

NGSS Lesson Planning Template

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| Grade/ Grade Band: 2 nd grade | Topic: Water on Earth | # of Lessons: 8 – 9 |
| <p>Brief Lesson Description: This series of lessons will take place after the unit of properties of materials giving students the background of the three states of matter/water: solid, liquid, and gas. Prior to these lessons students will have learned about the water cycle further building their background knowledge in order to build the connection that water is found in many different form on Earth including as liquid in the form of rivers, lakes, and streams as well as a solid in the form of glaciers, icebergs, ice shelves, and snow.</p> | | |
| <p>Performance Expectation(s): 2-ESS2-3. Obtain information to identify where water is found on Earth and that it can be solid or liquid.</p> | | |
| <p>Specific Learning Outcomes: Students will engage in conversation to share what they know (or think they know) about where water is found on Earth Students will make observations of different places on Earth to identify the different forms of water. Students will make a model of how a melting glacier can form different bodies of water. Students will use this model to identify different forms of water on Earth. Students will conduct research on a body of water and explain what they learned by creating a flipgrid. Students will use what they have learned to label the bodies of water in their lab observations.</p> | | |
| Narrative / Background Information | | |
| <p>Prior Student Knowledge: Prior to this lesson students will have had practice reading maps and be familiar with how to use a map key. Students will also have reviewed the different states of solid, liquid, and gas and have had lessons about the water cycle. Students should know that all water travels on Earth travels in a cycle and that it can either be found in the form of a solid, liquid, or gas.</p> | | |
| <p>Science & Engineering Practices: Obtaining, Evaluating, and Communicating Information Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.</p> <p>Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question.</p> | <p>Disciplinary Core Ideas: ESS2.C: The Roles of Water in Earth’s Surface Processes Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form.</p> | <p>Crosscutting Concepts: Patterns Patterns in the natural world can be observed.</p> |
| <p>Common Core State Standards: ELA/Literacy — W.2.6 With guidance and support from adults, use a variety of digital tools to produce and publish writing, including in collaboration with peers. W.2.8 Recall information from experiences or gather information from provided sources to answer a question.</p> | | |
| LESSON PLAN – 5-E Model | | |
| <p>ENGAGE: 1 class period Objective: Students will engage in conversation to share what they know (or think they know) about where water is found on Earth</p> <ul style="list-style-type: none"> • Show the students the KLEWS chart (Renfrew) (what do you KNOW, what have you LEARNED, EVIDENCE, WHAT do you want to know, and SCIENCE words). The heading of the chart should read “Where do we find water on Earth?” Have students share their ideas of where we find water on Earth. Write these ideas down under the K • Show the students the image of glaciers and glacial lakes in Bhutan-Himalaya (Image 1) (https://en.wikipedia.org/wiki/Retreat_of_glaciers_since_1850#/media/File:Glacial_lakes,_Bhutan.jpg) • Students will take a few moments to look at the photograph and then share their wonderings about what they see. Allow students to share all ideas and record them. • Have students share their ideas and tape them or write them on the chart under the ‘K’. Later in the lessons the class can revisit what they said in the beginning to see if and how their thinking how and where water is found on Earth has changed. | | |

EXPLORE:**Objective: 1 class period**

Students will make observations of different places on Earth to identify the different forms of water.

- After discussing what they know about different bodies of water, students will make observations of different photographs to identify where they see different forms of water. (*Students should have experience with the different forms of water: solid, liquid, and ice, and have an understanding that these are reversible changes.*)
- Explain to the students that each group will receive a picture (there are four pictures so two groups have the same picture, this will allow two groups to discuss their observations). They will observe the pictures and will circle all the places that they see water. If they can identify these bodies of water, they will use a sticky note to label the body of water. (See images below).
- Meet back at the carpet after the groups have looked at their pictures and have the groups share what they observed. Each picture contains two forms of water liquid and either ice or snow. Even though we have previously discussed the different forms of water students may not make the connection that snow, and ice are forms of water on land.

Objective: 3 – 4 class periods

Students will make a model of how a melting glacier can form different bodies of water.

Students will use this model to identify different forms of water on Earth.

Students will conduct research on a body of water and explain what they learned by creating a flipgrid.

