

Port Operations and Logistics – Sustainability and STEM Careers

LESSON PLAN

Subject: Science Technology Engineering and Math (STEM)

Unit: 4

Lesson Title: Containerization

Sessions Number: 4

Number of Sessions:
approximately 6 - 90 minute
blocks

Objective(s): After given instruction, the student will:

1. Research

- a. Apply digital tools to gather, evaluate, and use information.
- b. Explore careers in transportation and technical visualization.
- c. Gain general knowledge of containerization in the logistics industry.

2. Design

- a. Plan and manage activities to develop a solution to containerization problems.
- b. Develop and analyze a storyboard.
- c. Demonstrate creative thinking, problem solving, and develop innovative products and processes.
- a. Work as a member of a design team.
- b. Apply existing knowledge to generate new ideas, products, or processes.

3. Model Creation

- a. Model/design a containerization system in a logistics process.
- b. Create visualizations using basic design skills, graphing, image processing, 2D and 3D modeling, animation and simulation.

4. Presentation

- c. Demonstrate understanding of technological concepts, and systems in containerization operations for commerce.
- d. Manipulate and manage data, including the use of spreadsheets and application of mathematical principles.
- e. Use computer data input and output devices that handle audio, video, static graphic, and alphanumeric-

based information.

- f. Create and deliver multimedia presentations.
- g. Use appropriate logistics, containerization, modeling, and simulation terms in context.

5. Develop 21st Century Skills – Why We Need To Teach Technology In School and/or 21st Century Learning Matters (Show students this video and discuss their reaction prior to beginning instruction)

- a. Use flexibility and adaptability throughout the project process.
- b. Develop self-directed skills to produce quality products.
- c. Work in diverse teams to complete projects on time.
- d. Develop leadership, responsibility, social skills, collaboration skills, and cultural awareness.

Materials/Technology Integration:

Text:

- Word processing software
- Presentation software (e.g. 3ds Max, Sketch Up, Premiere Elements, Movie maker, Photo Story, Powerpoint)
- Computer with Internet access and a web browser that is Java –enabled
- Electronic Portfolio
- [Storyboard template](#)

- Multimedia Projector
- Mapping software e.g. Google Earth
- Graph paper
- Pencil and paper

Anticipatory Set: Imagine a business so steeped in tradition that it used centuries-old labor practices just 50 years ago. In fact, this was the case with the shipping industry just after World War II, when cargo handling was as labor-intensive as it had been in 1848.

Today transporting goods relies less on man and more on technology. It started with a simple steel box — the container — and it would soon revolutionize international trade. Yet, for as many benefits as it has given, it also presented unique problems to solve.

Ask students: What are some goods that they receive from big box stores (Wal-Mart, Target etc) in containers? What help do these containers provide to you the consumer and to the retailer and supplier? What are some of the important markings on the container?



Estimated Time: 15 Minutes

Correlation with Virginia Standards of Learning:

English: 10.4

Mathematics: A.1, A.2, A.4, G.2, G.3, G.10, G.12 and All-T.2

Science: PH.1, PH.2

History and Social Science: WHII.1, WHII.6, WHII.8

The overall goal of these activities is to empower students to use 21st century tools in a learning process that requires critical and creative thinking, collaboration, and problem solving. The immediate goal is to engage students in hands-on, less abstract learning. The ultimate goal is preparing students for work and life in a changing economy that demands participants who are creative and innovative thinkers in addition to being skilled digital-age workers. *The following activities are designed to be used in order or randomly as the teacher sees fit based on student needs. The activities were developed with differentiation in mind for both product and process.*

Evaluation: Assigned Activities

1. Students successfully answer 75% of the post test questions.
2. Review storyboard for correctness.
3. Students complete an animated model or 2d drawing of a

Closure:

<p>containerization / movement of cargo within the supply-chain system.</p> <ol style="list-style-type: none"> 4. Students present and explain their portion of the project to their team and the other members of the class. 5. Present completed model/2d drawing to the class for peer critique. 6. Review Notes: It is suggested that each student have a project notebook to organize their work throughout the projects. If possible, this notebook can be an online project notebook. Online notebooks may be created with many different free online tools. Two possibilities are: Google Docs (http://docs.google.com) and Wikispaces (http://www.wikispaces.com/). Teams working together may organize their work in a shared online project notebook. <p>Estimated Time: As Noted</p>	
<p>Homework: None</p>	<p>Reflections:</p>
<p>Procedure: Guided Practice (Instructional Strategies)</p> <p>Project #1: Administer the Containerization Pre Test section to students. Explain that The results on this test will help identify their understanding and learning needs.</p> <p>Estimated Time: 3 Minutes</p> <p>Project #2: Present Port Operations and Logistics PowerPoint presentation section 4 on Containerization to students.</p>	<p>Procedure: Independent Practice:</p> <p>Project #1: Answer to the best of your ability the Containerization Pre Test section questions. The results on this test will help identify your understanding and learning needs.</p> <p>Estimated Time: 15 Minutes</p> <p>Project #2: Listen and analyze Port Operations and Logistics PowerPoint presentation section 4 on Containerization. Ask</p>

Estimated Time: 25 Minutes

Project #3: Assign students the activity of defining the terms on [Terminology worksheet](#) and use them in context. This can be a team assignment where one member defines and the other team member uses the word in context.

