



Run for Your Lives! The Johnstown Flood of 1889



(National Park Service)

On June 1, 1889, newspapers across the country bore huge headlines announcing that on the day before, Johnstown, Pennsylvania, had been ravaged by the most devastating flood in the nation's history. With railroad tracks washed away and telegraph lines down, contact with the city was completely cut off, so most early newspaper editions carried stories based on rumor, conjecture, and the accounts of a few overwrought survivors. One bold headline proclaimed, "JOHNSTOWN BLOTTED OUT BY THE FLOOD! HALF OF ITS PEOPLE KILLED." The story that followed told of unbelievable horrors, but the truth, when it became known, was scarcely less ghastly than the fabricated tales of the "yellow" journalists of the time: more than 2,200 people were known to be dead and hundreds more were missing. Property damage amounted to \$17 million. The cleanup operation would take five years, and bodies were still being found months and even years after the flood.



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Where this lesson fits into the curriculum

Time Period: Late 19th century

Topics: This lesson could be used in U.S. history, social studies, and geography courses in units on the rise of American industrialization and the Gilded Age or on understanding the relationship of technology and the environment.

Relevant United States History Standards for Grades 5-12

This lesson relates to the following National Standards for History from the UCLA National Center for History in the Schools:

US History Era 6

- **Standard 1A:** The student understands the connections among industrialization, the advent of the modern corporation, and material well-being.
 - **Standard 1B:** The student understands the rapid growth of cities and how urban life changed.
 - **Standard 1D:** The student understands the effects of rapid industrialization on the environment and the emergence of the first conservation movement.
 - **Standard 2C:** The student understands how new cultural movements at different social levels affected American life.
 - **Standard 3A:** The student understands how the "second industrial revolution" changed the nature and conditions of work.
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Relevant Curriculum Standards for Social Studies

This lesson relates to the following Curriculum Standards for Social Studies from the National Council for the Social Studies:

Theme II: People, Places, and Environment



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- Standard A: The student elaborates mental maps of locales, regions, and the world that demonstrate understanding of relative location, direction, size, and shape.
- Standard B: The student creates, interprets, uses, and distinguishes various representations of the earth, such as maps, globes, and photographs
- Standard G: The student describes how people create places that reflect cultural values and ideals as they build neighborhoods, parks, shopping centers, and the like.
- Standard H: The student examines, interprets, and analyzes physical and cultural patterns and their interactions, such as land use, settlement patterns, cultural transmission of customs and ideas, and ecosystem changes.
- Standard J: The student observes and speculates about social and economic effects of environmental changes and crises resulting from phenomena such as floods, storms, and drought.

Theme V: Individuals, Groups, and Institutions

- Standard G: The student applies knowledge of how groups and institutions work to meet individual needs and promote the common good.

Theme VII: Production, Distribution, and Consumption

- Standard F: The student explains and illustrates how values and beliefs influence different economic decisions.
- Standard I: The student uses economic concepts to help explain historical and current developments and issues in local, national, or global contexts.

Theme VIII: Science, Technology, and Society

- Standard D: The student explains the need for laws and policies to govern scientific and technological applications, such as in the safety and well-being of workers and consumers and the regulation of utilities, radio, and television.

Theme X: Civic Ideals, and Practices

- Standard A: The student examines the origins and continuing influence of key ideals of the democratic republican form of government, such as individual human dignity, liberty, justice, equality, and the rule of law.
- Standard B: The student identifies and interprets sources and examples of the rights and responsibilities of citizens.

Relevant Common Core Standards

This lesson relates to the following Common Core English and Language Arts Standards for History and Social Studies for middle and high school students:

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Key Ideas and Details

- CCSS.ELA-Literacy.RH.6-12.1
- CCSS.ELA-Literacy.RH.6-12.2
- CCSS.ELA-Literacy.RH.6-12.3

Craft and Structure

- CCSS.ELA-Literacy.RH.6-12.6

Integration of Knowledge and Ideas

- CCSS.ELA-Literacy.RH.6-12.7

Range of Reading and Level of Text Complexity:

- CCSS.ELA-Literacy.RH.6-12.10



About This Lesson

This lesson is based on the National Register of Historic Places registration file for "Johnstown Flood National Memorial" and other sources on the Johnstown flood. It was written by Fay Metcalf, education consultant, and edited by the Teaching with Historic Places staff. It was published in 2001. TwHP is sponsored, in part, by the Cultural Resources Training Initiative and Parks as Classrooms programs of the National Park Service. This lesson is one in a series that brings the important stories of historic places into the classrooms across the country.

