Imaging Technology

8474 18 weeks

8455 36 weeks

Table of Contents

Acknowledgments

Maura Stout, Wilson Memorial High School, Augusta County Public Schools
Matt Walton, Glen Allen High School, Henrico County Public Schools

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

Leslie R. Bowers, English Teacher (ret.), Newport News Public Schools
Vickie L. Inge, Mathematics Committee Member, Virginia Mathematics and Science Coalition
Anne F. Markwith, New Teacher Mentor (Science), Gloucester County Public Schools
Michael L. Nagy, Social Studies Department Chair, Rustburg High School, Campbell County Public Schools

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

Heather A. Widener, Writer/Editor
Kevin P. Reilly, Administrative Coordinator

Virginia Department of Education Staff

Dr. Lynn Basham, Specialist, Technology Education and Related Clusters
Dr. Tricia S. Jacobs, CTE Coordinator of Curriculum and Instruction
Dr. David S. Eshelman, Director, Workforce Development and Initiatives
George R. Willcox, Director, Operations and Accountability

Office of Career, Technical, and Adult Education
Virginia Department of Education

Course Description

Suggested Grade Level: 9 or 10 or 11 or 12
Prerequisite: 8415 or 8418

Students in Imaging Technology apply the principles of design in the creation of images. Students explore the development of imaging as a communication medium and its evolution into the digital realm. Image-editing software allows students to enhance images and develop a portfolio. Investigation focuses on career exploration and the application of photographic and imaging technology across various industries.

Task/Competency List

- 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	8455	8474	Tasks/Competencies
Introducing Imaging Technology			
39	⊕	⊕	Explain the term *imaging technology*.
40	⊕	⊕	Research the history and development of imaging technology.
41	⊕	⊕	Describe three-dimensional (3D) imaging, such as VR and medical imaging.
42	⊕	⊕	Create a device that can project a simple hologram.
43	⊕	⊕	Rotate 3D images on a computer screen.
44	⊕	⊕	Outline a brief history of photographic technology.
Exploring Ethics and Laws in Imaging Technology			
45	⊕	⊕	Explore ethical issues related to imaging technology.
46	⊕	⊕	Explore legal issues related to imaging technology.
Exploring Medical Imaging			
47	⊕	⊕	Explain the differences among types of medical imaging.
48	⊕	⊕	Examine radiographs (e.g., X-rays) to determine limits of an abnormality.
49	⊕	⊕	Examine MRI images.
50	⊕	⊕	Examine CT images.
51	⊕	⊕	Examine ultrasound images.
Examining Photographic Imaging			

52	⊕	⊕	Define the term *photography*.
53	⊕	⊕	Identify camera types and parts.
54	⊕	⊕	Examine the characteristics and uses of various lenses.
55	⊕	⊕	Examine genres of photography.

Planning Images

56	⊕	⊕	Propose an image.
57	⊕	⊕	Plan an image production schedule.
58	⊕	⊕	Define *composition* and its components.

Capturing Images

59	⊕	⊕	Capture an image using the rule of thirds.
60	⊕	○	Produce an image using balance.
61	⊕	○	Compose a photograph that demonstrates rhythm in environment.
62	⊕	⊕	Demonstrate depth of field.
63	⊕	⊕	Use the shutter to control motion.
64	⊕	⊕	Produce photographic images using various techniques.
65	⊕	⊕	Use natural lighting to create a properly exposed image.
66	⊕	⊕	Use artificial lighting to create a properly exposed image.
67	⊕	○	Use lighting techniques to create a dramatic effect on a photographic image.

Working in the Darkroom

68	○	○	Demonstrate safety and environmentally friendly practices in the darkroom.
69	○	○	Demonstrate the handling and care of equipment in the darkroom.
70	○	○	Examine the physical and chemical properties of film and paper.

Exploring Post-Production Processes			
71	⊕	⊕	Manage digital images, using software.
72	⊕	⊕	Enhance digital images, using software.
73	⊕	⊕	Scan an image from a photograph.
74	⊕	⊕	Transfer photos.
75	⊕	⊕	Manipulate an image.
76	⊕	⊕	Present images.
77	⊕	⊕	Maintain a portfolio of photographic images.
78	⊕	⊕	Critique student photographs.
Examining 3D Imaging			
79	⊕	⊕	Explain x, y, and z coordinate planes.
80	⊕	⊕	Create 3D geometric objects.
81	⊕	⊕	Use parametric modeling software.
82	⊕	⊕	Examine VR.
83	⊕	⊕	Generate VR background and objects.
84	⊕	⊕	Generate first-person viewpoint actions in VR.
Exploring Careers in Imaging			
85	⊕	⊕	Evaluate the work of a published or professional photographer.
86	⊕	⊕	Explore careers in imaging technology.
87	⊕	⊕	Research the integration of imaging technology in various industries.

Legend: ⊕Essential ◯Non-essential ⊖Omitted

Curriculum Framework

Introducing Imaging Technology

Task Number 39

Explain the term *imaging technology*.

Definition

Explanation should include the process of making a visual representation of something by scanning it with a detector such as a computer scanner, digital camera, or electromagnetic beam. Images can also come from satellites, medical equipment, or even be drawn by hand.

Process/Skill Questions

- What does *image* mean?
- What are ways to acquire images?
- What computer technologies can demonstrate imaging?
- How can a hand-drawn image be turned into digital format?

Task Number 40

Research the history and development of imaging technology.

Definition

Research should include the use of resources to gather information, such as

- milestones in the history of imaging technology
- milestones in medical imaging (e.g., radiography, magnetic resonance imaging [MRI], computerized tomography [CT])
- satellite imagery
- milestones in the history of digital imaging (e.g., first charged coupled device [CCD]-based camera, first iteration of editing software, the digital single-lens reflex [DSLR] camera, camera phones, virtual reality [VR]/augmented reality [AR] headsets)
- current applications (e.g., social media, press, photojournalism, drone photography, medicine, entertainment).

Process/Skill Questions

- Who are the major contributors to the advancement of photography, and what are their contributions?
- What are the major technological developments that have helped move imaging to its present-day status?
- What applications of imaging are used in industry?
- How has imaging influenced society and industry?

ITEEA National Standards

1. The Characteristics and Scope of Technology

17. Information and Communication Technologies

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

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

5. The Effects of Technology on the Environment

6. The Role of Society in the Development and Use of Technology

7. The Influence of Technology on History

Task Number 41

Describe three-dimensional (3D) imaging, such as VR and medical imaging.

Definition

Description should include the concepts of

- VR—computer-simulated reality that replicates an environment and simulates a user's physical presence in that environment so that the user interacts with the environment
- medical imaging—takes images at regular increments to form a 3D view of the body when the images are combined.

Process/Skill Questions

- What is VR?
- What kinds of objects or environments can be represented in VR?

- How does MRI create an image of the body?
- What is a radiograph?

Task Number 42

Create a device that can project a simple hologram.

Definition

Creation should include materials, tools, and cell phone images of holograms.

Process/Skill Questions

- What is a hologram?
- How can a hologram be projected from a cell phone?

Task Number 43

Rotate 3D images on a computer screen.

Definition

Rotation should include uploading 3D images and manipulating the images using a mouse.

Process/Skill Questions

- Where can 3D images be found?
- What is an advantage of rotating an image?

Task Number 44

Outline a brief history of photographic technology.

Definition

Outline should include the earliest type of photographic technology through digital photographic technology with major changes in technology highlighted.

Process/Skill Questions

- How were the first photographic images made?
- How did Louis-Jacques-Mandé Daguerre change photography?
- What are some of the changes that made photography possible for the common population?

Exploring Ethics and Laws in Imaging Technology

Task Number 45

Explore ethical issues related to imaging technology.

Definition

Exploration should include ethics as related to

- manipulation of images (e.g., body images)
- photojournalism
- privacy and permission
- distribution of photographs
- social media implications
- image theft.

