Standard: Technology Literacy (2009)

8.1: Education Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.

8.2: Technology Education, Engineering, and Design: All students will develop an understanding of the nature and impact of technology, engineering, technology design, and the designed world, as they relate to the individual, global, and the environment.

9.1: 21st Century Life and Career Skills: All students will demonstrate the creativity, critical thinking, collaboration, and problem-solving skills needed to function successfully as both global citizens and workers in diverse ethnic and organizational cultures.

Strand:

8.1.A: Technology Operations and Concepts
8.1.F: Critical Thinking, Problem Solving, and Decision Making

8.2.B: Design: Critical Thinking, Problem Solving, and Decision Making
8.2.F: Resources for a Technological World
8.2.G: The Designed World

9.1.A: Critical Thinking and Problem Solving
9.2.E: Communication and Media Fluency
9.2.F: Accountability, Productivity, and Ethics

Curriculum aligned with: 2009 New Jersey Core Curriculum Content Standards for 21st Century Skills (9.1 A-F)

21st Century Theme: *Global Awareness ☐,Financial, economic, business and entrepreneurial literacy ☐ Civic literacy ☐,Health literacy ☐Environmental Literacy X*

21st Century Skills: *Critical Thinking & Problem Solving ☐,Creativity and Innovation ☐,Collaboration, Teamwork and Leadership ☐,Cross-Cultural Understanding and Interpersonal Communications X Communication and Media Fluency ☐, Accountability, Productivity and Ethics ☐*

Interdisciplinary Connection: Math=MA, English=ELA, Science=SCI, Social Studies=SS, Physical Education=PE, Art=ART, Music=MU, Technology=TECH, World Language=WL Business = BU

Essential Questions	Enduring Understandings	Activities, Investigation, and Student Experiences
• How can classes, objects, and methods be used to solve a problem? • What is a nested loop and how can it be used? • How can transformation of images be made to appear differently? • What algorithms can be developed to transform sound clips?	*Students will understand….* • Object- based programming using classes, objects, and methods to solve problems • A class specifies a set of attributes and methods for the objects of that class • The behavior of an object depends on its current contents and the methods that manipulate this state • The set of a class's methods is called its interface • A class usually includes a toString method that returns a string representation of an object of the class • A nested loop structure is used to visit each position in a two-dimensional grid • An enhanced for loop structure is used to visit • each pixel in an image	Task 1: An algorithm to posturize a given image works like the algorithm to convert an image to black and white, but uses two given color values instead. Write a program that prompts the user for an image filename. The program should posterize the image before and after each transformation. Task 2: Inverting a gray scale image makes it look like a photographic negative. To do this, you reset each RGB component to 255 minus that component. Write a program that inverts gray scale images. Task 3: Write a program that accepts the name of a sound clip as input and creates a new clip that is the reverse of the input. The program should then draw the new clip, which will allow the user to play it or save it to a file. The first sample in the clip should not be moved. Task 4: Write a Java code segment that draws a blue boarder around the edges of the image. Unlike the code in an earlier exercise, this code should not override the edges of the original image, but instead create a new image with contents of the original image enclosed in the border. Task 5: Write a Java code segment that creates a gray scale of an image. The original image should be unchanged. BU **Unit Project:** The local bookstore has a mark up of 10 percent on each book sold. Write a program that takes the sale price of a book as input and displays the following outputs. The markup amount of the book you just sold

Content Statements	**Cumulative Progress Indicators**	
Students will know… ● How to use the concepts of object based programming to solve a problems ● How to write a loop to visit a sequence of date values ● How to write a nested loop to visit positions in a two dimensional grid of data values ● Develop algorithms to perform simple transformations	● Tests ● Quizzes ● Practice problems for homework ● Unit projects ● Worksheets	
Desired Results		
● Understand the building blocks of object-oriented programing ● Understand how a class shapes a Java program ● Know how to write a nested loop to visit positions in a two dimensional grid of data values ● Know how to Develop algorithms to perform simple transformations		
Standards for Mathematical Practices		Teacher Resources

1. Make sense of problems and persevere in solving them. 2. Reason abstractly and quantitatively. 3. Construct viable arguments and critique the reasoning of others. 4. Model with mathematics. 5. Use appropriate tools strategically. 6. Attend to precision. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.	http://www.cengage.com/us http://achievethecore.org https://learnzillion.com https://www.khanacademy.org/ https://www.desmos.com/ http://www.ixl.com http://www.parcconline.org

LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*

Troy Lee Hudson https://www.nasa.gov/pdf/714670main_Algebra2.pdf
https://solarsystem.nasa.gov/people/2882/troy-hudson/

The mission is to ensure that every student is able to see themselves in our rich and diverse history.

Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***
Self-Awareness Social Awareness Self-Management Relationship Skills Responsible Decision-Making	• Recognizing the importance of self-confidence in handling daily tasks and challenges. • Demonstrate an awareness of the expectations for social interactions in a variety of ways. • Demonstrate an understanding of the need for mutual respect when viewpoints differ. • Recognize the skills needed to establish and achieve personal and educational goals. • Utilize positive communication and social skills to interact effectively with others. • Develop, implement, and model effective problem solving and critical thinking skills.