Unit 3 Strings Copied from: AP Computer Science A, Copied on: 02/21/22

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Strings

Department of Curriculum and Instruction

Belleville Public Schools

Curriculum Guide

AP Computer Science A - Java

Strings

Belleville Board of Education

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Board Approved:

Unit Overview

Unit Overview - AP Essential Knowledge
A: STUDENTS WILL KNOW: • How to create and initialize Strings • How call to various built-in methods when working with Strings to perform tasks • How to begin programming with objects in mind ***B: STUDENTS WILL UNDERSTAND THAT:*** • String objects are more versatile with function ability than primitive data types • Object-Orientated programming is more efficient to program with than top-to-bottom programing • Variables within methods cannot be used throughout the entire program ***C: STUDENTS WILL BE ABLE TO:*** • Select and implement appropriate built in string methods to perform key tasks when writing programs • Create strings to increase the versatility and complexity when writing programs

- Begin to program with an object-oriented paradigm in mind through the creation of user-defined method
- Understand the existence of variables and how they are affected through various actions throughout the s
- Use various commands from the math library in the context of a program
- Examine and debug compiler and runtime errors within programs
- Format output to a console

Enduring Understanding

All data stored on a computer is ultimately stored as a sequence of 0s and 1s. This includes text, digital books, images, songs, videos, and "executable files" like games and applications. Strings, an example of text data, are stored in the following way:

- a string is a sequence of characters (e.g., the string "Hello, World!" contains 13 characters including letters like "H", "e" and punctuation like " ", "!"
- each character is actually represented by a number (e.g., "H" is represented by the number 40; this is its ASCII/Unicode value)

(Numbers are stored internally in a 0-1 binary format.)

Strings, which are widely used in Java programming, are a sequence of characters. In the Java programming language, strings are objects.

Essential Questions

Essential Questions

1. How are characters and string objects used in programs?

2. How can we write and compare string objects?
3. How can we use formatting for outputs with numeric values?
4. How can we cast between a character, string, and numeric data type?
5. How can we work with the string data type to: determine its length, obtain a character, concatenate string
6. How is programming with object-orientation in mind different than the top-to-bottom approach?

Exit Skills

Exit Skills - Assessment

- Complete various written checkpoint exercises that focus on the explanation and description of computer basics.
- Develop a visual representation of the communication processes within a computer using appropriate ter
- Properly document a program using correct indentation, spacing, and comment style.
- Debug programs and determine the types of errors in the program.
- Create programs based on programming exercises that display various types of output using string and n
- Unit 1 Assessment

Formative Evaluations:	**Summati**
Formative Assessment with polling codeIt! Nows Quizzes Long Programs (LP)/ Lab work	Unit 1 Te

Sequence and Scope

Day	*Topic/Activities*	
1	- **String Objects** - codeIt! Now	
2	- **Immutability of Strings** - **Using Strings** - codeIt! Now	
3	- **Using Strings** - codeIt! Now	I
4	- *Lab Work: LP #1 & #2*	I
5	- *Lab Work: LP #1 & #2*	I
6	- *Quiz Question #1 and #1a* - *Lab Work: LP #1 & #2*	I

7	- **Numeric Values within Strings** - codeIt! Now	
8	- Continue **Numeric Values within Strings** - codeIt! Now	
9	- *Lab Work: LP #3*	
10	- *Lab Work: LP #3*	
11	- *Quiz Question #2* - *Lab Work: LP #3*	
12	- **Programming w/ Objects in Mind** - codeIt! Now	
13	- Continue **Programming w/ Objects in Mind** - codeIt! Now	
14	- Continue **Programming w/ Objects in Mind** - codeIt! Now	
15	- *Quiz Question #3* - *Lab Work: LP #4*	
16	- *Lab Work: LP #4*	
17	- Unit 1 Assessment	

New Jersey Student Learning Standards (NJSLS-S)