Process/Skill Questions

- How can photo manipulation lead to ethical issues?
- What are the implications involved in altering a person's physical appearance in a photo?
- Why is it important for a photojournalist to adhere to ethical standards?
- How has the development of drone photography prompted privacy concerns?
- How is plagiarism involved in photography?

Task Number 46

Explore legal issues related to imaging technology.

Definition

Exploration should include

- copyright laws and fair use
- licensing (e.g., Creative Commons)
- contracts (e.g., waivers, model releases, consent forms)
- usage rights (e.g., image theft, unauthorized use).

Process/Skill Questions

- How can photo manipulation lead to legal issues?
- What is a copyright, and how is a copyrighted photograph identified?
- What are the economic effects of the unauthorized use of images?
- When using and publishing images, when and why are releases necessary?
- How do copyright laws and legal issues apply to a student as a photographer?
- What is the difference between getting permission to use a photo and crediting an image?

Exploring Medical Imaging

Task Number 47

Explain the differences among types of medical imaging.

Definition

Explanation should include

- radiographs (e.g., X-rays)
- MRI
- CT
- ultrasound imaging.

Process/Skill Questions

- Why might a healthcare provider order an X-ray?
- How are CT scans used?

Task Number 48

Examine radiographs (e.g., X-rays) to determine limits of an abnormality.

Definition

Examination should include differentiating between normal and abnormal images of the same type.

Process/Skill Questions

- When might an X-ray need to be repeated?
- How has X-ray technology evolved?

Task Number 49

Examine MRI images.

Definition

Examination should include differentiating between normal and abnormal images of the same type.

Process/Skill Questions

- When was MRI technology developed?
- What health conditions might necessitate an MRI?

Task Number 50

Examine CT images.

Definition

Examination should include differentiating between normal and abnormal images of the same type.

Process/Skill Questions

- How can one differentiate a normal vs. an abnormal CT image?
- What health conditions might necessitate a CT scan?

Task Number 51

Examine ultrasound images.

Definition

Examination should include differentiating between normal and abnormal images of the same type.

Process/Skill Questions

- How can one differentiate a normal vs. an abnormal ultrasound image?
- What health conditions might necessitate an ultrasound?

Examining Photographic Imaging

Task Number 52

Define the term *photography*.

Definition

Definition should include the nature and scope of capturing images.

Process/Skill Questions

- What is the effect of light on a photograph?
- What are the linguistic roots of the word *photography*?
- Where, in other disciplines, would one encounter the term *photo*?
- What materials are needed to produce a photographic image?
- How can a photographer ensure that a viewer can identify the purpose or subject of an image?

ITEEA National Standards

1. The Characteristics and Scope of Technology

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

---

Task Number 53

Identify camera types and parts.

Definition

Identification should include knowledge of

- camera formats
- digital vs. film cameras
- primary camera components
- criteria used to identify types of cameras and component systems
- how the parts of the camera affect the captured image.

Process/Skill Questions

- What are the characteristics of various types of cameras?
- What primary components are common to all camera types?
- What are the three interactive systems of a camera?
- What effect do the three interactive systems have on a captured image?
- How does a camera on a mobile device compare with a DSLR camera?

ITEEA National Standards

14. Medical Technologies

17. Information and Communication Technologies

2. The Core Concepts of Technology

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

---

Task Number 54

Examine the characteristics and uses of various lenses.

Definition

Examination should include the

- use of focal length
- differentiation among lens features (e.g., optical vs. digital zoom)
- use of lens applications (e.g., wide angle, normal, telephoto, zoom)
- use of controls
- effects on light.

Process/Skill Questions

- What is meant by *lens speed*?
- Why is focal length important?
- What subjects would require a telephoto lens, a wide-angle lens, or a normal lens?
- What is a macro lens?

ITEEA National Standards

13. Assess the Impact of Products and Systems

TSA Competitive Events

Photographic Technology

Task Number 55

Examine genres of photography.

