

# JSD 3D Learning Activity Template

**Grade:** 6th

**Title:**  
Utah Lake Disaster

**Utah Science with Engineering Education Standard (SEEd): 6.4.5**

Evaluate competing design solutions for preserving ecosystem services that protect resources and biodiversity based on how well the solutions maintain stability within the ecosystem. Emphasize obtaining, evaluating, and communicating information of differing design solutions. Examples could include policies affecting ecosystems, responding to invasive species or solutions for the preservation of ecosystem resources specific to Utah, such as air and water quality and prevention of soil erosion.

**Key crosscutting concept(s) (CCC): Cause and Effect, Stability and Change,**  
**Key science and engineering practice(s) (SEP): Asking Questions and Defining Problems, Analyzing and Interpreting Data, Constructing Explanations and Designing Solutions and Obtaining and Evaluating and Communicating Information.**

**Materials: 1 computer per 2 students, printed out article (see below), 1 sheet of paper and color pencils for each pair of students, draw time line on across whiteboard (1840s-2000) and tape**

**Time: 1.5 hours**

**Teacher background, key content information and hints: Background on Utah Lake.**

**Prior knowledge that students need:**

## Learning Activity Plan

*These three aspects of a lesson should be identified in your learning activity.*

**Gathering:** *(Obtain Information, Ask Questions/Define Problems, Plan & Carry Out Investigations, Use Models to Gather Data and Information, Use Mathematics/Computational Thinking.)*

**Reasoning:** *(Evaluate Information, Analyze Data, Use Mathematics/Computational Thinking, Construct Explanations/Solve Problems, Develop Arguments from Evidence, Use Models to Predict & Develop Evidence.)*

**Communicating:** *(Communicate Information, Argue from Evidence (written & oral), Use Models to Communicate).*

**Phenomenon:**

Phenomena: Show old pictures and new pictures of Utah Lake... explain the changes?

Old:



New:



**Learning Activity:****Gathering:**

Show this image of Tamarisk:

<https://www.youtube.com/watch?v=Uby86bJpgjk>

Tamarisks are plants that were introduced to the Colorado River to help control erosion. It's currently drinking HALF of the water that flows through the Colorado. Scientists released beetles that eat ONLY tamarisks and introduced them along the banks of the Colorado River. Scientists project that the tamarisks will be gone in less than a decade.

Use Tamarisk data sheet to read with students. Use data to create a graph in google sheets. Use the first set of data (rising Tamarisk population) to show the kids how to graph and use the line that's graphed to predict the future. Then have students work in pairs to graph second set of data about the declining populations of Tamarisks. Have students predict when the Tamarisks will be eradicated along the Colorado River.

## Tamarisks Along the Colorado River

Starting in 1900, 150 Tamarisks were planted along the banks of the Colorado River to control erosion.

### Tamarisks growth prior to 2000

Year	Number of Tamarisks along the Colorado River
1900	150
1905	289
1910	439
1915	600
1920	753
1925	919
1930	1,078
1935	1,276
1940	1,362
1945	1,600
1950	1,600
1955	1,811
1960	1,987
1970	2,109
1975	2,523
1980	2,344
1985	2,453
1990	2,705
1995	2,865

Tamarisks also known as Saltcedars. Saltcedars also deposits salt above and below the ground, forming saline crust inhibiting other plants from growing in its vicinity. In addition to outcompeting native species, this also enables the Saltcedar to cope with high concentrations of dissolved solids.



If you float through this 25 mile stretch of the river, it is easy to tell the areas that have had invasive species removed from the ones that haven't. The spots given assistance are filled with green willows and young cottonwoods, enhancing the view of the river.

The untouched areas are a lot less aesthetically pleasing and prevent native vegetation growth and limit wildlife habitats. The tamarisk patches can be very dense and many of the bushes have been stripped of a lot, if not all, of their leaves due to beetles that have attacked and defoliated trees over the past eight years or so. The bushes aren't very pretty to look at anyway, but their impact makes worsens the situation, leaving groves of black trunks marked by tangles of white branches protruding into the air.

From 2000-2001 scientists introduced beetles to eat the Tamarisks

This table shows the decline of the Tamarisk population.

Year	Number of Tamarisks along the Colorado River
2000	3,597
2001	3,503
2002	3,434
2003	3,302
2004	3,199
2005	3,027
2006	2,895
2007	2,801
2008	2,678
2009	2,602
2010	2,519
2011	2,389
2012	2,296
2013	2,201
2014	2,116
2015	1,998
2016	1,812
2017	1,694
2018	1,600

The beetles aren't native to the area. After extensive research, they were transplanted from Asia to different areas in the Rocky Mountain and along the West Coast. They arrived at the Colorado River near Moab in 2005, and by the following year, they had successfully defoliated eighteen miles of tamarisk. The beetles only feed on tamarisk plants, and after repeated defoliation over a three-to-five year period, the average shrub loses its ability to survive.

"The beetles are doing their job," Schnurr said.

"During a heavy winter with a lot of snow, we burn the piles," WCCC Director Trevor Wickersham added.

The cleared areas are then replanted with natural vegetation. Cottonwood and willow starts are surrounded by cages to protect them from wildlife, along with a piece of rebar for support.

"We haven't had real good luck with the willows," Schnurr admitted. "But the cottonwood are good if you can keep the beaver off them."

Members of the BLM office does some of the work themselves, including seeding, but the WCCC is used for the bigger clearing jobs.

Here's a few more internet resources on the tamarisks

<http://www.westword.com/news/photos-colorado-river-battle-against-a-serious-enemy-invasive-tamarisk-5887768>

<https://www.youtube.com/watch?v=Uby86bJpgik>

Show this: (same situation in Georgia... they planted Kudzu along the highways to help with erosion and it's now taking over)

Kudzu

<https://www.youtube.com/watch?v=q7-QXvj6kU8>

I would use this article:

[http://utahlakecommission.org/wp-content/uploads/2012/11/Invasive Plants at Utah Lake June 2012.complete.pdf](http://utahlakecommission.org/wp-content/uploads/2012/11/Invasive%20Plants%20at%20Utah%20Lake%20June%202012.complete.pdf)

I like the questions at the end.

### **Reasoning and Communicating:**

I would have students pair up and put together a 5 slide google slides to present to the class about how to solve the problem of polluted Utah Lake. It needs to include 1 graph, 5 images, timeline, benefits and drawbacks of the design solution and an outline of the solution. Have students discuss all the design solutions, and vote on the one they think will be most successful.

### **Assessment of student learning**

*Google slides of design solution to restore Utah Lake and participation in following discussion.*