
Designers for Learning & Grace Centers for Hope

Probability

(Or, “What Are the Chances of That?”)

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Overview

Course Purpose:

This course will cover the topic of Probability, in preparation for the newly revised GED exam (aligning with the 2013 College and Career Readiness Standards). The target audience consists of residents at the Grace Centers of Hope rehabilitation campus in Pontiac, Michigan. Participation in the GED program is a condition of continued residency at the Center. Completion of the program will increase the likelihood of successfully passing the GED and have a positive impact on career or college goals.

Audience Description:

This course will be accessed by an “age diverse” adult population. Their educational experience and skill levels vary, as does their attitude toward educational settings. All have challenges in their background that have left them homeless at present. Enrollment in the basic education program is a condition of continued residency in Grace Centers of Hope.

Some clients will have basic computer literacy skills, and all are sufficiently fluent for instruction in English. While some clients may be hesitant about their ability to perform well in a structured academic situation, most have goals that provide motivation to succeed in the learning program. Opportunity for authentic and immediate achievement will lay a foundation for successful completion of the course.

Course Scope:

This course will cover basic probability concepts and calculations.

It will include a review of the prerequisite mathematical proficiencies of multiplying fractions and decimals and reducing fractions to lowest terms. Relevant vocabulary terms, the distinction between *simple* and *compound* events and the procedure for determining probability based on “real life” situations will be covered.

Course Objectives:

Given various events, students will:

- Determine the probability of simple and compound events.
 - a) Calculate probability of simple events
 - b) Calculate probability of compound events
- Recognize probability in context.
 - a) Identify elements of probability (event, outcome, sample space, etc.)
 - b) Use context clues to identify probability in “real life” situations
 - 1) Distinguish between probability, combination and permutation
- Explain probability in context.
 - a) Formulate an explanation of probability

Prerequisites:

It is assumed the Learner will be familiar with and able to perform basic mathematical calculations involving fractions and decimals. Review will be provided.

Engagement Approaches:

Within the capabilities of the given authoring tool (PowerPoint) and the procedure-based topic, the course will offer interactive components (drag and drop, check boxes, hotspots, fill-in-the-blank) to encourage Learner engagement. Each practice activity will offer immediate feedback so Learner can gauge their understanding of the material.

Assessment Approaches:

The course will culminate with a set of Level II (using Kirkpatrick's evaluation model) questions to assess that the objectives have been met. The ultimate assessment will be whether Learners pass the Probability section of the GED exam.

Instructional Media:

Beyond the basic presentation, the course will utilize a Resource tab that will have links to supplemental videos, suggested reading and practice activities. Per the Style Guide, inessential graphics are not being used.

Repeated practice, over time, is essential to embed learning so printable practice worksheets will be included for each concept. It will also be recommended that learners solve 2-3 practice examples at least twice a week in preparation for the GED exam.

Course Technical/Logistical Requirements

Course Delivery Method:

- Course will be accessed by students from Google Drive site.

Requirements for Learner's Computer:

Hardware specifications:

- High-speed access to the Internet is preferable
- Video support for 1024 X 768 display resolution
- Audio support with external computer speakers or headphones
- Keyboard and mouse input devices
- Connection to a printer is preferred

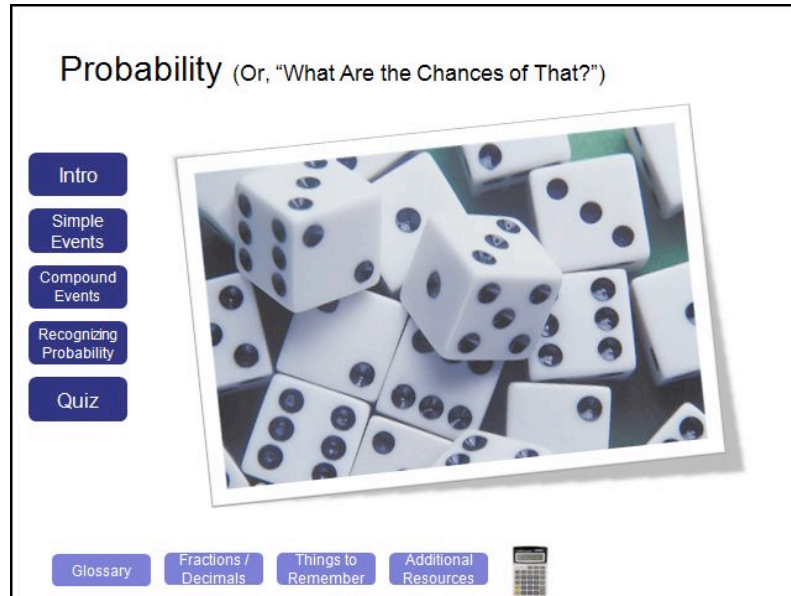
Software considerations:

- An operating system that supports the Microsoft Internet Explorer or Firefox browser applications and PowerPoint 2007
- **NOTE on software:** I have located a safe macro for PowerPoint that allows drag-and-drop capability. It was developed by Hans Werner Hofmann and is recommended and used by many online education developers. When the PP file is opened, a dialog box asks that the macro be "enabled." It is safe to do so. I'm not familiar enough with Google Drive to know if it will "translate" properly when the file is uploaded. I guess we'll see!

