



# **Preparation Manual**

## **Technology Applications EC–12 (242)**

**Overview and Exam Framework**

**Sample Selected-Response Questions**

**Sample Selected-Response Answers and Rationales**

# Preparation Manual

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## Section 3: Overview and Exam Framework Technology Applications EC–12 (242)

### Exam Overview

<b>Exam Name</b>	<b>Technology Applications EC–12</b>
<b>Exam Code</b>	242
<b>Time</b>	5 hours
<b>Number of Questions</b>	100 selected-response questions
<b>Format</b>	Computer-administered test (CAT)

The TExES Technology Applications EC–12 (242) exam is designed to assess whether an examinee has the requisite knowledge and skills that an entry-level educator in this field in Texas public schools must possess. The 100 selected-response questions are based on the Technology Applications EC–12 exam framework and cover grades EC–12. The exam may contain questions that do not count toward the score. Your final scaled score will be based only on scored questions.

### The Standards

#### **Standard I**

All teachers use and promote creative thinking and innovative processes to construct knowledge, generate new ideas and create products.

#### **Standard II**

All teachers collaborate and communicate both locally and globally using digital tools and resources to reinforce and promote learning.

#### **Standard III**

All teachers acquire, analyze and manage content from digital resources.

#### **Standard IV**

All teachers make informed decisions by applying critical-thinking and problem-solving skills.

#### **Standard V**

All teachers practice and promote safe, responsible, legal and ethical behavior while using technology tools and resources.

#### **Standard VI**

All teachers demonstrate a thorough understanding of technology concepts, systems and operations.

## Standard VII

All teachers know how to plan, organize, deliver and evaluate instruction for all students that incorporates the effective use of current technology for teaching and integrating the Technology Applications Texas Essential Knowledge and Skills (TEKS) into the curriculum.

## Standard X

The digital art/animation teacher has the knowledge and skills needed to teach the creativity and innovation; communication and collaboration; research and information fluency; critical thinking, problem solving, and decision making; digital citizenship; and technology operations and concepts strands of the Technology Applications Texas Essential Knowledge and Skills (TEKS) in digital art/animation, in addition to the content described in Technology Applications Standards I–VII.

## Standard XII

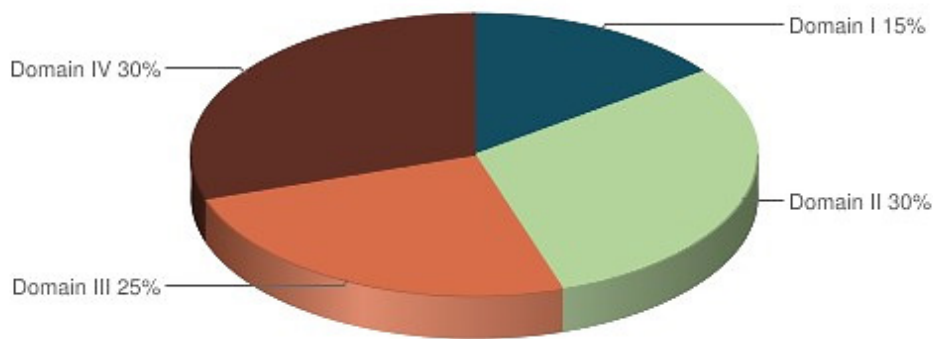
The digital communications teacher has the knowledge and skills needed to teach the creativity and innovation; communication and collaboration; research and information fluency; critical thinking, problem solving and decision making; digital citizenship; and technology operations and concepts strands of the Technology Applications Texas Essential Knowledge and Skills (TEKS) in digital communications, in addition to the content described in Technology Applications Standards I–VII.

## Standard XIII

The Web design teacher has the knowledge and skills needed to teach the creativity and innovation; communication and collaboration; research and information fluency; critical thinking, problem solving and decision making; digital citizenship; and technology operations and concepts strands of the Technology Applications Texas Essential Knowledge and Skills (TEKS) in Web design, in addition to the content described in Technology Applications Standards I–VII.

## Domains and Competencies

Domain	Domain Title	Approx. Percentage of Exam	Standards Assessed
I	Technology Applications Core	15%	Technology Applications EC–12: I–VII
II	Digital Art and Animation	30%	Technology Applications EC–12: X
III	Digital Communication and Multimedia	25%	Technology Applications EC–12: XII
IV	Web Design	30%	Technology Applications EC–12: XIII



The content covered by this exam is organized into broad areas of content called **domains**. Each domain covers one or more of the educator standards for this field. Within each domain, the content is further defined by a set of **competencies**. Each competency is composed of two major parts:

- The **competency statement**, which broadly defines what an entry-level educator in this field in Texas public schools should know and be able to do.
- The **descriptive statements**, which describe in greater detail the knowledge and skills eligible for testing.

## Domain I—Technology Applications Core

**Competency 001—The Technology Applications teacher knows technology terminology and concepts; the appropriate use of hardware, software and digital files; and how to acquire, analyze and evaluate digital information.**

The beginning teacher:

- Knows and uses technology terminology and concepts appropriate to the task.
- Knows the appropriate use of software and hardware components.
- Demonstrates knowledge of various types of networks (e.g., LAN, WAN, intranets and the Internet).
- Knows how to select, connect and use a variety of local and remote peripheral devices.
- Knows how to manage compatibility issues for a variety of media, file formats (e.g., text, graphics, image, video, audio), file naming conventions, file management structures and digital organization strategies.
- Knows how to evaluate software for quality, appropriateness, effectiveness, efficiency, support and licensing to make decisions regarding its proper acquisition and use.
- Knows how to access, manage and manipulate information from secondary storage devices.
- Knows strategies for searching, acquiring and accessing information from electronic resources.
- Knows how to assess the accuracy and validity of acquired information and how to resolve information conflicts through research and comparison of data from multiple sources.
- Demonstrates knowledge of intellectual property rights (e.g., copyright, Creative Commons, free and open source licensing) when accessing, using, manipulating and editing electronic data.
- Demonstrates knowledge of issues of unacceptable use of computer resources including, but not limited to, cyberbullying and harassment, computer hacking, computer piracy, plagiarism, vandalism, intentional virus setting and invasion of privacy.
- Demonstrates ethical and lawful acquisition of digital information, including the use of established methods to cite sources.

- M. Understands digital safety, privacy rules, digital etiquette, acceptable use of technology and the ethical and legal responsibilities of using social media.
- N. Knows how to use online help and other support documentation to troubleshoot minor technical problems with hardware and software.
- O. Knows how to develop documentation for a variety of products.
- P. Demonstrates knowledge of technology's historical and future impact on society.

**Competency 002—The Technology Applications teacher knows how to use technology tools to solve problems, evaluate results and communicate information in a variety of formats for diverse audiences.**

The beginning teacher:

- A. Knows how to plan, create, edit, analyze and represent data in documents using general productivity software.
- B. Knows how to explore complex concepts using simulations, models, interactive virtual environments, and new technologies to develop hypotheses, modify input and analyze results.
- C. Demonstrates knowledge of how to design and implement procedures to track trends, set timelines and evaluate the progress of products using project management tools for continual improvement in process and product development.
- D. Knows how to evaluate projects for design, purpose, audience and content delivery using various criteria (e.g., project specifications, rubrics).
- E. Knows how to select representative products to be collected and stored in an electronic evaluation tool and to evaluate products for relevance to the assignment or task.
- F. Knows how to plan and design products that are accessible to learners with diverse needs and abilities.

**Competency 003—The Technology Applications teacher knows how to plan, organize, deliver and evaluate instruction that effectively utilizes current technology for teaching the Technology Applications Texas Essential Knowledge and Skills (TEKS) for all students.**

The beginning teacher:

- A. Knows how to implement developmentally appropriate instructional practices, activities and materials to improve student learning.
- B. Knows how to implement lessons using diverse instructional strategies.
- C. Demonstrates knowledge of issues related to the equitable use of technology for diverse populations.
- D. Knows how to implement instruction that allows students to solve problems by posing questions, collecting data and interpreting results.
- E. Knows how to develop and facilitate collaborative tasks among group members, incorporating diverse perspectives while exploring alternative solutions.
- F. Knows strategies to help students learn how to locate, retrieve, analyze, evaluate, communicate and retain content-related information from a variety of texts and digital sources.
- G. Knows how to evaluate student projects and portfolios using various assessment methods (e.g., formal, informal).
- H. Knows how to promote effective self-evaluation and use of feedback from peers.
- I. Knows the relationship between instruction and assessment.

- J. Knows how to adjust instruction based on assessment results.
- K. Demonstrates knowledge of emerging technology and its role in education.
- L. Knows the importance of self-assessment and planning for professional growth.