Objectives

1. To analyze the reasons people shrug off the potential for disasters such as the Johnstown flood;
2. To outline the circumstances that caused the flood and to explain how it could have been prevented;
3. To use maps and photographs as well as the written record to analyze a historical event
4. To describe humanitarian responses to such disasters;
5. To research local history to see if any disasters have occurred in their region.

Materials for students

The materials listed below can either be used directly on the computer or can be printed out, photocopied, and distributed to students.

1. One map depicting the path of the flood;
2. Three readings about why the flood occurred, the destruction it caused, and the inclined plane railway built after the flood as a potential lifesaving mechanism;
3. Six photos of the aftermath of the flood.

Visiting the site

Johnstown Flood National Memorial, administered by the National Park Service, is located about 10 miles northeast of Johnstown, Pennsylvania, along U.S. 219 and PA 869 at the South Fork Dam site. The park contains nearly 165 acres and preserves the remains of the South Fork Dam and portions of the former Lake Conemaugh bed. For more information, contact the Superintendent, Johnstown Flood National Memorial, 733 Lake Road, South Fork, PA 15956, or visit the [park's website](#).



Getting Started



**What might have caused the destruction
seen in this photo?**

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Photo Analysis Worksheet

Step 1:

Examine the photograph for 10 seconds. How would you describe the photograph?

Step 2:

Divide the photograph into quadrants and study each section individually. What details--such as people, objects, activities--do you notice?

Step 3:

What other information--such as time period, location, season, reason photo was taken--can you gather from the photo?

Step 4:

How would you revise your first description of the photo using the information noted in Steps 2 and 3?

Step 5:

What questions do you have about the photograph? How might you find answers to these questions?



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Setting the Stage

The Johnstown Flood National Memorial in Pennsylvania commemorates the most devastating flood of the 19th century in the United States and the greatest national catastrophe in the post-Civil War era. The Johnstown Flood was caused by the giving way of the South Fork Dam and is an example of what can happen when people disregard principles of engineering and hydrology. The flood has provided a vast literature with important lessons for environmental management today. At present, all that remains of the historic earthen dam (originally about 900 feet long and 75 feet high) are the north and south abutments, the spillway cut around the north abutment to carry off excess water, and a few remnants of wood and culvert foundation stones representing the location of the control mechanism.

The story of the break of the South Fork Dam begins innocently enough. The dam had been built between 1838 and 1853 by the Commonwealth of Pennsylvania to provide water for the operation of the Western Division of the Pennsylvania Mainline Canal between Johnstown and Pittsburgh. Located some 12 miles east of Johnstown at a point where the South Fork branch of the Little Conemaugh River and several mountain streams converged, the dam created what was, at the time, one of the largest artificial lakes in the nation, more than two miles long and nearly a mile wide in some places. The Pennsylvania Railroad Company purchased the entire Mainline works in 1857 and left the dam and the reservoir virtually unattended.

In 1879 a group of wealthy industrialists formed the South Fork Fishing and Hunting Club and bought the dam and the reservoir for a private summer resort. By 1881 the dam had been repaired—without benefit of an engineer—and the reservoir filled to capacity to form the now nearly three-mile-long Lake Conemaugh. A clubhouse with 47 rooms fronted the lake. From its large porch, members could watch the club's two steam yachts setting off on excursion trips. A number of club members built large cottages nearby. For the next eight years the summer resort offered fishing, hunting, boating, and other recreational opportunities for club members, until, in 1889, the dam broke and sent some 20 million tons of water crashing down the valley towards Johnstown. When it was over, the flood had claimed more than 2,000 lives.

