LESSON PLAN

Simple Machines And Basic Science

Overview & Major Themes

USS *Constitution* was built as a fighting machine and utilized the six simple machines of science to accomplish the many tasks required of her. Students will identify and manipulate these machines to create inventions that would have made life aboard the Ship easier for sailors.

Objectives

- Students will be able to identify six simple machines: pulley, lever, wedge, inclined plane, screw, and wheel & axle.
- Students will be able to explain how at least one of these tools was used to accomplish a task on USS Constitution during the War of 1812.
- Students will be able to think creatively about how simple machines can help solve problems.

Outcomes

- Students will complete a scavenger hunt identifying simple machines around their school or town.
- Students will complete a prototype that utilizes one of more simple machines to accomplish a task sailors had on board Constitution.

Materials & Resources

- Picture of *Constitution*
- Photos of simple machines or if available, simple machine manipulatives available from educational resource sites
- Copies of simple machine scavenger hunt, clipboards, & pencils
- Challenge Cards
- Invention factory materials (pipe cleaners, cardboard, tape, machine parts, construction paper, etc)

Instructional Activity

5 min.

Introduce main theme: *Constitution* works because of simple machines that helped people do hard work. Explore the Ship online with students and identify areas that hard work is being done, and places where machines are helping them.

15 min.

Simple Machines Overview:

- Break group into six teams seated at a table with at least one simple machine manipulative or picture. Ask teams to work together to: (a) try and accomplish the task assigned to the machine in front of them and (b) identify the machine from the list. (3 minutes) OR (a) hypothesize what type of tasks the machine in front of them might accomplish and (b) identify the machine from the list.

- Ask a member of each team to report back to the group – what machine did your team have and what could you accomplish with it? (8 minutes)

- Define simple machines: devices that make work easier for humans often by having us push or pull things over a distance.

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30 min.

Scavenger Hunt:

- Prior to the lesson, walk through your school or an area nearby (neighborhood or town) and identify all six simple machines at work. Create a simple map with stars that direc their attention to the right location. Incorporate the questions below into your map to create a worksheet. Here are some common examples that might help get you started:

• Pulley: flag pole, clothesline, curtain
• Screw: furniture, door handle
• Wheel & Axle: cars, carts
• Wedge: door stoppers
• Inclined Plane: ramps, ladders
• Lever: stapler, hole punch

- Each team will be given twenty minutes to track down examples of the six simple machines on USS Constitution that can be found in their school or on a field trip through town.

- Guidelines and rules: teams must stick together with a chaperone; elect a time keeper, a map reader, and a reader; answer as many questions as possible from the list below; spend no more than 5 minutes at each stop and at the end of 30 minutes meet back in the theater.

- If they have extra time, they can look for other examples beyond those found on the map.

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30 min.

Invention Factory:

- As teams re-enter the classroom, assign them to an invention factory lab table.

- At each lab table, teams will find a challenge card asking them to solve the challenge and invent a prototype solution using at least one simple machine and the materials provided.

- Teams have 20 minutes to complete their invention prototype.

- Teach back: Each team has a few minutes to read their challenge card explain their invention to the rest of the group.