Explain to the class that we will use a model today to see how different bodies of water, like the ones they observe in the pictures, can be formed. (see the attached lab sheet for instructions)

- Show students how to set up the lab
- Review the steps of the lab
- After each group has gathered and set up their lab materials begin the lab.
- Model the first step for the students

After the lab give students the opportunity to discuss with each other at the table what happened in the lab. They may identify different bodies of water that have been created even though we have not formally introduced the terms. Bring the class back to the carpet to discuss what they saw in the lab. If they want to identify the bodies of water that is fine, but it will be explained in the next lessons.

Next, we will read the book *Covered in water* (Lawrence, 2016). As we read, we will create a list of the different bodies of water. When we are done each group will be assigned a different body of water. They will use the different books in EPIC to do their research. As they research their body of water (river, stream, lake, pond, glacier, iceberg, iceshelf) they will record key facts using the graphic organizer (see attached) and will draw a diagram to illustrate the body of water on an index card. When they are finished each group will create a flipgrid to show to the class explaining key facts about the water they were assigned.

After we watch the flipgrids students will add their index card drawings to the KLEWS chart under what we have learned.

EXPLAIN: 1 class period**Objective:**

Students will use what they have learned to label the bodies of water in their lab observations.

- Today we will explain where fresh, salt, and frozen water are found on Earth. Students will need their notebooks to go back to the lab they completed. Now we will label the different bodies of water. Students should be able to identify the rivers and streams, lakes and ponds, and the ice that was at the top of the mountain as either snow or glacier.
- Before the class discussion watch the following video from NASA: How much water is on Earth?
<https://spaceplace.nasa.gov/water/en/>
- Discuss how water travels in a cycle as we know and that precipitation, streams and rivers, and runoff from

melting snow and ice can fill the depressions in the Earth's surface to create lakes, ponds, and oceans. We know from the different class presentations that some water on Earth is fresh water like our streams, rivers, and lakes while some water is salty like our oceans.

In the video we learned that 3.5% of the water on Earth is fresh water, the type of water that we can drink. Of that 3.5% most of it is trapped in ice and glaciers.

Show the class the picture below.



https://climate.nasa.gov/climate_resources/4/graphic-dramatic-glacier-melt/

Ask the class, if much of our fresh water is trapped in the ice do you think we would want it to melt? What do you think would happen if it all melted? Do they think that what we see in the picture above is good or bad?

Allow students to discuss this with their partners and then share their thoughts.

Vocabulary:

Fresh Water

Glacier

Ice

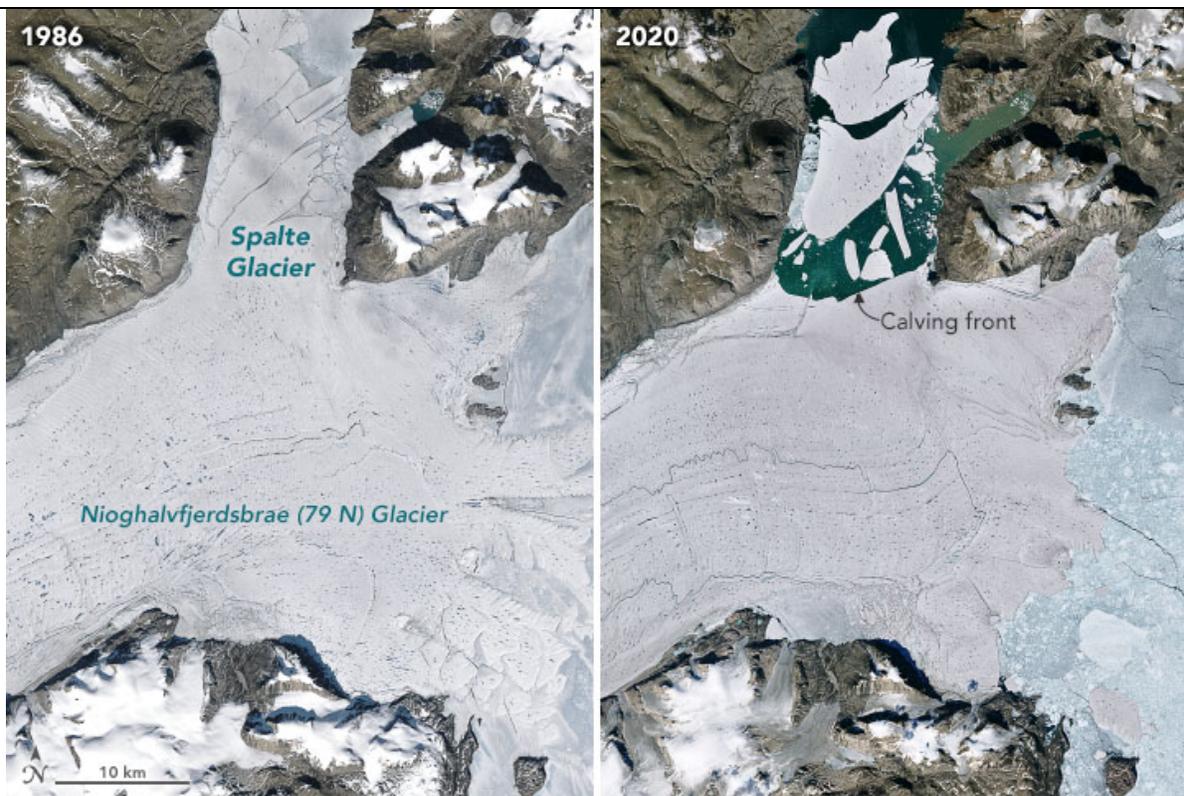
Runoff

Depression

ELABORATE: 2 class period

Measuring Sea Ice and the Sea Level is an important part of looking at our planet's health. But how do we do it? Today we are going to explore one of the many ways that scientists at NASA monitor and measure the ice on the Earth.

- In our model we saw the ice cube melt and create rivers, lakes, and streams but what kind of impact would that have to us on Earth?
- Introduce students to NASA's ICE-Sat. Together we will explore the website to see how NASA scientists and engineers have developed tools to measure the frozen and icy areas of our planet called the cryosphere.



<https://earthobservatory.nasa.gov/images/147350/spalte-splits>

- NASA earth observatory has many images that show the melting of the cryosphere. Allow students to work in pairs to explore the https://icesat-2.gsfc.nasa.gov/fun_zone. There are several interactives that are appropriate for this grade level.
- Have students share what they learned as they explored the website and images.
- The images we have observed are caused by climate change.
- Ask the students what they already know about climate change. Write down their ideas.
- Next have the students read the article Climate Change in National Geographic Kids <https://kids.nationalgeographic.com/explore/science/climate-change/>
- Create an anchor chart for students to fill in the impact of climate change and the loss of part of our cryosphere. Have the word CLIMATE CHANGE in the middle – around the word write their ideas.
- Read about the students in Iceland that held a funeral for its melted glaciers (<https://www.kidsnews.com.au/environment/iceland-holds-funeral-for-its-melted-glacier-and-leaves-a-letter-to-the-future/news-story/91115ec36523c85d2a2073451fc5860c>) Have the students write a letter back to the those students in support of their feelings about the dangers of climate change and the loss of the glaciers.

EVALUATE:

Formative Monitoring –

This will be done throughout the lesson. There are many opportunities to listen to the students talk about their ideas and listen for misconception and misunderstanding as well as to gauge how well students are understanding the concepts. When students revisit the lab this is also an opportunity for a formative assessment to see if they can correctly identify the different forms of water in their model.

Summative Assessment –

See attached assessment and rubric. This assessment will be given after we read about climate change.

Materials

Chart paper for KLEWS chart

Forms of Water on Earth Lab Sheet – one for each student

Materials for the Lab – one for each group

- One blue ice cube (pre make these and use blue food coloring to dye them blue. This makes it easier to see the water in the lab)
- One small paper bowl
- Lab tray
- One large piece of tin foil
- Squeeze bottle filled with warm water

Body of Water graphic organizer

Index card for each group

Laptop with access to flipgrid for the assignment

Images

https://en.wikipedia.org/wiki/Retreat_of_glaciers_since_1850#/media/File:Glacial_lakes,_Bhutan.jpg

<https://www.nationalgeographic.com/science/2019/11/glaciers-of-himalaya-other-south-asian-mountain-ranges-melting-feature/>

<https://www.asianart.com/articles/halji2/23.html>

<https://www.theguardian.com/environment/2020/aug/31/satellite-images-show-rapid-growth-glacial-lakes>

<https://video.nationalgeographic.com/video/science/perpetual-planet/0000016e-60d6-de5b-a3ee-70f69b3c0000>