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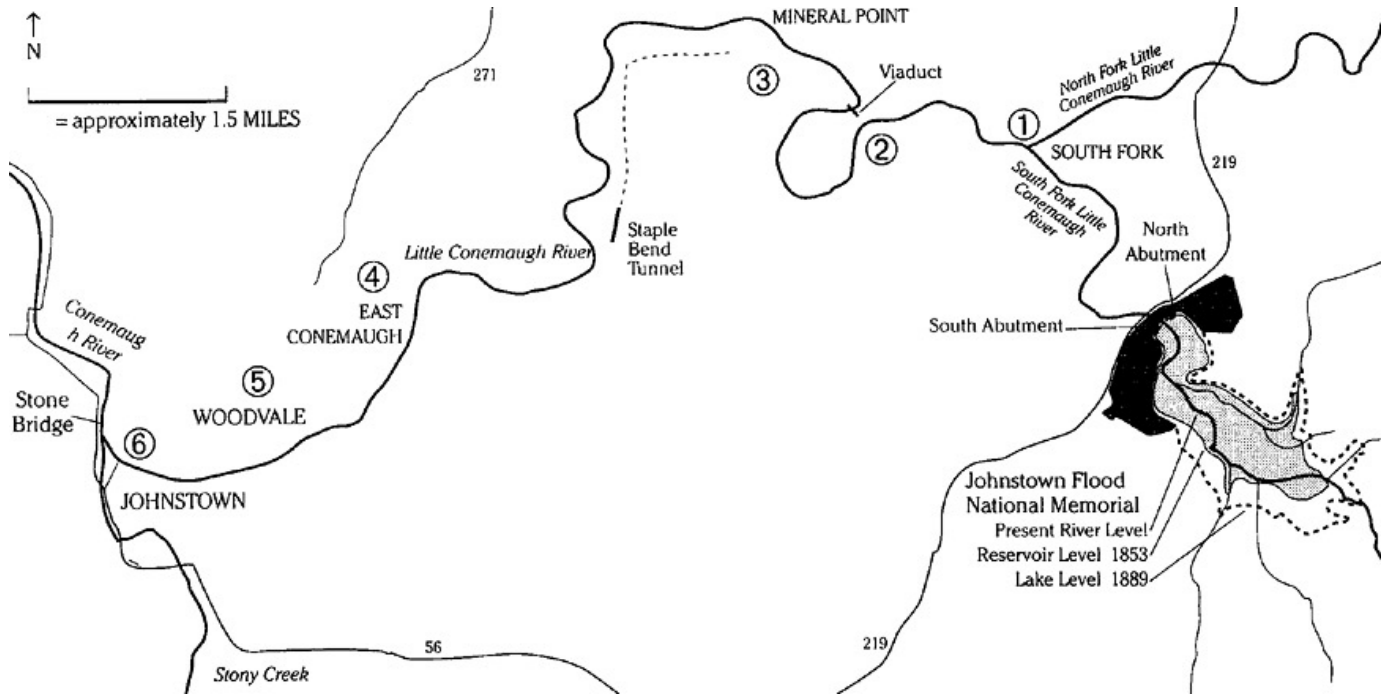
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Locating the Site

Map 1: In the flood's wake



(National Park Service)



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Map 1: In the flood's wake (Key)

1) When the South Fork Dam (elevation 1,650 feet) was breached, the lake waters followed their natural course downhill along the river, growing stronger and more destructive as the flood waters picked up and carried along everything in their path. The first town struck was South Fork, two miles downstream. The flood claimed its first four victims and 20 to 30 homes were destroyed.

2) When the wave reached the two-mile long oxbow in the river it split. Part of the wave left the river channel here, crossed the oxbow, and hit the 75-foot-high stone viaduct. Because the water was choked with debris by this time, it was temporarily dammed at the arch. The greater part of the flood followed the oxbow, and crashed into the viaduct six to seven minutes later. For a brief moment, the wreckage at the viaduct created a second dam for Lake Conemaugh. When the viaduct collapsed, it did so with even greater violence than the South Fork Dam.

