

Communication Systems

8418 18 weeks

8415 36 weeks

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Acknowledgments

The following industry representatives served on the curriculum development team:

Ryn Bruce, Owner, Coloryn Studio, Richmond
Judd Burnette, Associate Creative Director, The Martin Agency, Richmond
Adrian Daniels, Vice-President, West Cary Group, Richmond
Lolita Foster, Senior Content Developer, West Cary Group, Richmond
Frederico Garza, Founder and Lead Developer, Garza Web Design, LLC, Richmond
Marc Redmond, Owner and Senior Developer, KNOWN Agency, Richmond
Ric Withers, President, WYTHKEN Printing, Richmond

The following educators served on the curriculum development team:

Brittany Carper, Millbrook High School, Frederick County Public Schools
Kristin Guthrie, James Wood High School, Frederick County Public Schools
Brandon Hamby, Hickory High School, Chesapeake City Public Schools
Jim Kennedy, Jamestown High School, Williamsburg-James City County Public Schools

Correlations to the Virginia Standards of Learning were reviewed and updated by the following:

Norma J. Bonney, Kempsville High School, Virginia Beach City Public Schools
Anne F. Markwith, New Teacher Mentor, Gloucester County Public Schools
Cathy Nichols-Cocke, PhD, Fairfax High School, Fairfax County Public Schools
Caroline C. Wheeler, M.T., Secondary English, Richmond

The framework was edited and produced by the CTE Resource Center:

Nathan K. Pope, Writer/Editor
Kevin P. Reilly, Administrative Coordinator

Dr. Lynn Basham, Specialist, Technology Education and Related Clusters
Office of Career, Technical, and Adult Education
Virginia Department of Education

Dr. Tricia S. Jacobs, CTE Coordinator of Curriculum and Instruction
Office of Career, Technical, and Adult Education
Virginia Department of Education

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Course Description

Suggested Grade Level: 9 or 10 or 11 or 12

Communication Systems provides experiences in the fields of imaging technology, graphic production, video and media, technical design, and various modes of communicating information through the use of data. Students develop critical-thinking and problem-solving skills using the universal systems model. Students also learn about the impact of communication on society and potential career fields relating to communications.

Task Essentials Table

- Tasks/competencies designated by plus icons (⊕) in the left-hand column(s) are essential
- Tasks/competencies designated by empty-circle icons (○) are optional
- Tasks/competencies designated by minus icons (⊖) are omitted

- Tasks marked with an asterisk (*) are sensitive.

Task Number	8415	8418	Tasks/Competencies
Introducing Communication Systems			
39	+	+	Define <i>communication</i> .
40	+	+	Explain ethics as they relate to communication systems.
41	+	+	Identify technology used in communication.
42	+	+	Identify types of communication.
43	+	+	Define <i>digital communication technology</i> .
44	+	○	Research the history and development of various types of communication systems.
45	+	+	Analyze the impact of communication systems.
46	+	+	Analyze communication systems problems/challenges.
47	+	+	Describe elements of design.
48	+	+	Describe principles of design.
49	+	+	Explain the design process.
Exploring Digital Visualization			
50	+	+	Identify the components of a storyboard.
51	+	+	Create a storyboard for a simple animation.
52	+	+	Generate a simple, two-dimensional animation.
53	+	○	Generate a simple, digital, three-dimensional model.
54	+	+	Modify a simple, digital, three-dimensional model.
55	+	+	Animate a simple, digital, three-dimensional model.
Exploring Imaging Technology			
56	+	+	Identify various systems for capturing and transmitting images.

57	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Examine the theories and properties of light.
58	<input checked="" type="radio"/>	<input type="radio"/>	Explore photographic and other imaging media.
59	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Incorporate composition elements.
60	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Capture a digital image.
61	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Manipulate digital images.
62	<input type="radio"/>	<input type="radio"/>	Mount a photograph.
Examining Graphic Production			
63	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Explain graphic production.
64	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Describe the different methods of graphic production.
65	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Prepare images for output.
66	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify the different types of coding used to create data communication systems.
67	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify basic concepts of developing a web page.
68	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Create a web page.
69	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Describe channels for delivering web communication.
70	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Identify elements of typography.
71	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Produce a finished graphic product.
Examining Video and Media Technology			
72	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Describe the concepts of audio and video communication.
73	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Describe audio and video production equipment and terminology.
74	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Describe the production process.
75	<input checked="" type="radio"/>	<input checked="" type="radio"/>	Produce a video or an animation, using the production process.
76	<input checked="" type="radio"/>	<input type="radio"/>	Output video to analog or digital format.
Exploring Communications Careers and Advancement			

77	+	+	Describe careers related to communication systems.
78	+	+	Create a portfolio including work from Communication Systems.

