Learning Objectives
The teacher will:
- Learn how to incorporate Primary Sources digital images from the Library of Congress (LOC) into Technology Engineering Education
- Integrate multiple subject areas into one lesson: Science, Technology, Engineering and social studies
- See the demonstration of effective practice for this strategy
- Have an opportunity to ask questions for clarification

Tennessee Standards:
Career and Technical Education - Technology Engineering Education
7th Grade: Inventions and Innovations
Standard 5: Develop an understanding of the attributes of problem solving, design, troubleshooting, research and development, and experimentation.
8th Grade: Technological Systems
Standard 3: Explore the key components of technological systems.

Purpose – In this lesson the learner will (TLW) explore primary sources digital images on the Library of Congress website from the Civil War period which contains structures such as buildings or bridges. TLW explore the picture using zoom features, list all human made structures, and describe what might be their vulnerabilities in time of war. Additionally, TLW problem solve ways to compensate for those vulnerabilities.

Materials
• PowerPoint: Defending Civil War Structures compiled by Perry Louden (file attached)
• Webcam
• Web Links:
  1. Modern Marvels: Civil War Tech
     http://www.youtube.com/watch?v=_T4LK2dt9hk
  2. Library of Congress:
     http://www.loc.gov/index.html
     (individual image links are located at the end of lesson)
  3. History Channel
     http://www.history.com/topics/civil-war-technology/videos#civil-war-tech
  4. Capitol Cannons
     http://www.scribas.com/flashbacks/image/3691

Preparation
• Copy of Handouts for each pair of students
• Teacher should book mark site and ensure they open correctly

Instructional Plan
• Launch –
  1. Students are introduced to Civil War Technology by watching the video “Modern
Marvels Civil War Tech” at http://www.youtube.com/watch?v=_T4LK2dt9hk.

2. Students complete Handout (H1).

- **Explore**
  - **Teaching Strategies** –
    - Differentiation - content, context, product
      - Adaptation to different instructional levels - Watch on-line videos. Stop the video to point out important ideas from the video. Students will complete the Modern Marvels Handout (H1). Teacher will show primary resources using PowerPoint and discuss images with students. Students will work with a partner to complete worksheets (H2, H3). Teacher will monitor and give support as needed as students complete the activities.
      - Diverse audiences – Students will bring different points of view to the lesson and they will all be encouraged to share their ideas.
      - Learning styles – Students have the opportunity to work at their own ability levels on the activity. Computer and internet resources will be utilized to access primary source images. Students work, discuss, and write in pairs on the activity. Upon conclusion, students present their activities to the whole class.
      - Scaffolding – Teacher may assist students with searching the images as needed. Teacher may direct students to certain items in the image. Teacher will encourage discussion to assist students in arriving at decisions. Teacher may assist students in analyzing the image and preparing defensive positions on map as needed. Teacher may provide hints and ask questions to guide students.

- **Teaching Practice / Procedure**
  
  **Day 1**
  *Students are introduced to Civil War Technology by watching the video “Modern Marvels Civil War Tech.” Students complete Handout (H1).

  **Day 2**
  *
  *Introduction: Using PowerPoint Presentation, Ask students the following questions:
  
  a) **What structures have you been in today?**
  b) **What are they made out of?**
  c) **What do you think structures were made of 150 years ago?**
  * Tell students that in this lesson, they will explore various human made structures during the Civil War and open the discussion of the student’s prior knowledge about the Civil War including battles, generals, president, causes, and other issues.
  *Using the PowerPoint, discuss Civil War technology and review information from the video of the previous day. Additionally, click on the History Channel icon and watch the short video clip (rifles, cannon, telegraph, trains, and ironclads). Discuss the construction materials of that period (wood, lumber, concrete, steel, earthworks, bricks, stone, and canvas).
  *Discuss the image of the State Capitol and how it was turned into “Fortress Andrew
Johnson.” Access the site by clicking on the picture and discuss the information on the Biographical Page. Click on the “JPEG kb” tab. Explore the picture again using the control key and + and – keys on your keyboard. Discuss the materials used to construct the capitol, the houses, and tents.

* Return to the PowerPoint and discuss the map citing the locations of units, roads, rivers, creeks, and railroads. Discuss other ways Governor Andrew Johnson could employ other means to defend this structure (cannons, infantry units, and ironclad ships in the river). Show and discuss the pictures of the cannons on the steps of the capitol.

* Introduce the Defending Tennessee’s Civil War Structures Research Worksheet (H2) activity and review the scenario. Show Picture #1, “Tennessee River Blockhouse on the bank.” Click on the 3rd tab over “JPEG 100 kb”. When the image opens, explore the picture again using the control key and + and – keys on your keyboard. Ask students what they observe in the picture and identify the materials the structure is made from. Ask how they could best defend the structure from an attack by General Forrest.

* Partner students up, assign a picture for each team, and send students to a computer. Allow students to work independently for approximately 20 minutes. Monitor as needed.

**Day 3**

* Students continue working on the handout from the previous day.

