

# Digital Visualization

8459 36 weeks

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## Course Description

**Suggested Grade Level:** 10 or 11 or 12

Students gain experiences related to computer animation by using graphics and design concepts. Students solve problems involving 3-D object manipulation, storyboarding, texturing/mapping, lighting concepts, and environmental geometry. Students create a variety of animations that reflect real-world applications and are introduced to interactive and 3-D animation software. Production of a portfolio showcasing examples of original student work is included.

***Recommended prerequisite(s):*** *Communication Systems 8415 (36 weeks) or 8418 (18 weeks); Technical Drawing 8435 (36 weeks) or (18 weeks) 8434*

# 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	8459	Tasks/Competencies
Introducing Digital Visualization		
39	⊕	Explain digital visualization.
40	⊕	Create a multimedia portfolio of examples of student's digital visualization work.
41	⊕	Analyze legal and ethical considerations related to digital visualization.
Exploring Fundamentals of Graphics		
42	⊕	Compare raster and vector images.
43	⊕	Explain standard file-naming conventions.
44	⊕	Create an image.
44	⊕	Edit an image, using image-editing software.
45	⊕	Describe the design process.
46	⊕	Explain the elements of design.
47	⊕	Analyze the principles of design.
Exploring Computer Animation		
48	⊕	Describe computer input devices.
49	⊕	Outline the evolution of animation technology.
50	⊕	Examine the mutual influence between animation and society.
51	⊕	Analyze fundamental principles of animation.

52	+	Explore careers related to computer animation.
Exploring Storyboards		
53	+	Explain the storyboard.
54	+	Analyze an existing storyboard.
55	+	Create a storyboard.
Exploring Computer Modeling		
56	+	Describe the computer-modeling process.
57	+	Create computer models of basic 3D forms.
58	+	Modify basic computer-generated 3D forms.
Creating Computer Animation		
59	+	Analyze an existing animation.
60	+	Create an animation of a graphic image.
61	+	Create an animated product for the purpose of informing.
62	+	Create an animated product for the purpose of instructing.
63	+	Create an animated product for the purpose of persuading.
64	+	Create an animated product for the purpose of entertaining.
Exploring Interactive Animation		
65	+	Explain interactive animation.
66	+	Create an interactive animation.

Legend: + Essential ○ Non-essential - Omitted

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# Curriculum Framework

## Introducing Digital Visualization

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## **Task Number 39**

### **Explain digital visualization.**

#### **Definition**

Explanation should include

- definition of *visualization*
- uses of computer graphics and animation
- key terminology (e.g., three-dimensional [3D] forms, faces, polygon count, vertices)
- use of mathematics in creating 3D forms, including the Cartesian coordinate system and the six orthographic views.

#### **Process/Skill Questions**

- What are the differences among faces, polygons, and vertices?
- Why are mathematical concepts relevant to modeling and animation?
- How has technology influenced digital visualization?
- What would be the consequences of not visualizing your product before development?

#### **ITEEA National Standards**

##### **Information and Communication Technologies**

##### **The Characteristics and Scope of Technology**

##### **TSA Competitive Events**

##### **Digital Video Production**

##### **Future Technology Teacher**

##### **Scientific Visualization (SciVis)**

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## **Task Number 40**

# **Create a multimedia portfolio of examples of student's digital visualization work.**

## **Definition**

Creation should include examples of student's use of

- storyboarding
- environmental geometry
- character geometry
- texture/materials
- lighting
- graphic imaging
- animation.

Portfolio should also include a self-reflection (e.g., analyses of work and work habits).

## **Process/Skill Questions**

- In what ways can a portfolio be used to illustrate your work?
- Why should a portfolio have balanced and varied examples of your work?
- Why is it important to self-reflect about your own work in your portfolio?
- What are some styles or methods for presenting your portfolio?

## **ITEEA National Standards**

### **Apply Design Processes**

### **Information and Communication Technologies**

### **The Core Concepts of Technology**

### **Use and Maintain Technological Products and Systems**

## **TSA Competitive Events**

### **Digital Video Production**

### **Scientific Visualization (SciVis)**

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## **Task Number 41**

# **Analyze legal and ethical considerations related to digital visualization.**

## **Definition**

Analysis should include such considerations as

- copyright
- intellectual property
- fair use
- patents
- plagiarism
- liability
- obtaining permissions.

