Platte Basin Timelapse

Water Science: Droughts and Floods

This activity satisfies one of the required JNMN lessons needed to complete the Junior Water Science Master Badge.

WATER MASTER

Appropriate Ages 8-12

Expected Time: 55 min

Learning Objectives:

Students will be able to develop a solution that relieves the risk of floods on humans and natural habitats.

Students will interpret timelapse photography of a Nebraska river.

Students will use maps and photo timelapses to describe patterns of earth's land and climate features.

Science Standards:

Grades 3-6

SC.3.7.2.D

SC.4.13.4.C

SC.4.13.4.D

SC.5.13.4.C

SC5.13.4.D

SC.6..13.5

Did You Know?
.The 2019 Super Flood of NE damaged a Waste Treatment Facility and waste ran directly into the MO River for 53 days.

BEFORE YOU TEACH

BACKGROUND KNOWLEDGE

Throughout the Platte River's 900 miles, using dozens of mounted cameras, viewers are given a bankside view as the timelapse project follows a drop of water across Nebraska. Every drop of water is spoken for in the Platte River and seasonal changes lead to changes in demand. The lenses document the rising water of a flood, desiccation of a drought, or the arrival of the Sandhill cranes, giving students a rare look at the water and life along the Platte River.

VOCABULARY

River Basin: An area of land drained by a river and its branches.

Flood: An overflowing of a large amount of water beyond its normal confines, especially over what is normally dry land.

Drought: A prolonged period of abnormally low rainfall, leading to a shortage of water.

Materials And Prep:

Drought Timelapse Flashdrive
Quadrilla
Nature Journal worksheet
Flooding Over Instructions and Script

Engage: 10 min

Students will visit the Platte Basin Timelapse webpage: https://plattebasintimelapse.com Have them write down 3 things they notice, 2 things they wonder, and 1 prediction they have about the project? Come back as a group and talk about what the students noticed on the website. Explain what the timelapse is doing and ask students why they think it's important?

Explore: 15 min

Direct students to the "Timelapse" page. As they scroll down, there will be a map of the Platte Basin Timelapse coverage area. Each camera icon allows them to view the timelapse of a different area in the Platte Basin. Note the right half of the map is the state of Nebraska. Students will choose a location by clicking on the pin drop, viewing a photo from the location, then scrolling down to their selected location. Click on this heading (location's name) to see the timelapse. Students then write dates from the timelapse in their nature journal. The journals are three pages, each page representing a different date. The first page is the first date of the timelapse, the third will be the last, and the second will be any date in between. Journals should include the date, weather, water level that they notice, and any other observations or predictions about what animals, plants, and human activities depend on the ecosystem.

JUNIOR NEBRASKA MASTER NATURALIST

Explain: 15 min

Have a few students share what timelapse site they chose and what patterns they noticed about the timelapse. Explain what causes droughts/floods naturally and what human interactions cause droughts and floods.

Natural causes can be abnormal amounts of precipitation upstream, and/or abnormal depths of ice formation downstream. Humans can cause droughts by overusing water. To view the most recent drought on timelapse, use the provided flashdrive or attached images. Students/Teacher will then go to the platte basin timelapse webpage https://plattebasintimelapse.com Scroll down and open The Year of the Flood. From there, scroll down to Fremont and Omaha satellite imagery, and just beneath that, draw the students' attention to the before and after flood pictures. The following 3 timelapses are dated in the lower left corner, play the March 12th 2019 timelapse

Extend: 15 min

Split students into groups of 3 to 5. Provided in the Quadrilla box are pictures, a script and set up instructions for the 'Flooding Over' activity. Students should develop a solution that could be implemented in order to reduce the impact of floods on their cities.

Evaluate: 10 min

Group leaders explain their solutions and answer questions from the class. Facilitate a discussion about the effects of a flood such as this one would have on plants and animals.

Hands On Extension

Using Technology: Visit https://river-runner.samlearner.com/
River Runner uses Google Earth to simulate the path of a raindrop. Click anywhere in the U.S. and follow alongside a raindrop as it makes its way to the nearest river. Have fun looking at the landscape as you simulate travel along the length of the watershed. This technology allows students to start in the extreme West of Nebraska and follow it as far as they want, perhaps all the way to the ocean!