Legend: + Essential ○ Non-essential - Omitted

Curriculum Framework

Introducing Communication Systems

Task Number 39

Define *communication*.

Definition

Definition should encompass the concept of transferring information or ideas from a source to a destination, using codes and storage systems.

Process/Skill Questions

- What are the basic concepts of the communication process?
- What needs does communication technology meet?
- What are some modes of communication technology?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Digital Video Production

Music Production

On Demand Video

Photographic Technology

Prepared Presentation

Scientific Visualization (SciVis)

Video Game Design

Webmaster

Task Number 40

Explain ethics as they relate to communication systems.

Definition

Explanation may include issues related to

- copyright laws and other legal issues
- digital editing
- sampling of audio and video media
- social media
- cybersecurity
- computer viruses
- privacy
- software piracy.

Process/Skill Questions

- What might be consequences of not following copyright, patent, and trademark laws?
- Why does digital editing raise ethical problems?
- What is a computer virus, and how are viruses spread?
- What are consequences of using unauthorized software?

ITEEA National Standards

Information and Communication Technologies

The Cultural, Social, Economic, and Political Effects of Technology

TSA Competitive Events

Digital Video Production

Music Production

On Demand Video

Photographic Technology

Prepared Presentation

Scientific Visualization (SciVis)

Video Game Design

Webmaster

Task Number 41

Identify technology used in communication.

Definition

Identification should include examples of tools and methods used to deliver communication.

Process/Skill Questions

- What is technology and how does it relate to communication?
- What are some examples of tools used in communication?
- What roles do storage systems play in communication?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Animatronics

Digital Video Production

Music Production

On Demand Video

Photographic Technology

Prepared Presentation

Scientific Visualization (SciVis)

Video Game Design

Webmaster

Task Number 42

Identify types of communication.

Definition

Identification should include

- human-to-human
- human-to-machine/device
- machine/device-to-human
- machine/device-to-machine/device.

Process/Skill Questions

- What is an example of human-to-human communication? Machine/device-to-human communication? Human-to-machine/device communication? Machine/device-to-machine/device communication?
- What language(s) do machines/devices use?
- Under what circumstances would a machine/device communicate with a human?
- What is the term for communication between a person who posts information and a viewer of that information?
- What is *haptics* and how is it used in human-to-machine/device communication?

ITEEA National Standards

Information and Communication Technologies

Use and Maintain Technological Products and Systems

TSA Competitive Events

Animatronics

Computer-Aided Design (CAD), Architecture

Computer-Aided Design (CAD), Engineering

Debating Technological Issues

Digital Video Production

Essays on Technology

Geospatial Technology (Virginia only)

System Control Technology

Webmaster

Task Number 43

Define *digital communication technology*.

Definition

Definition should encompass the concept of transferring data through processes involving the coding of ones and zeroes.

Process/Skill Questions

- What are the characteristics of a binary code?
- What are the processes of data transferring through binary code?
- What is digitization?
- What is the difference between an analog and digital clock/watch?

ITEEA National Standards

Information and Communication Technologies

The Core Concepts of Technology

TSA Competitive Events

Digital Video Production

Geospatial Technology (Virginia only)

Photographic Technology

Webmaster

Task Number 44

Research the history and development of various types of communication systems.

Definition

Research should include the use of a variety of reliable resources to identify

- significant contributions to the development of communication systems
- major figures in the history of communication systems
- transition from analog to digital communication technology.

Process/Skill Questions

- Who are some major inventors/innovators in the communication field?
- What are some historical communication devices?
- How have communication systems evolved over time?
- What are the regulations for the use of analog and digital communication systems?
- What are the advantages and disadvantages of analog and of digital?

ITEEA National Standards

Information and Communication Technologies

The Influence of Technology on History

The Role of Society in the Development and Use of Technology

TSA Competitive Events

Debating Technological Issues

Task Number 45

Analyze the impact of communication systems.

Definition

Analysis may include environmental, societal, political, and economic impacts.