3) A mile below the viaduct the sawmill town of Mineral Point was struck by the renewed force of the wave. Thirty families lived on the village's main street, but when the flood had passed, only bare rock remained. Sixteen people died.

4) The wave headed toward East Conemaugh. A witness said the water by now was almost obscured by the debris, resembling "a huge hill rolling over and over, "tossing up logs high above its surface. Before the flood hit East Conemaugh, train engineer John Hess tried to warn the residents by tying his train whistle down and racing toward town ahead of the wave. His warning saved many, but 50 people died, including about 25 passengers on trains that had been stranded in the town by earlier flooding caused by the rain.

5) As the river straightened out between East Conemaugh and Woodvale, the flood gathered speed and power. Woodvale had no warning. Part of a mill was all that was left standing after the flood struck. Of 1,100 residents, 314 died. When the Gautier Wire Works were hit, boilers exploded creating what flood survivors in Johnstown called the black "death mist."

6) The flood hit Johnstown (elevation 1,174 feet) with full force, bearing the remains of the Conemaugh Valley. The time was 4:07 p.m., 57 minutes after the dam had broken. Again, the wave split, sparing some buildings in the center of town. Still in use is the stone bridge, where the mass of debris, animals, and humans piled up and caught fire, taking 80 lives. By now, the torrent had spent its force and the wave continued to break up and lose speed as it continued its downward course. It caused no more damage.

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Questions for Map 1

- 1) Find Johnstown on a map of Pennsylvania and describe its location within the state.

- 2) Trace the path of the flood wave. How many towns were affected by the flood?

- 3) What happened at the oxbow? Why do you think this occurred?

- 4) What is the elevation change between the dam site and Johnstown? How would this have affected the flood wave?



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Determining the Facts

Reading 1: A Roar Like Thunder

Johnstown in 1889 was a town of German and Welsh immigrants. With a population of 30,000, it was a growing and industrious community known for the quality of its steel. Founded in 1794, Johnstown began to prosper with the building of the Pennsylvania Mainline Canal in 1834 and the arrival of the Pennsylvania Railroad and the Cambria Iron Company in the 1850s. There was one small drawback to living in the city. Johnstown had been built on a floodplain at the fork of the Little Conemaugh River and Stony Creek. Because the growing city had increased the runoff from the surrounding hills by stripping them for wood, and had narrowed the river banks to gain building space, the heavy annual rains had caused increased flooding in recent years.

Furthermore, 14 miles up the Little Conemaugh, three-mile-long Lake Conemaugh was held on the side of a mountain—450 feet higher than Johnstown—by the old South Fork Dam. It had been poorly maintained, and every spring there was talk that the dam might not hold. But it always had, and the supposed threat became something of a standing joke around town.

But at 4:07 on the chilly, wet afternoon of May 31, 1889, the inhabitants heard a low rumble that grew to a "roar like thunder." Some knew immediately what had happened: after a night of heavy rains, South Fork Dam had finally broken, sending 20 million tons of water crashing down the narrow valley. Most never saw anything until the 36-foot wall of water, already boiling with huge chunks of debris, rolled over them at 40 miles per hour, consuming everything in its path. Those who did see it said it "snapped off trees like pipe stems," "crushed houses like eggshells," and "threw around locomotives like so much chaff." A violent wind preceded it, blowing down small buildings. Making the wave even more terrifying was the black pall of smoke and steam that hung over it—the "death mist" remembered by survivors.

Thousands of people desperately tried to escape the wave, but they were slowed as in a nightmare by the 2 to 7 feet of water already covering parts of town (this flooding was typical in seasons of heavy rain, and it had been raining heavily that spring). One observer from a hill above the town said the streets "grew black with people running for their lives." Some remembered reaching the hills and pulling themselves out of the flood path seconds before it overtook them. Those caught by the wave found themselves swept up in a torrent of oily, yellow-brown water, surrounded by tons of grinding debris, which crushed some, provided rafts for others. Many became helplessly entangled in miles of barbed wire from a destroyed wire works. People indoors when the wave struck raced upstairs seconds ahead of the rising water, which reached the third story in many buildings. Some never had a chance, as homes were immediately crushed or ripped from foundations and added to the churning rubble, ending up hundreds of yards away. Everywhere people were hanging from rafters or clinging to rooftops and railcars being swept downstream, frantically trying to keep their balance as their rafts pitched in the flood.