Flooding Over

(15 minutes) up to 5 groups

- Position 5 boundaries of blue survey tape draped in large circles across the floor.
- Each Quadrilla provides enough materials for 5 groups of 2-3 students. Coordinator will provide more than one Quadrilla for classes/groups greater than 15.
- Ask students what causes floods. Paint a mental picture of a floodplain.
- Assign students a job - build a city within the blue boundary tape using blocks and a rail.
- Once each group's city is built, educator reviews where each group positioned their cities within the blue boundary, in relation to the river. Ask a group what their reason for placing the city where they did?
- Educator leads the flooding story, setting the stage with images and details.
- Every group is directed to start their flood. The tan twine pieces are moved off the rails [which symbolize the river] and the twine creeps over the bank of the river, but stops short of reaching their city.
- The next repetition will begin when all groups have brought their cities alongside the river.
- Educator leads with their flood story, every group is directed to start their flood, this time it damages the city, and the tan twine pieces make it into the city streets.
- Students brainstorm possible solutions to prevent the city from flooding and being damaged again.
-
- Educator introduces new blocks/materials.
- Students are directed to rebuild their cities adding their materials and solutions.
- Each group shares their solution.
- Educator finishes by relating to the real life example of Offutt Air Force Base and what solutions they put in place to protect them from the next big flood.
- The tan flat blocks, purple flat blocks, and both kinds of the very small red blocks shouldn't be used during this first build stage. "Today I have a job for each of you, to build a city. The city can be built anywhere within the blue tape boundary, Each group will have blocks to represent city structures and a rail to represent the Missouri River. Instruct them to set up the tan twine on top of their rail (this 'water' will creep out of the banks of the Missouri River and into the city when you direct it to "Flood". After 3 minutes each group should have built a city somewhere within the blue tape boundary. Ask each group where they placed their city, and why? Now the instructor begins their flood story using detailed imagery, about it creeping up the banks and how scary it was when the water seemed to be moving higher faster and faster. Students are instructed to move their tan twine away from the river just a bit into the floodplain, as it begins to flood more as the day goes on, they should move their tan flat blocks farther away from the river, but stopping short before entering the city. "What happened to their city that was built within the boundaries of the blue tape?" Gather an answer from each group. Side note: Each group may have positioned their city in different places within the boundary. For those groups who built alongside the river, they can wait while the other groups move their cities, so that they, too, are now positioned along the Missouri River for the second 'flooding'. Make sure every group's tan twine is again placed on top of their river rail(s). Have the students repeat the flooding scenario by again moving the tan flat blocks into the floodplain symbolizing the flood. This time some buildings start to crumble and break off their foundations.
- "What did the flood look like? What happened to the inside of the bank? The grocery store?" Add to your flood story that it was a total loss, they had to start over and remove the flooded buildings. How much money would this cost? Does anybody know what would be the first thing you would do to begin the clean up of your city?" Ask them to begin to rebuild.
- Knock the flooded part of the town down. "Now, talk with your group again, and figure out what all of you could do for the city. Is there a way to make the city safer from the floodwater?"

Flooding Over

Give each group time to share their solutions. Congratulate them on making the same decisions that adult, professional engineers make when mitigating floods.

Finish with a real life example. "Do you know what happened to Offutt Air Force Base? It was severely flooded.. Employees could not go to work and it took 4 weeks for the water to dry up, then the buildings had to be knocked down and rebuilt. Total, this cost 10 million dollars. Engineers had to figure out, just like you, what they could do so that the next time it flooded Offutt Air Force Base wouldn't get flooded at all. Can you guess what they chose to do for the next flood?.. They built the levy up several more feet from what was already there.