CSTA Standards
Computing Systems • 3A-CS-03 Develop guidelines that convey systematic troubleshooting strategies that others can use to id • 3B-CS-02 Illustrate ways computing systems implement logic, input, and output through hardware comp
Networks and the Internet • 3B-NI-03 Describe the issues that impact network functionality (e.g., bandwidth, load, delay, topology).
Data and Analysis • 3A-DA-09 Translate between different bit representations of real-world phenomena, such as characters,

- 3A-DA-12 Create computational models that represent the relationships among different elements of dat phenomenon or process.
- 3B-DA-06 Select data collection tools and techniques to generate data sets that support a claim or comm
- 3B-DA-07 Evaluate the ability of models and simulations to test and support the refinement of hypothes

Algorithms and Programming

- 3A-AP-13 Create prototypes that use algorithms to solve computational problems by leveraging prior stu personal interests.
- 3A-AP-15 Justify the selection of specific control structures when tradeoffs involve implementation, rea performance, and explain the benefits and drawbacks of choices made.
- 3A-AP-17 Decompose problems into smaller components through systematic analysis, using constructs s modules, and/or objects.

3A-AP-19 Systematically design and develop programs for broad audiences by incorporating feedback from us

- 3A-AP-21 Evaluate and refine computational artifacts to make them more usable and accessible.
- 3A-AP-22 Design and develop computational artifacts working in team roles using collaborative tools.
- 3B-AP-10 Use and adapt classic algorithms to solve computational problems.
- 3B-AP-11 Evaluate algorithms in terms of their efficiency, correctness, and clarity.
- 3B-AP-14 Construct solutions to problems using student-created components, such as procedures, modu
- 3B-AP-20 Use version control systems, integrated development environments (IDEs), and collaborative documentation) in a group software project.
- 3B-AP-21 Develop and use a series of test cases to verify that a program performs according to its desig
- 3B-AP-22 Modify an existing program to add additional functionality and discuss intended and unintend breaking other functionality).
- 3B-AP-23 Evaluate key qualities of a program through a process such as a code review.

Impacts of Computing

- 3A-IC-25 Test and refine computational artifacts to reduce bias and equity deficits.
- 3A-IC-26 Demonstrate ways a given algorithm applies to problems across disciplines.
- 3A-IC-29 Explain the privacy concerns related to the collection and generation of data through automate be evident to users.

LA.RST.11-12	Reading Science and Technical Subjects
TECH.8.2.12.E.3	Use a programming language to solve problems or accomplish a task (e.g., robotic

functions, website designs, applications, and games).

Functions

Interdisciplinary Connections

Primary interdisciplinary connections:

Infused within the unit are connections to the 2009 NJCCCS for Language Arts Literacy and Business, Science and Technology.

Critical reading, writing, and mathematical modeling skills are promoted within the problem solving process and as a means to explain solutions.

Learning Objectives

STUDENTS WILL BE ABLE TO:

- Select and implement appropriate built in string methods to perform key tasks when writing programs
- Create strings to increase the versatility and complexity when writing programs
- Begin to program with an object-oriented paradigm in mind through the creation of user-defined methods.
- Understand the existence of variables and how they are affected through various actions throughout the structure of a program
- Use various commands from the math library in the context of a program
- Examine and debug compiler and runtime errors within programs
- Format output to a console

Suggested Activities & Best Practices

- Complete various written checkpoint exercises that focus on the explanation and description of computer hardware and Java basics.
- Develop a visual representation of the communication processes within a computer using appropriate terminology.

- Properly document a program using correct indentation, spacing, and comment style.
- Debug programs and determine the types of errors in the program.
- Create programs based on programming exercises that display various types of output using string and numeric expressions.

https://chortle.ccsu.edu/Java5/Notes/chap29/chap29quizRev2.html

problem-based learning: engages student learning in the context of a (broad) problem

Assessment Evidence - Checking for Understanding (CFU)

- Complete various written checkpoint exercises that focus on the explanation and description of computer basics.
- Develop a visual representation of the communication processes within a computer using appropriate ter
- Properly document a program using correct indentation, spacing, and comment style.
- Debug programs and determine the types of errors in the program.
- Create programs based on programming exercises that display various types of output using string and n
- Unit 1 Assessment
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Formative Evaluations:	**Summat**
Formative Assessment with polling codeIt! Nows Quizzes Long Programs (LP)/ Lab work	Unit 1 Te Assessm