## **Process/Skill Questions**

- Why do we have regulations and laws pertaining to copyright, intellectual property, and patents?
- What is the difference between a consumer and a producer/prosumer of media?
- Where can one learn current copyright regulations regarding animations/multimedia?
- What can be the consequences of plagiarism within an animation?
- How is fair use limited?

## **ITEEA National Standards**

### **Relationships Among Technologies and the Connections Between Technology and Other Fields**

#### **The Role of Society in the Development and Use of Technology**

### **TSA Competitive Events**

#### **Debating Technological Issues**

#### **Digital Video Production**

#### **Essays on Technology**

#### **Video Game Design**

#### **Webmaster**

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# Exploring Fundamentals of Graphics

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## Task Number 42

### Compare raster and vector images.

#### Definition

Comparison should include

- defining each type of image
- describing the use of each.

#### Process/Skill Questions

- Why are there two types of images?
- Why would one change a vector image into a raster image?
- What are some examples of the use of raster images in real-world applications?
- What are some examples of the use of vector images in real-world applications?
- What might be some consequences of not knowing what image type to use?

#### ITEEA National Standards

Information and Communication Technologies

TSA Competitive Events

Geospatial Technology (Virginia only)

Scientific Visualization (SciVis)

Video Game Design

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## Task Number 43



# **Explain standard file-naming conventions.**

## **Definition**

Explanation should include

- identifying different files types (e.g., jpg, gif, tiff, png, avi, wav)
- describing the use of each type
- listing rules for naming files.

## **Process/Skill Questions**

- Why are there rules for naming files?
- What are the benefits of correct file naming in the real world?
- What might be some consequences of using an incorrect file extension?
- What is the significance of accurate file naming?

## **ITEEA National Standards**

### **Information and Communication Technologies**

#### **Use and Maintain Technological Products and Systems**

### **TSA Competitive Events**

#### **Computer-Aided Design (CAD), Architecture**

#### **Computer-Aided Design (CAD), Engineering**

#### **Digital Video Production**

#### **Geospatial Technology (Virginia only)**

#### **Scientific Visualization (SciVis)**

#### **Video Game Design**

#### **Webmaster**

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## **Task Number 44**

# **Create an image.**

## **Definition**

Creation may include

- using a computer-input device
- following recommended procedures for using image-editing software.

## **Process/Skill Questions**

- How can a graphic image be created using an input device, such as a scanner?
- What is the process of creating and importing an image with the use of a digital camera?
- What are the benefits of creating an image, using a computer-input device?
- What is the procedure for creating an image, using image-editing software?
- What might be the consequences of not following recommended procedures for using image-editing software?
- What are the benefits of using a tablet for 3D sculpting? For painting?

## **ITEEA National Standards**

**Use and Maintain Technological Products and Systems**

### **TSA Competitive Events**

**Computer-Aided Design (CAD), Architecture**

**Computer-Aided Design (CAD), Engineering**

**Digital Video Production**

**Geospatial Technology (Virginia only)**

**Scientific Visualization (SciVis)**

**Video Game Design**

**Webmaster**

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## **Task Number 45**

# **Edit an image, using image-editing software.**

## **Definition**

Editing should include

- cropping
- resizing
- resolution adjustment
- exposure correction
- color correction.

## **Process/Skill Questions**

- What is the relationship between dots per inch (dpi) and file size?
- How is image-editing affected by the type of file being used?
- How is image-editing software used in conjunction with animation software?
- What are some industry-standard image-editing software programs?
- What are the differences between exposure correction and color correction?
- What is the importance of image resolution?

