Name: _____ Date: _____

Ships Climb Hills of Water

Circle group

Before 1914, a ship going from New York to San Francisco had to sail all the way around the tip of South America. That trip was about 13,000 miles. Then the Panama Canal opened. The trip shrank to about 5,000 miles. The canal cuts through a narrow strip of land in Panama. It joins the Atlantic Ocean to the Pacific Ocean. A shorter trip saves fuel, time, and money. That is why shipping companies value the canal.

Building it was one of the hardest jobs of its time. Workers cut through mountains and cleared thick jungle. Heavy rains caused landslides. Disease was a deadly danger too. Mosquitoes carried illnesses such as yellow fever and malaria. Thousands of workers died. Doctors learned that mosquitoes spread these diseases. Crews drained standing water and put screens on homes. This cut the sickness a great deal.

The canal's best trick is that ships go up and down hills of water. The middle of Panama is higher than the sea. So engineers built a large lake called Gatun Lake. It is about 26 meters, or 85 feet, above the ocean. A ship enters a lock, a giant chamber with gates at both ends. Water flows in from the lake by gravity. It lifts the ship step by step, with no pumps. At the far side, the steps run in reverse. The ship is lowered back to sea level. The whole trip takes about eight to ten hours.

Today more than 13,000 ships pass through each year. They carry goods such as grain, cars, and electronics. In 2016, a wider set of locks opened. Even larger ships could now cross.

Questions

1. How much shorter did the trip from New York to San Francisco become?

_____

_____

2. Which diseases did mosquitoes spread among the workers?

_____

_____

3. How does water get into a lock?

_____

_____

4. Why did engineers have to build a lake in the middle of Panama?

_____

_____

5. Why did draining standing water cut the sickness?

_____

_____

Words to know

canal: a waterway dug by people for ships
landslide: a mass of earth and rock sliding down a slope
lock: a chamber with gates that raises or lowers ships
chamber: a large enclosed space

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Ships Climb Hills of Water

Triangle group

Before 1914, a ship traveling from New York to San Francisco had to sail all the way around the southern tip of South America, a journey of about 13,000 miles. Then the Panama Canal opened, and the trip shrank to about 5,000 miles. The canal cuts through a narrow strip of land in Panama, joining the Atlantic Ocean to the Pacific Ocean. A shorter trip saves fuel, time, and money, which is why shipping companies value the canal so highly.

Building it was among the hardest engineering projects of its time. Workers had to cut through mountains, clear thick jungle, and handle heavy rains that caused landslides. Disease was also a deadly danger. Mosquitoes carried illnesses such as yellow fever and malaria, and thousands of workers died. Doctors eventually learned that mosquitoes spread these diseases, and crews drained standing water and sealed homes with screens, which sharply reduced the sickness.

The canal's greatest trick is that ships go up and down hills of water. The middle of Panama is higher than sea level, so engineers built a large lake, Gatun Lake, about 26 meters, or 85 feet, above the ocean. Ships enter a lock, which is a giant chamber with gates at both ends. Water flows in from the lake by gravity, lifting the ship step by step, with no pumps. At the far side, the process runs in reverse and the ship is lowered back to sea level. The whole crossing takes about eight to ten hours.

Today more than 13,000 ships pass through each year, hauling goods such as grain, cars, and electronics. In 2016, a wider set of locks opened so even larger ships could cross.

Questions

1. How much shorter did the trip from New York to San Francisco become?

_____

_____

2. What diseases did mosquitoes spread among the workers?

_____

_____

3. How does water get into a lock?

_____

_____

4. Why did engineers need to build a lake in the middle of Panama?

_____

_____

5. Why did draining standing water reduce the sickness?

_____

_____

Words to know

canal: a waterway dug by people for ships
engineering: using science and math to design and build things
landslide: a mass of earth and rock sliding down a slope
lock: a chamber with gates that raises or lowers ships
chamber: a large enclosed space

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

Name: _____ Date: _____

Ships Climb Hills of Water

Square group

Prior to 1914, a vessel traveling from New York to San Francisco was obliged to sail all the way around the southern tip of South America, a voyage of roughly 13,000 miles. Then the Panama Canal opened, and the journey shrank to about 5,000 miles. The canal slices through a narrow strip of land in Panama, linking the Atlantic Ocean with the Pacific Ocean. A shorter route conserves fuel, time, and money, which is why shipping companies value the canal so highly.

Constructing it was among the most formidable engineering projects of its era. Workers had to carve through mountains, clear dense jungle, and cope with torrential rains that triggered landslides. Disease posed another deadly threat. Mosquitoes carried illnesses such as yellow fever and malaria, and thousands of workers perished. Doctors eventually discovered that mosquitoes spread these diseases, and crews responded by draining standing water and sealing homes with screens, which sharply reduced the sickness.

The canal's most ingenious feature is that ships travel up and down hills of water. Because the middle of Panama lies higher than sea level, engineers created a vast lake, Gatun Lake, roughly 26 meters, or 85 feet, above the ocean. Ships enter a lock, which is an enormous chamber with gates at both ends. Water pours in from the lake by gravity, raising the ship step by step without any pumps. At the far side, the process runs in reverse, and the ship is lowered back to sea level. The entire crossing takes about eight to ten hours.

Today more than 13,000 ships pass through the canal each year, transporting cargo such as grain, cars, and electronics. In 2016, a wider set of locks opened so that even larger ships could make the crossing.

Questions

1. By how many miles did the canal shorten the trip from New York to San Francisco?

_____

_____

2. Which illnesses did mosquitoes carry that threatened the workers?

_____

_____

3. How does water enter a lock, and are pumps needed?

_____

_____

4. Why did the engineers need to create a vast lake in the middle of Panama?

_____

_____

5. Why did draining standing water sharply reduce the sickness?

_____

_____

Words to know

canal: a waterway dug by people for ships
engineering: using science and math to design and build things
landslide: a mass of earth and rock sliding down a slope
lock: a chamber with gates that raises or lowers ships
chamber: a large enclosed space

Talk together (every group has these)

1. Find one fact that every group read. How did your sheet say it?
2. What did your sheet tell you that you think another group's did not? Ask them.
3. What is one question about this topic that none of the sheets answered?

For the teacher: Ships Climb Hills of Water

Each student sheet carries a shape, not a level. The same topic and facts, written three ways.

Circle: Ships Climb Hills of Water

Easier · 267 words · Flesch-Kincaid grade 3.8

1. From about 13,000 miles to about 5,000 miles.
2. Yellow fever and malaria.
3. It flows in from the lake by gravity, with no pumps.
4. The land is higher than the sea, so ships needed a lake to cross.
5. Mosquitoes breed in standing water, so fewer mosquitoes spread disease.

Triangle: Ships Climb Hills of Water

This passage · 272 words · Flesch-Kincaid grade 7.7

1. From about 13,000 miles to about 5,000 miles.
2. Yellow fever and malaria.
3. It flows in from the lake by gravity, with no pumps.
4. The land is higher than sea level, so ships needed a lake to travel across.
5. Mosquitoes breed in standing water, so there were fewer mosquitoes to spread disease.

Square: Ships Climb Hills of Water

Harder · 283 words · Flesch-Kincaid grade 8.9

1. About 8,000 miles, from roughly 13,000 miles to about 5,000 miles.
2. Yellow fever and malaria.
3. It pours in from the lake by gravity, and no pumps are needed.
4. The middle of Panama lies higher than sea level, so ships needed a lake to cross it.
5. Mosquitoes breed in standing water, so there were fewer mosquitoes to spread the diseases.