Alternate Assessment-Multimedia reports

Benchmark Assessment-Creat a Multimedia poster

- Admit Tickets
- Anticipation Guide
- Common Benchmarks
- Compare & Contrast
- Create a Multimedia Poster
- DBQ's
- Define
- Describe
- Evaluate
- Evaluation rubrics
- Exit Tickets
- Explaining
- Fist- to-Five or Thumb-Ometer
- Illustration
- Journals
- KWL Chart
- Learning Center Activities
- Multimedia Reports
- Newspaper Headline
- Outline
- Question Stems
- Quickwrite
- Quizzes
- Red Light, Green Light
- Self- assessments
- Socratic Seminar
- Study Guide
- Surveys
- Teacher Observation Checklist
- Think, Pair, Share
- Think, Write, Pair, Share
- Top 10 List
- Unit review/Test prep
- Unit tests
- Web-Based Assessments
- Written Reports

Primary Resources & Materials

NJCTL Curriculum

Curriculum development Resources/Instructional Materials/Equipment Needed Teacher Resources: • www.gliffy.com • Eclipse IDE • MS DOS Prompt • Computers

Ancillary Resources

Java Resources

- Java Review for the AP CS A Exam - Great review site with lots of practice questions.
- Aplus Compter Science Exam Review Material -Slide, Free Response, and more!
- Introduction to Java - a textbook for a first course in computer science for the next generation of scientists and engineers
- Guru-99 Introduction Java Material
- Oracles (owners of Java) has their own tutorials
- Dick Baldwin - ACC - Introduction and Advanced Java Material
- Introduction to Computer Science using Java - by Bradley Kjell
- Thinking in Java
- Blue Pelican Java
- Java Coding Bat - Lots of good practice problems
- Code Academy - No Java but good practice.