* As students finish, give them the second part of the handout (H3). Students will search LOC for a map of the area around their structure and create their own map, identify major terrain features, their structure, and the defenses that they would put in place. They may use the map of Nashville from earlier as an example.

* Conclusion: Call students back to desks. Bring up each photo on the overhead and let the students tell what they observed, how they would defend it, and show their maps that they created. Use a document presentation device such as an ELMO or Hue web cam if available.

Review the following questions:

a) What human made structures were used during the Civil War period?

b) What were these structures made from?

c) How were they vulnerable to the enemy attack?

d) How could these weaknesses be compensated for?

e) How is the modern military similar or different in regard to structures?

- Student guided practice / activity
  See Teaching Practice/Procedures

- Application / Transference to assessment
  o Class participation (50pts)
    o Completing the Defending Civil War Structures Research Worksheet (50pts)

- Technology as a facilitator of quality education
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   (individual image links are located at the end of lesson)
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- Summarize
  - Reflection of student learning
    - Teacher will review the main ideas of technology and construction from the Civil War period. TLW present to the class their assigned image and discuss the building materials used. They will show and discuss their maps with the location of defensive measures.

Assessment Options (as part of lesson)
- Formative (ongoing; checking to ensure audience is with you)
  - Informal – Teacher will observe student understanding of Civil War technological advancements, and construction materials by participation, questions, and comments.
  - Formal – The map can be used as a tool to measure student understanding of concepts.
  - Performance – TLW complete the worksheets and complete the map with the added information regarding defensive formations.
  - Student self assessment - Student self assessment: Students will evaluate their own projects using the checklist.
  - Students will have an opportunity in class to share their maps with one another.
  - Students will be able to answer multiple choice questions about the events.
- Summative
  - Teacher uses PowerPoint presentation to summarize lesson to include higher order thinking questions.

Extensions
- Enrichment
  - Students can make a PowerPoint presentation describing their structure
  - Students build the structure from a similar type of material i.e. balsa wood, plaster of Paris for concrete, and mud or dirt.
- Intervention
  - Students may need to refer back to the primary sources images in the PowerPoint. The teacher may provide these as a model to guide students.
ELC Effective Practice Template for Teachers
*Using Primary Sources/Grades 7 & 8 / Technology Engineering Education – Perry Louden*

- Collaborative discussion should be encouraged.
- Students will inevitably come up with more questions than were answered in the presentations, so the teacher may provide on-line access and/or reference materials for students to find answers to their inquiries.

**Reflections/Insights of Teacher**
- **Learnings** *(what worked well; what didn’t work well; what will you do the same; what will you do differently; what will you not do again; cautions; advice)*

**LOC RESOURCES**
The 15 in. gun at Fortress Monroe, Va.

James River, Va. Effect of Confederate shot on Federal Ironclad GALENA

Signal Telegraph Machine and operator - Fredericksburg

Unidentified soldier in Union uniform with musket and bayonet in scabbard
[http://www.loc.gov/pictures/item/2010648777/](http://www.loc.gov/pictures/item/2010648777/)

Railroads. Train with steam engine coming down tracks

Beaufort, South Carolina. Group of negroes on J.J. Smith’s plantation

Fair Oaks, Virginia. Rudoubt thrown up by Capt. Jeremiah McCarthy, 1st Pa. Artillery near the extreme front at the battle of Fair Oaks

Old Fort Redout [sic] near Pensacola, Fla.

Antietam, Md. President Lincoln and Gen. George B. McClellan in the general's tent; another view

Soldier standing at graves of Federal soldiers, along stone fence, at Burnside Bridge, Antietam, Maryland
[http://www.loc.gov/pictures/item/96509279/](http://www.loc.gov/pictures/item/96509279/)

The Capitol, Nashville, (Tenn.)
[http://www.loc.gov/pictures/item/2005677502/](http://www.loc.gov/pictures/item/2005677502/)

Map of Nashville--Tenn. and vicinity 1863
[http://hdl.loc.gov/loc.gmd/g3964n.cw042940](http://hdl.loc.gov/loc.gmd/g3964n.cw042940)

Blockhouse on the bank of the Tennessee River.
Nashville railroad yard and depot with locomotives  
http://www.loc.gov/pictures/resource/cwpb.02111/

Men repairing single-track railroad after Battle of Stone's River  
http://www.loc.gov/pictures/resource/cwpb.02135/

Confederate prisoners at railroad depot at Chattanooga, Tennessee  
http://www.loc.gov/pictures/resource/cwpb.02114/

Federal supply depot at Johnsonville, Tennessee  
http://www.loc.gov/pictures/resource/cwpb.02099/

Environ of Knoxville seen from south bank of Tennessee  
http://www.loc.gov/pictures/resource/cwpb.03477/

Blockhouse Chattanooga  
http://www.loc.gov/pictures/resource/cwpb.02149/

Nashville Military Academy  
http://www.loc.gov/pictures/resource/cwpb.02075/

Fortified railroad bridge across Cumberland River, Nashville, TN  
http://www.loc.gov/pictures/resource/cwpb.02092/