Estimated Time: 5 Minutes

Project #4: Have students perform the role of a movement control technician by calculating the movement cost of household goods across several states. Explain to the students that this activity replicates some of the planning that goes into the movement of cargo at port terminals. See the [Goods Movement Management worksheet](#).

Estimated Time: 5 Minutes

Project #5: Invite guest speaker to discuss containerization and or supply chain management with students. [Craney Island Expansion Academic Outreach Contact Form](#):

Estimated Time: 25 Minutes

Project #6: Have students watch video of a container loaded at Ect Delta Terminal. Ask students to comment on safety during this operation. http://www.youtube.com/watch?v=a_T0EWiJ-w4&feature=Playlist&p=DA8BC07BE46C2C5A&playnext_from=PL&playnext=2&index=2

Time: 10 Minutes

Project #7: Have students watch video on a virtual tour of a Supply Chain Containerization company. Carrier Industries, Inc.

questions and be an active learner.

Estimated Time: 25 Minutes

Project #3: Define the terms on [Terminology worksheet](#) and use them in context as directed by your teacher.

Estimated Time: 25 Minutes

Project #4: You will perform the role of a movement control technician by calculating the movement cost of household goods across several states. See the [Goods Movement Management worksheet](#).

Estimated Time: 45 Minutes

Project #5: Listen to a Logistics professional and ask questions about the containerization operations. Complete the [guest speaker worksheet](#) and discuss at the conclusion of the presentation.

<http://craneyisland.info/educationservices.html>

Estimated Time: 25 Minutes

Project #6: Watch video of a container loaded at Ect Delta Terminal. Comment on safety during this operation.

http://www.youtube.com/watch?v=a_T0EWiJ-w4&feature=Playlist&p=DA8BC07BE46C2C5A&playnext_from=PL&playnext=2&index=2

Time: 10 Minutes

Project #7: After watching the video of a virtual tour of a Supply Chain Containerization company. Carrier Industries, Inc.

<http://www.carrierindustries.com/video.html>

Require them to list 10 questions regarding what they saw in the video. Those questions can then be used later to generate research ideas for discovery and developing visual modeling to visually answer questions.

Time: 10 Minutes

Project #8: Career Focus - Show and discuss the Material handlers and Logistics video (5:30 minutes) on careers. Have students make a list of the careers identified also have them team up to determine ways that modeling and simulation can help these jobs be more efficient. Have students also answer questions on [Video worksheet](#).

<http://media.internet4associations.com/mheda/Introducing-Material-Handling.wmv>

Estimated Time: 20 Minutes

Project #9: Have students develop a [storyboard](#) for a logistics containerization process. Consider the entire supply chain sequence for ideas. (rail, truck, ship, security, warehousing among others) Have students use various Material Handling Equipment drawings as a guide in this process – [Example](#)

<http://www.ise.ncsu.edu/kay/mhetax/TransEq/Conv/index.htm>

<http://www.directindustry.com/prod/vanderlande-industries/sorting-system-5796-186187.html>

Assign students to watch video of: Disney – The Art of Storyboarding [http://filmmakeriq.com/pre-](http://filmmakeriq.com/pre-production/storyboarding/disney-the-art-of-storyboarding.html)

[production/storyboarding/disney-the-art-of-storyboarding.html](http://filmmakeriq.com/pre-production/storyboarding/disney-the-art-of-storyboarding.html)

This will provide background and guidance on the storyboarding

<http://www.carrierindustries.com/video.html>

List 10 questions that you developed while watching the video. Turn your questions in to the instructor for further evaluation and instructions.

Time: 40 Minutes

Project #8: Career Focus - View the Material handlers and Logistics video on careers. Make a list of the various careers identified and think of ways that modeling and simulation can make these jobs more efficient. (5:30 minutes)

<http://media.internet4associations.com/mheda/Introducing-Material-Handling.wmv>

Answer questions on [Video worksheet](#).

Estimated Time: 20 Minutes

Project #9: Develop a [storyboard](#) for a logistics containerization process. Consider the entire supply chain sequence for ideas. (rail, truck, ship, security, warehousing among others) See various Material Handling Equipment, to assist you in your development - [Example](#)

<http://www.ise.ncsu.edu/kay/mhetax/TransEq/Conv/index.htm>

<http://www.directindustry.com/prod/vanderlande-industries/sorting-system-5796-186187.html>

Watch video of: Disney – The Art of Storyboarding

<http://filmmakeriq.com/pre-production/storyboarding/disney-the-art-of-storyboarding.html> This will provide background and

guidance on the storyboarding process.

Estimated Time: 55 Minutes

Project #10: Review questions developed in Project #6. You and your team will develop visual answers to a selected question or

process.

Estimated Time: 5 Minutes

Project #10: Assign students questions developed in Project #6 or allow them to select their own. They will then develop visual answers to a selected question or questions using your 2d drawing, 3d modeling and animation tools. This work might be used as a training video or marketing commercial.

