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**Module:** Simple Machines Webquest

**Introduction (to students):**

Many of your favorite possessions were manufactured somewhere else in the world and brought to Hampton Roads through an intermodal port. A new museum is opening up in Hampton Roads featuring the maritime industry and the science behind the industry. Your task is to create both a presentation and an exhibit to explain one of the simple machines and explain how one of the many terminals in the Hampton Roads area functions using a combination of simple machines called a compound machine.

**Tasks:**

1. You must create one of the following presentations: PowerPoint/Keynote/Explain Everything/Google Doc presentation, and include the following:
  - a) Research your simple machine.
  - b) Describe your simple machine.
  - c) Give credit to anyone who may have invented the machine or first used it.
  - d) Explain how the machine is most commonly used today.
  - e) Explain if the machine's use has changed since it was first introduced.
  - f) Give specific examples of how the machine makes work easier. Use arrows and text to illustrate the different input and output forces and distances and motion
  - g) Highlight one of the many terminals included in The Port of Virginia (Hampton Roads area) and explain how the terminal moves cargo using your machine
  - h) Explain how the simple machine is incorporated as part of a compound machine that moves cargo from one place to another at the terminal you mentioned in part "g"
2. Answer the questions listed in item 7 of the Process section
3. Design an exhibit (diorama) to be built during class (have your materials ready) using the information from task 1 parts "d, e, f, and g." The diorama should be no larger than 30 cm x30 cm x 30 cm.

**Process:**

1. In teams of three students will research their simple machine lever, wheel and axle, pulley, inclined plane, wedge, and screw, The Port of Virginia, and work towards completing the assigned tasks. Keep your notes well organized (who took the notes, from which source did the information come from (include web address or book and page), and how will the

information be used in either/or the presentation or exhibit. Homework Monday: continue with your research.

2. Tuesday during class, each student should continue their research on their simple machine, the Port of Virginia, and machinery used in the Port of Virginia used to move cargo. **Students need to share their work daily with their coworkers just in case someone is absent.** Homework, continue with research.
3. Wednesday during class, the team should meet and compile the data collected Monday and yesterday and answer the questions provided in step 7 below. The team members should then delegate tasks for further research or tasks. (A member of the team must include a list of what each team member is responsible for before the next meeting.) Students should then continue with research based on the delegated tasks and continue their research for homework.
4. Thursday during class, the team members should then meet again and plan what they want as key items in their presentation and exhibit (see tasks). A member of the team must include a list of what each team member is responsible for before the next meeting). Begin creating your presentation and designing your exhibit. Homework, continue working on delegated tasks.
5. Friday during class, members of the team should continue to work on their presentation and designing their exhibit. Homework, anything not completed during the week.
6. Once the presentation is completed and the design for the exhibit is finished, team members should meet again and evaluate their work using the rubrics provided. Any adjustments should be made before submitting your final products.
7. Questions the team is responsible for answering:
  1. Describe the location and the entities that make up the Port of Virginia?
  2. What is an intermodal port?
  3. What are the four major competencies of a crane operator and describe them?
  4. How do the cars get on and off the ship in Singapore? Is the same method used in the Port of Virginia?
  5. What is the problem with "time in port" for a ship?
  6. Explain how the control center manages the Port of Singapore? Is the same method used in the Port of Virginia?
  7. Describe the various types of work a longshoreman performs?

**Evaluation:**

**Research:**

Content	3 points	2 points	1 point
<i>Printed Notes</i>	Team submitted well organized notes (see requirement in process item 1).	Team submitted organized notes (see requirement in process item 1).	Team submitted somewhat organized notes (see requirement in process item 1).
<i>Printed Team Meetings</i>	Team met three times during the week and delegated tasks. Team member responsible for taking notes during the meetings submitted the paper work with the delegated tasks.	Team met twice during the week and delegated tasks. Team member responsible for taking notes during the meetings submitted the paper work with the delegated tasks.	Team met once during the week and delegated tasks. Team member responsible for taking notes during the meeting submitted the paper work with the delegated tasks.
<i>Printed Questions</i>	Team answered all seven questions in Process item number 7 using three or more complete sentences.	Team answered five of seven questions in Process item number 7 using three or more complete sentences.	Team three of seven questions in Process item number 7 using three or more complete sentences.
<i>Amount of Information</i>	All topics were addressed in the team's research notes.	Most of the topics were addressed in the team's research notes.	Few of the topics were addressed in the team's research notes.
<i>Quality of Information</i>	Information provided clearly relates to the required topics and includes more than two supporting details.	Information provided relates to the required topics and includes at least two supporting details.	Information provided relates to the required topics and includes at least one supporting detail.
<i>References</i> <b>MLA format must be used. If no citations, no credit for this assignment.</b>	Team used at least 10 different sources to support their statements in their presentation, exhibit, and questions.	Team used at least 7 different sources to support their statements in their presentation, exhibit, and questions.	Team used at least 5 different sources to support their statements in their presentation, exhibit, and questions.