Definition

Examination should include a series of related images in genres such as

- photojournalism
- editorial
- fashion
- sports

- portrait
- candid
- landscape
- photo essay.

Process/Skill Questions

- Why do many photographers focus on a specific genre?
- What is unique about photojournalism?
- What do all genres have in common?

Planning Images

Task Number 56

Propose an image.

Definition

Proposal may include

- purpose
- subject
- lighting
- equipment
- process (e.g., time, date, location)
- output (e.g., printed poster, digital thumbnail).

Process/Skill Questions

- What is the importance of emotion in photography? What role does it play in telling the story behind the image?
- How does an image engage a viewer?
- How does an understanding of the image output (e.g., resolution) affect a photographer's process?

Task Number 57

Plan an image production schedule.

Definition

Plan includes

- identifying tasks involved in image production
- scheduling tasks involved in image production
- adhering to deadlines and planning for unforeseen circumstances.

Process/Skill Questions

- How can client requirements contribute to a photographer's production schedule?
- Why are production schedules important?
- Why must professional photographers adhere to strict deadlines?

Task Number 58

Define *composition* and its components.

Definition

Definition includes *composition* as well as terms referring to the components of composition, such as

- *the rule of thirds*
- *depth-of-field*
- *balance*
- *rhythm*
- *framing*
- *proportion*
- *leading lines*
- *perspective.*

Process/Skill Questions

- How can composition affect the outcome of the image?
- What are the key elements and principles of composition?
- How does the rule of thirds create interest in an image?
- What is foreground, middle ground, and background?

Capturing Images

Task Number 59

Capture an image using the rule of thirds.

Definition

Capturing should include a composition that places a subject within any of the intersecting thirds (horizontal and vertical) of the frame.

Process/Skill Questions

- What compositional technique can be effectively used when paired with the rule of thirds?
- Why is subject placement important?
- When does it make sense to compose a photograph without the rule of thirds?
- What are the benefits to using the rule of thirds rather than placing a subject in the center of the frame?

ITEEA National Standards

11. Apply the Design Process

12. Use and Maintain Technological Products and Systems

17. Information and Communication Technologies

TSA Competitive Events

Biotechnology Design

Photographic Technology

Webmaster

Task Number 60

Produce an image using balance.

Definition

Production should include

- composing the image using symmetry
- composing the image using a primary subject and secondary subject
- composing the image with subjects arranged to draw the eye around the frame
- manipulating balance to achieve a desired effect.

Process/Skill Questions

- Why should a composition be symmetrical?
- When should a composition have other elements in various parts of the frame?
- Why is it important to allow the eye to move through a composition?
- What are ways to correct balance while composing an image?

ITEEA National Standards

11. Apply the Design Process

12. Use and Maintain Technological Products and Systems

17. Information and Communication Technologies

TSA Competitive Events

Biotechnology Design

Webmaster

Task Number 61

Compose a photograph that demonstrates rhythm in environment.

Definition

Composition should include examples of

- repetition of elements
- repetitive elements receding in space
- elements that have a static pattern (e.g., a row of columns)
- elements that have an organic pattern (e.g., waves of a sand dune show rhythm).

Process/Skill Questions

- What elements of a given composition might form a pattern?
- What elements of a given composition contain multiples of the same subject?
- Where should the camera be placed to enhance the regularity of the elements?
- How would the line of elements change through a narrow or wide depth of field?

ITEEA National Standards

11. Apply the Design Process

12. Use and Maintain Technological Products and Systems

13. Assess the Impact of Products and Systems

TSA Competitive Events

Biotechnology Design

Photographic Technology

Webmaster

Task Number 62

Demonstrate depth of field.

Definition

Demonstration should include a series of images that show the

- foreground in focus
- middle ground in focus
- background in focus.

Process/Skill Questions

- Why should only one plane be in focus?
- What advantages are there to narrowing the focal plane and making the background out of focus?
- What advantages are there to making the foreground and/or the background out of focus?
- How can the focal plane be widened or narrowed?
- How does aperture affect depth of field?