Estimated Time: 20 Minutes

Project #11: Assign students to calculate whether a forklift will work on a given ramp using the Forklift and Ramp Angle

[calculator](#) at

<http://www.raymondhandlingsolutions.com/rampcalculator.html>

Inputs:

- Ramp height= 82 inches
- Ramp length= 250 inches
- Vehicle Under clearance=5 inches
- Wheelbase= 59.4

Will this vehicle bottom out? If so. Why?

Estimated Time: 2 Minutes

Project #12: Assign students to calculate how many boxes and pallets will fit into a sea container. Use [calculator](#) at

http://www.raymondhandlingsolutions.com/calculate_how_many_boxes_fit_in_a_sea_container.html

Inputs:

- Box length= 40 inches
- Box width= 16 inches
- Box height=12 inches
- Pallet length= 48 inches

questions using your 2d drawing, 3d modeling and animation tools. This work might be used as a training video or marketing commercial.

Estimated Time: 460 Minutes

Project #11: calculate whether a forklift will work on a given ramp using the Forklift and Ramp Angle [calculator](#) at

<http://www.raymondhandlingsolutions.com/rampcalculator.html>

Inputs:

- Ramp height= 82 inches
- Ramp length= 250 inches
- Vehicle Under clearance=5 inches
- Wheelbase= 59.4

Will this vehicle bottom out? If so. Why?

Estimated Time: 15 Minutes

Project #12: Calculate how many boxes and pallets will fit into a sea container. Use [calculator](#) at

http://www.raymondhandlingsolutions.com/calculate_how_many_boxes_fit_in_a_sea_container.html

Inputs:

- Box length= 40 inches
- Box width= 16 inches
- Box height=12 inches
- Pallet length= 48 inches
- Pallet width= 40 inches
- Pallet height= 60 inches

How many boxes will fit in the 20 and 40 foot containers?

How many pallets will fit in the 20 and 40 foot containers?

What happens to these numbers when you increase the

- Pallet width= 40 inches
 - Pallet height= 60 inches
- How many boxes will fit in the 20 and 40 foot containers?
 How many pallets will fit in the 20 and 40 foot containers?
 What happens to these numbers when you increase the box length and width by 15%?

Estimated Time: 5 Minutes

Project #13: Select various Supply Chain management videos from the Supply Chain Television Channel.

<http://www.scdigest.com/TypeList.php?colid=VIDEOCAST>

There is a requirement to register with an email address but the service is free and informative. Topics include warehousing strategies, labor force, distribution center forecasting and much more.

Estimated Time: 5 Minutes

Project #14: Administer the Containerization [Post Test](#) section to students. Explain that The results on this test will help identify their understanding of the instruction presented.

Estimated Time: 3 Minutes

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Additional Resources:

- Transportation education and training solutions - <http://onlinepubs.trb.org/Onlinepubs/trnews/trnews257.pdf>
- McHenry Community College Transportation, Warehousing and Logistics studies -

box length and width by 15%?

Estimated Time: 25 Minutes

Project #13: Watch selected Supply Chain management videos from the Supply Chain Television Channel.

<http://www.scdigest.com/TypeList.php?colid=VIDEOCAST>

Discuss your understanding of the topic area with your classmates and teacher. Topics include warehousing strategies, labor force, distribution center forecasting and much more.

Estimated Time: 25 Minutes

Project #14: Answer to the best of your ability the Containerization [Post Test](#) section questions. The results on this test will help identify how well you learned the objectives of the instruction.

Estimated Time: 15 Minutes

<http://www.mchenry.edu/twl/index.asp>

- SEVAPORT News on M&S High school programs collaboration with Junior Achievement - <http://seva-port.org/news/news.html#news3>
- The Port of Virginia - <http://www.portofvirginia.com/>
- Teaching Port operations Outreach programs - <http://www.aapa-ports.org/files/PDFs/sec5.pdf>
- HPTI Hamburg Port Training Institute GmbH - http://www.hpti.de/port_operations_courses.html
- TR News Sep – Oct 2006 - <http://onlinepubs.trb.org/onlinepubs/trnews/trnews246.pdf>
- Material Handling Industry of America – <http://www.mhia.org/video/4777/the-incredible-visible-product>
- The College Industry Council on Material Handling Education (CICMHE) sponsors an annual material handling student design competition for teams of students interested in the analysis and design of material handling systems. - <http://www.mhia.org/industrygroups/cicmhe/designcompetition>
- Material Handling Equipment - <http://www.ise.ncsu.edu/kay/mhetax/TransEq/Conv/index.htm>
- How Stuff Works (RFID) - <http://electronics.howstuffworks.com/gadgets/high-tech-gadgets/rfid.htm>
- Raymond Handling Solutions – Online shipping and

warehousing calculators -

<http://www.raymondhandlingsolutions.com/Tools.html>

- Videos of conveyors systems -

<http://www.directindustry.com/video/handling-lifting-conveying/roller-conveyors-S-608.html>