Process/Skill Questions

- What are the effects on society of past inventions and innovations?
- What are examples of current communication devices influencing our society?
- What are possible future effects of present communication systems? Explain.
- What are some effects of communication systems on natural resources?
- How does disposal of communication devices affect the environment?
- Where and how are communication systems used or maintained in countries such as North Korea, China, Afghanistan, or Cuba?

ITEEA National Standards

Information and Communication Technologies

The Cultural, Social, Economic, and Political Effects of Technology

The Effects of Technology on the Environment

The Influence of Technology on History

TSA Competitive Events

Debating Technological Issues

Engineering Design

Future Technology Teacher

Task Number 46

Analyze communication systems problems/challenges.

Definition

Analysis should include using the universal systems model and the communication systems model.

Use of universal systems model includes

- inputs
- processes
- outputs
- feedback.

Use of communication systems model may include

- message
- sender
- channel
- receiver
- feedback.

Process/Skill Questions

- How do these systems apply to communication devices?
- What is the role of each component of the universal systems model?
- What is the role of each component of the communication systems model?

ITEEA National Standards

Information and Communication Technologies

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

TSA Competitive Events

Music Production

System Control Technology

Technology Problem Solving

Video Game Design

Task Number 47

Describe elements of design.

Definition

Description may include physical aspects such as

- shape
- form
- line
- color
- texture
- size
- space.

Process/Skill Questions

- What are the components of a good design?
- How do elements of design apply to typography?
- How do various considerations (e.g., audience, budget/time constraints) affect the design of a publication?

ITEEA National Standards

Apply Design Processes

Engineering Design

The Attributes of Design

TSA Competitive Events

On Demand Video

Photographic Technology

Scientific Visualization (SciVis)

Task Number 48

Describe principles of design.

Definition

Description may include concepts such as

- balance
- rhythm
- harmony
- proportion
- variety
- emphasis.

Process/Skill Questions

- How does formal balance differ from informal balance?
- How do these principles apply to everyday life? Advertising? Cultures?
- How do these principles influence human feelings when used in design?
- How are the various principles similar/different?

ITEEA National Standards

Apply Design Processes

The Attributes of Design

TSA Competitive Events

Engineering Design

On Demand Video

Photographic Technology

Scientific Visualization (SciVis)

Video Game Design

Task Number 49

Explain the design process.

Definition

Explanation should include the following steps:

- Identify the problem.
- Define the goal.
- Research background information (e.g., industry, product, client).
- Explore the possible solutions.
- Assess alternatives for best solutions.
- Take action on solution.
- Evaluate results with goal.

Process/Skill Questions

- What is the significance of the design process?
- What is the significance of each step of the design process?
- What does the purpose of the message have to do with the design and delivery of the message?
- When designing, why is it preferable to follow a process in a certain order?

ITEEA National Standards

Apply Design Processes

Engineering Design

The Attributes of Design

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

TSA Competitive Events

Animatronics

Biotechnology Design

Digital Video Production

Engineering Design

Fashion Design and Technology

Music Production

Prepared Presentation

Scientific Visualization (SciVis)

Video Game Design

Exploring Digital Visualization

Task Number 50

Identify the components of a storyboard.

Definition

Identification should include

- frame
- script
- setting
- camera positioning
- audio timing.

Process/Skill Questions

- What aspects of an animation project should be included in the storyboard process?
 - What role does visualization play in creating a storyboard?
 - What are the consequences of leaving out one or more of the elements of the storyboard?
 - Why is audio timing important to include on a storyboard?
-

Task Number 51

Create a storyboard for a simple animation.

Definition

Creation should include

- applying the elements and principles of design
- applying the design process
- applying storyboard components.

Process/Skill Questions

- Why is it important that the script be finalized prior to creating the storyboard?
- What should you consider before you start your storyboard?
- How is the storyboard used when working through the animation process?
- Why should you apply the principles of design when creating a storyboard?
- How can you determine whether you used the elements of design effectively in your storyboard?

Task Number 52

Generate a simple, two-dimensional animation.

Definition

Generation may include

- stop-motion animation
- digital software for two-dimensional (2D) animation
- writing a script, storyboard, and apply the design process to a simple animation.

Process/Skill Questions

- What is the difference between 2D animation and 3D animation?
- How does a timeline impact the animation?
- What is the difference between keyframe animation and path animation?
- What influence can a simple animation, viewed on the Internet, have in your personal life?