## **ITEEA National Standards**

### **Relationships Among Technologies and the Connections Between Technology and Other Fields**

#### **Use and Maintain Technological Products and Systems**

#### **TSA Competitive Events**

##### **Computer-Aided Design (CAD), Architecture**

##### **Computer-Aided Design (CAD), Engineering**

##### **Digital Video Production**

##### **Geospatial Technology (Virginia only)**

##### **Scientific Visualization (SciVis)**

##### **Video Game Design**

# **Task Number 46**

## **Describe the design process.**

### **Definition**

Description should include the design process as a systematic, creative process for turning ideas into real products and environments, including

- identification of a design problem
- identification of criteria and constraints
- brainstorming of possible solutions
- performance of research concerning the possible solutions
- creation of a preliminary draft
- refinement of the design
- evaluation of the design
- development of a final product or system
- reevaluation of final solution.

### **Process/Skill Questions**

- How can design problems be identified?
- Why is it important to identify criteria and constraints?
- What techniques are used to refine a design?
- How can a design be evaluated?
- Why should final solutions be reevaluated? How is this done?
- What is the importance of a preliminary draft?
- What other scenarios require the design process?
- What criteria would be used to evaluate the success of a design?
- Why is it important to use a systematic process? Are the steps always followed in sequential order?

### **ITEEA National Standards**

#### **The Attributes of Design**

#### **TSA Competitive Events**

#### **Architectural Design**

#### **Computer-Aided Design (CAD), Architecture**

#### **Dragster Design**

**Engineering Design**

**Flight Endurance**

**Scientific Visualization (SciVis)**

**System Control Technology**

**Technology Problem Solving**

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## **Task Number 47**

### **Explain the elements of design.**

#### **Definition**

Explanation should include examples of the following elements:

- Shape
- Form
- Line
- Color
- Texture
- Size
- Space
- Direction
- Value

#### **Process/Skill Questions**

- What is the importance of the elements of design?
- How do the elements of design help you visualize a design?
- How do you determine which elements of design are more important to a particular project?
- How are the elements of design incorporated into a preliminary draft?

#### **ITEEA National Standards**

##### **The Attributes of Design**

##### **TSA Competitive Events**

**Animatronics**

**Architectural Design**

**Computer-Aided Design (CAD), Architecture**

**Digital Video Production**

**Engineering Design**

**Fashion Design and Technology**

**On Demand Video**

**Photographic Technology**

**Scientific Visualization (SciVis)**

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## **Task Number 48**

### **Analyze the principles of design.**

#### **Definition**

Analysis should include explanation and examples of the following principles:

- Rhythm
- Balance
- Proportion
- Variety
- Emphasis
- Harmony

#### **Process/Skill Questions**

- How can the principles of design strengthen a project?
- How can balance and proportion be incorporated simultaneously in creating a project?
- In what other contexts can the principles of design be applied?

#### **ITEEA National Standards**

#### **The Attributes of Design**

## **TSA Competitive Events**

**Animatronics**

**Architectural Design**

**Computer-Aided Design (CAD), Architecture**

**Digital Video Production**

**Engineering Design**

**Fashion Design and Technology**

**On Demand Video**

**Photographic Technology**

**Scientific Visualization (SciVis)**

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# **Exploring Computer Animation**

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## **Task Number 49**

**Describe computer input devices.**

### **Definition**

Description should include the definition and use of such devices as

- scanners
- digital still cameras
- digital video cameras
- optical microscopes
- digital tablets
- microphones.

### **Process/Skill Questions**

- How can a scanner aid in the computer-animation process?
- Why might you use an optical microscope to create an animation?
- What resources are available to learn about recent advances in input devices?
- What considerations influence the selection of a computer input device?

## **ITEEA National Standards**

### **Relationships Among Technologies and the Connections Between Technology and Other Fields**

#### **The Core Concepts of Technology**

#### **TSA Competitive Events**

**Computer-Aided Design (CAD), Architecture**

**Computer-Aided Design (CAD), Engineering**

**Geospatial Technology (Virginia only)**

**On Demand Video**

**Scientific Visualization (SciVis)**

**Video Game Design**

**Webmaster**

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## **Task Number 50**

### **Outline the evolution of animation technology.**

#### **Definition**

Outline should include materials, processes, important developers, and techniques of animation from its inception.