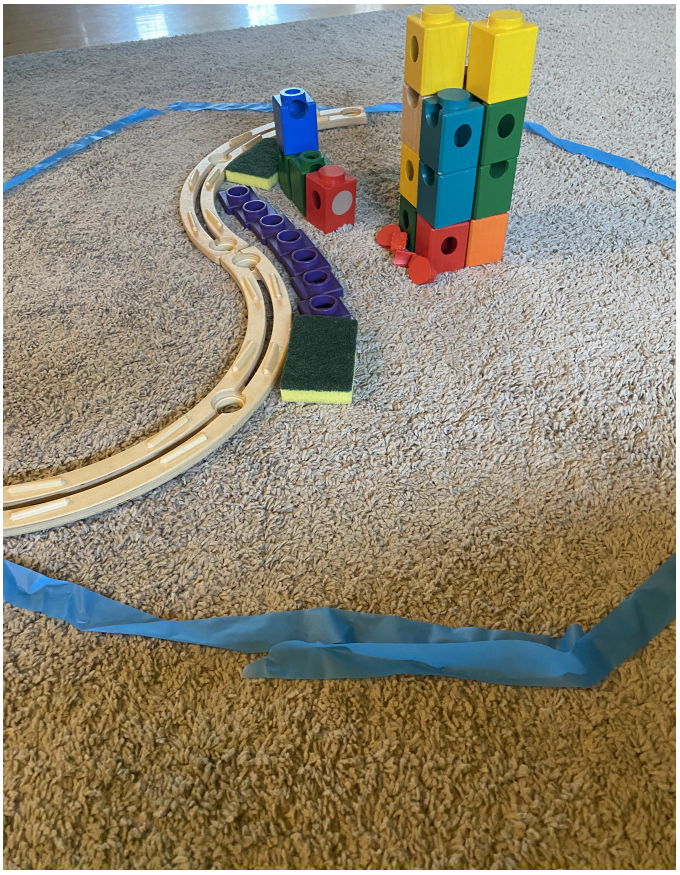
"The next time the Missouri River floods, your solutions may save your city from ruin and damages."

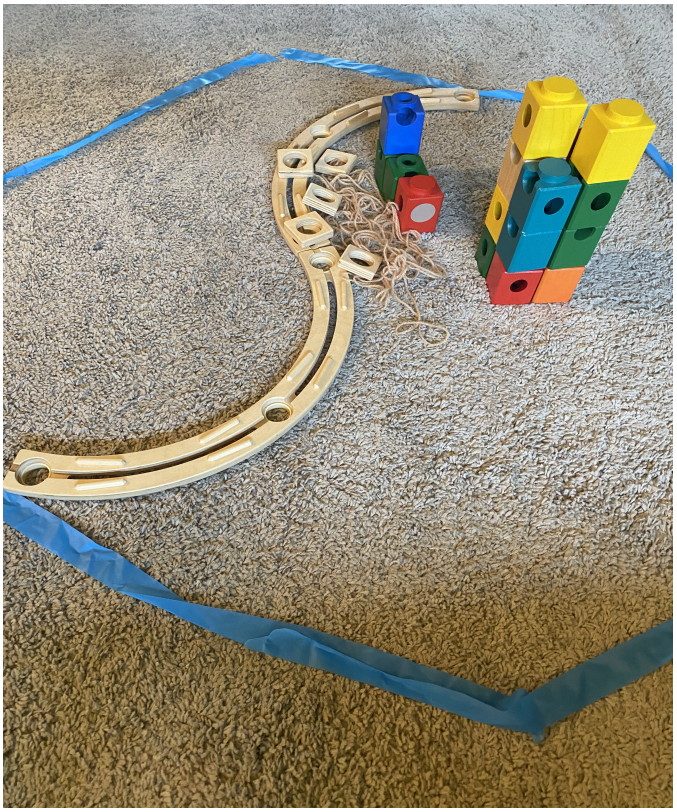
Instruct them to rebuild using these new materials:

1. Some of the purple flat blocks to create a levy,
2. The very small red block pieces 'sandbags'
3. Blue cleaning pad to add a lake between the river and city (floodwater storage), green stove cleaning sponge for wetlands, (also floodwater storage).

- Give each group time to share their solutions. Congratulate them on making the same decisions that adult, professional engineers make when mitigating floods.
- Finish with a real life example. "Do you know what happened to Offutt Air Force Base? It was flooded very badly. Employees could not go to work and it took 4 weeks for the water to dry up, then the buildings had to be knocked down and rebuilt. This cost them ten million dollars. Engineers had to figure out, just like you, what they could do so that the next time it flooded Offutt Air Force Base wouldn't get flooded at all. Can you guess what they chose to do for the next flood?.. They built the levy up several more feet from what was already there.
- "The next time the Missouri River floods, your solutions may save your city from ruin and damages."

