Unit 06: Image Formation and Digital Video

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **FY**
Status: **Published**

Standards Alignment

New Jersey Student Learning Standards

LA.K-12.NJSLSA.R2	Determine central ideas or themes of a text and analyze their development; summarize the key supporting details and ideas.
	Craft and Structure
LA.K-12.NJSLSA.R4	Interpret words and phrases as they are used in a text, including determining technical, connotative, and figurative meanings, and analyze how specific word choices shape meaning or tone.
LA.K-12.NJSLSA.R6	Assess how point of view or purpose shapes the content and style of a text.
LA.K-12.NJSLSA.R10	Read and comprehend complex literary and informational texts independently and proficiently with scaffolding as needed.
LA.RST.9-10	Reading Science and Technical Subjects
LA.RST.9-10.2	Determine the central ideas, themes, or conclusions of a text; trace the text's explanation or depiction of a complex process, phenomenon, or concept; provide an accurate summary of the text.
LA.RST.9-10.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.
LA.RST.9-10.6	Determine the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.
LA.RST.9-10.10	By the end of grade 10, read and comprehend science/technical texts in the grades 9-10 text complexity band independently and proficiently.
AAAA.K-12.2	Draw conclusions, make informed decisions, apply knowledge to new situations, and create new knowledge.
AAAA.K-12.2.1	Skills
AAAA.K-12.2.1.2	Organize knowledge so that it is useful.
AAAA.K-12.2.1.5	Collaborate with others to exchange ideas, develop new understandings, make decisions, and solve problems.
AAAA.K-12.2.1.6	Use the writing process, media and visual literacy, and technology skills to create products that express new understandings.

Integration of Career Readiness, Life Literacies and Key Skills

CRP.K-12.CRP1	Act as a responsible and contributing citizen and employee.

CRP.K-12.CRP2	Apply appropriate academic and technical skills.
CRP.K-12.CRP3	Attend to personal health and financial well-being.
CRP.K-12.CRP4	Communicate clearly and effectively and with reason.
CRP.K-12.CRP5	Consider the environmental, social and economic impacts of decisions.
CRP.K-12.CRP6	Demonstrate creativity and innovation.
CRP.K-12.CRP7	Employ valid and reliable research strategies.
CRP.K-12.CRP8	Utilize critical thinking to make sense of problems and persevere in solving them.
CRP.K-12.CRP9	Model integrity, ethical leadership and effective management.
CRP.K-12.CRP10	Plan education and career paths aligned to personal goals.
CRP.K-12.CRP11	Use technology to enhance productivity.
CRP.K-12.CRP12	Work productively in teams while using cultural global competence.

Technology / Integration of Computer Science and Design Thinking

Interdisciplinary Connections: NJSLS for ELA, Social Studies, Science and/or Math Section

Integration of Diversity, Equity and Inclusion; Climate Change; Informational and Media LiteracyNew Section

see Crosswalks

21st Century Life and Careers

Stage I: Desired Results

Transfer/Overview/Rationale

Transfer / Overview / Rationale
Unit Rationale The purpose of this unit…

Meaning

Essential Questions

Essential Questions

What are the digital scanning process?

How is a digital image formed?

What are the different types of television available?

What are compressions and codecs?

What are downloading and streaming?

What are the similarities and differences between the five steps of pre-production?

How do I choose a crew? talent?

Enduring Understanding/Indicators of Understanding

Enduring Understanding/Indicators of Understanding

understand basic image formation.

understand what is digital.

understand compressions, codecs, downloading and streaming.

understand that producing a video production requires well prepared and written treatments, rundowns and scripts, storyboards and timelines.

understand that a prepared technical and talent crew and an understanding of basic post production editing will allow producer to complete a successful video production.

Acquisition (Student Learning Objectives)

Knowledge

Knowledge

Students will know…

An interlaced television frame is made up of two scanning fields, which are necessary for one complete frame. Interlaced scanning scans every other line, then goes back and scans the lines that were skipped. Progressive scanning scans every line. In progressive scanning, each scanning cycle produces not fields but a complete video frame. The frame rate, or refresh rate, can vary.

The most prevalent digital television scanning systems are 480p, 720p, 1080i, and 1080p. These systems produce video with higher resolution than standard analog television, improved color, and more subtle shadings between the brightest and darkest picture areas. High-definition television (HDTV) uses the 720p and 1080i scanning systems; super-high-definition digital cinema (4K and 8K systems) uses a higher number of scanning lines, with each line made up of thousands of pixels.

Some video cameras, especially high-end digital cinema cameras, have a variable scanning system that can produce the standard movie frame rate of 24 frames per second (fps) or even lower as well as the HDTV 60 fps and even a very high frame rate for slow-motion effects.

There are three flat-panel systems: LED, LCD, and plasma panels. Although they operate on different complex technical principles, their pixels are all activated by the video signal. The LED panels are more economical in power consumption and generate less heat than the other two systems.

An analog signal fluctuates exactly like the original stimulus. A digital signal is based on a binary code that uses on/off, either/or values represented by 0's and 1's; it is purposely discontinuous.

Digital signals sample the analog signal at equally spaced intervals and assign each sample a specific binary number—the process of quantizing. Each number consists of a combination of 0's and 1's. The higher the sampling rate, the higher the picture quality. Digital signals are very robust and do not deteriorate over multiple generations.