## **Domain II—Digital Art and Animation**

**Competency 004—The Technology Applications teacher demonstrates knowledge of the principles and elements of design and their application to digital art and animation.**

The beginning teacher:

- A. Knows concepts and terminology related to digital art and animation applications.
- B. Knows how to differentiate among and demonstrate the appropriate use of a variety of tools found in graphic and photo editing software applications.
- C. Demonstrates knowledge of the rules of visual composition (e.g., rule of thirds and golden section) and how they relate to harmony and balance as well as discord and drama.
- D. Knows how to apply basic pictorial qualities using elements and principles of design (e.g., proportion, balance, variety, emphasis, harmony, symmetry and unity) in type, color, size, line thickness, shape and space.
- E. Knows how to critique projects implementing the fundamental concepts of graphic design using rubrics for problem-solving tasks.
- F. Demonstrates knowledge of perspective (e.g., background, light, shade/shadow and scale) to capture a focal point and create depth.
- G. Knows how to create three-dimensional effects using depth of field (e.g., foreground, middle distance and background).
- H. Knows how to identify, select and appropriately use various color formats (RGB, CMYK, Hexadecimal and Pantone) and processes such as spot color and black and white.
- I. Demonstrates knowledge of color theory and knows how it is applied to create new colors in digital format.
- J. Knows how to apply a variety of color schemes (e.g. tertiary, monochromatic, analogous, complementary and cool and warm colors; primary/secondary triads; and split complements) to digital designs.
- K. Knows how to define and use the twelve principles of animation to meet the requirements of an animation project.
- L. Knows how to distinguish between and use different modeling techniques such as box modeling and polygon primitives that use extrusion and rotation.

**Competency 005—The Technology Applications teacher demonstrates knowledge of principles of typography, modeling and page layout using appropriate graphic tools to create a variety of products.**

The beginning teacher:

- A. Knows how to integrate information using productivity tools (e.g., text, database, spreadsheet and graphic files).
- B. Demonstrates the appropriate use of typography (e.g., serif, sans serif, drop cap, decorative letters and embedded-text frames) as graphic elements.

- C. Demonstrates the proper usage among the categories of typefaces while recognizing and resolving conflicts that occur from combined usage.
- D. Knows how to use styles, including a variety of type specifications and formatting.
- E. Knows how to critique the fundamental concepts of 3-D modeling and design, such as composition, perspective, angles, lighting, repetition, proximity, white space, balance and contrast.
- F. Knows how to examine 3-D model objects to interpret the point of interest, the prominence of the subject and visual parallels between the structures of natural and human-made environments.

**Competency 006—The Technology Applications teacher knows how to use graphics, animation and page design to produce products that convey a specified message to an intended audience.**

The beginning teacher:

- A. Knows how to apply the appropriate vocabulary related to digital art and animation software.
- B. Knows how to implement the basic concepts of color and design theory working with bitmap and vector images in order to create a complete graphic design (e.g., backgrounds, characters and other objects).
- C. Knows concepts and terminology related to computer animation (e.g., rendering, storyboarding, timeline, materials/textures, layers, GIFs, framerate, keyframes, tweening and rigging).
- D. Knows how to distinguish between and use the animation techniques of path- and cel-animation and utilize basic animation tools such as onion-skinning and tweening.
- E. Demonstrates appropriate use of scripting languages in order to create an animation.
- F. Identifies and defines the design attributes and requirements of products created for a variety of print and digital purposes (e.g., posters, billboards, e-publications, Web pages and multimedia format).
- G. Knows how to implement and evaluate design and printing requirements as they relate to purpose, audience and final output specifications.
- H. Knows how to make decisions regarding the selection, acquisition and use of graphics and animation software, taking into consideration its quality, appropriateness, effectiveness and efficiency.
- I. Knows how to synthesize information using data gathered from interview, print and multi-media resources.
- J. Demonstrates appropriate use of lighting techniques.
- K. Knows how to publish information in a variety of formats.
- L. Knows how to delineate and make necessary adjustments regarding compatibility issues, including but not limited to digital file formats and cross-platform connectivity.
- M. Demonstrates the impact of graphics, animation, typography and page design on society, including concepts related to persuasiveness, marketing and point of view.
- N. Knows how to research the history and future of digital art and animation career opportunities.

### **Domain III—Digital Communications and Multimedia**

**Competency 007—The Technology Applications teacher knows how to produce and distribute digital video and multimedia products.**

The beginning teacher:

- A. Knows the roles and responsibilities of a production crew for digital video and multimedia projects.

- B. Knows how to address issues related to the stages of production for projects (preproduction, production and postproduction).
- C. Knows critical elements, issues and concepts of the preproduction stage (e.g., design procedures, timeline, scripting, equipment and casting).
- D. Demonstrates knowledge of postproduction strategies for audio, video and multimedia publications.
- E. Demonstrates knowledge of issues related to creating multimedia products for a variety of purposes and audiences.
- F. Demonstrates proper strategies for script writing.
- G. Knows how to use camera perspective, content selection and framing (e.g., color and white space) in multimedia products for a defined audience and purpose.
- H. Knows how to import/export audio, video and multimedia files from a variety of sources.
- I. Knows how to publish using a variety of platforms.

**Competency 008—The Technology Applications teacher demonstrates knowledge of current practice, future trends and procedural protocols in the use of audio/video and digital publications.**

The beginning teacher:

- A. Understands how to identify/define problems and questions for multimedia publications.
- B. Knows how to design and implement procedures to track trends, set timelines and review and evaluate progress for project completion.
- C. Knows how to use current industry standards to plan and examine document, script and storyboard development processes.
- D. Knows how to use and implement audio techniques in order to create, edit and integrate digital sounds.
- E. Knows how to determine the most appropriate file type based on universally recognized file formats for audio, video and digital publications, such as WAV, MP3, OGG, MP4, AVI, MOV, PDF, PNG, JPG, IBA, WebM and EPUB.
- F. Knows how to select the appropriate compression codec for documents, images, audio and video files with consideration for audience and final platform.
- G. Demonstrates knowledge of various videography techniques (including lighting, composition, audio, resolution, voice-over editing and delivery) in completion of a final product.
- H. Knows how to select the appropriate evaluation tools and delivery methods for digital publications, as well as audio (e.g., sound rates, channels and frequency) and video files.

**Competency 009—The Technology Applications teacher knows how to design, produce and distribute multimedia products.**

The beginning teacher:

- A. Demonstrates an understanding of the impact that digital publications have on current and emerging media environments.
- B. Knows how to apply copyright laws, licenses, and fair use (including Creative Commons and public domain) as well as use digital information such as attributing ideas and citing sources.
- C. Demonstrates appropriate respect for intellectual property when manipulating, morphing and editing graphics, video, text and sound.



- D. Knows how to explain the ethical impact that digital publishing and audio and video production have on society.
- E. Knows how to create pre-planning designs such as rough sketches, storyboards and brainstorming.
- F. Knows how to design and implement procedures to track trends, set timelines and review and evaluate progress for project completion.
- G. Knows how to create a portfolio to document work experiences and samples.
- H. Knows how to format digital information for effective communication for a defined audience.
- I. Knows how to select the appropriate evaluation tools and delivery methods for digital publications as well as audio and video files.
- J. Knows how to deliver the product in a variety of media formats.

## **Domain IV—Web Design**

**Competency 010—The Technology Applications teacher demonstrates knowledge of strategies and techniques for website administration.**

The beginning teacher:

- A. Knows concepts and terminology related to Web administration (e.g., URL, IP addresses, HTML, CSS and FTP).
- B. Knows how to obtain, assess and use various Web standards such as those of the World Wide Web Consortium (W3C), Ecma International and the Internet Corporation for Assigned Names and Numbers (ICANN) to make informed decisions and implement standards in original work.
- C. Knows the differences between Internet and intranet.
- D. Demonstrates knowledge of the top-level domains (e.g., gov, net, com, mil, org and edu) and is familiar with new domain implementation.
- E. Knows the technical needs and functionality/use of Web servers.
- F. Demonstrates knowledge of the requirements for a Web server and resolves issues relating to compatibility (e.g., file formats and cross-platform connectivity).
- G. Knows the historical development and characteristics of a variety of network protocols and knows methods of accessing information on the Internet (e.g., HTTP, FTP, TCP/IP, Telnet, Gopher and WAIS).
- H. Knows issues related to network security and knows how to select and implement methods to protect a Web server from unauthorized use.
- I. Understands bandwidth issues as related to audience, server, connectivity and cost.
- J. Knows how to establish a folder/directory hierarchy for storage of Web pages and their related files.
- K. Knows how to control access to a Web site via password controls and global access/deny controls.
- L. Knows how to make decisions regarding the selection, acquisition and use of software related to Web mastering, Web gaming and Web communications, taking into consideration its quality, appropriateness, effectiveness and efficiency.

**Competency 011—The Technology Applications teacher knows principles of Web design and implements a variety of tools and techniques to create and troubleshoot Web pages for a diverse audience.**

The beginning teacher:

- A. Knows how to use specific tools such as text editors and Web authoring programs to create a Web site.
- B. Knows how to discuss, analyze, compare and contrast game types such as action, action adventure, adventure, construction and management simulation, life simulation, massively multiplayer online role-playing game (MMORPG), music, party, puzzle, role-playing, sports, strategy, trivia and vehicle simulation.
- C. Demonstrates knowledge of issues related to incorporating graphics, video, audio and multimedia sequences into a Web page.
- D. Demonstrates knowledge of design principles (e.g., size of graphics, font size and color, backgrounds, ratio of text to white space, proximity, unity, balance, alignment, repetition and contrast).
- E. Knows how to analyze and determine the appropriate use of dynamic, static and interactive Web sites and open/closed file formats and software.
- F. Demonstrates knowledge of issues related to displaying Web pages on a variety of browsers and monitors (e.g., color, page size, browser version, plug-ins) with cross-browser compatibility.
- G. Knows how to plan and design Web pages that are accessible to diverse audiences (e.g., visually impaired, learning disabled, physically disabled).
- H. Knows how to work collaboratively to create Web-based programs and gaming products.
- I. Knows how to validate HTML code to current industry standards using available online diagnostic tools.
- J. Knows how to use hypertext markup language (HTML), cascading style sheets (CSS), Hypertext PreProcessor (PHP) and JavaScript through hard coding using a text editor, and Web authoring programs utilizing interactive databases and server-side processing.