Task Number 63

Use the shutter to control motion.

Definition

Using the shutter to control motion includes

- stop-action
- blur motion
- long exposure
- panning.

Process/Skill Questions

- What is the difference between blur motion and panning?
- How do photographers use shutter speed to control motion?
- How does the environment influence the choice of shutter speed?

Task Number 64

Produce photographic images using various techniques.

Definition

Production of high-quality images should incorporate the rules of photographic composition and techniques, such as

- panoramic
- high dynamic range (HDR)
- forced perspective
- framing.

Process/Skill Questions

- What is the advantage of using HDR images?
- How does one choose which technique is the right technique for the image?
- What is the correlation between photography composition and graphic design? What do they have in common? What are their differences?

ITEEA National Standards

11. Apply the Design Process

13. Assess the Impact of Products and Systems

8. The Attributes of Design

TSA Competitive Events

Biotechnology Design

Digital Video Production

Engineering Design

Photographic Technology

Webmaster

Task Number 65

Use natural lighting to create a properly exposed image.

Definition

Use should include

- applying knowledge of the characteristics of light (e.g., reflection, refraction, wavelength, frequency)
- differentiating color temperature in visible light
- understanding white balance and its effect on photographs.

Process/Skill Questions

- What conditions would cause digital cameras to have a difficult time capturing an image?
- How would a photographer compensate for backlighting?
- How do atmospheric effects (e.g., humidity) influence light?
- What effect does time of day and season of year have on light?

ITEEA National Standards

13. Assess the Impact of Products and Systems

2. The Core Concepts of Technology

3. The Relationships Among Technologies and the Connections Between Technology and Other Fields

TSA Competitive Events

Digital Video Production

Photographic Technology

Task Number 66

Use artificial lighting to create a properly exposed image.

Definition

Use should include

- characteristics of light (e.g., reflection, refraction, wavelength, frequency)
- differentiation among color temperatures in visible light (e.g., fluorescent, flash)
- differentiation among types of artificial lights
- manipulation of light in a scene (e.g., subject placement, reflectors, diffusers, studio lighting).

Process/Skill Questions

- What are the advantages and disadvantages of using a flash?
- What effect do filters have on color temperature?
- What conditions would cause digital cameras to have a difficult time capturing an image?

Task Number 67

Use lighting techniques to create a dramatic effect on a photographic image.

Definition

Use includes achieving the desired mood or effect in an image through

- manipulation of natural or artificial light
- physical lighting arrangements (e.g., reflectors, diffusers, lamp positioning)
- adjustments to lighting using software to enhance the photograph.

Process/Skill Questions

- What effect does lighting have on the mood of an image?
- Why would a photographer use a flash in an outdoor composition?
- What compositional concepts can be applied to a scene that support effective lighting?
- What strategies may be applied in demonstrating effective artificial lighting?
- What are the ethical considerations in adjusting lighting through software or other digital applications?

ITEEA National Standards

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

11. Apply the Design Process

13. Assess the Impact of Products and Systems

8. The Attributes of Design

TSA Competitive Events

Biotechnology Design

Photographic Technology

Working in the Darkroom

Task Number 68

Demonstrate safety and environmentally friendly practices in the darkroom.

Definition

Demonstration should include

- safe handling of equipment and materials
- use of personal protective equipment (PPE) when appropriate
- responsible recycling or disposal of waste.

Process/Skill Questions

- What are some potential workplace hazards?
- What is the purpose of PPE?
- What is a safety data sheet (SDS)?
- Why is it important to prevent contamination of chemicals?

Task Number 69

Demonstrate the handling and care of equipment in the darkroom.

Definition

Demonstration should include following established guidelines and manufacturer's recommendations when using and maintaining equipment.

Process/Skill Questions

- How should chemicals be stored in the classroom?
- What precautions should be taken to prevent contamination of materials and chemicals?
- What is the best way to store lenses that are not being used?
- What precautions must be taken when moving equipment?
- When traveling, where should equipment be stored in a vehicle?