Examples of Course Navigation

Example of Section Title screen

Dark blue buttons link to content sections



Example of informational screen

Simple Probability

A *simple* event is one that has a SINGLE outcome.

Examples

- ❖ Rolling a four using one die
- ❖ Landing on Boardwalk when playing Monopoly
- ❖ Pulling a king from a deck of cards
- ❖ Your team wins the Super Bowl

Non-Examples

- Rolling an even number using one die
- Landing on a railroad or a utility when playing Monopoly
- Not pulling a king from a deck of cards
- Your team wins at least 4 out of 6 games

The informational screen includes a vertical column of five dark blue buttons on the left: "Intro", "Simple Events", "Compound Events", "Recognizing Probability", and "Quiz". At the bottom are four light blue buttons: "Glossary", "Fractions / Decimals", "Things to Remember", and "Additional Resources", followed by a small calculator icon.

Light blue buttons lead to optional resources, including online calculator

Course Structure Outline

| Screen # | Content Outline | Design Strategy | Navigation/Interaction Strategy | Visual Description |
|-----------------|---|---|--|--|
| 1 | Navigating the course | Narration with navigation instructions referencing the player wrapper | Learner clicks forward after viewing navigation instructions | Title text |
| 2 | Course overview (topics and objectives) <ul style="list-style-type: none"> Identify elements of probability Formulate an explanation of probability Calculate probability of simple events Calculate probability of compound events Distinguish between probability, combination and permutation | Narration with bullet points animating in | Learner clicks forward after viewing course objectives | Bullet list of objectives NOTE: The style guides indicates graphics/images should be kept to a minimum, so few are used throughout the course |
| Topic 1: | Introduction | | | |
| 3 | Section Title Slide | n/a | n/a | Section title with image of dice |
| 4 | Why Learn Probability? Examples of probability in life (lottery, genetics, sports, medical decisions, insurance rates, weather) | Images with pop up text animate in | Learner clicks to advance to next screen after reading examples | Images of probability situations with captions |
| 5 | Vocabulary: event, random, simple, compound, sample space, outcome, complementary event, conditional probability, relative frequency, permutation, simplest form | Text with hotspots revealing pop up definitions | Learner mouses over vocabulary word to see definition and examples | <i>(will have access to link throughout course from Menu bar)</i> |
| 6 | REVIEW – Links to MathsIsFun.com - -Reducing fractions to simplest form -Multiplying fractions -Multiplying decimals | Tabs linking to each topic http://www.mathsisfun.com/simplifying-fractions.html | Learner clicks tab to review that topic | <i>(will have access to link throughout course from Menu bar)</i> Plain background with text and worked examples |

| Screen # | Content Outline | Design Strategy | Navigation/Interaction Strategy | Visual Description |
|-----------------|--|--|--|---|
| | <i>(Learners may review this topic in preparation for probability calculations)</i> | http://www.mathsisfun.com/fractions_multiplication.html http://www.mathsisfun.com/multiplying-decimals.html | | |
| 7 | KNOWLEDGE CHECK A Learner performs multiplication of fractions and decimals (using calculator), reducing to simplest form | <i>(4 items)</i> Multiple Choice | Learner fills in the blank with their response <i>(answer key provided)</i> | Plain background with equations and answer choices |
| 8 | Explaining probability Simple vs. Compound Definition with examples of each | Narration as text animates in | Learner clicks to advance to next screen | Text defining probability, simple event and compound event |
| 9 | KNOWLEDGE CHECK B 1) Learner identifies sample space, event, outcome, frequency 2) Learner writes explanation of probability | <i>(2 items)</i> Drag and drop Text box | 1) Learner drags label to correct feature of probability equation 2) Learner types response <i>(answer key provided)</i> | Plain background with text Link to printable practice worksheet (pdf) w/ answer key |
| 10 | Things to Remember -W/ replacement or w/o replacement -Basic Counting Principle -Probability Formula (simple, compound) | Bulleted list | Learner clicks to advance to next screen | <i>(will have access to link throughout course from Menu bar)</i> Plain background with text |
| Topic 2: | Simple Events | | | |
| 11 | Section Title slide | n/a | n/a | Section title with image of single die |
| 12 | Formula for calculating simple events – explanation and demonstration | Demonstrations / Worked Examples, Components animate in with explanation | Learner clicks to advance to next screen | Plain background with worked examples |
| 13 | Calculating simple events in “real life” situations – explanation and demonstration | Demonstrations / Worked Examples Components highlighted | Learner clicks to advance to next screen | Plain background with worked examples |