**Competency 012—The Technology Applications teacher knows how to use Web pages to communicate and interact effectively with others.**

The beginning teacher:

- A. Knows how to format information for appropriate and effective communication (e.g., appropriate use of hyperlinks, designing content for a specific audience).
- B. Understands, analyzes and determines the appropriate use of dynamic, static and interactive Web sites.
- C. Knows how to implement methods for creating interactivity in Web pages.
- D. Knows how to effectively create a Web site that communicates intended information to the target audience.
- E. Knows how to engage in online activities that follow appropriate behavioral, communication and privacy guidelines (e.g., ethics, personal security, verbiage) determined by the intended audience, including the ethical use of files and file sharing.
- F. Knows how to examine the impact of internet technologies on society through research, interviews and personal observations.
- G. Knows how to comprehend the impact of Internet history and structure on current use.
- H. Knows how to examine and apply the proper and acceptable use of digital/virtual communications technologies.
- I. Knows how to work collaboratively to create functioning Web-based programs and gaming products.

# Preparation Manual

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## Section 4: Sample Selected-Response Questions Technology Applications EC–12 (242)

This section presents some sample exam questions for you to review as part of your preparation for the exam. To demonstrate how each competency may be assessed, sample questions are accompanied by the competency that they measure. While studying, you may wish to read the competency before and after you consider each sample question. Please note that the competency statements do not appear on the actual exam.

For each sample exam question, there is a correct answer and a rationale for each answer option. The sample questions are included to illustrate the formats and types of questions you will see on the exam; however, your performance on the sample questions should not be viewed as a predictor of your performance on the actual exam.

### Domain I—Technology Applications Core

**Competency 001—The Technology Applications teacher knows technology terminology and concepts; the appropriate use of hardware, software and digital files; and how to acquire, analyze and evaluate digital information.**

1. Which of the following types of networks allows parents to register for accounts to view their child’s grades on the school district Web site?

- A. Router
- B. Server
- C. Intranet
- D. Extranet

Answer \_\_\_\_\_

2. While researching the origins of a community, a student discovers a conflict when comparing data obtained from different sources. Which of the following sources is considered the most reliable?

- A. An editorial commemorating the hundredth anniversary of the community's founding
- B. Famous anecdotes in pamphlet distributed by the local chamber of commerce
- C. Published letters written by one of the community's original settlers
- D. A recent biography of the life of the individual credited with founding the community

Answer \_\_\_\_\_

3. Which of the following scenarios describes an ethical acquisition and acceptable use of multimedia?

- A. Creating a file-sharing service for movies that have been copied from purchased DVDs
- B. Creating a musical composition by combining parts of eighteenth-century folk songs
- C. Posting a video online that uses a current hit song for background music
- D. Using highlights from a televised athletic event to sell sportswear

Answer \_\_\_\_\_

4. Which TWO of the following activities are examples of using audio, video, or digital sources to solve an authentic problem?

- A. Collecting and analyzing data from a database to identify areas of critical need for a water project
- B. Preparing a video to dramatize the life cycle of a butterfly as described in a textbook
- C. Summarizing electronic book information provided about the Amazon rain forest
- D. Using an online archive of photographs to generate questions about life during the Great Depression
- E. Watching current travel videos of historical locations throughout the United States

Answer \_\_\_\_\_

**Competency 002—The Technology Applications teacher knows how to use technology tools to solve problems, evaluate results and communicate information in a variety of formats for diverse audiences.**

5. A formula in a spreadsheet is copied from cell B1 to cell C2.

If the original formula is =\$A2, which of the following best represents the resulting formula?

- A. =A2
- B. =B1
- C. =\$A3
- D. =\$B2

Answer \_\_\_\_\_

6. To effectively evaluate student presentations created at the conclusion of a social studies unit project, it is most important for a teacher to use a rubric to evaluate the

- A. special effects and the flashiness of the finished products.
- B. content learned and the effectiveness of the presentations.
- C. level of participation and contribution during the project.
- D. abilities and skills in using the presentation software.

Answer \_\_\_\_\_

**Competency 003—The Technology Applications teacher knows how to plan, organize, deliver and evaluate instruction that effectively utilizes current technology for teaching the Technology Applications Texas Essential Knowledge and Skills (TEKS) for all students.**

7. Which of the following graphic organizers should a student create electronically to best clarify the sequence of events in a movie script?

- A. Storyboard
- B. Venn diagram
- C. Story map
- D. T-chart

Answer \_\_\_\_\_

8. A technology applications teacher is preparing a class to begin work on a group project. Which of the following strategies is most effective in facilitating collaboration and teamwork among group members?

- A. Separating girls and boys into different groups
- B. Limiting each group to three members
- C. Emphasizing group harmony as the most important goal
- D. Modifying group norms as the situation requires

**Answer** \_\_\_\_\_

9. Which of the following is the most important for a teacher to consider when designing assessment methods to evaluate a student portfolio?

- A. The arrangement of items included in the portfolio
- B. The intended audience for the portfolio
- C. The recommended timeline for selecting material to include
- D. The scoring criteria for the learning objective

**Answer** \_\_\_\_\_

10. Which of the following tools will best guide students through effectively completing a final product?

- A. Project rubric
- B. Project supplies
- C. Project calendar
- D. Project checklist

**Answer** \_\_\_\_\_

11. A teacher instructs students on how to safely research information on the Internet, participate in electronic discussions, follow accepted practices (e.g., netiquette), and use approved passwords to access information resources. The teacher primarily understands the importance of implementing which of the following objectives of information literacy?

- A. Students comprehend the legal and social implications of using information.
- B. Students use information effectively to accomplish a specific purpose.
- C. Students evaluate information and its sources critically.
- D. Students retrieve information effectively and efficiently.

**Answer** \_\_\_\_\_

12. Which of the following is the best way to maintain up-to-date technology use in the classroom?

- A. Reading a book on how to use tablets to integrate technology
- B. Writing a blog about implementing technology in the classroom
- C. Searching the Internet for the latest educational technology trends
- D. Reading the user manuals for new technology equipment on campus

**Answer** \_\_\_\_\_

## Domain II—Digital Art and Animation

**Competency 004—The Technology Applications teacher demonstrates knowledge of the principles and elements of design and their application to digital art and animation.**

13. The primary purpose of the rule of thirds is to
- A. frame a subject in a photograph.
  - B. create leading lines within a photograph.
  - C. change the lighting conditions for a photograph.
  - D. produce a balanced photograph.

**Answer \_\_\_\_\_**

14. Which of the following color modes is best to use to print a poster at a professional printer?
- A. CMYK
  - B. RGB
  - C. Indexed
  - D. Lab

**Answer \_\_\_\_\_**

15. Which of the following color mixing models provides the simplest tools for adjusting the tone of a particular color?
- A. Red, yellow, blue (RYB)
  - B. Cyan, magenta, yellow, black (CMYK)
  - C. Hue, saturation, brightness (HSB)
  - D. Red, green, blue (RGB)

**Answer \_\_\_\_\_**

16. Which of the following terms refers to the tonal value of a graphic?
- A. Resolution
  - B. Pixel
  - C. Luminosity
  - D. Opacity

**Answer \_\_\_\_\_**

17. According to the twelve principles of animation, which of the following statements best describes the concept of *arc*?
- A. Characters must be propelled into action via a story plot.
  - B. Audiences prefer smooth, curved lines to harsh corners and straight lines.

- C. Motion typically occurs along a natural and realistic trajectory.
- D. Natural motion tends to accelerate and decelerate at its start and end.

Answer \_\_\_\_\_

**Competency 005—The Technology Applications teacher demonstrates knowledge of principles of typography, modeling and page layout using appropriate graphic tools to create a variety of products.**

18. High school journalism students are planning an online school newspaper. To establish consistent guidelines for using fonts, font styles, and paragraph alignment, the students should develop

- A. a grid layout.
- B. a master template.
- C. page specifications.
- D. style sheets.

Answer \_\_\_\_\_

19. Which of the following criteria is most important for a teacher to consider when preparing a school's newsletter for the community?

- A. Using several columns on the same page to make it easier to read
- B. Choosing a background color that is similar to the font color
- C. Removing the margins to easily add the page number in the header
- D. Arranging the photos to be right aligned for neatness

Answer \_\_\_\_\_

20. When creating a 3-D object, an important reason to look at different perspectives is to

- A. see the vanishing point at eye level.
- B. ensure all sides are completely created.
- C. make sure the object is symmetrical.
- D. create an isometric projection.

Answer \_\_\_\_\_

**Competency 006—The Technology Applications teacher knows how to use graphics, animation and page design to produce products that convey a specified message to an intended audience.**

21. A student inserts a bitmap image into a Web page. When the page is uploaded, the image looks blocky and the quality is poor.

Which of the following causes pixilation of this kind?

- A. The image was saved at 48 bits instead of 16 bits.
- B. The student did not rasterize the image.