ITEEA National Standards

Apply Design Processes

Engineering Design

Information and Communication Technologies

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Use and Maintain Technological Products and Systems

TSA Competitive Events

Computer-Aided Design (CAD), Architecture

Digital Video Production

Video Game Design

Task Number 53

Generate a simple, digital, three-dimensional model.

Definition

Generating a simple three-dimensional model requires the use of 3D design software to illustrate it.

Process/Skill Questions

- What are the three axes used by the 3D design software?
- What are the different ways you can view a 3D model?
- What tools are used to manipulate and modify a 3D model?
- What are some methods for adding realism to a 3D model?

ITEEA National Standards

Apply Design Processes

Engineering Design

Information and Communication Technologies

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Use and Maintain Technological Products and Systems

TSA Competitive Events

Computer-Aided Design (CAD), Engineering

Digital Video Production

Video Game Design

Task Number 54

Modify a simple, digital, three-dimensional model.

Definition

Modification may include

- adjusting vertices, edges, and faces of objects
- changing color and texture
- using additive and subtractive techniques.

Process/Skill Questions

- What is the difference between an edge and a vertex?
- What are different methods for modifying 3D models?
- How is texture changed or added to an object?
- What are examples of additive techniques? Subtractive techniques?

Task Number 55

Animate a simple, digital, three-dimensional model.

Definition

Animation may include

- tweening key frames

- constraining to a path
- adding and moving cameras.

Process/Skill Questions

- What areas of learning can benefit from animated products?
- What are some of the ethical implications regarding animation?
- What areas of industry can benefit from using animated models?

Exploring Imaging Technology

Task Number 56

Identify various systems for capturing and transmitting images.

Definition

Identification may include

- photography
- scanners (2D and 3D)
- lasers
- fiber optics
- holograms
- medical imaging.

Process/Skill Questions

- How are various imaging systems used in industry?
- How do the various imaging systems compare and contrast?
- How can capturing images enhance your life?
- What can holograms be used for?
- Why is capturing images and transmitting images important in the medical field?
- What careers can benefit from capturing images? How does it benefit the career field?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Biotechnology Design

Geospatial Technology (Virginia only)

Photographic Technology

Scientific Visualization (SciVis)

Task Number 57

Examine the theories and properties of light.

Definition

Examination may include a study of

- lenses
- refraction
- reflection
- electromagnetic spectrum
- wave/particle theory
- visible spectrum
- color theory
- temperature
- polarization.

Process/Skill Questions

- What is the difference between refraction and reflection?
- What are the properties of light?
- How do different lenses affect focal length?
- How are lenses classified?
- What is focal length?
- What is focal point?
- What is reflection?
- What is refraction?
- What is color theory?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Geospatial Technology (Virginia only)

Photographic Technology

Scientific Visualization (SciVis)

Task Number 58

Explore photographic and other imaging media.

Definition

Exploration may include a study of

- digital photography
- continuous-tone photography
- Ortho Litho
- video
- cyanotypes
- holography
- magnetic resonance imaging (MRI)
- computerized axial tomography (CAT) scans.

Process/Skill Questions

- What are some practical uses of photographic and other imaging media?
- What is the difference between RGB and CMYK?
- How does continuous-tone photography differ from digital photography?
- Why is resolution important to photography?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Digital Video Production

On Demand Video

Photographic Technology

Task Number 59

Incorporate composition elements.

Definition

Incorporation should include arranging the photograph's subject matter according to the purpose of the assignment. Elements may include

- rule of thirds
- balance
- rhythm
- framing
- proportion
- function
- perspective
- s-curve
- contrast
- point of interest
- panning.

Process/Skill Questions

- How does the purpose of the assignment dictate the composition?
- How can attention to composition improve a photograph?
- What are characteristics of poor composition? Successful composition?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Architectural Design

Digital Video Production

Fashion Design and Technology

Photographic Technology

Video Game Design

Task Number 60

Capture a digital image.

Definition

Capturing should include using a digital camera or scanner and importing the image into a computer.

Process/Skill Questions

- What is the difference between a continuous tone photograph and a digital photograph?
- How does a digital camera record an image?
- What are the advantages/disadvantages of a digital camera vs. a film camera?