It was over in 10 minutes, but for some the worst was still to come. Thousands of people, huddled in attics or on the roofs of buildings that had withstood the initial wave, were still threatened by the 20-foot current tearing at the buildings and jamming tons of debris against them. In the growing darkness, they watched other buildings being pulled down, not knowing if theirs would last the night. But the most harrowing experience for hundreds came at the old stone railroad bridge below the junction of the rivers. There, thousands of tons of debris scraped

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from the valley along with a good part of Johnstown, piled up against the arches. The 45-acre mass held buildings, machinery, hundreds of freight cars, 50 miles of track, bridge sections, boilers, telephone poles, trees, animals, and 500 to 600 humans. The oil-soaked jam was immovable, held against the bridge by the powerful current and bound tightly by the barbed wire.

Those who were able began scrambling over the heap toward shore. But many were trapped in the wreckage, some still hopelessly hung up in the barbed wire, unable to move. Then the oil caught fire. As rescuers worked in the dark to free people, the flames spread over the whole mass, burning with "all the fury of hell," according to a Johnstown newspaper account. Eighty people died at the bridge, some still in their own homes.

The next morning survivors were unsettled by the eerie silence hanging over the city. During the night the waters had receded, revealing vast heaps of mud and rubble filling streets—where there were still streets—up to the third story. Entire blocks of buildings had been razed. Hundreds, alive and dead, were buried beneath the ravaged city. Many bodies were never identified, and hundreds of the missing were never found. As everyone had dreaded, disease followed in the wake of the flood, and typhoid added 40 more lives to the 2,209 that had already died. Emergency morgues and hospitals were set up, and commissaries distributed food and clothing. The nation responded to the disaster with a spontaneous outpouring of time, money, food, and clothing. Contributions from the United States and abroad totaled over \$3,700,000. The flood also provided the newly formed American Red Cross under the leadership of Clara Barton with its first test. Barton and her staff of 50 doctors and nurses arrived in Johnstown five days after the flood. After surveying the scene, she set up hospital tents and built six Red Cross "hotels" for the homeless. Barton and her crew remained in Johnstown until October, when the city was finally able to begin rebuilding itself.



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Questions for Reading 1

- 1) Why was the location of Johnstown a "problem"?

- 2) What posed an additional danger to the city?

- 3) Describe the flood that devastated Johnstown.

- 4) The flood lasted only 10 minutes, but the destruction and fear continued through the night. Describe those events.

- 5) What did the survivors find when dawn broke the following morning?



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Determining the Facts

Reading 2: Our Misery is the Work of Man

Why weren't the people of Johnstown warned? They were—three times in the hours before the flood—but they had heard those warnings for years. The South Fork Dam, one of the largest earthen dams in the world, had always held during high water before. And wasn't the dam being maintained by some of the richest and most powerful men in America?

The South Fork Fishing and Hunting Club, made up of Pittsburgh industrialists and businessmen like Andrew Carnegie and Andrew Mellon, had bought the lake and dam 10 years earlier as an exclusive and somewhat secret summer retreat. The reservoir was originally built to supply water for the Pennsylvania Mainline Canal. The dam had been built according to accepted engineering practices of the time, but the canal system was obsolete by the time the dam was completed in 1853. The Pennsylvania Railroad bought the dam four years later. In 1862 a break occurred near the discharge pipes, but little damage resulted because the water level was so low. The railroad abandoned the dam, and it deteriorated until 1879, when it was bought by the South Fork club, which repaired the dam carelessly and without the advice of engineers.

At first the 72-foot-high dam frightened some residents. Said one, "No one could see the immense height to which that artificial dam had been built without fearing the tremendous power of the water behind it.... People wondered and asked why the dam was not strengthened, as it certainly had become weak, but nothing was done, and by and by they talked less and less about it." Others, realizing their continuing vulnerability, called the dam "the sword of Damocles hanging over Johnstown." Daniel J. Morrell, president of Cambria Iron Company, was one of those worried about the dam. The first president of the South Fork club, Benjamin Ruff, refused Morrell's repeated requests that the dam be strengthened, saying, "You and your people are in no danger from our enterprise."