Websites / videos

Video: How Much Water is on Earth? <https://spaceplace.nasa.gov/water/en/>

<https://icesat-2.gsfc.nasa.gov/icesat-2-data>

https://climate.nasa.gov/climate_resources/4/graphic-dramatic-glacier-melt/

<https://climatekids.nasa.gov/10-things-glaciers/>

Image #1 (Engage)



https://en.wikipedia.org/wiki/Retreat_of_glaciers_since_1850#/media/File:Glacial_lakes,_Bhutan.jpg
(this image is credited to NASA http://visibleearth.nasa.gov/view_rec.php?id=2876 but the link created an error message)

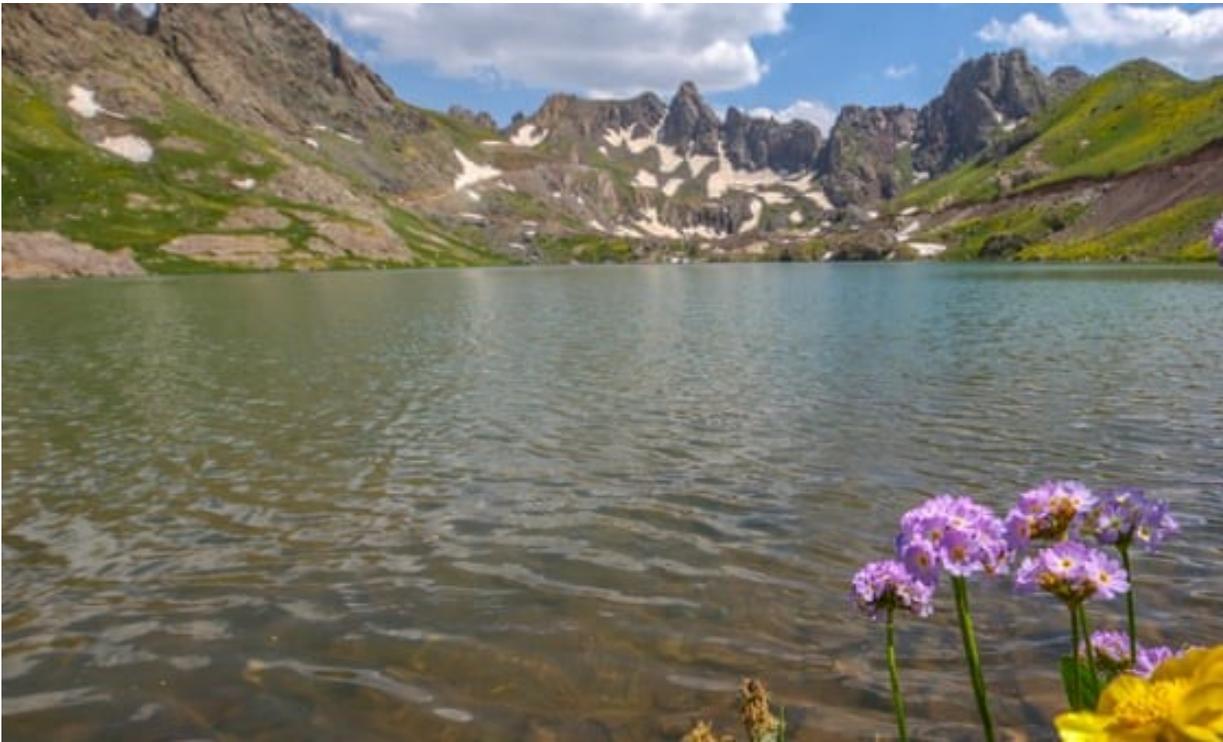
Images for Explore



<https://www.nationalgeographic.com/science/2019/11/glaciers-of-himalaya-other-south-asian-mountain-ranges-melting-feature/>



<https://www.asianart.com/articles/halji2/23.html>



<https://www.theguardian.com/environment/2020/aug/31/satellite-images-show-rapid-growth-glacial-lakes>



<https://video.nationalgeographic.com/video/science/perpetual-planet/0000016e-60d6-de5b-a3ee-70f69b3c0000>

Name: _____

Forms of Water on Earth Lab

Step 1: Place the paper bowl upside down on the tray.

Step 2: Take the tin foil and place it over the bowl creating a “mountain” with the tin foil.

Step 3: Place the blue ice cube on the top of the mountain.