ITEEA National Standards

Information and Communication Technologies

The Attributes of Design

TSA Competitive Events

Photographic Technology

Task Number 61

Manipulate digital images.

Definition

Manipulation requires the use of software (e.g., imaging design, graphic design) to modify the original image.

Process/Skill Questions

- What is a digital manipulation?
- Why might a digital image require modifications?
- What considerations should be taken when manipulating digital images?
- What ethical issues may arise when manipulating digital images?

ITEEA National Standards

Apply Design Processes

Information and Communication Technologies

The Attributes of Design

TSA Competitive Events

Digital Video Production

Photographic Technology

Video Game Design

Task Number 62

Mount a photograph.

Definition

Mount should include dry or wet mounting and/or mat cutting.

Process/Skill Questions

- What are the proper procedures for mounting a photograph?
- What considerations should be taken into account when matting a photograph?

ITEEA National Standards

Apply Design Processes

Information and Communication Technologies

TSA Competitive Events

Photographic Technology

Examining Graphic Production

Task Number 63

Explain graphic production.

Definition

Explanation should include the concept of designing, reproducing, and modifying images on a surface.

Process/Skill Questions

- Under what stage does graphic production fall in the design process?
- What are some of the different types of graphic production?
- What are some responsibilities of a graphic designer? Web designer? Commercial artist?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Webmaster

Task Number 64

Describe the different methods of graphic production.

Definition

Description may include identifying process steps and characteristics of images produced by

- flexography
- offset lithography
- gravure printing
- electrostatic (laser) printing
- inkjet printing
- letterpress printing
- laser engraving
- sublimation printing
- vinyl sign cutting
- screen printing.

Process/Skill Questions

- What are the applications of these methods for graphic production?
- What are some methods for graphic production?
- What considerations should be taken into account when choosing a method of graphic production?

ITEEA National Standards

Information and Communication Technologies

Task Number 65

Prepare images for output.

Definition

Preparation may include

- web
- flexography
- offset lithography
- gravure printing
- electrostatic (laser) printing
- inkjet printing
- laser printing
- laser engraving
- sublimation printing

- vinyl sign cutting
- screen printing.

Process/Skill Questions

- How do you prepare images for display on the web? Screen?
- What constraints of these methods must be considered when preparing for output?
- What type of software is an appropriate choice for creating a vinyl sign? Why?
- What are the consequences of creating a file without consideration to what you want to create (the output)?

ITEEA National Standards

Apply Design Processes

Information and Communication Technologies

The Attributes of Design

The Role of Troubleshooting, Research and Development, Invention and Innovation, and Experimentation in Problem Solving

Use and Maintain Technological Products and Systems

TSA Competitive Events

Photographic Technology

Webmaster

Task Number 66

Identify the different types of coding used to create data communication systems.

Definition

Identification should include latest languages and apps and may include

- HTML5
- CSS3

- JavaScript
- PostScript
- robotics programming
- functional programming
- Java
- C++
- object-oriented programming.

Process/Skill Questions

- Where are these types of coding systems found?
- What type of code would you use to develop a web page?
- In what circumstances are the different programming languages used?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Animatronics

System Control Technology

Webmaster

Task Number 67

Identify basic concepts of developing a web page.

Definition

Identification should include

- user interface
- dynamic elements
- design for various devices (mobile, etc.)
- page layout
- site structure
- defined purpose
- elements of design.

Process/Skill Questions

- How do the elements of design influence the aesthetics/purpose of the web page?
- What is the significance of defining your target audience?
- Where does planning fit into the design process? Why is planning important for web page development?

ITEEA National Standards

Information and Communication Technologies

The Attributes of Design

TSA Competitive Events

Webmaster

Task Number 68

Create a web page.

Definition

Creation should include

- working links
- navigation tools
- web-appropriate graphic(s) (e.g., jpg, png, svg)
- use of motion and audio
- supporting text.

Process/Skill Questions

- What platform considerations should you take into account when creating your web page?
- What tools can you use to create a web page?
- How can you ensure your graphics are web appropriate?
- What are the consequences of creating a web page without going through the design process?

ITEEA National Standards

Apply Design Processes

Assess the Impact of Products and Systems

Information and Communication Technologies

The Attributes of Design

Use and Maintain Technological Products and Systems

TSA Competitive Events

Webmaster

Task Number 69

Describe channels for delivering web communication.