| Screen # | Content Outline | Design Strategy | Navigation/Interaction Strategy | Visual Description |
|-----------------|---|--|--|---|
| | | within story; calculation animates in | | |
| 14 | KNOWLEDGE CHECK C Given story examples, Learner calculates simple probability | (2 items) Questions in story format with 4 answer choices | Learner clicks to select response (answer key provided) | Plain background with story problems and answer choices Link to printable practice worksheet (pdf) w/ answer key |
| Topic 3: | Compound Events | | | |
| 15 | Section Title slide | n/a | n/a | Section title with image of bowl of jelly beans |
| 16 | Formula for calculating compound events – explanation and demonstration | Demonstrations / Worked Examples, Components animate in with explanation | Learner clicks to advance to next screen | Plain background with worked examples |
| 17 | Calculating compound events in “real life” situation – explanation and demonstration | Demonstrations / Worked Examples Components highlighted within story; calculation animates in | Learner clicks to advance to next screen | Plain background with worked examples |
| 18 | KNOWLEDGE CHECK D 1) Learner identifies examples of Simple and Compound events 2) Given story examples, Learner calculates compound probability | (2 items) Check box Questions in story format with 4 answer choices | Learner clicks correct box to sort items Learner clicks to select response (answer key provided) | Plain background with story problems and answer choices Link to printable practice worksheet (pdf) w/ answer key |
| Topic 4: | Probability vs. Permutations & Combinations | | | |
| 19 | Section Title slide | n/a | n/a | Section title with image of clothing hanging in closet (instructional stories relate to clothing choices) |
| 20 | Distinguishing Probability from Permutation / Combination | Demonstrations / Worked Examples Components highlighted within story | Learner clicks to advance to next screen | Plain background with text |
| 21 | KNOWLEDGE CHECK E | (4 items) | Learner drags items to | Plain background with story problems |

| Screen # | Content Outline | Design Strategy | Navigation/Interaction Strategy | Visual Description |
|---------------------|--|---|--|---|
| | Given story examples, Learner identifies which involve probability calculations (vs. combination or permutation) | Drag and drop | correct “bucket” <i>(answer key provided)</i> | and answer “buckets” Link to printable practice worksheet (pdf) w/ answer key |
| Summary | | | | |
| 22 | Recap of topics covered: <ul style="list-style-type: none"> • Identify elements of probability • Formulate an explanation of probability • Calculate probability of simple events • Calculate probability of compound events • Distinguish between probability, combination and permutation | Narration with text animating in | Learner clicks to advance to Quiz | <ul style="list-style-type: none"> ▪ Review main concepts (pointing to objectives) |
| Quiz | | | | |
| 23 | Section Title slide | n/a | n/a | Section Title with image of blackboard with mathematical equations |
| 24 | -Learner identifies elements of probability (event, conditions, etc.) -Identify simple and compound probability events (<i>5 items</i>) -Given word problems, Learner computes probability of simple event (<i>3 items</i>) -Given word problem, Learner computes probability of compound events (<i>3 items</i>) -Given examples, Learner identifies whether probability calculation is needed (<i>3 items</i>) | Printable quiz with multiple choice responses (pdf) | <i>(answer key provided)</i> | Plain background with questions /answer choices |
| What's Next? | | | | |

| Screen # | Content Outline | Design Strategy | Navigation/Interaction Strategy | Visual Description |
|-------------------------|--|------------------------|---|---|
| 25 | Graph on how quickly information is forgotten unless it's used. Learner is advised to practice 2-3 problems from worksheets at least twice a week to embed the learning in preparation for GED exam. | Narration with graphic | Learner clicks to exit course | Ebbinghaus' "Forgetting Curve" graphic link to practice worksheets |
| Course Resources | <i>Optional navigation link</i> | | | |
| 26 | Links to various resources on probability | Bulleted text | Learner clicks links to access video or pdf | <ul style="list-style-type: none"> ▪ Practice Worksheets / Activities ▪ Explanation of "Gambler's Fallacy" ▪ Videos ▪ Suggested Reading |