In fact, the club members had made some changes to the dam and failed to make others. They built a fish trap across the spillway that became clogged with debris in heavy rains. They failed to repair a two-to-four-foot sag in the middle of the dam. They did not replace the discharge pipes, and they poorly maintained the stone rip-rap covering the face of the dam.

The dam was put to the test on May 30, 1889, when unusually heavy rains hit the area. In Johnstown people made the usual preparations for flooding, but up at South Fork Dam, John Parke, the club engineer, knew things were more serious, as he watched the lake rising an inch every 10 minutes. He knew that once the water ran over the top of the earthen dam, it would cut through it like a knife and the whole thing would go. His workers desperately tried to dig another spillway and increase the height of the dam, but the water was rising too fast. Parke was caught in a painful dilemma. He could cut through the end of the dam, where the pressure was less, so it would give way more slowly and reduce the water's destructive force. But afterwards, how could he prove that the dam would have gone anyway? People would know only that he was the one who destroyed the dam and flooded the valley. He chose not to do it.

When the dam started to go at 3:10, Parke later wrote, "the fearful rushing waters opened the gap with such increasing rapidity that soon after the entire lake leaped out.... It took but forty minutes to drain that three miles of water." One observer said the break "roared like a mighty battle." Twenty million tons of water took its natural course, dropping 450 feet in 14 miles, at times 70 to 75 feet high and reaching speeds of 40 miles per hour. Now all the telegraph and telephone lines were down, and no more

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messages could be sent to Johnstown. In 57 minutes the wave would engulf the town. Over 2,200 people were tragically unaware that death was already moving down the valley.



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Determining the Facts

Reading 3: The Johnstown Inclined Railway

The inclined plane railway was built as a "lifesaver" after the Johnstown Flood. It was constructed with a 986.5-foot runway at 71 percent grade. The wheels, rails, and other parts were adapted from standard railroad equipment by the Cambria Iron Company which built the railway, at least in part, to provide easy transportation for the residents of the iron company's new real-estate development, the town of Westmont. The lower entrance to the railway, crossing Stony Creek, consisted of a heavy iron bridge constructed with three-foot-thick iron girders and supported by immense stone abutments. The railway itself was made up of two cable-driven cars, each of which weighed 42 tons with a 15-ton capacity. The cable was 2 inches in diameter, 1130 feet in length, and consisted of one pulling cable and one safety cable capable of supporting over 165 tons. The unique design of the cars provided a level ride for horses and wagons (and later cars and trucks) and pedestrians. Because of its convenience and access to the heart of the business district, the railway was directly responsible for Westmont's development into one of the nation's first residential suburbs.

In 1935 Bethlehem Steel, the successor to the Cambria Iron Company, sold the railway to Westmont for \$1.00. The next year, on March 17, it carried more than 4,000 men, women, and children to safety from the flood waters of the Conemaugh River and Stony Creek. In 1962, the railway was restored and operated under the auspices of the Cambria County Tourist Council and the Johnstown Chamber of Commerce. Even though good roads were built and the use of the railway declined, the people of the region cared enough about it to spend public funds to restore the railway. By 1972, the inclined railway had carried over 40 million passengers and countless vehicles with the loss of only one life due to an accident involving a truck on one of the railway cars and not because of equipment malfunction. It is one of the longest and steepest hoists in the world and one of the few transportation systems of its kind still in existence.



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Visual Evidence

Photo 1: Aftermath of the Johnstown Flood



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Visual Evidence

Photo 2: Aftermath of the Johnstown Flood



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Visual Evidence

Photo 3: Debris at the stone bridge



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Visual Evidence

Photo 4: Rescue workers searching for survivors and bodies



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Visual Evidence

Photo 5: Locomotives from the East Conemaugh Trainyard



(National Park Service)

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Questions for Photos 3, 4, and 5

- 1) Do these images help you to understand the impact of the flood? If so, how?

