

\* This page is the T-chart with suggested discussion topics and answers of the problems and solutions to those problems.

TIME PERIOD AND PROBLEM	SOLUTION
<p style="text-align: center;"><u>Before 1800's</u></p> <p>Balanced System</p>	<p>No solution was necessary</p>
<p style="text-align: center;"><u>1840's - 1950's</u></p> <p>Unregulated fishing/ over fishing In 1872 Dynamiting fish damaged the fish population</p>	<p>Laws passed making fishing during the spawning season illegal. 1896 a law was passed making 'blasting' fishing with dynamite a felony and a large fine was paid if caught.</p>
<p style="text-align: center;"><u>1850's</u></p> <p>Dams and Irrigation Canals</p>	<p>1872 Law passed requiring fishways by dams 1872 Law passed making it illegal to put any substance in the lake that would kill fish or pollute usable water.</p>
<p style="text-align: center;"><u>1881</u></p> <p>Non-native fish introduced into the lake. Specifically carp.</p>	<p>2010 Carp Removal Project</p>
<p style="text-align: center;"><u>1880's</u></p> <p>Sugar Beet Mills – dump waste Saw Mills -- dump sawdust This was in violation of the 1872 law.</p>	<p>Enforce the law.</p>
<p style="text-align: center;"><u>1890's - 1950</u></p> <p>Raw sewage is dumped into the lake.</p>	<p>Sewage plants are built.</p>
<p style="text-align: center;"><u>1960's - 1970's</u></p> <p>The steel mill created an environment where many felt water was not suitable for swimming.</p>	<p>Massive cleanup project in the 1990s, Geneva Steel Closed in 1999.</p>
<p style="text-align: center;"><u>1970's</u></p> <p>June sucker population became lower with introduction of predator fish; white bass and walleye. In 1998, the June sucker population was less than 1,000.</p>	<p>1973 Endangered Species Act /Money available 1986 June sucker on Endangered Species list/funds available Helping the June sucker fish will help the entire lake.</p>
<p style="text-align: center;"><u>1986</u></p> <p>June sucker is added to the Endangered Species list.</p>	<p>2002 June Sucker Implementation Program</p>
<p style="text-align: center;"><u>2000's</u></p> <p>People in the future need to understand the history and future of Utah Lake.</p>	<p>2010 Begin teaching fourth grade students about the June sucker fish and the history of Utah Lake</p>

\* These two sheets are provided with dates. It is for the first variation of the instruction.

<p style="text-align: center;"><u>Prior to 1847</u></p> <p>First, the Fremont Indians lived along the Provo River. Archaeology has discovered that this ancient culture relied on fish as one of its main food sources. Later, the Ute Indians also learned how to harvest fish. In 1776 one of the first Spanish Explorers, Father Escalante, drew one of the first recorded maps we have of the now Utah Valley.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p style="text-align: center;"><u>1847 - 1848</u></p> <p>Mormon pioneers arrived in Utah in 1847. In 1848, an early frost killed most of the pioneers' crops. Swarms of grasshoppers destroyed what was left. The settlers were faced with starvation. Pioneers organized fishing companies and turned to Utah Lake. Thousands of pounds of native fish were caught and this great resource literally helped the settlers to survive and not starve.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>
<p style="text-align: center;"><u>1855-1856</u></p> <p>Records from 1855 hunger relief efforts show 2,301 pounds of Utah Lake fish were distributed to Salt Lake pioneers. In 1856, Mormon wards organized fishing companies. In the 1850s, the number of fish in Utah Lake seemed unlimited. Because the number of fish in the lake seemed infinite, little thought was given to their long-term survival. Large nets were placed at the mouth of the Provo River. This made it difficult for fish to go to their spawning grounds.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p style="text-align: center;"><u>1850's</u></p> <p>Dams were built and water was diverted for irrigation. Fish could no longer move up the stream to spawn and unscreened ditches carried adult and newly hatched fish to farms instead of back to the lake.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>
<p style="text-align: center;"><u>1881</u></p> <p>Carp were introduced to the lake. It was hoped these non-native fish would be hardy and able to survive the changing conditions of the lake and be a good food source. However, carp did not become a popular food choice and it ate the aquatic vegetation leaving little cover for June Sucker fish to hide from predators.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p style="text-align: center;"><u>1880's</u></p> <p>Sugar beet mills dumped waste into the lake. This caused plant algae to grow which causes less oxygen in the water. Fish 'breathe' oxygen by water passing through their gills. Lower oxygen levels can kill fish. Saw mills dumped sawdust into the lake, which got into the gills of the fish. This can suffocate fish.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>