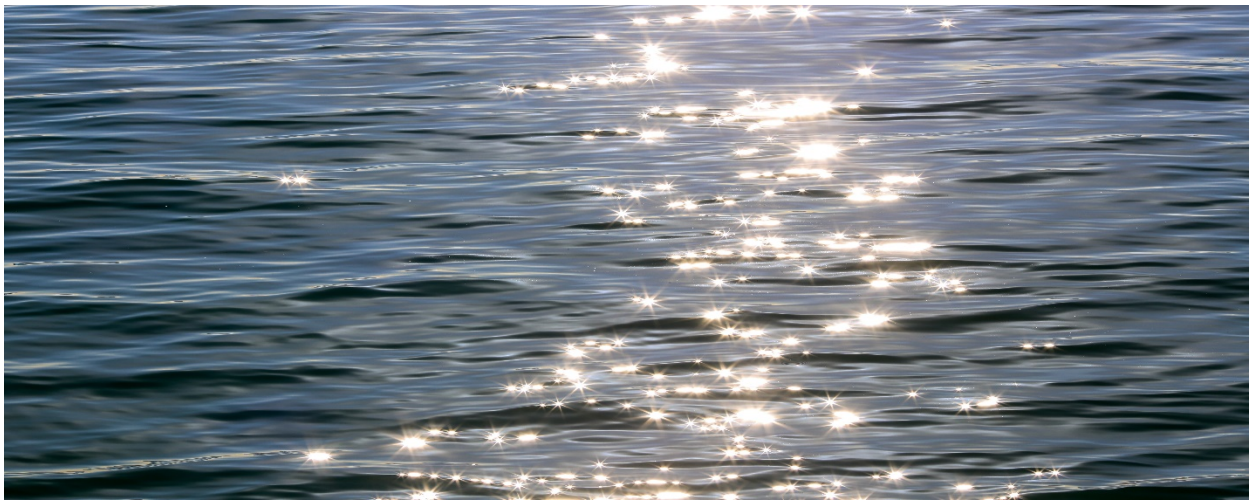
Flooding Over







Name of timelapse: _____ First Date on timelapse: _____



Write 3 things you notice

1.

2.

3.

Write 2 things you wonder

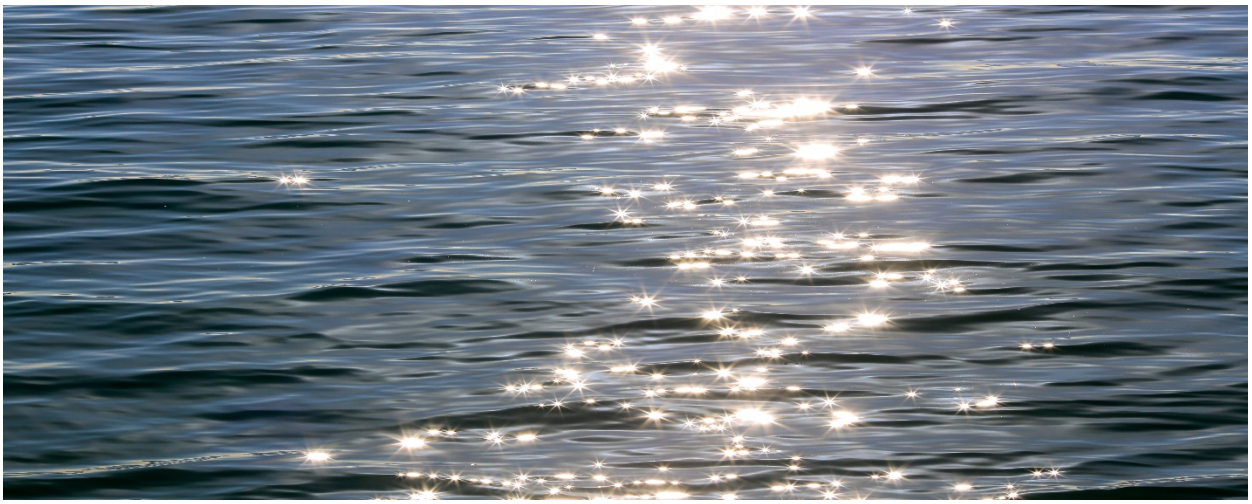
1.

2.

Write 1 thing you predict.....a prediction about what you'll see and learn

1.