- C. The student did not compress the image.
- D. The image was saved at too low a resolution.

**Answer** \_\_\_\_\_

22. Bitmapped images are preferable to vector images for

- A. creating logos and illustrations.
- B. editing digital photographs.
- C. making videos and animation.
- D. enlarging digital photographs.

**Answer** \_\_\_\_\_

23. Which of the following phrases describes an alley in desktop publishing?

- A. The width of the margin
- B. The space between columns
- C. The space between paragraphs
- D. The width of the columns

**Answer** \_\_\_\_\_

24. A teacher wants to print single-sided, numbered student packets. Which of the following print settings is best to use?

- A. Tile
- B. Booklet
- C. Collate
- D. Duplex

**Answer** \_\_\_\_\_

25. A teacher is preparing a lesson to instruct students how to edit photographs for publication on the Web and in print. Which of the following principles should the teacher primarily emphasize?

- A. Printed photographs require higher resolution than Web photographs do.
- B. Web photographs need to use CMYK color, but printed photographs can use RGB.
- C. Printed photographs should be JPEGs, while Web photographs must be GIFs.
- D. Web photographs should be saved as bitmap images, but printed photographs should be saved as vectors.

**Answer** \_\_\_\_\_

26. Environment mapping is most effective for creating a realistic image of which of the following objects?

- A. Cotton towel
- B. Glass mirror



- C. Stone vase
- D. Wooden shelf

Answer \_\_\_\_\_

## Domain III—Digital Communications and Multimedia

**Competency 007—The Technology Applications teacher knows how to produce and distribute digital video and multimedia products.**

27. Which of the following production crew members is responsible for securing funding, creating a vision, and having a strong understanding of business in terms of finance and legal obligations?

- A. Digital producer
- B. Producer
- C. Director
- D. Executive producer

Answer \_\_\_\_\_

28. Issues related to locations, scenes, equipment, and people are primarily addressed during which of the following stages of preproduction?

- A. Audience definition
- B. Budget development
- C. Production scheduling
- D. Video scripting

Answer \_\_\_\_\_

29. When streaming media, the network chosen for content delivery should primarily have

- A. balanced loads.
- B. consolidated caches.
- C. isolated networks.
- D. minimized bandwidths.

Answer \_\_\_\_\_

30. In two sequential medium shots, the director of photography frames a man and a woman having a conversation. In the first shot, the man is seen on the left side of the composition, and the woman is seen on the right side. The second shot continues the action; however, the man is now on the right side of the composition, and the woman is on the left.

The director of photography has broken which of the following rules of continuity?

- A. Crossing the action axis
- B. Shooting the reverse angle

- C. Maintaining screen direction
- D. Cheating the actors

**Answer** \_\_\_\_\_

31. Which of the following camera angles is most effective for making a subject appear large and imposing?

- A. Bird's eye
- B. Worm's eye
- C. Close-up
- D. Oblique

**Answer** \_\_\_\_\_

**Competency 008—The Technology Applications teacher demonstrates knowledge of current practice, future trends and procedural protocols in the use of audio/video and digital publications.**

32. For a multimedia production, students wish to import a graphic that fades from 100% opaque to 100% transparent. Which of the following file formats best supports this type of varying transparency?

- A. GIF
- B. JPEG
- C. PNG
- D. BMP

**Answer** \_\_\_\_\_

33. At which of the following points in a recording should an audio file be cut to best prevent pops and clicks when two regions in the file are joined?

- A. Where the waveform's amplitude is above 10dB
- B. At a zero crossing where the waveform's amplitude equals 0dB
- C. Where the waveform's amplitude is less than -10dB
- D. At any point where the waveform's amplitude is plus or minus 2dB

**Answer** \_\_\_\_\_

34. A student wishes to replace one scene in a video with another that will run longer. If the student is using linear editing, which of the following approaches is uniquely required?

- A. Adding transitions between the previous material and the new clip
- B. Copying the longer clip onto the student's computer hard drive
- C. Rebuilding the video from the edited clip to the end of the video
- D. Using drag and drop to replace the original clip

**Answer** \_\_\_\_\_

35. Which of the following sample rates is sufficient to produce an audio file for a standard DVD?

- A. 11,025 Hz
- B. 22,050 Hz
- C. 48,000 Hz
- D. 96,000 Hz

**Answer** \_\_\_\_\_

**Competency 009—The Technology Applications teacher knows how to design, produce and distribute multimedia products.**

36. Which of the following Creative Commons licenses allows redistribution as long as the work is passed along intact with credit given to the license holder?

- A. CC Attribution-NoDerivs
- B. CC Attribution-NonCommercial
- C. CC Attribution-ShareAlike
- D. CC0 Public Domain Dedication

**Answer** \_\_\_\_\_

37. Which of the following digital tools has the greatest impact on society as a driving force for positive community action?

- A. e-book
- B. Meme
- C. Mobile computing
- D. Social media

**Answer** \_\_\_\_\_

38. Which of the following is the first step a teacher should take when planning a Web site for the class?

- A. Determining the target audience for the Web site
- B. Determining the purpose and goal of the Web site
- C. Deciding upon the color scheme and layout of the Web site
- D. Deciding upon a markup language to create the content of the Web site

**Answer** \_\_\_\_\_

## **Domain IV—Web Design**

**Competency 010—The Technology Applications teacher demonstrates knowledge of strategies and techniques for website administration.**

39. Which of the following describes the primary function of a DNS server?

- A. It provides resolution of host names to IP addresses.
- B. It provides security for a network with the use of control lists.
- C. It secures network traffic through shared key encryption.
- D. It secures client access through log in and authentication.

**Answer** \_\_\_\_\_

40. A teacher is required to take daily attendance using the district's secure site. On which of the following types of network is the site most likely located?

- A. Internet
- B. Intranet
- C. Local Area Network (LAN)
- D. Wide Area Network (WAN)

**Answer** \_\_\_\_\_

41. Which of the following descriptions best illustrates a typical intranet network structure used by many school districts?

- A. A worldwide connection of networks that is accessible to the district faculty, staff, students, and parents from any location with Internet access
- B. A private network that uses World Wide Web communication standards but is not connected to the Web and is accessible only to on-site staff
- C. A private network that utilizes the communication standards and some resources of the World Wide Web, with specific parts of the network accessible outside the network
- D. A network connection of computers with common print and file servers for printing and sharing documents among staff on the network

**Answer** \_\_\_\_\_

42. Which of the following approaches is the most effective way to protect a Web server from unauthorized use?

- A. Applying the latest security patches available for Web server software
- B. Including any software modules that might be required in the future
- C. Using full-privilege accounts such as "root" or "SYSTEM"
- D. Giving Web server software write-access rights to files being served to users

**Answer** \_\_\_\_\_

**Competency 011—The Technology Applications teacher knows principles of Web design and implements a variety of tools and techniques to create and troubleshoot Web pages for a diverse audience.**

43. During a unit on Web design, a class analyzes games on the Internet. The students discuss various video game perspectives. The best perspective to use when designing a driving game is

- A. first person.
- B. second person.
- C. third person.
- D. multiplayer.

**Answer** \_\_\_\_\_

44. A GIF logo displayed on an image-based background exhibits a halo effect. Changing the logo to a PNG format will make it possible to adjust which of the following characteristics to correct the problem?

- A. Antialiasing
- B. Opacity
- C. Rasterization
- D. Transparency

**Answer** \_\_\_\_\_

45. Which THREE of the following are guidelines for Web design that should be used when adding graphics to Web pages?

- A. Use minimal contrast between text and background colors.
- B. Ensure that graphics are consistent with the purpose, organization, and style of the page.
- C. Make sure the layout follows the rule of thirds.
- D. Reduce the size of graphics files.
- E. Avoid repeating overly bright images.

**Answer** \_\_\_\_\_

46. Which of the following is the most accepted ratio of text to white space to provide optimum readability?

- A. 1:1
- B. 1:2
- C. 2:3
- D. 3:5

**Answer** \_\_\_\_\_

47. A Web site designer wishes to include a mechanism on a Web site's enrollment page to determine whether a human is attempting to enter the required information. To make the mechanism accessible for the visually impaired, which of the following should the designer use?

- A. Audio files describing text
- B. Images containing text
- C. Text describing images
- D. Videos depicting text

**Answer** \_\_\_\_\_

**Competency 012—The Technology Applications teacher knows how to use Web pages to communicate and interact effectively with others.**

48. Which of the following formatting devices allows Web visitors to easily scan and locate information on a Web page?

- A. Graphics
- B. Web-safe colors
- C. Links
- D. Cascading Style Sheets

**Answer \_\_\_\_\_**

49. A teacher wants to share a lesson plan with members of a Personal Learning Network (PLN). Which of the following is the most effective way to give the PLN members access to the lesson plan?

- A. Saving the lesson plan as a PDF file and uploading it to a blog
- B. Saving the lesson plan as a DOC file and sending it via e-mail
- C. Saving the lesson plan as a GIF file and uploading it to a flash drive
- D. Saving the lesson plan as a JPEG file and printing it out for the group

**Answer \_\_\_\_\_**

50. Which of the following is the best strategy for protecting an individual's online image?

- A. Checking security settings for social networking sites
- B. Limiting online purchases and online posts
- C. Considering possible consequences before posting online
- D. Separating personal profiles from professional profiles

**Answer \_\_\_\_\_**

# Preparation Manual

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## Section 4: Sample Selected-Response Answers and Rationales Technology Applications EC–12 (242)

This section presents some sample exam questions for you to review as part of your preparation for the exam. To demonstrate how each competency may be assessed, sample questions are accompanied by the competency that they measure. While studying, you may wish to read the competency before and after you consider each sample question. Please note that the competency statements do not appear on the actual exam.