Definition

Description may include the application of

- mobile
- social media
- webcasting
- video/media broadcasting
- radio broadcasting.

Process/Skill Questions

- What resources are necessary for telecommunication?
- How do you determine the most appropriate channel for communication?
- What are some applications for telecommunication?

ITEEA National Standards

Information and Communication Technologies

Use and Maintain Technological Products and Systems

TSA Competitive Events

Digital Video Production

Music Production

On Demand Video

Webmaster

Task Number 70

Identify elements of typography.

Definition

Identification should include

- font families (typeface)
- appropriate uses.

Process/Skill Questions

- What are the different typeface families?
- What are the components of a font family?
- What is the definition of hierarchy within fonts for a page layout?
- Why might it be important to use type as an image?

ITEEA National Standards

Information and Communication Technologies

Use and Maintain Technological Products and Systems

TSA Competitive Events

Children's Stories

Digital Video Production

Promotional Design

Scientific Visualization (SciVis)

Video Game Design

Webmaster

Task Number 71

Produce a finished graphic product.

Definition

Production should include using a series of thumbnail sketches and a rough layout before completing a detailed product suitable for presentation.

Process/Skill Questions

- Under what stage does the finished graphic product fall in the design process?
- What is a thumbnail sketch?
- What is a rough layout?
- How can a thumbnail sketch be used to produce a finished product?

ITEEA National Standards

Apply Design Processes

Information and Communication Technologies

TSA Competitive Events

Webmaster

Examining Video and Media Technology

Task Number 72

Describe the concepts of audio and video communication.

Definition

Description should include moving images and sound to communicate a message. Description should also identify guidelines governing the use of sound and moving images to communicate a message.

Process/Skill Questions

- What are some methods of transmitting and receiving audio/video messages?
- What is audio?
- What is video?
- How do audio/video communications fit into a communications model?
- What is the difference between linear and nonlinear editing?

ITEEA National Standards

Information and Communication Technologies

The Attributes of Design

The Cultural, Social, Economic, and Political Effects of Technology

TSA Competitive Events

Digital Video Production

Music Production

On Demand Video

Scientific Visualization (SciVis)

Task Number 73

Describe audio and video production equipment and terminology.

Definition

Description should include a list of the possible equipment required to produce finished audio/visual communications, as well as terms used by professionals in the audio/video field.

Process/Skill Questions

- What are some examples of professional audio/video equipment used in the industry?
- What basic equipment is used to record audio and video?
- What equipment is used to modify and produce an audio/video production?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Music Production

On Demand Video

Task Number 74

Describe the production process.

Definition

Description should include preproduction, production, and postproduction.

Process/Skill Questions

- What is a storyboard?
- What are the essential elements of a script?
- What are some roles and responsibilities related to video production?
- How does planning affect the postproduction process?
- What are the differences in design considerations for a short video and a longer, feature film?

ITEEA National Standards

Information and Communication Technologies

The Attributes of Design

TSA Competitive Events

Digital Video Production

Music Production

On Demand Video

Task Number 75

Produce a video or an animation, using the production process.

Definition

Production should include methods used by professionals during preproduction, production, and postproduction stages.

Process/Skill Questions

- How significant is the preproduction process to the outcome of an assignment?
- What changes might occur to your concept throughout the three stages of the production process?
- Why is editing a significant part of the production process?

ITEEA National Standards

Information and Communication Technologies

The Cultural, Social, Economic, and Political Effects of Technology

Use and Maintain Technological Products and Systems

TSA Competitive Events

Digital Video Production

Music Production

On Demand Video

Scientific Visualization (SciVis)

Video Game Design

Task Number 76

Output video to analog or digital format.

Definition

Output requires following procedures to store and encode productions in analog or digital format.

Process/Skill Questions

- What are the most common file formats? What are the differences among various file formats?
- How are video productions stored in analog format? Digital format?
- What are the benefits of analog vs. digital format?

ITEEA National Standards

Information and Communication Technologies

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Digital Video Production

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Scientific Visualization (SciVis)

Exploring Communications Careers and Advancement

Task Number 77

Describe careers related to communication systems.

Definition

Description should include benefits, drawbacks, and projections of a variety of careers as well as education/training requirements.

Many websites offer career exploration resources, including the Virginia Department of Education's [Career Planning Guide](#).