- 2) Why did so much debris collect at the stone bridge? Why did so many deaths occur there?

- 3) What would have been some of the challenges faced by rescue workers?



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Visual Evidence

Photo 6: Woodvale, Pennsylvania, July 1889



(National Park Service)

Very little withstood the wave as it tore through Woodvale. Most of the town was reduced to mud flats. The destruction of the wire works released miles of barbed wire, adding to the terror of those caught in the flood.

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Questions for Photo 6

- 1) Approximately how long after the flood was this photo taken?
- 2) How did the destruction of the wire works affect flood victims?

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Putting It All Together

The following activities will help students consider the impact and implications of disasters.

Activity 1: Averting a Disaster

Divide the class into groups of 4 or 5 students, with one student per group acting as recorder. Ask each group to develop a list of local, regional, national, or international sites, events, and issues that have the potential to become a disaster or a crisis (some possibilities are a nuclear accident such as that at Chernobyl, earthquakes and hurricanes, losing the battle to protect the region's forests, or poisoning of the local water supply through an industrial accident). Have the groups then list the possible causes of such disasters and the means of preventing them by considering (1) moral and ethical concerns, (2) technological concerns, and (3) legal and political concerns. Next, have the entire class discuss each group's list. Ask them to select two or three scenarios that realistically could result in averting a disaster.

Then have the students, individually or in small groups, choose a single one of these sites, events, or issues to research and prepare a report for presentation to the class. This report should include location (absolute and relative); the places that would be involved in the event—those places with human habitation or which have been modified by human activity; and human-environmental interactions related to the site, event, or issue. Students should conclude their reports by describing a step-by-step action plan for averting or mitigating the disaster. If the reports are of high quality, you may wish the class to vote on the most realistic and effective report and then invite appropriate local and regional authorities to visit the class to discuss the action plans.

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Activity 2: Investigating the Community

Ask students to read local history books and interview older members of the community to see if any disasters occurred in the area in the past. If so, have them find out if the people involved were warned and able to escape; who or what caused the disaster; and if the event could have been avoided, and if so, by what means.

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References and Endnotes

Reading 1

Reading 1 was compiled from the National Park Service visitor's guide for the Johnstown Flood National Memorial.

Reading 2

Reading 2 was compiled from the National Park Service visitor's guide for the Johnstown Flood National Memorial.

Reading 3

Reading 3 was compiled from the National Register nomination form "Johnstown Inclined Railway" (Cambria County, Pennsylvania), Pennsylvania Historic Sites and Landmarks, 1972.



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Additional Resources

By looking at *Run for Your Lives! The Johnstown Flood of 1889*, students determine how environmental management, technology, and the actions of 19th-century industrialists contributed to a disaster in Pennsylvania that shocked the nation. Those interested in learning more will find that the Internet offers a variety of interesting materials.

Johnstown Flood National Memorial

Visit the [Johnstown Flood National Memorial Web pages](#) to learn more about the park or the story of the flood. Included on the site are details about the dam, eye witness accounts of the disaster, information on other U.S. disasters, and much more.

The Johnstown Flood Museum

The [Johnstown Flood Museum Web pages](#) offers extensive photographs and a detailed history of the incident.

Johnstown Historic Information

The [Johnstown Pennsylvania Information Source Online](#) offers a great compilation of writings on different aspects of Johnstown history. Included is information about how the town came into existence, its railroad age, the flood, news on the flood from different sources, and much more.

The Johnstown Inclined Plane

For a brief history and photographs of the railway, visit the [Johnstown Inclined Plane Web page](#).

U.S. Geological Survey

The U.S. Geological Survey provides a Web page detailing [significant floods in the United States](#) during the 20th Century. Included on the site is information on details such as flood measurements, why floods occur, which areas are most likely to flood, flood facts, and more.

For Further Reading

Students and educators wishing to learn more about the Johnstown Flood may want to read the following: David G. McCulloch, *The Johnstown Flood* (1968); Richard O'Connor, *Johnstown: The Day the Dam Broke* (1957).