For each sample exam question, there is a correct answer and a rationale for each answer option. The sample questions are included to illustrate the formats and types of questions you will see on the exam; however, your performance on the sample questions should not be viewed as a predictor of your performance on the actual exam.

### Domain I—Technology Applications Core

**Competency 001—The Technology Applications teacher knows technology terminology and concepts; the appropriate use of hardware, software and digital files; and how to acquire, analyze and evaluate digital information.**

1. Which of the following types of networks allows parents to register for accounts to view their child’s grades on the school district Web site?

- A. Router
- B. Server
- C. Intranet
- D. Extranet

#### Answer

**Option D is correct** because the extranet allows controlled access from outside parties to information in secured networks. **Option A is incorrect** because a router is only physical device that connects devices to a network. **Option B is incorrect** because a server only stores data for quick access. **Option C is incorrect** because an intranet is designed for internal communications and is only accessible by an organization’s authorized members.

2. While researching the origins of a community, a student discovers a conflict when comparing data obtained from different sources. Which of the following sources is considered the most reliable?

- A. An editorial commemorating the hundredth anniversary of the community’s founding
- B. Famous anecdotes in pamphlet distributed by the local chamber of commerce
- C. Published letters written by one of the community’s original settlers
- D. A recent biography of the life of the individual credited with founding the community

#### Answer

**Option C is correct** because letters from the time being researched qualify as a primary resource and are considered reliable. **Options A, B, and D are incorrect** because an editorial, anecdotes, and a recently published biography would be considered secondary sources and therefore less reliable than a primary source, and they could possibly be biased.

3. Which of the following scenarios describes an ethical acquisition and acceptable use of multimedia?

- A. Creating a file-sharing service for movies that have been copied from purchased DVDs
- B. Creating a musical composition by combining parts of eighteenth-century folk songs
- C. Posting a video online that uses a current hit song for background music
- D. Using highlights from a televised athletic event to sell sportswear

**Answer**

**Option B is correct** because the music from eighteenth-century folk songs would be in the public domain. **Option A is incorrect** because file-sharing movies would interfere with the copyright owner's right to distribute and benefit from their sale. **Options C and D are incorrect** because both describe situations that interfere with the copyright owner's right to publicly display, perform, or distribute the multimedia.

4. Which TWO of the following activities are examples of using audio, video, or digital sources to solve an authentic problem?

- A. Collecting and analyzing data from a database to identify areas of critical need for a water project
- B. Preparing a video to dramatize the life cycle of a butterfly as described in a textbook
- C. Summarizing electronic book information provided about the Amazon rain forest
- D. Using an online archive of photographs to generate questions about life during the Great Depression
- E. Watching current travel videos of historical locations throughout the United States

**Answer**

**Option A is correct** because collecting and analyzing data to identify areas of critical need is consistent with research of an authentic problem. **Option D is correct** because generating questions from a digital resource such as the one described is an activity associated with authentic problem solving. **Option B is incorrect** because preparing a video based on information from a textbook does not require the degree of research associated with an authentic problem. **Option C is incorrect** because summarizing a source does not provide in and of itself the original thinking required for an authentic problem. **Option E is incorrect** because watching travel videos does not in and of itself provide the rigor necessary for an authentic problem.

**Competency 002—The Technology Applications teacher knows how to use technology tools to solve problems, evaluate results and communicate information in a variety of formats for diverse audiences.**

5. A formula in a spreadsheet is copied from cell B1 to cell C2.

If the original formula is =\$A2, which of the following best represents the resulting formula?

- A. =A2
- B. =B1
- C. =\$A3
- D. =\$B2

**Answer**

**Option C is correct** because when a formula is copied to another row with a dollar sign in front of the column letter, the cell address updates only by the row number. The dollar sign acts as an anchor to the row number or



column letter that it is in front of when you copy the formula or cell address to another cell. **Option A is incorrect** because a formula with an anchoring dollar sign always presents with a dollar sign in its placement when it is copied. **Option B is incorrect** because the address of the cell is not what is being copied. **Option D is incorrect** because the dollar sign in front of a column label protects that value in the formula from changing.

6. To effectively evaluate student presentations created at the conclusion of a social studies unit project, it is most important for a teacher to use a rubric to evaluate the

- A. special effects and the flashiness of the finished products.
- B. content learned and the effectiveness of the presentations.
- C. level of participation and contribution during the project.
- D. abilities and skills in using the presentation software.

#### Answer

**Option B is correct** because the most important part of the student's presentation is its content; multimedia projects in education are all about showing the depth of knowledge acquired. The second most important aspect is the effectiveness of the presentation and the skill of the presenters. **Option A is incorrect** because the presentation should be evaluated on what the students learned and how they presented/communicated it, not how well they can use the special effects. **Option C is incorrect** because participation and contribution levels don't assess what the student has learned. **Option D is incorrect** because the presentation is evaluated on what the students learned and not how well they used the presentation software.

**Competency 003—The Technology Applications teacher knows how to plan, organize, deliver and evaluate instruction that effectively utilizes current technology for teaching the Technology Applications Texas Essential Knowledge and Skills (TEKS) for all students.**

7. Which of the following graphic organizers should a student create electronically to best clarify the sequence of events in a movie script?

- A. Storyboard
- B. Venn diagram
- C. Story map
- D. T-chart

#### Answer

**Option A is correct** because a storyboard is a sequence of pictures representing events in a story or movie. **Option B is incorrect** because a Venn diagram is best used for comparisons. **Option C is incorrect** because a story map is best used for identifying characters, setting and other parts of a story. **Option D is incorrect** because a t-chart is used to examine two facets of an object, situation or event and to make comparisons related to a variety of subject and content areas.

8. A technology applications teacher is preparing a class to begin work on a group project. Which of the following strategies is most effective in facilitating collaboration and teamwork among group members?

- A. Separating girls and boys into different groups
- B. Limiting each group to three members

- C. Emphasizing group harmony as the most important goal
- D. Modifying group norms as the situation requires

**Answer**

**Option D is correct** because flexible group norms should be established so that the groups do not become rigid and intolerant or develop sub-groups. **Option A is incorrect** because the best groups have an equal number of boys and girls. **Option B is incorrect** because groups should be midsized. Small groups of three or less lack enough diversity and may not allow divergent thinking to occur. A moderate size group of four to five is ideal. **Option C is incorrect** because group harmony can override the necessity for more critical perspectives.

9. Which of the following is the most important for a teacher to consider when designing assessment methods to evaluate a student portfolio?

- A. The arrangement of items included in the portfolio
- B. The intended audience for the portfolio
- C. The recommended timeline for selecting material to include
- D. The scoring criteria for the learning objective

**Answer**

**Option D is correct** because scoring criteria and an associated system must be established to ensure that evaluation is conducted as objectively as possible. **Options A, B, and C are incorrect** because they only indirectly affect the evaluation of a student portfolio as it relates to the learning objectives.

10. Which of the following tools will best guide students through effectively completing a final product?

- A. Project rubric
- B. Project supplies
- C. Project calendar
- D. Project checklist

**Answer**

**Option A is correct** because a rubric has all the expectations for the final outcome of the project. **Option B is incorrect** because the supplies do not affect the entire process of the project. **Option C is incorrect** because a project's requirements and expectations can be met without a calendar. **Option D is incorrect** because it only provides a list of tasks and not specific expectations.

11. A teacher instructs students on how to safely research information on the Internet, participate in electronic discussions, follow accepted practices (e.g., netiquette), and use approved passwords to access information resources. The teacher primarily understands the importance of implementing which of the following objectives of information literacy?

- A. Students comprehend the legal and social implications of using information.
- B. Students use information effectively to accomplish a specific purpose.
- C. Students evaluate information and its sources critically.
- D. Students retrieve information effectively and efficiently.

## Answer

**Option A is correct** because netiquette refers to proper use of Internet and this falls under the economic, legal, and social issues of uses of information. **Option B is incorrect** because rules and regulations for Internet research have nothing to do with using information effectively to accomplish a specific purpose. **Option C is incorrect** because rules and netiquette do not fall under the category of selecting information and adding it to one's knowledge base and value system. **Option D is incorrect** because ethical rules and netiquette do not fall under the category of accessing information or retrieval.

12. Which of the following is the best way to maintain up-to-date technology use in the classroom?

- A. Reading a book on how to use tablets to integrate technology
- B. Writing a blog about implementing technology in the classroom
- C. Searching the Internet for the latest educational technology trends
- D. Reading the user manuals for new technology equipment on campus

## Answer

**Option C is correct** because the Internet provides many resources to help a teacher keep up with current technology information. Exploring and making the effort to educate oneself and staying informed is key. **Option A is incorrect** because reading a book on how to use tablets to integrate technology does not ensure knowledge of technology as a whole. **Option B is incorrect** because writing a blog does not necessarily help a teacher to maintain knowledge of current technology. **Option D is incorrect** because reading the user manuals for all new equipment is not feasible. There are many software programs and instructional technologies on the Internet that can be implemented without the use of new equipment.