Task Number 70

Examine the physical and chemical properties of film and paper.

Definition

Examination should include a comparison of the properties of film and paper as they relate to one another in the process of creating photographic images.

Process/Skill Questions

- What physical differences can be observed between photographic film and photographic paper?
- Why do photographic films and papers need to dry after development?
- What material forms the basis for the photosensitive emulsion on film and paper?
- How does exposed photosensitive emulsion react when developed?

Exploring Post-Production Processes

Task Number 71

Manage digital images, using software.

Definition

Management includes

- downloading and converting images to digital format using memory cards, cables, card readers, and/or drives
- organizing files for efficiency
- understanding
    - how pixels are used in digital photography
    - digital file formats (e.g., RAW, TIFF, JPEG) as they pertain to image capture
    - compression of digital file sizes (e.g., extra fine, fine, basic, and normal) as they pertain to image capture
    - the difference between high and low resolution, and how these are linked to pixelation.

Process/Skill Questions

- What can affect pixel size?

- What steps can you take to improve a low-resolution image?
- When would you choose a low-resolution image instead of a high-resolution image?
- What is the RAW file format? What are the benefits of using RAW files?

Task Number 72

Enhance digital images, using software.

Definition

Enhancement should include

- rotating
- cropping
- making exposure adjustments (e.g., levels)
- transforming
- converting modes
- making color adjustments.

Process/Skill Questions

- What is the difference between destructive editing and nondestructive editing?
- Why do photographers use imaging software to enhance an image?
- How do photographers make exposure adjustments using photo-editing software?

Task Number 73

Scan an image from a photograph.

Definition

Scanning should include the use of a full-page scanner to produce an image to be altered.

Process/Skill Questions

- How can old photographs be preserved and shared?
- How can damaged photographs be restored?
- What other actions might be applied to scanned images?

Task Number 74

Transfer photos.

Definition

Transfer should use the process that allows file relocation from one type of device and operating system to another (e.g., iPhone to personal computer).

Process/Skill Questions

- How can photos from cell phones be printed?
- Why might one want to use a cell phone photo in a poster or advertisement? What are the legal and ethical considerations of such use?

Task Number 75

Manipulate an image.

Definition

Manipulation may include

- selecting objects
- building layers
- applying filters
- creating layer masks.

Process/Skill Questions

- What are the differences between Photoshop and Illustrator?
- What is the advantage of having pure black and pure white in all images?
- What is the difference between a PSD image and a JPEG image?
- What does it mean to delete something from an image?
- How can photographers use imaging software to create?

Task Number 76

Present images.

Definition

Presentation should include

- adherence to design elements
- application of layout techniques
- basic display/presentation practices (e.g., mounting, matting, framing, social media, websites, print).

Process/Skill Questions

- What are methods to professionally display/present photographic work?
- What would be the benefits of publicly displaying photographic work?
- How can the basic elements of composition and design be applied to the creation of an online portfolio?
- What are the benefits of an online portfolio vs. a print portfolio?
- What options are available to print images?

Task Number 77

Maintain a portfolio of photographic images.

Definition

Maintaining a portfolio should include organizing a collection of photographs or created images to reflect progress and ability.

Process/Skill Questions

- Why is a portfolio necessary?
- Why would a photographer want to keep copies of his or her best work in one location?
- How many different methods can be used to organize a collection of images?

Task Number 78

Critique student photographs.

Definition

Critique includes

- self

- peer
- oral
- written.

Process/Skill Questions

- Why is it important for photographers to continually reflect on their work?
- What can a photographer learn through a peer critique?
- How does feedback indicate the extent to which a photography project meets its purpose or goals?
- What is the difference between a critique and criticism?

Examining 3D Imaging

Task Number 79

Explain x, y, and z coordinate planes.

Definition

Explanation should include the Cartesian coordinate system and may include visuals.

Process/Skill Questions

- What are Cartesian coordinates?
- What is the definition of a *plane*?

Task Number 80

Create 3D geometric objects.