Process/Skill Questions

- What aspects of a career should be considered when deciding on a career path?
- What are some methods for exploring local career opportunities?
- What are some other careers related to communication systems?
- What motivated you to choose this career pathway?
- What other skills will be needed for this career?

Task Number 78

Create a portfolio including work from Communication Systems.

Definition

Portfolio should include examples of student's work as it relates to Communication Systems. Examples may include

- newsletter
- resume
- personal webpage
- photographs
- slide-show presentation
- video presentation.

Process/Skill Questions

- How should you choose content to include in the portfolio?

- What considerations should be made in determining the type of portfolio?
- What considerations should be made in the organization of the portfolio?
- With the fast-paced advancement of technology, what factors must be considered when determining the platform used in creating your portfolio?

ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Computer-Aided Design (CAD), Architecture

Computer-Aided Design (CAD), Engineering

Photographic Technology

SOL Correlation by Task

39	Define <i>communication</i> .	English: 9.3, 10.3, 11.3, 12.3 History and Social Science: WHI.2
40	Explain ethics as they relate to communication systems.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: GOVT.1, GOVT.9, GOVT.16, VUS.14 Mathematics: COM.2, COM.12, COM.18
41	Identify technology used in communication.	Mathematics: COM.1
42	Identify types of communication.	History and Social Science: VUS.8, VUS.13, VUS.14, WHII.9 Mathematics: COM.1
43	Define <i>digital communication technology</i> .	English: 9.3, 10.3, 11.3, 12.3 Mathematics: COM.15
44	Research the history and development of various types of communication systems.	English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8, 12.5, 12.8 History and Social Science: VUS.1, VUS.8, VUS.13, VUS.14, WHII.9

45	Analyze the impact of communication systems.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: VUS.1, VUS.8, VUS.13, VUS.14, WHII.9 Science: PH.4
46	Analyze communication systems problems/challenges.	Mathematics: COM.10, COM.11
47	Describe elements of design.	English: 9.5, 10.5, 11.5, 12.5 Mathematics: G.3, COM.12
48	Describe principles of design.	English: 9.5, 10.5, 11.5, 12.5 Mathematics: G.7
49	Explain the design process.	English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8, 12.5, 12.8
50	Identify the components of a storyboard.	
51	Create a storyboard for a simple animation.	Mathematics: G.3
52	Generate a simple, two-dimensional animation.	Mathematics: COM.1, COM.2
53	Generate a simple, digital, three-dimensional model.	Mathematics: G.14, COM.2
54	Modify a simple, digital, three-dimensional model.	Mathematics: G.14
55	Animate a simple, digital, three-dimensional model.	Mathematics: G.3, G.14
56	Identify various systems for capturing and transmitting images.	Mathematics: G.3, G.14
57	Examine the theories and properties of light.	English: 9.5, 10.5, 11.5, 12.5 Mathematics: G.3 Science: PH.8, PH.9
58	Explore photographic and other imaging media.	English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8, 12.5, 12.8 Mathematics: COM.1
59	Incorporate composition elements.	Mathematics: G.3
60	Capture a digital image.	History and Social Science: WG.1 Mathematics: COM.10
61	Manipulate digital images.	Mathematics: COM.1, COM.2
62	Mount a photograph.	
63	Explain graphic production.	English: 9.5, 10.5, 11.5, 12.5 Mathematics: COM.12

64	Describe the different methods of graphic production.	English: 9.5, 10.5, 11.5, 12.5 Mathematics: COM.12
65	Prepare images for output.	History and Social Science: WG.1 Mathematics: COM.11, COM.12
66	Identify the different types of coding used to create data communication systems.	English: 9.5, 10.5, 11.5, 12.5 Mathematics: COM.15
67	Identify basic concepts of developing a web page.	English: 9.5, 10.5, 11.5, 12.5 Mathematics: COM.1, COM.2, COM.12
68	Create a web page.	English: 9.6, 10.6, 11.6, 12.6 Mathematics: COM.10, COM.11, COM.12
69	Describe channels for delivering web communication.	English: 9.2, 9.5, 10.2, 10.5, 11.2, 11.5, 12.2, 12.5 History and Social Science: VUS.14 Mathematics: COM.1
70	Identify elements of typography.	English: 9.5, 10.5, 11.5, 12.5
71	Produce a finished graphic product.	History and Social Science: WG.1 Mathematics: COM.12
72	Describe the concepts of audio and video communication.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: GOVT.1, GOVT.9, VUS.1, VUS.13, VUS.14, WG.1 Science: PH.8
73	Describe audio and video production equipment and terminology.	English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5, 12.5
74	Describe the production process.	English: 9.5, 10.5, 11.5, 12.5
75	Produce a video or an animation, using the production process.	History and Social Science: GOVT.1 Mathematics: COM.12
76	Output video to analog or digital format.	History and Social Science: GOVT.1 Mathematics: COM.11
77	Describe careers related to communication systems.	English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8, 12.5, 12.8