<p style="text-align: center;"><u>Before the 1890's</u></p> <p>Raw sewage was dumped into the lake.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p style="text-align: center;"><u>1901 - 1905</u></p> <p>178 tons of fish were harvested each year.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>
<p style="text-align: center;"><u>1920</u></p> <p>Columbia Steel (later called Geneva Steel). The process Columbia Steel used to make their steel created hazardous pollutants that were dumped into the lake.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p style="text-align: center;"><u>1930</u></p> <p>Severe drought: less rainfall during the year resulted Utah Lake being very shallow. A severe drought in the early 1930's prompted farmers to drain the Provo River in a futile attempt to save their dying crops. At the same time, Utah Lake shriveled to an alarming average depth of one foot. Scientists later concluded that the native fish population never fully recovered from the droughts and poorly managed irrigation.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>
<p style="text-align: center;"><u>1960's and 1970's</u></p> <p>Years of abuse caused signs to be posted warning swimmers not to go into the water because of the pollutants.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p style="text-align: center;"><u>1986</u></p> <p>In 1973, the Endangered Species Act made money available to help endangered species but it wasn't until 1986 when the June Sucker was added to the list. This provided protection for the fish from being caught or harmed.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>
<p style="text-align: center;"><u>1950's</u></p> <p>Introduction of non-native predator fish species, such as walleye and white bass. These species changed the native environment creating a challenge for the June sucker's survival.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p style="text-align: center;"><u>1998</u></p> <p>June sucker population in Utah Lake is thought to have fallen below 1000 fish.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>

\* These two sheets are provided with no dates. It is for the second variation of the instruction.

<p>First, the Fremont Indians lived along the Provo River. Archeology has discovered that this ancient culture relied on fish as one of its main food sources. Later, the Ute Indians also learned how to harvest fish. In ( ) one of the first Spanish Explorers, Father Escalante, drew one of the first recorded maps we have of the now Utah Valley.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p>Mormon pioneers arrived in Utah in ( ). In ( ), an early frost killed most of the pioneers' crops. Swarms of grasshoppers destroyed what was left. The settlers were faced with starvation. Pioneers organized fishing companies and turned to Utah Lake. Thousands of pounds of native fish were caught and this great resource literally helped the settlers to survive and not starve.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>
<p>Records from ( ) hunger relief efforts show 2,301 pounds of Utah Lake fish were distributed to Salt Lake pioneers. In ( ), Mormon wards organized fishing companies. In the ( )'s the number of fish in Utah Lake seemed unlimited. Because the number of fish in the lake seemed infinite, little thought was given to their long-term survival. Large nets were placed at the mouth of the Provo River. This made it difficult for fish to go to their spawning grounds.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p>Dams were built and water was diverted for irrigation. Fish could no longer move up the stream to spawn and unscreened ditches carried adult and newly hatched fish to farms instead of back to the lake.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>
<p>Carp were introduced to the lake. It was hoped these non-native fish would be hardy and able to survive the changing conditions of the lake and be a good food source. However, carp did not become a popular food choice and it ate the aquatic vegetation leaving little cover for June Sucker fish to hide from predators.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p>Sugar beet mills dumped waste into the lake. This caused plant algae to grow which causes less oxygen in the water. Fish 'breathe' oxygen by water passing through their gills. Lower oxygen levels can kill fish. Saw mills dumped sawdust into the lake, which got into the gills of the fish. This can suffocate fish.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>

<p>Raw sewage was dumped into the lake.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p>178 tons of fish were harvested each year.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>
<p>Columbia Steel (later called Geneva Steel) The process Columbia Steel used to make their steel created hazardous pollutants that were dumped into the lake.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p>Severe drought: less rainfall during the year resulted Utah Lake being very shallow. A severe drought in the early ( )'s prompted farmers to drain the Provo River in a futile attempt to save their dying crops. At the same time, Utah Lake shriveled to an alarming average depth of one foot. Scientists later concluded that the native fish population never fully recovered from the droughts and poorly managed irrigation.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>
<p>Years of abuse caused signs to be posted warning swimmers not to go into the water because of the pollutants.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p>In 1973 the Endangered Species Act made money available to help endangered species but it wasn't until ( ) when the June Sucker was added to the list. This provided protection for the fish from being caught or harmed.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>
<p>Introduction of non-native predator fish species, such as walleye and white bass. These species changed the native environment creating a challenge for the June sucker's survival.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>	<p>June sucker population in Utah Lake is thought to have fallen below 1000 fish.</p> <p>Activity: Illustrate a picture that represents what happened during this time period. Write a sentence describing the picture.</p>