#### **Process/Skill Questions**

- What was the influence of the work of Walt Disney, Walter Lantz, and other early animators in the evolution of animation?
- Who are current leaders in animation?



- What is celluloid (cel) animation?
- How does software develop as a result of the demands of animators?
- What resources are available for staying current with new technologies?

## **ITEEA National Standards**

### **The Influence of Technology on History**

### **The Role of Society in the Development and Use of Technology**

## **TSA Competitive Events**

### **Computer-Aided Design (CAD), Architecture**

### **Digital Video Production**

### **Scientific Visualization (SciVis)**

### **Video Game Design**

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## **Task Number 51**

### **Examine the mutual influence between animation and society.**

#### **Definition**

Examination should include examples of

- animation's influence on society (e.g., culture, economics, entertainment, education)
- society's influence on animation.

#### **Process/Skill Questions**

- What influence has animation had on education?
- What economic impact has animation had upon the entertainment industry?
- How has animation affected other aspects of society?
- How have other cultures influenced animation?
- What aspects of social history have been represented in animation?

## **ITEEA National Standards**

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

**The Role of Society in the Development and Use of Technology**

**TSA Competitive Events**

**Computer-Aided Design (CAD), Architecture**

**Digital Video Production**

**Scientific Visualization (SciVis)**

**Video Game Design**

**Webmaster**

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## **Task Number 52**

**Analyze fundamental principles of animation.**

### **Definition**

Analysis should include the following:

- Solid drawing
- Character movement (e.g., squash and stretch, anticipation, arcs, secondary action, exaggeration)
- Staging
- Straight-ahead action and pose-to-pose
- Follow-through and overlapping action
- Timing
- Slow out and slow in
- Appeal

### **Process/Skill Questions**

- How can you stage an animation to keep the focus on what is important?
- How can visualizing movement improve an animation?
- How is timing critical to establishing aspects of a character?
- Why must an animator be skilled in basic modeling?

### **ITEEA National Standards**

## **Information and Communication Technologies**

### **TSA Competitive Events**

**Computer-Aided Design (CAD), Architecture**

**Digital Video Production**

**Scientific Visualization (SciVis)**

**Video Game Design**

**Webmaster**

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## **Task Number 53**

### **Explore careers related to computer animation.**

#### **Definition**

Exploration should result in a list of relevant job titles in a variety of fields (e.g., science, medicine, law enforcement, architecture, advertising, entertainment, engineering) and should include for each field

- uses of animation
- preparation required for entering
- opportunities for advancement
- employment trends.

Students should use job databanks and match their abilities, aptitudes, and job expectations with industry standards.

#### **Process/Skill Questions**

- What are some ways to prepare for a career in computer animation?
- How is animation used in forensics?
- How are computer games created, using 3D animation?
- How can animation be used in advertising?

#### **ITEEA National Standards**

**Information and Communication Technologies**

## **Relationships Among Technologies and the Connections Between Technology and Other Fields**

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

**TSA Competitive Events**

**Computer-Aided Design (CAD), Architecture**

**Digital Video Production**

**Scientific Visualization (SciVis)**

**Video Game Design**

**Webmaster**

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# **Exploring Storyboards**

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## **Task Number 54**

### **Explain the storyboard.**

#### **Definition**

Explanation should include

- defining the term *storyboard* (i.e., a preliminary graphic outline of the animation sequence)
- stating the purpose of a storyboard
- stating the reason that a storyboard should be the initial step in the animation process
- listing the components of a storyboard (e.g., frame, script, setting, camera movement, audio, timing) and their functions.

#### **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 might be the consequences of skipping the storyboard step?
- In what other fields are storyboards used?

## **ITEEA National Standards**

### **Information and Communication Technologies**

### **TSA Competitive Events**

#### **Digital Video Production**

#### **Scientific Visualization (SciVis)**

#### **Video Game Design**

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## **Task Number 55**

### **Analyze an existing storyboard.**

#### **Definition**

Analysis should include a summary of the ways the storyboard meets the criteria of storyboard components.