## Domain II—Digital Art and Animation

**Competency 004—The Technology Applications teacher demonstrates knowledge of the principles and elements of design and their application to digital art and animation.**

13. The primary purpose of the rule of thirds is to

- A. frame a subject in a photograph.
- B. create leading lines within a photograph.
- C. change the lighting conditions for a photograph.
- D. produce a balanced photograph.

## Answer

**Option D is correct** because the rule of thirds is about balancing a composition properly. **Option A is incorrect** because framing deals with depth, scale, and distance in a composition. **Option B is incorrect** because lines provide movement, speed, and sometimes drama in a composition. **Option C is incorrect** because lighting is used to change the appearance of a subject.

14. Which of the following color modes is best to use to print a poster at a professional printer?

- A. CMYK
- B. RGB

- C. Indexed
- D. Lab

**Answer**

**Option A is correct** because CMYK color is used by professional printers and publishing houses. **Option B is incorrect** because RGB color is used by monitors and displays. **Option C is incorrect** because indexed color is used to limit the number of colors used. **Option D is incorrect** because lab color is used to print standard photographs.

15. Which of the following color mixing models provides the simplest tools for adjusting the tone of a particular color?

- A. Red, yellow, blue (RYB)
- B. Cyan, magenta, yellow, black (CMYK)
- C. Hue, saturation, brightness (HSB)
- D. Red, green, blue (RGB)

**Answer**

**Option C is correct** because adjusting the brightness or darkness (light or dark tone) of a particular color using the HSB model is simply a matter of using the brightness slider. **Option A is incorrect** because RYB is not a commonly accepted model—especially when considering digital products. **Option B is incorrect** because CMYK, the printing color model, has difficulties similar to the RGB model—all the sliders have to be moved in order to find a darker tone of the same color. **Option D is incorrect** because with the RGB model, all the sliders have to be moved in order to find a darker tone of the same color.

16. Which of the following terms refers to the tonal value of a graphic?

- A. Resolution
- B. Pixel
- C. Luminosity
- D. Opacity

**Answer**

**Option D is correct** because opacity is the degree of color or tonal value of an image. **Option A is incorrect** because resolution involves how sharp graphics look based on pixels. **Option B is incorrect** because a pixel is the smallest part of a picture. **Option C is incorrect** because luminosity pertains to the brightness of an area.

17. According to the twelve principles of animation, which of the following statements best describes the concept of *arc*?

- A. Characters must be propelled into action via a story plot.
- B. Audiences prefer smooth, curved lines to harsh corners and straight lines.
- C. Motion typically occurs along a natural and realistic trajectory.
- D. Natural motion tends to accelerate and decelerate at its start and end.

## Answer

**Option C is correct** because the term *arc* refers to the natural motion of objects in animation, often following a parabolic trajectory. **Option A is incorrect** because the twelve principles of animation do not address story or plot. **Option B is incorrect** because basic pictorial elements of design are not featured in the twelve principles of animation. **Option D is incorrect** because it refers to a different principle of animation often referred to as "slow in and slow out."

**Competency 005—The Technology Applications teacher demonstrates knowledge of principles of typography, modeling and page layout using appropriate graphic tools to create a variety of products.**

18. High school journalism students are planning an online school newspaper. To establish consistent guidelines for using fonts, font styles, and paragraph alignment, the students should develop

- A. a grid layout.
- B. a master template.
- C. page specifications.
- D. style sheets.

## Answer

**Option D is correct** because style sheets preserve uniformity in the use of fonts, font styles, font color, paragraph alignment and indents, leading, and hyphenation throughout a document. **Option A is incorrect** because a grid layout will not maintain consistency in the use of fonts, font styles, and paragraph alignment; it is used to plan placement of text, graphics, and white space. **Option B is incorrect** because the master template is used as a starting point for each new document—style sheets can be associated with but are not the same as a master template. **Option C is incorrect** because page specifications are usually included as part of the master template.

19. Which of the following criteria is most important for a teacher to consider when preparing a school's newsletter for the community?

- A. Using several columns on the same page to make it easier to read
- B. Choosing a background color that is similar to the font color
- C. Removing the margins to easily add the page number in the header
- D. Arranging the photos to be right aligned for neatness

## Answer

**Option A is correct** because multiple columns are used for neatness, organization, and better appearance. **Option B is incorrect** because matching both colors makes the font unreadable. **Option C is incorrect** because setting the margins to 0 affects the printed document. **Option D is incorrect** because newsletter alignment is either left aligned, center aligned, or justified.

20. When creating a 3-D object, an important reason to look at different perspectives is to

- A. see the vanishing point at eye level.
- B. ensure all sides are completely created.
- C. make sure the object is symmetrical.
- D. create an isometric projection.

## Answer

**Option B is correct** because in a 3-D environment you must look at all perspectives of your object to ensure that you have created your object in 3-D and that all the parts are in place. **Option A is incorrect** because the vanishing point at eye level is only one view; when working in 3-D you must look at all views. **Option C is incorrect** because symmetry refers to the shape of the object and not the view or perspective. **Option D is incorrect** because an isometric projection is a 2-D drawing for technical and engineering purposes. Isometric projections show one perspective of an object, and designs are always drawn at 30-degree angles.

**Competency 006—The Technology Applications teacher knows how to use graphics, animation and page design to produce products that convey a specified message to an intended audience.**

21. A student inserts a bitmap image into a Web page. When the page is uploaded, the image looks blocky and the quality is poor.

Which of the following causes pixilation of this kind?

- A. The image was saved at 48 bits instead of 16 bits.
- B. The student did not rasterize the image.
- C. The student did not compress the image.
- D. The image was saved at too low a resolution.

## Answer

**Option D is correct** because bitmap images are resolution dependent, and pixilation occurs when the resolution of the image is too low. **Option A is incorrect** because saving at 48 bits would increase the resolution of the bitmap image. **Option B is incorrect** because rasterizing means converting a vector graphic to a bitmap format. **Option C is incorrect** because compressing a file is used to make file sizes smaller, not to improve image quality.

22. Bitmapped images are preferable to vector images for

- A. creating logos and illustrations.
- B. editing digital photographs.
- C. making videos and animation.
- D. enlarging digital photographs.

## Answer

**Option B is correct** because photo editing requires a bitmap image; a vector image cannot be edited until it is converted into a bitmap image. **Option A is incorrect** because vector graphics are used to make logos and other images that need to be enlarged or reduced without reducing picture quality. **Option C is incorrect** because videos and animation must be vector graphics so they can be viewed and adjusted to any size. **Option D is incorrect** because bitmap images lose their resolution, as they get bigger.

23. Which of the following phrases describes an alley in desktop publishing?

- A. The width of the margin
- B. The space between columns
- C. The space between paragraphs
- D. The width of the columns

### Answer

**Option B is correct** because the alley is placed between columns to create white space. **Option A is incorrect** because in desktop publishing, the term alley refers to the space between the columns, not the width of the margins. **Option C is incorrect** because in desktop publishing, the term alley refers to the space between the columns, not between paragraphs. **Option D is incorrect** because in desktop publishing, the term alley refers to the space between the columns, not their width.

24. A teacher wants to print single-sided, numbered student packets. Which of the following print settings is best to use?

- A. Tile
- B. Booklet
- C. Collate
- D. Duplex

### Answer

**Option C is correct** because a collated print option allows for prints to come out in sequential order. **Option A is incorrect** because tiling setting is for piecing multiple sheets of paper edges to create one complete document. **Option B is incorrect** because in booklet printing, pages are printed on both sides and pages are not in numerical order and require additional binding to maintain sequential order. **Option D is incorrect** because duplexed printouts print on both sides.

25. A teacher is preparing a lesson to instruct students how to edit photographs for publication on the Web and in print. Which of the following principles should the teacher primarily emphasize?

- A. Printed photographs require higher resolution than Web photographs do.
- B. Web photographs need to use CMYK color, but printed photographs can use RGB.
- C. Printed photographs should be JPEGs, while Web photographs must be GIFs.
- D. Web photographs should be saved as bitmap images, but printed photographs should be saved as vectors.

### Answer

**Option A is correct** because a quality printed image needs a ppi (pixels per inch) resolution of 180–300, while Web images viewed on a monitor look fine at 72 ppi. **Option B is incorrect** because CMYK (cyan, magenta, yellow, and black) is a subtractive color model used in printing. RGB is an additive color model used by combining light, as in computer monitors. **Option C is incorrect** because GIF supports a limited number of colors; JPEG is the preferred format for photographs. **Option D is incorrect** because photographs are made of pixels, which by definition makes them bitmap rather than vector images.

26. Environment mapping is most effective for creating a realistic image of which of the following objects?

- A. Cotton towel
- B. Glass mirror
- C. Stone vase
- D. Wooden shelf

## Answer

**Option B is correct** because a mirror is reflective and would be most realistically represented using a texture that has stored the image of the environment surrounding the rendered object. **Options A, C and D are incorrect** because those materials are not a reflective.

## Domain III—Digital Communications and Multimedia

**Competency 007—The Technology Applications teacher knows how to produce and distribute digital video and multimedia products.**

27. Which of the following production crew members is responsible for securing funding, creating a vision, and having a strong understanding of business in terms of finance and legal obligations?