78	Create a portfolio including work from Communication Systems.	<p>English: 9.6, 9.7, 10.6, 10.7, 11.6, 11.7, 12.6, 12.7</p> <p>History and Social Science: VUS.1, VUS.8, VUS.13, VUS.14</p> <p>Mathematics: G.3, G.14, COM.12</p>
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Cyber Security and Cyber Forensics Infusion Units

Cyber Security and Cyber Forensics Infusion Units (CYBR) were designed to be infused with designated CTE courses to help students in those programs achieve additional, focused, validated tasks/competencies in personal and professional cyber security skills. These units are not mandatory, and, as such, the tasks/competencies are marked as "optional," to be taught at the instructor's discretion.

Entrepreneurship Infusion Units

Entrepreneurship Infusion Units may be used to help students achieve additional, focused competencies and enhance the validated tasks/competencies related to identifying and starting a new business venture. Because the unit is a complement to certain designated courses and is not mandatory, all tasks/competencies are marked "optional."

Appendix: Credentials, Course Sequences, and Career Cluster Information

Industry Credentials: Only apply to 36-week courses

- Adobe Certified Associate (ACA) Examinations
- College and Work Readiness Assessment (CWRA+)
- Desktop Publishing Certification - 3D Max Test
- National Career Readiness Certificate Assessment
- Workplace Readiness Skills for the Commonwealth Examination

Concentration sequences: *A combination of this course and those below, equivalent to two 36-week courses, is a concentration sequence. Students wishing to complete a specialization may take additional courses based on their career pathways. A program completer is a student who has met the requirements for a CTE concentration sequence and all other requirements for high school graduation or an approved alternative education program.*

- Digital Visualization (8459/36 weeks)
- Graphic Communications Systems (8458/36 weeks)
- Graphic Communications Systems (8494/18 weeks)
- Imaging Technology (8455/36 weeks)
- Imaging Technology (8474/18 weeks)
- Video and Media Technology (8497/36 weeks)

Career Cluster: Arts, Audio/Video Technology and Communications	
Pathway	Occupations
Audio and Video Technology and Film	Audio and Video Equipment Technician Audio-Video Designer, Engineer Editor Graphic Designer Multimedia Artist, Animator Producer Sound Engineering Technician Videographer
Journalism and Broadcasting	Art Director Broadcast Technician Editor Program Director Radio, TV Announcer Radio, TV Reporter
Performing Arts	Cinematographer Costume Designer Lighting Designer Technical Director Video, Film Editor

Career Cluster: Arts, Audio/Video Technology and Communications	
Pathway	Occupations
Printing Technology	Desktop Publisher Job Printer Prepress Technician Press Operator Production, Planning, Expediting Clerk
Telecommunications	Computer Programmer Network Systems and Data Communication Analyst Telecommunications Equipment Installer, Repairer
Visual Arts	Commercial Photographer Fashion Illustrator Graphic Designer Illustrator Interior Designer Media Planner, Buyer Multimedia Artist, Animator Photographic Process Technician

Career Cluster: Information Technology	
Pathway	Occupations
Network Systems	Computer Security Specialist Radio, TV Broadcast Technician Sound Engineering Technician Telecommunications Equipment Installer, Repairer
Web and Digital Communications	Graphic Designer Radiologic Technologist, Radiographer Web Developer

Career Cluster: Marketing	
Pathway	Occupations
Marketing Communications	Art Director Copy Writer Media Planner, Buyer Multimedia Artist, Animator Web Developer
Marketing Management	Art Director Entrepreneur Marketing Communication Manager Media Planner, Buyer Multimedia Artist, Animator
Marketing Research	Market Research Analyst Product Planner
Professional Sales	Entrepreneur Media Planner, Buyer Multimedia Artist, Animator Telemarketer