#### **Process/Skill Questions**

- How are transitions used?
- How are audio and script elements revealed in the storyboard?
- Does each frame fit together to reveal the whole animation process?
- Why should a storyboard be a work in progress?
- What factors may result in changing the storyboard?

## **ITEEA National Standards**

### **Information and Communication Technologies**

#### **The Attributes of Design**

### **TSA Competitive Events**

**Digital Video Production**

**Scientific Visualization (SciVis)**

**Video Game Design**

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## **Task Number 56**

### **Create a storyboard.**

#### **Definition**

Creation should include

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

#### **Process/Skill Questions**

- How would you describe the process of creating a storyboard?
- How is the storyboard used as a tool when working through the animation process?
- Why should you apply the principles of design in creating a storyboard?
- How can you determine whether you used the elements of design effectively in your storyboard?

#### **ITEEA National Standards**

**Apply Design Processes**

**The Attributes of Design**

#### **TSA Competitive Events**

**Digital Video Production**

**Scientific Visualization (SciVis)**

**Video Game Design**

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# Exploring Computer Modeling

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## Task Number 57

### Describe the computer-modeling process.

#### Definition

Description should include

- the planning process, including sketching and scanning
- development of basic geometric shapes and forms
- identification of the Cartesian coordinates and  $x$ ,  $y$ ,  $z$  axes
- modification of 3D forms.

#### Process/Skill Questions

- When would computer modeling be used in the design/planning process?
- In what situations are the Cartesian coordinates applicable in the computer-modeling process?
- How does the current software compare to similar software you have used previously?
- What are the purposes of modifying 3D forms?
- What might be the consequences of not following the plan you have made?

#### ITEEA National Standards

##### Information and Communication Technologies

##### TSA Competitive Events

##### Animatronics

##### Computer-Aided Design (CAD), Architecture

##### Computer-Aided Design (CAD), Engineering

##### Digital Video Production

##### Dragster Design

**Engineering Design**

**Scientific Visualization (SciVis)**

**Video Game Design**

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## **Task Number 58**

### **Create computer models of basic 3D forms.**

#### **Definition**

Creation should include the following forms:

- Cube
- Cylinder
- Sphere
- Torus
- Pyramid
- Cone

#### **Process/Skill Questions**

- Why is creating models of basic 3D forms important?
- How do geometrical forms represent 3D space?
- How does perspective enable visualization of 3D space?
- How are mathematical calculations related to creation of basic 3D forms?

#### **ITEEA National Standards**

**Information and Communication Technologies**

**Use and Maintain Technological Products and Systems**

#### **TSA Competitive Events**

**Computer-Aided Design (CAD), Architecture**

**Computer-Aided Design (CAD), Engineering**

**Digital Video Production**



**Dragster Design**

**Engineering Design**

**Scientific Visualization (SciVis)**

**Video Game Design**

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## **Task Number 59**

### **Modify basic computer-generated 3D forms.**

#### **Definition**

Modification should include

- joining different forms to create objects
- using additive and subtractive techniques
- free-form sculpting
- adding a skin or effect
- adding materials and textures.

#### **Process/Skill Questions**

- What are possible outcomes of using different modification techniques (e.g., extrude, bevel, smooth, cut)?
- How would you describe the process of modifying forms?
- How is adding a skin different from using an additive technique?
- What is the benefit of adding materials and textures to a 3D form?

#### **ITEEA National Standards**

##### **Information and Communication Technologies**

##### **Use and Maintain Technological Products and Systems**

##### **TSA Competitive Events**

##### **Computer-Aided Design (CAD), Architecture**

##### **Computer-Aided Design (CAD), Engineering**

**Digital Video Production**

**Dragster Design**

**Engineering Design**

**Scientific Visualization (SciVis)**

**Video Game Design**

**Webmaster**

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# **Creating Computer Animation**

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## **Task Number 60**

### **Analyze an existing animation.**

#### **Definition**

Analysis should include

- identification of purpose (i.e., inform, instruct, persuade, entertain)
- use of principles and elements of design
- representation of characters
- use of shadow effects
- use of backgrounds
- presentation of plot
- overall continuity and success.

#### **Process/Skill Questions**

- How can freeze framing be used for analysis?
- How does lighting enhance or detract from this animation?
- What criteria would you use to evaluate overall continuity and success of an animation?
- What is the intent of this animation?

#### **ITEEA National Standards**

**The Attributes of Design**

**TSA Competitive Events**

**Computer-Aided Design (CAD), Architecture**

**Digital Video Production**

**Dragster Design**

**Scientific Visualization (SciVis)**

**Video Game Design**

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## **Task Number 61**

### **Create an animation of a graphic image.**

#### **Definition**

Creation should include

- identifying typical uses of animations of graphic images (e.g., logos, commercial images, icons, and interactive graphics)
- selecting an image for animation
- stating a purpose of the animation
- creating the animation, using the design process
- explaining how the final animation fulfills its purpose.

#### **Process/Skill Questions**

- What steps are used to animate a graphic image?
- What criteria are used to select an image for animation?
- How should an animated graphic be formatted for web page use?
- How have animated graphics changed television (e.g., weather reports, sports broadcasts, children's programs)?
- How can you decide whether animating a graphic is appropriate within a specified context?

#### **ITEEA National Standards**

**Information and Communication Technologies**

## **Use and Maintain Technological Products and Systems**

### **TSA Competitive Events**

**Computer-Aided Design (CAD), Architecture**

**Digital Video Production**

**Engineering Design**

**Scientific Visualization (SciVis)**

**Video Game Design**

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## **Task Number 62**

**Create an animated product for the purpose of informing.**

### **Definition**

Creation should include

- the informative content to be communicated (e.g., science concepts, public service announcements, historical facts)
- planning (e.g., researching, script writing, audio recording, sketching, storyboarding)
- modeling
- texturing/mapping
- animating
- rendering.

### **Process/Skill Questions**

- What research must be done during the planning stage to create an animation for the purpose of informing?
- What areas of learning could benefit from animated products?
- How can you evaluate whether animation is enhancing the process of informing?

### **ITEEA National Standards**

**Apply Design Processes**

**Assess the Impact of Products and Systems**

**Information and Communication Technologies**

**The Attributes of Design**

**TSA Competitive Events**

**Digital Video Production**

**Scientific Visualization (SciVis)**

**Video Game Design**

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## **Task Number 63**

**Create an animated product for the purpose of instructing.**

### **Definition**

Creation should include

- the instructive content to be communicated (e.g., tutorials, step-by-step instructions, map directions)
- planning (e.g., researching, script writing, audio recording, sketching, storyboarding)
- modeling
- texturing/mapping
- animating
- rendering.

### **Process/Skill Questions**

- What is the difference between informing and instructing?
- How can animation address various learning styles when instructing?
- What factors should be considered when creating an animation for the purpose of instructing?
- How can you evaluate whether animation is enhancing the process of instructing?

### **ITEEA National Standards**

**Apply Design Processes**

**Assess the Impact of Products and Systems**

**Information and Communication Technologies**

**The Attributes of Design**

**TSA Competitive Events**

**Digital Video Production**

**Scientific Visualization (SciVis)**

**Video Game Design**

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## **Task Number 64**

**Create an animated product for the purpose of persuading.**

### **Definition**

Creation should include

- the persuasive content to be communicated (e.g., advertisements, political campaign literature, promotional information)
- planning (e.g., researching, script writing, audio recording, sketching, storyboarding)
- modeling
- texturing/mapping
- animating
- rendering.

### **Process/Skill Questions**

- What are the basic methods of persuasion?
- What ethical considerations should be included when creating an animation for the purpose of persuading?
- What elements and principles of design can help to make an animation persuasive?
- What other factors should be considered when creating an animation for the purpose of persuading?
- How can you evaluate whether animation is enhancing the process of persuading?

### **ITEEA National Standards**

**Apply Design Processes**

**Assess the Impact of Products and Systems**

**Information and Communication Technologies**

**The Attributes of Design**

**TSA Competitive Events**

**Digital Video Production**

**Scientific Visualization (SciVis)**

**Video Game Design**

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## **Task Number 65**

**Create an animated product for the purpose of entertaining.**

### **Definition**

Creation should include

- the entertaining content to be communicated (e.g., cartoons, movies, music videos)
- planning (e.g., researching, script writing, audio recording, sketching, storyboarding)
- modeling
- texturing/mapping
- animating
- rendering.

### **Process/Skill Questions**

- How can you create an animation specific to a target audience for the purpose of entertaining?
- How has the availability of social media affected the quantity and quality of animation?
- How does the quality of the texturing/mapping of an animation affect its entertainment value?
- What ethical considerations should be included when creating an animation for the purpose of entertaining?
- How can you evaluate whether animation is enhancing the process of entertaining?

## **ITEEA National Standards**

**Apply Design Processes**

**Assess the Impact of Products and Systems**

**Information and Communication Technologies**

**The Attributes of Design**

## **TSA Competitive Events**

**Digital Video Production**

**Scientific Visualization (SciVis)**

**Video Game Design**

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# **Exploring Interactive Animation**

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## **Task Number 66**

### **Explain interactive animation.**

#### **Definition**

Explanation should include

- virtual reality
- gaming
- virtual tour/walk-through
- scene animation
- the basics of programming logic.

#### **Process/Skill Questions**

- How is a user interface related to interactive animation?



- What are the different types of user interfaces?
- How does a computer interpret actions from a user into actions on a screen?
- How can you explain modality in terms of input and output?
- What are the six major steps in interactive design?
- What is artificial intelligence (AI)?
- What are some important real-world applications of interactive animation?

## **ITEEA National Standards**

### **Information and Communication Technologies**

### **TSA Competitive Events**

#### **Computer-Aided Design (CAD), Architecture**

#### **Digital Video Production**

#### **Dragster Design**

#### **Scientific Visualization (SciVis)**

#### **Video Game Design**

#### **Webmaster**

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## **Task Number 67**

### **Create an interactive animation.**

#### **Definition**

Creation should include

- planning (e.g., using a design document, storyboard)
- developing interaction between user and animation
- following the concepts of animation and modeling.

#### **Process/Skill Questions**

- What are the components of a virtual environment?
- How is programming logic used in creating interactive animations?
- What is a computer algorithm?

- How do computer algorithms relate to flow charts?
- Why are most games designed by a team rather than an individual?
- What could happen if a design team did not use a planning guide such as a game design document (GDD)?
- Why is debugging necessary?

## **ITEEA National Standards**

### **Apply Design Processes**

### **Information and Communication Technologies**

### **The Attributes of Design**

### **Use and Maintain Technological Products and Systems**

## **TSA Competitive Events**

### **Computer-Aided Design (CAD), Architecture**

### **Dragster Design**

### **Scientific Visualization (SciVis)**

### **Video Game Design**

## **SOL Correlation by Task**

39	Explain digital visualization.	English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5  History and Social Science: VUS.14  Mathematics: G.13, COM.12
40	Create a multimedia portfolio of examples of student's digital visualization work.	English: 9.1, 9.5, 9.6, 10.1, 10.5, 10.6, 11.1, 11.5, 11.6  Mathematics: G.3, COM.12
41	Analyze legal and ethical considerations related to digital visualization.	English: 9.5, 10.5, 11.5  History and Social Science: GOVT.1, GOVT.9, GOVT.15

42	Compare raster and vector images.	English: 9.5, 10.5, 11.5 Mathematics: MA.7
43	Explain standard file-naming conventions.	English: 9.5, 10.5, 11.5 Mathematics: COM.2
44	Create an image.	Mathematics: COM.1, COM.10, COM.12
45	Edit an image, using image-editing software.	Mathematics: COM.12
46	Describe the design process.	English: 9.5, 10.5, 11.5 History and Social Science: VUS.1 Mathematics: COM.3, COM.4
47	Explain the elements of design.	English: 9.5, 10.5, 11.5 Mathematics: G.3, COM.12
48	Analyze the principles of design.	English: 9.5, 10.5, 11.5 Mathematics: G.7
49	Describe computer input devices.	English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5 Mathematics: COM.10
50	Outline the evolution of animation technology.	English: 9.6, 9.7, 10.6, 10.7, 11.6, 11.7 History and Social Science: VUS.13, VUS.14, WHII.13, WHII.14 Mathematics: COM.12
51	Examine the mutual influence between animation and society.	English: 9.5, 10.5, 11.5 History and Social Science: VUS.13, VUS.14, WHII.13, WHII.14 Mathematics: COM.12
52	Analyze fundamental principles of animation.	English: 9.5, 10.5, 11.5 Mathematics: COM.12
53	Explore careers related to computer animation.	English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8 Mathematics: COM.12
54	Explain the storyboard.	English: 9.3, 9.5, 10.3, 10.5, 11.3, 11.5 Mathematics: COM.12
55	Analyze an existing storyboard.	English: 9.6, 10.6, 11.6
56	Create a storyboard.	Mathematics: G.13, COM.12