https://chortle.ccsu.edu/CS151/cs151java.html

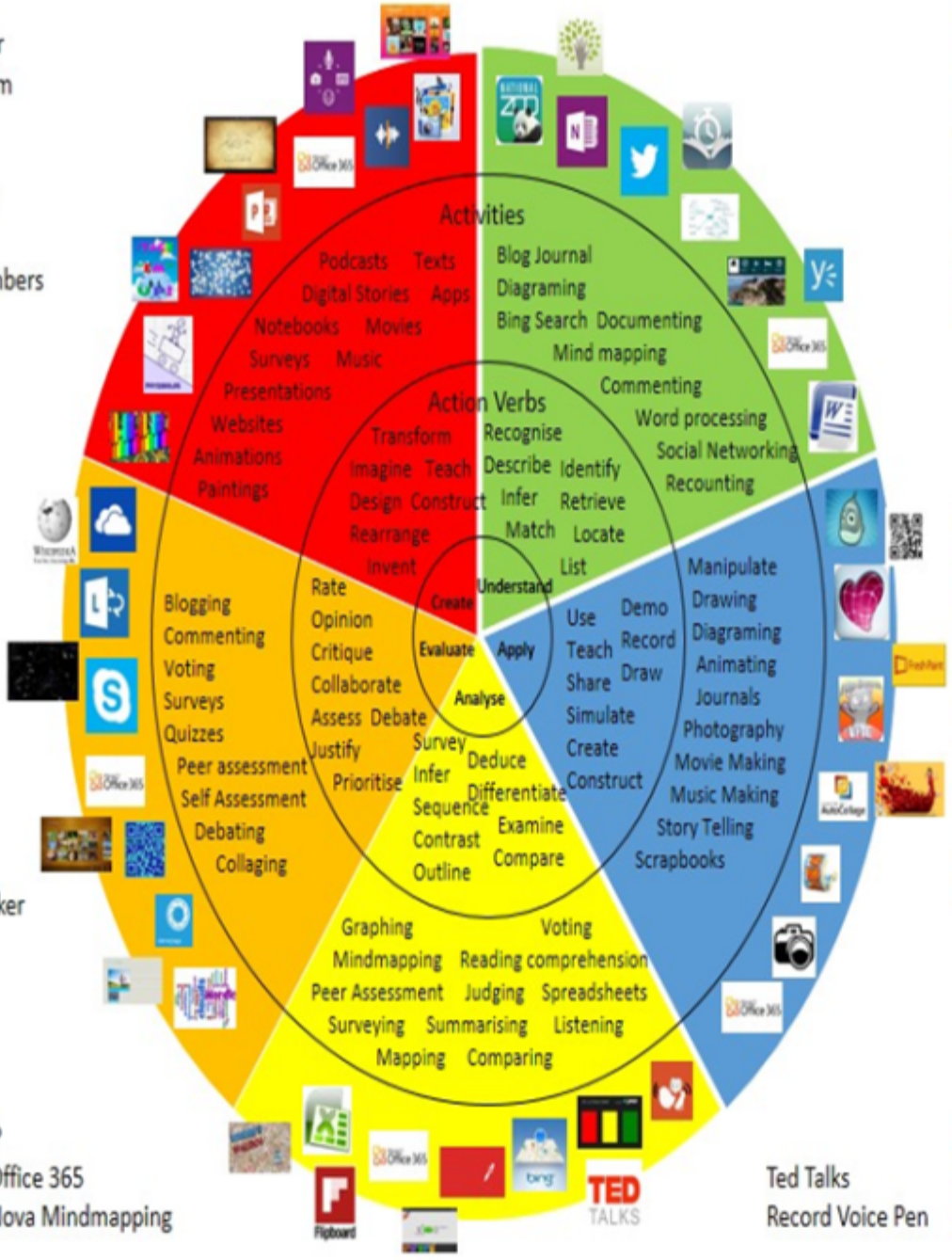
Technology Infusion

Technology Infusion and/or strategies include chromebooks online materials google/powerpoint slides

Win 8.1 Apps/Tools Pedagogy Wheel

Podcasts
Photostory 3
Kid Story Builder
Music Maker Jam
Paint A Story
Office 365
MS PowerPoint
Stack 'Em Up
NqSquared Numbers
Physamajig
Xylophone 8

Wikipedia
Skydrive
Lync
SkyMap
Skype
Office 365
Puzzle Touch
Easy QR
Memorylage
Life Moments
Word Cloud Maker



Where's Waldo?
MS Excel Office 365
Flipboard Nova Mindmapping

Ted Talks
Record Voice Pen

Originally taken from http://www.coetail.com/vzimmer/files/2013/02/iPadagogy-Wheel.001.jpg
And adapted for Windows 8.1 devices by Charlotte Beckhurst @CharBeckhurst

Alignment to 21st Century Skills & Technology

21st century themes: The unit will integrate the 21st Century Life and career standard 9.1 strands A-D. These strands include: critical thinking and problem solving, creativity and innovation, collaboration, teamwork, and leadership, and cross cultural understanding and interpersonal communication

Mastery and infusion of 21st Century Skills & Technology and their Alignment to the core content areas is essential to student learning. The core content areas include:

- English Language Arts;
- Mathematics;
- Science and Scientific Inquiry (Next Generation);
- Social Studies, including American History, World History, Geography, Government and Civics, and Economics;
- World languages;
- Technology;
- Visual and Performing Arts.

TECH.K-12.1.5.a	formulate problem definitions suited for technology-assisted methods such as data analysis, abstract models and algorithmic thinking in exploring and finding solutions.
TECH.K-12.1.5.b	collect data or identify relevant data sets, use digital tools to analyze them, and represent data in various ways to facilitate problem-solving and decision-making.
TECH.K-12.1.5.c	break problems into component parts, extract key information, and develop descriptive models to understand complex systems or facilitate problem-solving.
TECH.K-12.1.5.d	understand how automation works and use algorithmic thinking to develop a sequence of steps to create and test automated solutions.

21st Century Skills/Interdisciplinary Themes

21st century themes: The unit will integrate the 21st Century Life and career standard 9.1 strands A-D. These strands include: critical thinking and problem solving, creativity and innovation, collaboration, teamwork, and leadership, and cross cultural understanding and interpersonal communication

21st Century/Interdisciplinary Themes that will be incorporated into this unit.