Definition

Creation should include simple geometric objects with planes identified.

Process/Skill Questions

- What are some common geometric shapes?
- Why is 3D imaging important?

Task Number 81

Use parametric modeling software.

Definition

Use should include x and y coordinates followed by the addition of z coordinates. Use should also include geometric models which can be rotated on a computer screen.

Process/Skill Questions

- What are examples of parametric modeling software currently in use?
- What does parametric modeling software allow the designer to accomplish?

Task Number 82

Examine VR.

Definition

Examination should include

- background
- foreground
- objects
- point of view.

Process/Skill Questions

- Why is consideration of point of view important?
- What are the characteristics of a VR game?

Task Number 83

Generate VR background and objects.

Definition

Generation should include a wall or scenery; objects generated may include furniture, trees, or objects that can be moved to various locations.

Process/Skill Questions

- Why is consideration of background important?
- What are examples of objects that can be generated?

Task Number 84

Generate first-person viewpoint actions in VR.

Definition

Generation should include viewing the surroundings as if one person is looking around.

Process/Skill Questions

- What does *first-person viewpoint* mean?
- How does one create first-person viewpoint?
- What should first-person viewpoint allow one to see?

Exploring Careers in Imaging

Task Number 85

Evaluate the work of a published or professional photographer.

Definition

Evaluation should include identifying photographic and imaging techniques used in a variety of applications. Images should be analyzed aesthetically and technically.

Process/Skill Questions

- How is this image used?
- What could be done differently with the image?
- What is the photographer trying to convey?
- What rules is the photographer breaking?

ITEEA National Standards

11. Apply the Design Process

13. Assess the Impact of Products and Systems

17. Information and Communication Technologies

Task Number 86

Explore careers in imaging technology.

Definition

Exploration should include the use of resources to identify commercial and professional applications of imaging technology.

Process/Skill Questions

- What is needed to start a photography business?
- What might employers in the photography industry be looking for in terms of skills, education, and/or experience?
- How do photographers generate income by selling photography online?

ITEEA National Standards

1. The Characteristics and Scope of Technology

17. Information and Communication Technologies

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

6. The Role of Society in the Development and Use of Technology

TSA Competitive Events

Biotechnology Design

Digital Video Production

Photographic Technology

Webmaster

Task Number 87

Research the integration of imaging technology in various industries.

Definition

Research may include careers in areas such as

- agriculture, food, and natural resources
- architecture and construction
- arts, audio-visual (A/V) technology, and communications
- business management and administration
- education and training
- finance
- government and public administration
- health science
- hospitality and tourism
- human services
- information technology
- law, public safety, corrections, and security
- manufacturing
- marketing
- science, technology, engineering, and mathematics (STEM)
- transportation, distribution, and logistics.

Research also includes presentation of student findings.

Process/Skill Questions

- What industries use imaging technology?
- How is imaging used in health care, law, or architecture?
- Why is imaging technology important to various industries?
- Where can one find evidence of imaging being used across different industries?

SOL Correlation by Task

39	Explain the term *imaging technology*.	English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8, 12.5, 12.8 History and Social Science: VUS.14, WHII.14
40	Research the history and development of imaging technology.	English: 9.5, 9.8, 10.5, 10.8, 11.5, 11.8, 12.5, 12.8 History and Social Science: VUS.1, VUS.6, VUS.8, VUS.10, VUS.13, VUS.14, WHII.14
41	Describe three-dimensional (3D) imaging, such as VR and medical imaging.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: VUS.14, WHII.14
42	Create a device that can project a simple hologram.	
43	Rotate 3D images on a computer screen.	
44	Outline a brief history of photographic technology.	English: 9.6, 9.7, 10.6, 10.7, 11.6, 11.7, 12.6, 12.7 History and Social Science: VUS.14, WHII.14
45	Explore ethical issues related to imaging technology.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: VUS.14, WHII.14
46	Explore legal issues related to imaging technology.	English: 9.5, 10.5, 11.5, 12.5
47	Explain the differences among types of medical imaging.	English: 9.5, 10.5, 11.5, 12.5 History and Social Science: VUS.14, WHII.14
48	Examine radiographs (e.g., X-rays) to determine limits of an abnormality.	
49	Examine MRI images.	
50	Examine CT images.	
51	Examine ultrasound images.	
52	Define the term *photography*.	English: 9.3, 10.3, 11.3, 12.3
53	Identify camera types and parts.	English: 9.5, 10.5, 11.5, 12.5
54	Examine the characteristics and uses of various lenses.	English: 9.5, 10.5, 11.5, 12.5 Science: PH.4
55	Examine genres of photography.	English: 9.5, 10.5, 11.5, 12.5