- A. Digital producer
- B. Producer
- C. Director
- D. Executive producer

## Answer

**Option D is correct** because the role of the executive producer is to secure funding and organize marketing strategies to ensure that the project will be popular, because the executive producer is ultimately held responsible for the success or failure of the project. Executive producers must have creativity and vision to be able to recognize good ideas that will be commercially successful, and they must also have a strong understanding of business in terms of finance and legal obligations. **Option A is incorrect** because the digital producer is responsible for producing film, video, and digital media and ensuring that proposed campaigns can be delivered on time and on budget. **Option B is incorrect** because the producer works on the production for the entire process, from the initial concept right through to marketing and distribution. The producer is vital to the success of the final piece, as he or she oversees every aspect of production. Producers hire key members of the production team and approve locations, schedules, budgets, and scripts. **Option C is incorrect** because the director is responsible for the creative vision. Directors write or study scripts and decide how best to interpret them. Directors must have a strong understanding of all areas of the production, from the initial concept right through to the edit.

28. Issues related to locations, scenes, equipment, and people are primarily addressed during which of the following stages of preproduction?

- A. Audience definition
- B. Budget development
- C. Production scheduling
- D. Video scripting

## Answer

**Option C is correct** because the production schedule helps keep track of location, scene, shots, the equipment and people needed, as well as all contact information, dates, and times. **Option A is incorrect** because defining the audience is one of the first steps in preproduction and does not address issues about locations, scenes, equipment, or people. **Option B is incorrect** because budget development determines what can be afforded but other issues that arise about locations, scenes, equipment, or people are not addressed. **Option D is incorrect** because the video script shows the relationship between the characters and the action and does not address issues that arise from locations, scenes, equipment, or people.



29. When streaming media, the network chosen for content delivery should primarily have

- A. balanced loads.
- B. consolidated caches.
- C. isolated networks.
- D. minimized bandwidths.

**Answer**

**Option A is correct** because a content delivery network should balance loads to alleviate problems associated with excess traffic. **Option B is incorrect** because replicating caches, not consolidating, is a strategy used to offer what the industry calls fast and reliable distribution of content. **Option C is incorrect** because integrated networks are necessary for improving accessibility and maintaining correctness through content replication, not isolated networks. **Option D is incorrect** because bandwidths should be maximized for improving network performance.

30. In two sequential medium shots, the director of photography frames a man and a woman having a conversation. In the first shot, the man is seen on the left side of the composition, and the woman is seen on the right side. The second shot continues the action; however, the man is now on the right side of the composition, and the woman is on the left.

The director of photography has broken which of the following rules of continuity?

- A. Crossing the action axis
- B. Shooting the reverse angle
- C. Maintaining screen direction
- D. Cheating the actors

**Answer**

**Option A is correct** because crossing the action axis from the first shot to the second shot confuses the audience because the characters jump from one side of the composition to the opposite side. **Option B is incorrect** because although a reverse angle is an example of crossing the action axis, it requires the addition of a new action or entry of a new character. **Option C is incorrect** because maintaining screen direction requires the camera to produce a static, definitively bounded frame of reference: everything is viewed as if it were happening on a proscenium stage. **Option D is incorrect** because cheating the actors requires moving the actors slightly closer to or farther away from the camera to create a believable answering shot (the second pairing shot to complete the first shot); however, the view of any background must be minimal for the cheat to work.

31. Which of the following camera angles is most effective for making a subject appear large and imposing?

- A. Bird's eye
- B. Worm's eye
- C. Close-up
- D. Oblique

**Answer**

**Option B is correct** because a worm's-eye view, a low camera angle, will make the subject appear bigger. **Option A is incorrect** because a bird's-eye view is an elevated view of an object from above and makes large items seem smaller. **Option C is incorrect** because a close-up is used to accent the subject's facial expression or

to highlight a visual detail, leaving the background out of focus. **Option D is incorrect** because an oblique camera angle would be used to show instability or disorientation.

**Competency 008—The Technology Applications teacher demonstrates knowledge of current practice, future trends and procedural protocols in the use of audio/video and digital publications.**

32. For a multimedia production, students wish to import a graphic that fades from 100% opaque to 100% transparent. Which of the following file formats best supports this type of varying transparency?

- A. GIF
- B. JPEG
- C. PNG
- D. BMP

**Answer**

**Option C is correct** because like GIFs, PNG file formats support transparency, but they also support variable transparency, which allows users to control the degree to which an image is transparent. **Option A is incorrect** because although GIF files do support transparency, they do not support alpha channels; therefore, the transparency cannot be varied. **Option B is incorrect** because JPEG files do not support transparency. **Option D is incorrect** because BMP files are large; also, the format does not support transparency and is somewhat antiquated.

33. At which of the following points in a recording should an audio file be cut to best prevent pops and clicks when two regions in the file are joined?

- A. Where the waveform's amplitude is above 10dB
- B. At a zero crossing where the waveform's amplitude equals 0dB
- C. Where the waveform's amplitude is less than -10dB
- D. At any point where the waveform's amplitude is plus or minus 2dB

**Answer**

**Option B is correct** because when the beginning or ending of a cut does not correspond to a zero crossing, a discontinuity in the waveform amplitude will likely occur. This provokes glitches, pops, or click sounds. **Options A, C, and D are incorrect** because clicks can occur if the audio is cut at a point above or below zero dB.

34. A student wishes to replace one scene in a video with another that will run longer. If the student is using linear editing, which of the following approaches is uniquely required?

- A. Adding transitions between the previous material and the new clip
- B. Copying the longer clip onto the student's computer hard drive
- C. Rebuilding the video from the edited clip to the end of the video
- D. Using drag and drop to replace the original clip

**Answer**

**Option C is correct** because in linear editing the only way to fix the problem of a new clip covering up some of the next scene on the tape is to rebuild the video from that edit to the end. **Option A is incorrect** because transitions

are not unique to either linear or nonlinear editing. **Option B is incorrect** because copying the longer clip onto the hard drive is not a unique requirement to linear editing; however, it is required for most nonlinear editing. **Option D is incorrect** because drag and drop is a feature of nonlinear editing and is not unique to linear editing.

35. Which of the following sample rates is sufficient to produce an audio file for a standard DVD?

- A. 11,025 Hz
- B. 22,050 Hz
- C. 48,000 Hz
- D. 96,000 Hz

#### Answer

**Option C is correct** because a sample rate of 48,000 Hz is of sufficient quality to produce an audio file for a standard DVD. **Option A is incorrect** because it will not result in an audio file of sufficient quality for a standard DVD; instead, it would be appropriate for low-end multimedia like AM radio. **Option B is incorrect** because it will not result in an audio file of sufficient quality for a standard DVD; instead, it would be appropriate for high-end multimedia like FM radio. **Option D is incorrect** because it will result in an audio file of higher quality than needed for a standard DVD; instead, it would be appropriate for a Blu-ray.

**Competency 009—The Technology Applications teacher knows how to design, produce and distribute multimedia products.**

36. Which of the following Creative Commons licenses allows redistribution as long as the work is passed along intact with credit given to the license holder?

- A. CC Attribution-NoDerivs
- B. CC Attribution-NonCommercial
- C. CC Attribution-ShareAlike
- D. CC0 Public Domain Dedication

#### Answer

**Option A is correct** because the CC Attribution-NoDerivs license allows for redistribution as long as it passed along unchanged and is whole with credit to the license holder. **Option B is incorrect** because the CC Attribution-NonCommercial license lets others remix, tweak, and build upon a work noncommercially although the new works must also acknowledge the originator and be noncommercial, thus retaining some rights for the holder of the copyright. **Option C is incorrect** because the CC Attribution-ShareAlike license lets others remix, tweak, and build upon your work even for commercial purposes, as long as they credit creator and license their new creations under the identical terms, thus retaining some rights for the holder of the copyright. **Option D is incorrect** because the CC0 Public Domain Dedication license waives all copyright and related rights to a work to the extent possible under the law.

37. Which of the following digital tools has the greatest impact on society as a driving force for positive community action?

- A. e-book
- B. Meme

- C. Mobile computing
- D. Social media

**Answer**

**Option D is correct** because publishing on social media has resulted in individuals becoming more engaged in social causes as indicated by the increased level of action such as giving or volunteering. **Option A is incorrect** because e-books do not necessarily result in reader engagement and do not provide a direct link to tools, which allow the reader to become more involved. **Option B is incorrect** because though memes may represent a social cause and provoke interest, they do not necessarily result in other positive action such as donations. **Option C is incorrect** because mobile computing does not necessarily connect the user to a cause in a manner that results in a positive action.

38. Which of the following is the first step a teacher should take when planning a Web site for the class?

- A. Determining the target audience for the Web site
- B. Determining the purpose and goal of the Web site
- C. Deciding upon the color scheme and layout of the Web site
- D. Deciding upon a markup language to create the content of the Web site

**Answer**

**Option B is correct** because the purpose and goal will dictate the design and color scheme used to reach the targeted audience. **Option A is incorrect** because the teacher already knows the audience—students—and the goal is to build the site according to their needs. **Option C is incorrect** because the color scheme and layout depend on what the purpose of the Web site is and who the target audience is. **Option D is incorrect** because the markup language will be used to implement the design after the goal of the site has been determined.