- Communication and Collaboration
- Creativity and Innovation
- Critical thinking and Problem Solving
- ICT (Information, Communications and Technology) Literacy
- Information Literacy

- Life and Career Skills
- Media Literacy

TECH.8.1.12	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.12.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.12.A.CS1	Understand and use technology systems.

21st Century Skills

21st Century Skills that will be incorporated into this unit.

- Civic Literacy
- Environmental Literacy
- Financial, Economic, Business and Entrepreneurial Literacy
- Global Awareness
- Health Literacy

CAEP.9.2.12.C	Career Preparation
CAEP.9.2.12.C.1	Review career goals and determine steps necessary for attainment.
CAEP.9.2.12.C.2	Modify Personalized Student Learning Plans to support declared career goals.

Differentiation

Exemplar:

Extra time to complete assignments: Students will be allowed to turn in work up to 6 days after the due date

• Technology Resources • • Follow all IEP Modifications/504 Plan

These are the 12 best differentiated instruction strategies to help you better meet the needs of all of your students:

1. Group students based on knowledge
2. Create pods with student captains
3. Create tiered lessons
4. Create handouts for common questions
5. Include hands-on activities and projects
6. Provide study guides, worksheets, and notes
7. Flip your classroom
8. Leverage your students' strengths

9. Practice flexible grouping
10. Offer more choices for learning
11. Think-pair-share
12. Try digital curriculum

Differentiation in a lesson lies within content, process, and/or product.

Differentiations:

- Small group instruction
- Small group assignments
- Extra time to complete assignments
- Pairing oral instruction with visuals
- Repeat directions
- Use manipulatives
- Center-based instruction
- Token economy
- Study guides
- Teacher reads assessments allowed
- Scheduled breaks
- Rephrase written directions
- Multisensory approaches
- Additional time
- Preview vocabulary
- Preview content & concepts
- Story guides
- Behavior management plan
- Highlight text
- Student(s) work with assigned partner
- Visual presentation
- Assistive technology
- Auditory presentations
- Large print edition
- Dictation to scribe
- Small group setting

Hi-Prep Differentiations:

- Alternative formative and summative assessments
- Choice boards
- Games and tournaments
- Group investigations
- Guided Reading
- Independent research and projects
- Interest groups
- Learning contracts
- Leveled rubrics
- Literature circles
- Multiple intelligence options
- Multiple texts

- Personal agendas
- Project-based learning
- Problem-based learning
- Stations/centers
- Think-Tac-Toes
- Tiered activities/assignments
- Tiered products
- Varying organizers for instructions

Lo-Prep Differentiations

- Choice of books or activities
- Cubing activities
- Exploration by interest
- Flexible grouping
- Goal setting with students
- Jigsaw
- Mini workshops to re-teach or extend skills
- Open-ended activities
- Think-Pair-Share
- Reading buddies
- Varied journal prompts
- Varied supplemental materials

Special Education Learning (IEP's & 504's)

Adapting existing materials, simplifying or supplementing materials

- **Adjust** the method of presentation or content.
- **Develop** supplemental material.
- **Provide** alternatives for responding to questions.

- **Rewrite** brief sections to lower the reading level.
- **Break** tasks into smaller subtasks.
- **Provide** additional practice to ensure mastery..
- **Develop** simple study guides to complement required materials.

Special Education Learning adaptations that will be employed in the unit, using the ones identified below.