Name of timelapse: _____ First Date on timelapse: _____



Weather:

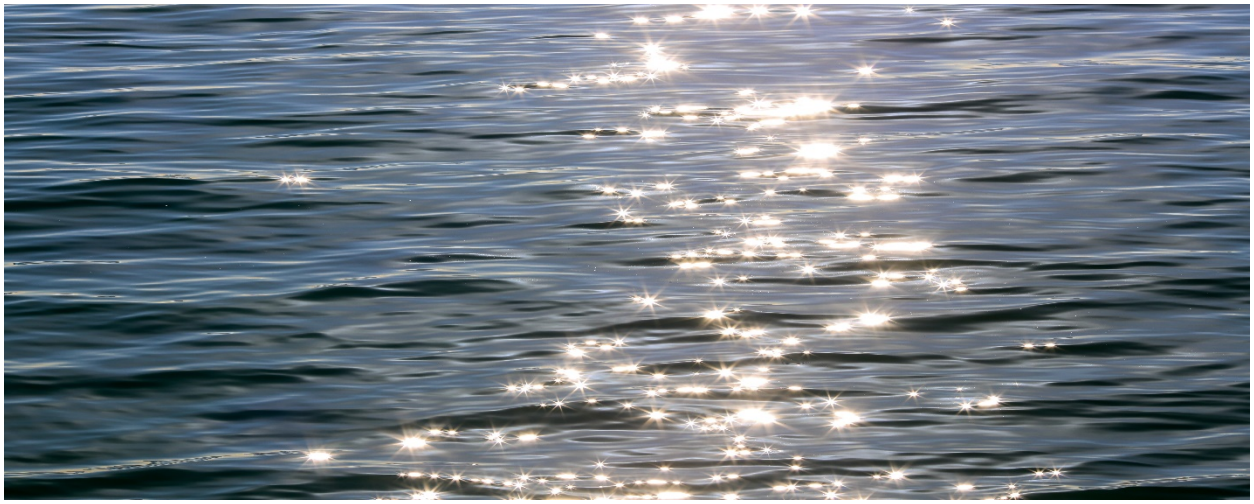
Water Level:

Observations of Plants:

Obeservations of Animals:

Observation of Human activity:

End date on timelapse_____



Weather:

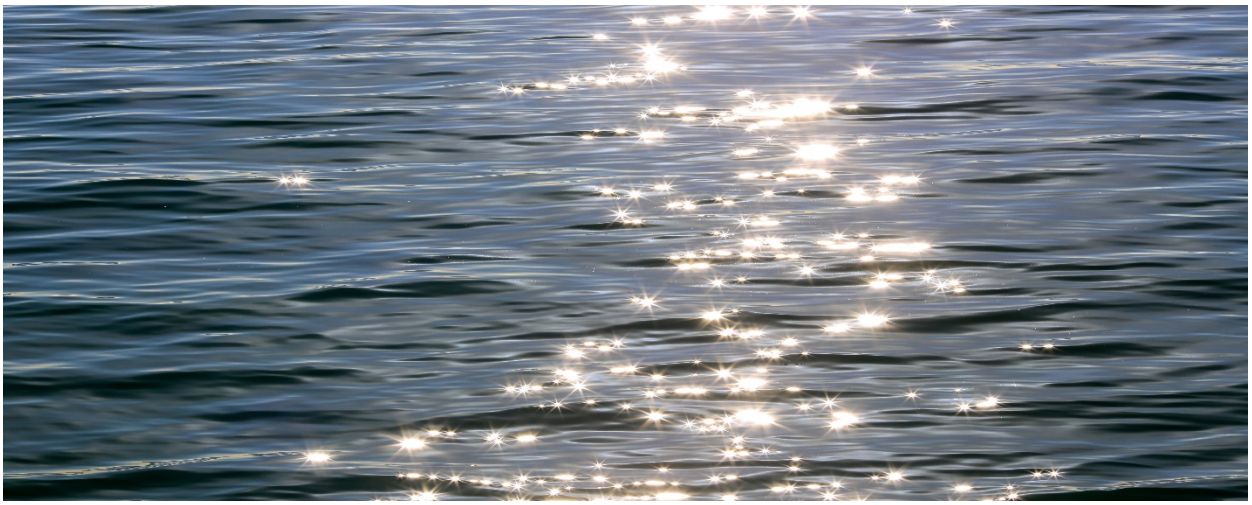
Water Level:

Observations of Plants:

Obeservations of Animals:

Observation of Human activity:

Any date in between the first date and the last: _____



Weather:

Water Level:

Observations of Plants:

Obeservations of Animals:

Observation of Human activity:

