Fort Pulaski

U.S. Department of the Interior
National Park Service

Fort Pulaski National Monument

Simple Machines for a Complex Job
Teacher Guide

Welcome to Fort Pulaski National Monument. Soldiers stationed at the fort made frequent use of simple machines. Life in the fort required the lifting and movement of heavy objects like cannons, big pieces of wood and other military equipment. Simple machines were crucial to getting this work done.

Simple machines provide a mechanical advantage. This allows the user to move or lift heavier weights with less effort. It would be beneficial if your students had prior knowledge of the simple machines covered in this activity, including inclined plane, wheel and axle, pulleys, lever, wedge and screw.

There is a map at the back of this guide to help you find your way. Each stop includes facts that you can share with your students.

To begin this tour, take your students to the second drawbridge at the fort entrance.

Stop 1

Stop 1 is the fort entrance.

- The fort entrance is called sallyport.
- The grooves cut into the stone floor were used to improve traction for soldiers wearing shoes with leather soles.

Show students the inclined plane leading into the fort.

Question for students: Why is the inclined plane here instead of steps?
Answer: The inclined plane made it easier for soldiers to roll heavy equipment into the fort.

Lead your students into the fort and walk left across the parade ground (the large grassy area) to the large black cannon.

Stop 2

Stop 2 is the black cannon.

- The total weight of this cannon is about 6,700 pounds.
- Normally, this cannon was moved from place to place by a team of 10 horses (but there were no horses in the fort).
- Once the cannon was put into position, it was rolled back and forth by 6 men.

Stop 2 (continued)

Show students the wheel and axle, which were used to move the cannon around.

Show students the screw below the back of cannon. This is called the elevating screw.

Question for students: What was the elevating screw used for?

Answer: To raise and lower the barrel, which was necessary for aiming the cannon. The soldiers turned the screw by hand, which represents the force applied. The cannon barrel is the load.

Go to what would be casemate 45. (The casemates are the large arched rooms that surround the fort.)

Stop 3

Stop 3 is the casemate gin. (It looks like a tripod.)

- The gin was used to lift cannon barrels on and off their carriages.
- A larger version of this gin could be used to lift cannons to the top of the fort.
- The typical cannon barrel in the fort weighted 10,000 pounds (as much as an elephant).
- Look at the photo of the gin rigged for use to help explain it to the students.
- The rope on the cannon was placed on the hook.
- The gin's rope ran through the pulleys, then down and around the roller.
- The soldiers placed a lever in the roller.
- When they pulled down on the lever, the hook raised the cannon.
- Using the lever in tandem with the pulleys increases the mechanical advantage of the gin.

Show students how the gin used pulley and levers.

Question for students: Notice the pieces of wood bolted to one of the gin's legs. What do you think these blocks were used for?
Answer: Soldiers used them as steps to climb to the top of the gin.

Walk over two casemates to what would be

The gin as you see it.

casemate #43

The gin rigged for use.

Stop 4

Stop 4 is the limber.

- A limber was a special cart used to carry ammunition for cannons.
- Normally, horses would have been hitched to the long pole to pull the limber (but there were no horses in the fort).
- Once the limber was put in position, the limber was maneuvered by the soldiers.

Show students the long, horizontal pole. This pole was used as a lever by the soldiers when they moved the limber by hand.

Show students the wedges resting against the wheels. The wedges prevent the wheels from moving when the limber is stationary.

Question for students: What was kept in the chest?
Answer: Ammunition for the cannon.

Walk through the casemates to the big black cannon.

Stop 5

Stop 5 is the cannon inside the casemate.

- This is an authentic cannon from the early 1800s.
- This cannon fired a 42-pound cannonball.
- This cannon was operated by five men.
- Cannons were set up like this in the fort to shoot at ships.

Show students the various types of wheels.

Question for students: Even though this cannon was stationary inside the casemate, it has three types of wheels and axles. What were the different types of wheels used for?

Answer:
A. The wheels at the rear of the cannon were used by the soldiers for sliding the cannon left and right for aiming.
B. The upper wheels allowed the cannnon to roll back and forth. When the cannon was fired, it rolled violently backward.
C. The wheel on the side was connected to the elevating screw for aiming the cannon. When the soldiers turned the wheel, the screw turned. Using

the wheel and the screw to adjust the barrel increases the mechanical advantage.

As you explore the fort, how many other simple machines can you find?

Simple Machines at Work in the Fort
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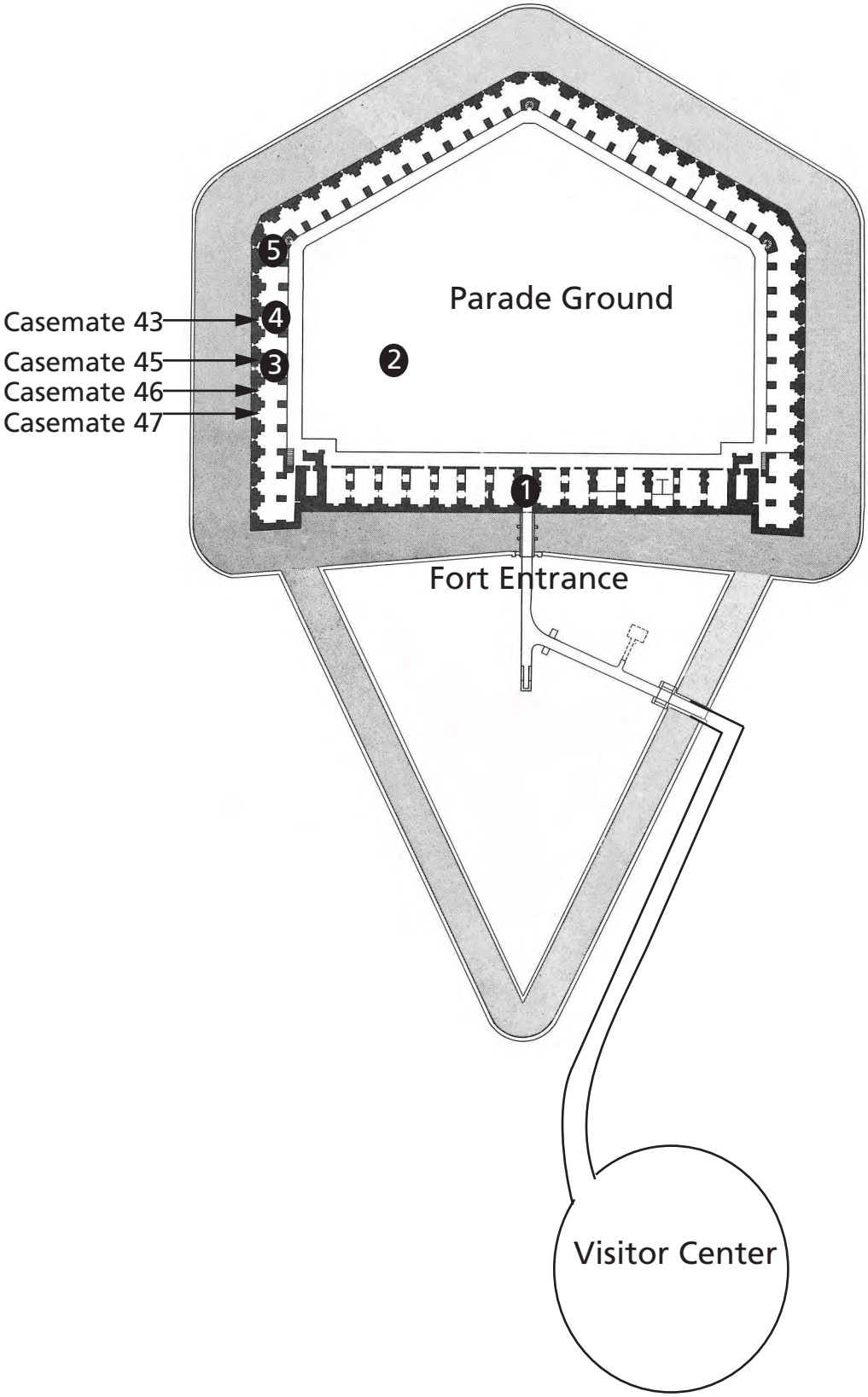
Map



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