Digital signals can be compressed; analog signals cannot. Compression eliminates redundant or unnecessary picture information to increase storage capacity and speed up signal transport and video and audio processing. Lossless compression rearranges the data into less space. Lossy compression throws away redundant or unimportant data. There are several codec (compression-decompression) systems that offer various means and degrees of compression.

Downloading means that the data are sent in packets that are often out of order. You need to wait until all packets have arrived before you can open the file. Streaming means that you can open the file and listen to and watch the first part while the data delivery of the balance of the file is still in progress.

The digital process permits a great number of copies to be made without any deterioration to picture and sound quality, various forms of compression and relatively safe signal transport, and the manipulation of pictures and sound. It can also be used to create new pictures and sound synthetically.

Skills

Skills

Student will be skilled at …

choosing between interlaced and progressive scanning.

differentiating between flat screen televisions.

choosing compression rates and codecs.

choosing whether to download or stream content.

Stage 3: Learning Plan

Resource and Mentor Texts

Resources and Mentor Texts

Video Basics 7th Edition Chapter 3

Formative Assessment Strategies

Formative Assessment Strategies

Testing concepts of digital and compressions

TestCh3-6.doc

Learning Activities/Unit of Study

Learning Activities/Unit of Study

Reading and annotating Chapter 3

Vocabulary quiz

Test

Demonstration of equipment

Modifications and/or Accommodations

Suggested Modifications (ELL, Sp. Ed, GIfted, At-risk of Failure)

English Language Learners

Native language support: The teacher provides auditory or written content to students in their native language.

Adjusted Speech: The teacher changes speech patterns to increase student comprehension. This could include facing the students, paraphrasing, clearly indicating the most important ideas, and speaking more slowly.

Visuals: The teacher uses graphics, pictures, visuals, and manipulatives. This helps ELL students better understand and comprehend the subjects at hand.

Front-Loading Vocabulary: The teacher front loads vocabulary. This means providing students with a list of important vocabulary words they will need to know for a book, lesson, etc. prior to the lesson being taught. Including pictures to go with the vocabulary words is also very beneficial for the students.

Special Education Students

Chunking: The teacher presents information in a way that makes it easy for students to understand and remember. Chunking is based on the presumption that our working memory is easily overloaded by excessive detail. The best way to deliver information is to organize it into meaningful units. Because students with special needs get overloaded easily, chunking is an effective strategy to use with them.

Checking for Understanding: It is important to constantly check for understanding, especially for students who have accommodations. Teachers want to make sure students understand the concepts being covered in a way that makes sense to them.

Extra time: The teacher provides students with special needs extra time to complete work or answer questions. It is important to give students enough time to process their thoughts.

Oral Reading: The teacher will read work orally to students. Class work such as tests and literature circles may need to be read aloud to the student.

Timers: The teacher will use timers as an instructional tool. The use of timers is beneficial for students who have trouble completing tasks. Timers can be helpful so the student is aware of how much time they have to complete an assignment.

Students with 504 Plans

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Gifted & Talented Strategies

Extensions/Enrichments: Teachers will provide gifted and talented students with extension/enrichment projects. Students will be challenged to further their understanding, to apply acquired knowledge, and/or to produce something in reference to acquired knowledge.

Modify/Change Activities: Teachers will monitor and modify activities to accommodate those students who need to be challenged further. Additional reading, problem-solving, writing, or project work is necessary for those students who are ready to move on at a rate more accelerated than their peers. In this way, G & T students are provided the same opportunity for support as special needs students.

Students at Risk of School Failure

Directions or Instructions: Make sure directions and/or instructions are given in limited numbers. Give directions/instructions verbally and in simple written format. Ask students to repeat the instructions or directions to ensure understanding occurs. Check back with the student to ensure he/she hasn't forgotten.

Peer Support: Peers can help build confidence in other students by assisting in peer learning. Many teachers use the 'ask 3 before me' approach. This is fine, however, a student at risk may have to have a specific student or two to ask. Set this up for the student so he/she knows who to ask for clarification before going to you.

Alternate or Modified Assignments: Always ask yourself, "How can I modify this assignment to ensure the students at risk are able to complete it?" Sometimes you'll simplify the task, reduce the length of the assignment or allow for a different mode of delivery. For instance, many students may hand something in, the at-risk student may jot notes and give you the information verbally. Or, it just may be that you will need to assign an alternate assignment.

Increase One to One Time: When other students are working, always touch base with your students at risk and find out if they're on track or needing some additional support. A few minutes here and there will go a long way to intervene as the need presents itself.

Contracts: It helps to have a working contract between you and your students at risk. This helps prioritize the tasks that need to be done and ensure completion happens. Each day write down what needs to be completed, as the tasks are done, provide a checkmark or happy face. The goal of using contracts is to eventually have the student come to you for completion sign-offs.

Hands On: As much as possible, think in concrete terms and provide hands-on tasks. This means a child doing math may require a calculator or counters. The child may need to tape record comprehension activities instead of writing them. A child may have to listen to a story being read instead of reading it him/herself.

Tests/Assessments: Tests can be done orally if need be. Break tests down in smaller increments by having a portion of the test in the morning, another portion after lunch and the final part the next day.

Seating: Seat students near a helping peer or with quick access to the teacher. Those with hearing or sight issues need to be close to the instruction which often means near the front.