56	Propose an image.	English: 9.5, 10.5, 11.5, 12.5
57	Plan an image production schedule.	English: 9.5, 10.5, 11.5, 12.5
58	Define *composition* and its components.	English: 9.3, 10.3, 11.3, 12.3 History and Social Science: WHI.15, WHII.2
59	Capture an image using the rule of thirds.	Mathematics: G.3
60	Produce an image using balance.	History and Social Science: WHI.15, WHII.2 Mathematics: G.3
61	Compose a photograph that demonstrates rhythm in environment.	
62	Demonstrate depth of field.	History and Social Science: WHI.15, WHII.2
63	Use the shutter to control motion.	
64	Produce photographic images using various techniques.	History and Social Science: WHI.15, WHII.2
65	Use natural lighting to create a properly exposed image.	History and Social Science: WHI.15, WHII.2 Mathematics: G.8, T.3 Science: PH.9
66	Use artificial lighting to create a properly exposed image.	Mathematics: G.8, T.3
67	Use lighting techniques to create a dramatic effect on a photographic image.	History and Social Science: WHI.15, WHII.2
68	Demonstrate safety and environmentally friendly practices in the darkroom.	
69	Demonstrate the handling and care of equipment in the darkroom.	
70	Examine the physical and chemical properties of film and paper.	English: 9.5, 10.5, 11.5, 12.5
71	Manage digital images, using software.	English: 9.5, 10.5, 11.5, 12.5
72	Enhance digital images, using software.	
73	Scan an image from a photograph.	
74	Transfer photos.	
75	Manipulate an image.	
76	Present images.	English: 9.1, 9.2, 10.1, 10.2, 11.1, 11.2, 12.1, 12.2
77	Maintain a portfolio of photographic images.	
78	Critique student photographs.	English: 9.1, 9.5, 9.6, 9.7, 10.1, 10.5, 10.6, 10.7, 11.1, 11.5, 11.6, 11.7, 12.1, 12.5, 12.6, 12.7
79	Explain x, y, and z coordinate planes.	English: 9.5, 10.5, 11.5, 12.5
80	Create 3D geometric objects.	

81	Use parametric modeling software.	
82	Examine VR.	
83	Generate VR background and objects.	
84	Generate first-person viewpoint actions in VR.	
85	Evaluate the work of a published or professional photographer.	English: 9.5, 10.5, 11.5, 12.5
86	Explore careers in imaging technology.	English: 9.8, 10.8, 11.8, 12.8 Science: PH.4
87	Research the integration of imaging technology in various industries.	English: 9.8, 10.8, 11.8, 12.8

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+)
- National Career Readiness Certificate Assessment
- Photography 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.*

- Communication Systems (8415/36 weeks)
- Communication Systems (8418/18 weeks)
- Digital Visualization (8459/36 weeks)
- Graphic Communications Systems (8458/36 weeks)
- Graphic Communications Systems (8494/18 weeks)
- Video and Media Technology (8497/36 weeks)

Career Cluster: Arts, Audio/Video Technology and Communications	
Pathway	**Occupations**
Audio and Video Technology and Film	**Editor** **Graphic Designer** **Multimedia Artist, Animator** **Videographer**
Journalism and Broadcasting	**Art Director**
Visual Arts	**Commercial Photographer** **Graphic Designer** **Photographic Process Technician**