57	Describe the computer-modeling process.	English: 9.5, 10.5, 11.5 Mathematics: G.13
58	Create computer models of basic 3D forms.	Mathematics: G.14
59	Modify basic computer-generated 3D forms.	Mathematics: G.14
60	Analyze an existing animation.	History and Social Science: VUS.5
61	Create an animation of a graphic image.	English: 9.5, 10.5, 11.5 History and Social Science: GOVT.1 Mathematics: COM.12
62	Create an animated product for the purpose of informing.	English: 9.1, 9.2, 10.1, 10.2, 11.1, 11.2 Mathematics: G.3, COM.12
63	Create an animated product for the purpose of instructing.	English: 9.1, 9.2, 10.1, 10.2, 11.1, 11.2 History and Social Science: GOVT.1 Mathematics: G.3, COM.12
64	Create an animated product for the purpose of persuading.	English: 9.2, 10.2, 11.2 History and Social Science: GOVT.1 Mathematics: G.3, COM.12
65	Create an animated product for the purpose of entertaining.	English: 9.1, 9.2, 10.1, 10.2, 11.1, 11.2 History and Social Science: GOVT.1 Mathematics: G.3, COM.12
66	Explain interactive animation.	English: 9.5, 10.5, 11.5 Mathematics: G.3, COM.12
67	Create an interactive animation.	Mathematics: G.3, COM.12

## 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

- 3D Visualization & Animation Examination
- Adobe Certified Associate (ACA) Examinations
- Autodesk Certified Professional Examinations
- Autodesk Certified User Examinations
- College and Work Readiness Assessment (CWRA+)
- National Career Readiness Certificate Assessment
- Unity Certified User Examination
- 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.*

- Advanced Drawing and Design (8438/36 weeks)
- Architectural Drawing and Design (8437/36 weeks)
- Architectural Drawing and Design (8492/18 weeks)
- Communication Systems (8415/36 weeks)
- Communication Systems (8418/18 weeks)
- Engineering Drawing and Design (8436/36 weeks)
- Engineering Drawing and Design (8493/18 weeks)
- Graphic Communications Systems (8458/36 weeks)
- Imaging Technology (8455/36 weeks)
- Introduction to Engineering Design (PLTW) (8439/36 weeks)
- Modeling and Simulation Technology (8460/36 weeks)
- Technical Drawing and Design (8434/18 weeks)
- Technical Drawing and Design (8435/36 weeks)
- Video and Media Technology (8497/36 weeks)

<b>Career Cluster: Arts, Audio/Video Technology and Communications</b>	
<b>Pathway</b>	<b>Occupations</b>
<b>Audio and Video Technology and Film</b>	<b>Audio and Video Equipment Technician</b> <b>Audio-Video Designer, Engineer</b> <b>Editor</b> <b>Graphic Designer</b> <b>Multimedia Artist, Animator</b> <b>Producer</b> <b>Sound Engineering Technician</b> <b>Videographer</b>
<b>Visual Arts</b>	<b>Graphic Designer</b>

<b>Career Cluster: Arts, Audio/Video Technology and Communications</b>	
<b>Pathway</b>	<b>Occupations</b>
	<b>Illustrator</b> <b>Media Planner, Buyer</b> <b>Multimedia Artist, Animator</b>