## Domain IV—Web Design

**Competency 010—The Technology Applications teacher demonstrates knowledge of strategies and techniques for website administration.**

39. Which of the following describes the primary function of a DNS server?

- A. It provides resolution of host names to IP addresses.
- B. It provides security for a network with the use of control lists.
- C. It secures network traffic through shared key encryption.
- D. It secures client access through log in and authentication.

**Answer**

**Option A is correct** because the domain name system (DNS) is an Internet service that translates domain names into IP addresses. Because domain names are alphabetic, they're easier to remember. The Internet, however, is really based on IP addresses. Every time you use a domain name, therefore, the domain name system must translate the name into the corresponding IP address. **Option B is incorrect** because the domain name (DNS) was originally designed as an open protocol and is therefore vulnerable to attackers. The domain name system has no built-in security measures. **Option C is incorrect** because the domain name system security extensions (DNSSEC) provide authentication through the use of digital signature schemes based on public key cryptography. The DNS server will not trust requests from third-party resolvers serving hidden name servers because the

resolvers cannot decrypt the packet and therefore this would disrupt the DNS function. **Option D is incorrect** because the domain name system security extensions (DNSSEC) are a set of Internet Engineering Task Force (IETF) standards created to address vulnerabilities in the domain name system (DNS) and protect it from online threats. DNSSEC adds authentication to DNS to make the system more secure. The DNS server alone cannot perform this function.

40. A teacher is required to take daily attendance using the district's secure site. On which of the following types of network is the site most likely located?

- A. Internet
- B. Intranet
- C. Local Area Network (LAN)
- D. Wide Area Network (WAN)

#### Answer

**Option B is correct** because it is the only choice that provides the security required for a school's attendance site. **Option A is incorrect** because a site on the Internet is accessible to anyone who knows the Uniform Resource Locator (URL) or Web address. **Option C is incorrect** because LANs do not generally provide the level of security needed for the described system. **Option D is incorrect** because WANs do not provide the level of security needed for the described system.

41. Which of the following descriptions best illustrates a typical intranet network structure used by many school districts?

- A. A worldwide connection of networks that is accessible to the district faculty, staff, students, and parents from any location with Internet access
- B. A private network that uses World Wide Web communication standards but is not connected to the Web and is accessible only to on-site staff
- C. A private network that utilizes the communication standards and some resources of the World Wide Web, with specific parts of the network accessible outside the network
- D. A network connection of computers with common print and file servers for printing and sharing documents among staff on the network

#### Answer

**Option B is correct** because an intranet is an internal network cut off from the World Wide Web that uses WWW standards of communication. **Option A is incorrect** because the network being described is the Internet. **Option C is incorrect** because the network structure being described is an extranet, in which parts of the intranet are accessible from outside the network. **Option D is incorrect** because it describes a typical local area network (LAN) setup, which does not use the World Wide Web standard of communication.

42. Which of the following approaches is the most effective way to protect a Web server from unauthorized use?

- A. Applying the latest security patches available for Web server software
- B. Including any software modules that might be required in the future
- C. Using full-privilege accounts such as "root" or "SYSTEM"
- D. Giving Web server software write-access rights to files being served to users

## Answer

**Option A is correct** because the latest security patches available for Web server software should be applied to best protect a Web server from unauthorized use. **Option B is incorrect** because only the modules actually needed should be installed to avoid possible security issues in unused modules. **Option C is incorrect** because Web server processes should only be run for appropriate privilege accounts—allowing processes to unnecessarily use privileged accounts makes a Web server vulnerable to attack. **Option D is incorrect** because Web server software should have read-only access rights to files being served to users—not write access.

**Competency 011—The Technology Applications teacher knows principles of Web design and implements a variety of tools and techniques to create and troubleshoot Web pages for a diverse audience.**

43. During a unit on Web design, a class analyzes games on the Internet. The students discuss various video game perspectives. The best perspective to use when designing a driving game is

- A. first person.
- B. second person.
- C. third person.
- D. multiplayer.

## Answer

**Option A is correct** because first person would allow the player to view the game through the windshield of the car. The driver would be able to see everything around him or her and control all turns of the vehicle, giving the player a more realistic game play. When the driver moves, everything in the scene must move along with him or her. **Option B is incorrect** because second person is when the player sees the game as the opponent. **Option C is incorrect** because third person is as if the player were standing on the sidelines as a spectator watching. The player would have no control. **Option D is incorrect** because multiplayer is a type of game and not a perspective.

44. A GIF logo displayed on an image-based background exhibits a halo effect. Changing the logo to a PNG format will make it possible to adjust which of the following characteristics to correct the problem?

- A. Antialiasing
- B. Opacity
- C. Rasterization
- D. Transparency

## Answer

**Option B is correct** because altering an image's opacity, which is possible with PNG formats but not with GIF formats, allows the image to be properly layered over various backgrounds. **Option A is incorrect** because antialiasing is available with both GIF and PNG formats and is not sufficient to allow the GIF image to blend on the described background. **Option C is incorrect** because rasterization is the process of converting an image to a bitmapped (raster) image, which includes processing compatibility such as antialiasing. **Option D is incorrect** because GIF transparency requires exact color matching, which limits portability and is not suitable for an image-based background.

45. Which THREE of the following are guidelines for Web design that should be used when adding graphics to Web pages?

- A. Use minimal contrast between text and background colors.
- B. Ensure that graphics are consistent with the purpose, organization, and style of the page.
- C. Make sure the layout follows the rule of thirds.
- D. Reduce the size of graphics files.
- E. Avoid repeating overly bright images.

**Answer**

**Option B is correct** because graphics should fit with the purpose, organization, and style of the page, enhancing the design, structure, or informative content of the Web page without causing distraction. **Option D is correct** because a graphic with a very large file size will take too long to load, causing viewers to leave the page. **Option E is correct** because repetitive use of overly bright or obnoxious images can cause viewers to lose patience with the site. **Option A is incorrect** because there should be sufficient contrast between the text and background color so the text on the graphic is readable. **Option C is incorrect** because the rule of thirds applies to picture composition, not Web design.

46. Which of the following is the most accepted ratio of text to white space to provide optimum readability?

- A. 1:1
- B. 1:2
- C. 2:3
- D. 3:5

**Answer**

**Option A is correct** because for optimum readability, a commonly accepted ratio of white space to text on a page is 1:1. **Options B, C, and D are incorrect** because they are not the recommended ratios and have too much white space.

47. A Web site designer wishes to include a mechanism on a Web site's enrollment page to determine whether a human is attempting to enter the required information. To make the mechanism accessible for the visually impaired, which of the following should the designer use?

- A. Audio files describing text
- B. Images containing text
- C. Text describing images
- D. Videos depicting text

**Answer**

**Option A is correct** because an audio file allows the visually impaired users to identify what they hear instead of what they cannot see. **Option B is incorrect** because the visually impaired users will have difficulty identifying any image that they can't see. **Option C is incorrect** because any text representation that would make the information available for the visually impaired users would also make it available for an automated program – a bot. **Option D is incorrect** because a video depicting text will be as difficult to distinguish for the visually impaired users as an image.

**Competency 012—The Technology Applications teacher knows how to use Web pages to communicate and interact effectively with others.**

48. Which of the following formatting devices allows Web visitors to easily scan and locate information on a Web page?

- A. Graphics
- B. Web-safe colors
- C. Links
- D. Cascading Style Sheets

**Answer**

**Option C is correct** because links, coupled with bolded headings/subheadings, make the Web page more scannable and easier for users to review the page in order to get an idea of what the page is about. **Option A is incorrect** because graphics are helpful and nice to have on any site, but they do not make information more scannable. **Option B is incorrect** because the purpose of Web safe colors is that they are at least somewhat predictable across the various hardware and software platforms. They have nothing to do with making a Web page more scannable. **Option D is incorrect** because CSS was created by Web developers to define the look and feel of their Web pages. Developers were then able to separate content from design so that HTML could perform more of the function that it was originally for without worry about the design and layout.

49. A teacher wants to share a lesson plan with members of a Personal Learning Network (PLN). Which of the following is the most effective way to give the PLN members access to the lesson plan?

- A. Saving the lesson plan as a PDF file and uploading it to a blog
- B. Saving the lesson plan as a DOC file and sending it via e-mail
- C. Saving the lesson plan as a GIF file and uploading it to a flash drive
- D. Saving the lesson plan as a JPEG file and printing it out for the group

**Answer**

**Option A is correct** because a PDF is the easiest file format to share, and almost every computer reads PDF files. **Option B is incorrect** because people may not have the right version of Word to open the DOC file, and e-mailing the file is not the most efficient way to share it. **Option C is incorrect** because GIFs are graphic files; in addition, saving a file on a flash drive won't give access to others online. **Option D is incorrect** because JPEGs are graphic files; in addition, printing a file out is not an efficient way to share it with others.

50. Which of the following is the best strategy for protecting an individual's online image?

- A. Checking security settings for social networking sites
- B. Limiting online purchases and online posts
- C. Considering possible consequences before posting online
- D. Separating personal profiles from professional profiles

**Answer**

**Option C is correct** because doing so gives individuals an opportunity to consider consequences of actions that could result in permanent damage of their reputation. **Option A is incorrect** because security settings do not necessarily prevent others from reposting damaging photos and comments. **Option B is incorrect** because limiting online posts will not prevent damage caused by the online actions that upon consideration probably should not have been made. **Option D is incorrect** because separating personal and professional profiles does not prevent damaging actions to become public.