- printed copy of board work/notes provided
- additional time for skill mastery
- assistive technology
- behavior management plan
- Center-Based Instruction
- check work frequently for understanding
- computer or electronic device utilizes
- extended time on tests/ quizzes
- have student repeat directions to check for understanding
- highlighted text visual presentation
- modified assignment format
- modified test content
- modified test format
- modified test length
- multi-sensory presentation
- multiple test sessions
- preferential seating
- preview of content, concepts, and vocabulary
- Provide modifications as dictated in the student's IEP/504 plan
- reduced/shortened reading assignments
- Reduced/shortened written assignments
- secure attention before giving instruction/directions
- shortened assignments
- student working with an assigned partner
- teacher initiated weekly assignment sheet
- Use open book, study guides, test prototypes

English Language Learning (ELL)

eDictionaries

When used correctly, technology never fails to transform a classroom. Allow your students to use eDictionaries in your classroom to look up unknown words. Any regular dictionary will do, but eDictionaries allow students to hear the pronunciations of words. As you might imagine, this is extremely helpful for anyone learning a second language. If students encounter an unknown word, they can type it into an eDictionary, hear the word pronounced and either read or listen to the definition. Also, if they aren't sure how to to spell a word, many eDictionaries will allow them to speak the word to have the correct spelling displayed.

English Language Learning adaptations that will be employed in the unit, using the ones identified below.

- teaching key aspects of a topic. Eliminate nonessential information
- using videos, illustrations, pictures, and drawings to explain or clarif
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning;
- allowing students to correct errors (looking for understanding)
- allowing the use of note cards or open-book during testing
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using computer word processing spell check and grammar check features
- using true/false, matching, or fill in the blank tests in lieu of essay tests

At Risk

Seating

Where are your students at risk? Hopefully, they are 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.

Parental Involvement

Planned intervention means involving parents. Do you have an agenda in place that goes home each night? Are parents also signing the agenda or contracts you have set up? How are you involving parental support at home for homework or additional follow up?

Intervention Strategies that will be employed in this unit, using the ones identified below.

- allowing students to correct errors (looking for understanding)
- teaching key aspects of a topic. Eliminate nonessential information
- allowing products (projects, timelines, demonstrations, models, drawings, dioramas, poster boards, charts, graphs, slide shows, videos, etc.) to demonstrate student's learning
- allowing students to select from given choices
- allowing the use of note cards or open-book during testing
- collaborating (general education teacher and specialist) to modify vocabulary, omit or modify items to reflect objectives for the student, eliminate sections of the test, and determine how the grade will be determined prior to giving the test.
- decreasing the amount of workpresented or required
- having peers take notes or providing a copy of the teacher's notes
- marking students' correct and acceptable work, not the mistakes
- modifying tests to reflect selected objectives
- providing study guides
- reducing or omitting lengthy outside reading assignments
- reducing the number of answer choices on a multiple choice test
- tutoring by peers
- using authentic assessments with real-life problem-solving
- using true/false, matching, or fill in the blank tests in lieu of essay tests
- using videos, illustrations, pictures, and drawings to explain or clarify

Talented and Gifted Learning (T&G)

http://www.grandviewlibrary.org/CurriculumAdaptations/General_Gifted.pdf

Grouping • Group gifted students with other gifted students or higher-level learners. • Refrain from grouping

gifted students with lower-level students for remediation.

Talented and Gifted adaptations that will be employed in this unit, using the ones identified below.

- Above grade level placement option for qualified students
- Advanced problem-solving
- Allow students to work at a faster pace
- Cluster grouping
- Complete activities aligned with above grade level text using Benchmark results
- Create a blog or social media page about their unit
- Create a plan to solve an issue presented in the class or in a text
- Debate issues with research to support arguments
- Flexible skill grouping within a class or across grade level for rigor
- Higher order, critical & creative thinking skills, and discovery
- Multi-disciplinary unit and/or project
- Teacher-selected instructional strategies that are focused to provide challenge, engagement, and growth opportunities
- Utilize exploratory connections to higher-grade concepts
- Utilize project-based learning for greater depth of knowledge

Sample Lesson

https://runestone.academy/runestone/books/published/csawesome/Unit2-Using-Objects/topic-2-6-strings.html?highlight=strings

Using the template below, please develop a **Sample Lesson** for the first unit only.

Unit Name:

NJSLS:

Interdisciplinary Connection:

Statement of Objective:

Anticipatory Set/Do Now:

Learning Activity:

Student Assessment/CFU's:

Materials:

21st Century Themes and Skills:

Differentiation/Modifications:

Integration of Technology: