – A proportion sets up equal ratios. If a proportion is written correctly, the cross products can be used to write an equation to solve for an unknown number.
- **Uses** – Percents are used in figuring sale prices and interest. Proportion is used in map scales and perception.

People and Ideas to Watch For

- Keith Devlin, Dean of Science from St. Mary's College, figures out the cost of buying produce. Other shoppers evaluate grocery prices using unit rates.
- Jon Arason, a city planner, uses a FAR number (Floor Area Ratio) to determine the size and height of a building on a lot.
- Zalman Usiskin, Professor of Education from the University of Chicago, lists benchmarks to use in working with percents.
- Dennis Puhr, instructor, works with students to figure sale prices and shows how cross-products are used to figure proportions.
- Joel Hynek, Effects Supervisor at Manex Entertainment, explains how camera angles, shadows, and other visual tricks using proportion can fool an audience into thinking the model of a building is real.

PROGRAM 33 ■ Measurement

Major Ideas in the Video Program

- **Units** – Units of measurement for time, distance, size, and weight help us understand relative sizes. To measure, you must understand the divisions of the measurement tool you are using.
- **Conversions** – The most common benchmark conversions, such as feet to yards, are given on the GED Math Test.
- **Linear** – Measures distance around a two-dimensional surface.
- **Area** – Measures a two-dimensional surface: length \times width.
- **Volume** – Measures a three-dimensional amount: length \times width \times height.
- **U.S. Customary (or English) System** – Americans prefer this system, but because the units are irregular, conversions are more involved.
- **Metric System** – The basic units are the meter, liter, and gram. The system is based on powers of ten. Once you know the meaning of the prefixes—*centi-*, *milli-*, *kilo-*—you can quickly convert measurements.

People and Ideas to Watch For

- Edward Schweitzer, graphic designer at Incognito, explains how designers use picas and points to break an inch into smaller units used to measure type size and spacing.
- Patricia Duryea, cooking instructor, states that knowing the relationship between units (for example, tablespoons and fluid ounces) is essential when cooking.
- Susan Hill, architect at Tate Hill Jacobs Architects, discusses the importance of converting measurements in order to give directions to subcontractors on a project.
- Patricia Wilkins, a landscape designer, explains how she figured out how many feet of lumber, square feet of paving stones, and cubic feet of mulch to buy to make a patio in her yard.
- Zalman Usiskin, Professor of Education from the University of Chicago, gives helpful information about the metric system and how the units are derived.

PROGRAM 34 ■ Formulas

Major Ideas in the Video Program

- **Formulas** – A formula is a tool, or set of instructions, for solving a problem. It has letters, or variables, and operations.
- **Solving Formulas** – To solve a formula, substitute numbers for the variables and do the operations.
- **Steps** – You may need one formula to solve for a number in another formula, or you may need to use more than one formula.
- **Pi (π)** – Pi is a constant needed to solve problems involving circles. Its value approximates 3.14, or $\frac{22}{7}$.
- **Common Formulas** –
 - $A = lw$ (area of a rectangle)
 - $r = \frac{d}{t}$
 - $C = 2\pi r = \pi d$
 - $A = \pi r^2$ (area of a circle)
 - $V = lwh$
 - $V = \pi r^2 h$ (volume of a cylinder)
- **The GED Test** – A page of formulas is given with the test, but a test-taker needs to know how to use the formulas.

People and Ideas to Watch For

- Jon Arason, Director of Annapolis Department of Planning and Zoning, says that formulas can be written into laws to control the size of signs and billboards.
- Architect Susan Hill shows how formulas are used to determine the area of irregular shapes on the blueprint of a school.
- Captain William Pinkney, Master of the *Amistad*, explains how the formula $d = rt$ can be used by a ship's captain to determine the distance traveled at sea.
- Professor Zalman Usiskin explains the value of pi and how it is used in the formula for circumference.
- Sam Guard, a construction manager, calculates the amount of concrete needed to fill a cylindrical hole. He takes measurements and proceeds through a series of formulas and unit conversions.
- Students show how they calculated the area of combined shapes.

PROGRAM 35 ■ Geometry

Major Ideas in the Video Program

- **Geometry** – To understand geometry, you must learn its special terms—point, line, ray, and so on.
- **Angles** – An angle is formed by two rays sharing the same endpoint (vertex).
- **Degrees** – A circle has 360 degrees. This system allows us to measure angles and navigate on the three-dimensional earth.
- **Angle Relationships** – Angles are classified as right, acute, or obtuse. You can often find the measure of an unknown angle when the measure of another angle is known. This applies to vertical angles, complementary angles, supplementary angles, and angles created by a transversal and parallel lines.
- **Triangles** – Triangles are classified by their angles: right, equilateral, isosceles, scalene. You can use ratio and proportion to find similar triangles and the Pythagorean relationship to solve for one side of a right triangle when the lengths of the other sides are known.

People and Ideas to Watch For

- Edward Schweitzer, a graphic designer for Incognito, shows how rectangles can be used on a two-page layout to help make the information easier to read and remember.
- Zalman Usiskin, Professor of Education from the University of Chicago, explains the classification of angles.
- Captain William Pinkney, Master of the *Amistad*, discusses latitude and longitude and explains how triangulation using satellite data can be used to fix an exact location on the earth.
- A GED class finds the measures of angles formed by a transversal.
- Susan Hill, architect for Tate Hill Jacobs Architects, shows how the relationship between a triangle and a rectangle can be used to find the area of a triangle drawn on a house blueprint.

PROGRAM 36 ■ Data Analysis, Parts One and Two

Major Ideas in the Video Program

- **Data** – Data are bits of information that can be arranged in tables and graphs.
- **Tables** – Tables help the reader locate data easily. Read the row and column headings. Find specific data where they intersect.
- **Graphs** – Bar, or column, graphs compare and contrast data. Circle graphs show the relationship of parts to a whole. Pictographs use pictures to represent numbers. Line graphs often show changes over time.
- **Misleading Graphs and Tables** – Certain numbers may be left out, or benchmarks not used, to suggest unjustified conclusions.
- **Central Tendency** – Mean, median, and mode are different ways to describe the typical values of a set of data.

People and Ideas to Watch For

- A diet counselor explains how charts and double-line graphs are used to help a dieter in a weight-loss program.
- An investment counselor uses a table to find how much \$100 will grow in 50 years.
- Edward Schweitzer, a graphic designer for Incognito, explains how charts and graphs make numbers more accessible to the reader.
- Zalman Usiskin, Professor of Education from the University of Chicago, draws conclusions from graphs in the newspaper. Later he demonstrates how to find the mean, median, and mode of a set of data.
- A columnist suggests that data can be manipulated to influence the reader.

PROGRAM 37 ■ Statistics and Probability

Major Ideas in the Video Program

- **Sampling** – To gather information about a large population, sample the population. If a sample is large enough, representative, and chosen at random, the data gathered can be applied to the larger population.
- **Margin of Error** – A margin of error tells you by what percent (+ or –) the actual data may vary.
- **Probability** – By comparing the number of desirable outcomes to the number of possible outcomes, you can find the chance, or probability, that an event will occur. Probability can be expressed as a fraction, a ratio, a decimal, or a percent.
- **Independent and Dependent Events** – Events are independent when the result of the first event does not affect the second event (for example, flipping a coin). Events are dependent when the first event does affect the second (for example, drawing a second card from a deck without replacing the first card).

People and Ideas to Watch For

- Jon Arason, a city planner, explains how census data is used to allocate funds and build housing and schools.
- Zalman Usiskin, Professor of Education from the University of Chicago, explains the difficulties in getting an accurate census and how to estimate undercounted populations.
- A pollster explains methods for choosing a sample and discusses how the results of a survey can be skewed by the way in which questions are asked.
- Kim Leigh Smith, the host, explains how the probability of flipping a coin heads up can be expressed as a fraction and how fractions are multiplied to find the probability that more than one event will happen.
- Keith Devlin, Dean of Science from St. Mary’s College, compares the chance of winning a state lottery to the chance of finding a dime hidden in a football field.

PROGRAM 38 ■ Introduction to Algebra

Major Ideas in the Video Program

- **Algebra** – Algebra focuses on operations and strategies. In algebra, the equal sign acts as the center of a balancing scale.
- **Equation** – An equation is a statement that two expressions are equal. Solve an equation by finding value(s) for the variable(s) that make(s) the statement true.
- **Inverse Operations** – Inverse, or opposite, operations can be used to isolate a variable. As long as the same operation is performed on both sides of the equal sign, the equation will remain balanced.
- **Properties** – Some powerful properties of arithmetic and multiplication can be applied to solve various problems:
 - **Commutative** – $a + b = b + a$
 - **Associative** – $(a + b) + c = a + (b + c)$
 - **Distributive** – $a(b + c) = ab + ac$
- **Signed Numbers** – Numbers can be positive or negative. Absolute value tells you the distance a number is from zero.

People and Ideas to Watch For

- Keith Devlin, Dean of Science from St. Mary’s College, compares algebra to the game of chess. You can learn the rules quickly, but it takes time to understand all the possible strategies.
- A bookkeeper explains how she uses a spreadsheet with an algebraic formula programmed in to keep books for a garage.
- Teacher Billie Travis and Professor Zalman Usiskin demonstrate how to isolate variables, substitute and simplify expressions, and apply algebraic properties.
- Usiskin explains signed numbers in terms of east-west directionality and shows how to add, subtract, multiply, and divide them.
- Travis says that many students have a general fear of algebra because they have been told it is hard, but she reassures learners that they can learn algebraic methods and apply them.

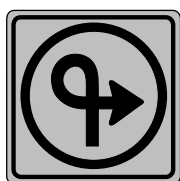
PROGRAM 39 ■ Special Topics in Algebra and Geometry

Major Ideas in the Video Program

- **Patterns** – In a number or spatial pattern, some part repeats. That part can sometimes be described by an equation.
- **Graphing an Equation** – Values that make an equation true can be plotted on a grid to give a picture.
- **Coordinate Grid** – A coordinate grid is a horizontal x -axis crossed by a vertical y -axis. Any point on the grid can be named by an ordered pair: (x,y) . The point where the axes cross is the origin, $(0,0)$.
- **Solution Set** – A line shows the solution set, or all possible values, of a linear equation.
- **Positive and Negative Slope** – If a line rises as it moves from left to right, its slope is positive. If it descends, its slope is negative.
- **Reflections on a Coordinate Grid** – Multiplying both coordinates of each point in a figure by -1 will turn the figure 180° .

People and Ideas to Watch For

- Weavers explain how patterns are formed using threads. The patterns are compared to the horizontal and vertical lines in a graph or coordinate grid.
- Zalman Usiskin, Professor of Education from the University of Chicago, points out that patterns occur everywhere (for example, items in a grocery store are grouped in patterns that help shoppers find them). He then shows how a pattern can be pictured by graphing the height of a child at different ages.
- Teacher Billie Travis writes an equation for comparing time to distance and then plots it on a coordinate grid.
- Usiskin demonstrates how multiplying by -1 is like looking at something from the opposite direction; it turns a picture 180° .



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