**Presentation:**

Content	3 points	2 points	1 point
<i>Presentation Organization</i>	The presentation was well organized and the audience could follow the story line with ease.	The presentation was organized and the audience could follow the story line.	The presentation lacked organization.
<i>Presentation Format</i>	The presentation used type large enough for the audience to read with ease. The balance of color between background and text made viewing the presentation easy.	The presentation had too much information on each page/slide and the audience had difficulty reading it. The balance of color between background and text made viewing the presentation easy.	The presentation font/color balance made it difficult to read the pages/slides.
<i>Amount of Information</i>	All topics were addressed in the team's presentation.	Most of the topics were addressed in the team's presentation.	Few of the topics were addressed in the team's presentation.
<i>Quality of Information</i>	Information provided clearly relates to the required topics and includes more than two supporting details.	Information provided relates to the required topics and includes at least two supporting details.	Information provided relates to the required topics and includes at least one supporting detail.

**Exhibit:**

Content	3 points	2 points	1 point
<i>Exhibit Organization</i>	The exhibit was well organized, marked clearly, and the viewer could understand the intent of the exhibit with ease.	The exhibit was organized and the viewer could understand the intent of the exhibit with ease.	The exhibit lacked organization and no markings were available to aid the viewer.
<i>Exhibit Format</i>	The exhibit was within the 30 cubic cm requirement, was colorful and included at least five artifacts relating simple machines to the Port of Virginia.	The exhibit exceeded the 30 cubic cm requirement, was colorful and included at least five artifacts relating simple machines to the Port of Virginia.	The exhibit was within the 30 cubic cm requirement, was colorful and included at least two artifacts relating simple machines to the Port of Virginia.
<i>Amount of Information</i>	The exhibit addressed all the required topics.	Most of the topics were addressed in the team's exhibit.	Few of the topics were addressed in the team's exhibit.
<i>Quality of Information</i>	Information provided clearly ties the required topics together.	Information provided ties the required topics together.	Information provided does not relate the required topics together.

**Resources:** These are just a few websites with information you will find valuable. Remember the difference between plagiarism and summarizing. If in doubt cite the source. All information must be documented using MLA format. This includes pictures or diagrams not constructed by the team members. Keep in mind the Honor Code at all times when using other peoples work. If no citations are given, no credit for this assignment will be given.

Kidipede: <http://scienceforkids.kidipede.com/physics/machines/>

University of Alabama: [http://mint.ua.edu/games/?id=simple\\_machines](http://mint.ua.edu/games/?id=simple_machines)

Phet: (simulations may not work on iPads) <https://phet.colorado.edu/en/search?q=simple+machines>

Glencoe: (simulation may not work on iPads):  
[http://www.glencoe.com/sites/common\\_assets/science/virtual\\_labs/E13/E13.html](http://www.glencoe.com/sites/common_assets/science/virtual_labs/E13/E13.html)

Inventors Tool Box: <http://legacy.mos.org/sln/Leonardo/InventorsToolbox.html>

Museum of Science and Industry Chicago: <http://www.msichicago.org/online-science/>

Idaho Public television: [http://idahoptv.org/sciencetrek/topics/simple\\_machines/facts.cfm](http://idahoptv.org/sciencetrek/topics/simple_machines/facts.cfm)

KHAN Academy: <http://www.khanacademy.org/science/discoveries-projects/simple-machines-explorations/a/simple-machines-and-how-to-use-this-article>

SMART Center : <http://www.maritime-technology.org/>

The Port of Virginia: <http://www.portofvirginia.com/>

Logistics and Supply Chain Career Field:  
<http://www.maritime-technology.org/video-gallery/>

A Day in the life of a Port Pilot  
<http://www.maritime-technology.org/video-gallery/>  
[American Society of Transportation and Logistics](http://www.ASTL.org)  
<http://www.ASTL.org>

Megastructures: Port of Singapore (5 videos; each about 45 minutes in length)  
<http://www.youtube.com/watch?v=B8j19od6efo>  
<http://www.youtube.com/watch?v=hkg7Z4y6lgo>  
<http://www.youtube.com/watch?v=OK8QeDVoi84>  
<http://www.youtube.com/watch?v=qwwljBBPt6l>  
[http://www.youtube.com/watch?v=0iREqElfw\\_w](http://www.youtube.com/watch?v=0iREqElfw_w)

United States Merchant Marine Academy  
<http://www.usmma.edu/>

Seafarers International Union  
<http://www.seafarers.org/jobs/ua.html>

United States Coast Guard

<http://www.uscg.mil/nmc/credentials/default.asp>

WisegEEK

<http://www.wisegEEK.com/how-do-i-become-a-longshoreman.htm#didyouknowout>

<http://www.wisegEEK.com/what-does-a-merchant-seaman-do.htm#>

Port Operations:

<http://www.youtube.com/watch?v=2PjgZzmug8U>

United States Customs and Border Patrol:

<http://www.youtube.com/watch?v=RQjobBwvcUU>