Step 4: Draw your model in the box below.

What do you think will happen as the ice cube begins to melt?

In science we use models to help us understand and explain things that happen in the natural world. This helps us see large scale events that take time to occur in a much shorter amount of time. How could we speed up the process of melting the ice cube?

Step 5: Take the warm bottle of water and slowly begin to pour it over the ice cube. Observe what happens as the ice cube melts.

Step 6: Draw your model. Use crayons to color in the blue areas of your model.

Body of Water Research Graphic Organizer

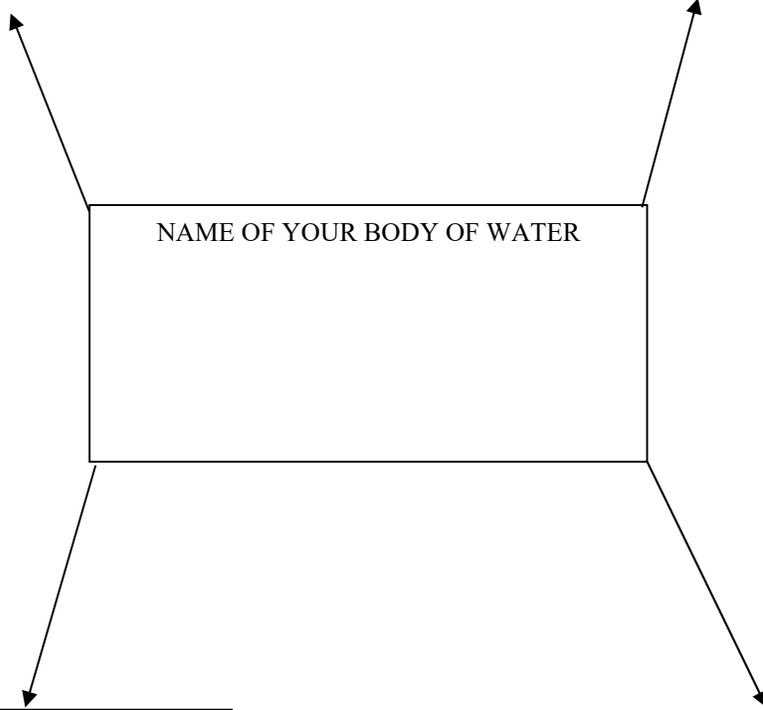
Tell us about the size of your body of water.

Tells us where your body of water can be found

NAME OF YOUR BODY OF WATER

What makes your body of water unique?

How much of all the water on Earth is made up of your type of water?



Short Performance Assessment: 2-ESS2-3

Grade Level: **Second Grade**

Adapted from [SNAP](#)¹

| | | | |
|---|--------------------------------|-----------|---------------------|
| Title | Touring Iceland's Water | | |
| Designed by | Paul Andersen | Course(s) | NGSS Grade 2 |
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|-------------------------|---|
| Performance Expectation | 2-ESS2-3: Obtain information to identify where water is found on Earth and that it can be solid or liquid. Clarification Statement: none Assessment Boundary: none |
|-------------------------|---|

| | |
|----------------------------------|--|
| Science and Engineering Practice | Obtaining, Evaluating, and Communicating Information <ul style="list-style-type: none">Obtain information using various texts, text features (e.g., headings, tables of contents, glossaries, electronic menus, icons), and other media that will be useful in answering a scientific question. |
| Disciplinary Core Ideas | ESS2.C: The Roles of Water in Earth's Surface Processes <ul style="list-style-type: none">Water is found in the ocean, rivers, lakes, and ponds. Water exists as solid ice and in liquid form. |
| Crosscutting Concept | Patterns <ul style="list-style-type: none">Patterns in the natural world can be observed. |

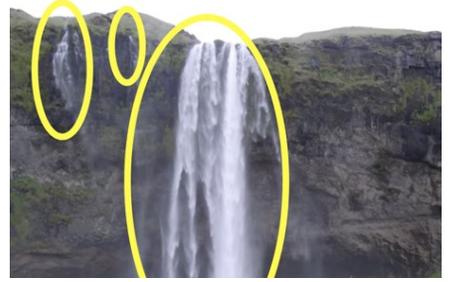
| | |
|---------------------|---|
| Student Performance | 1. Obtaining information 2. Evaluating information |
|---------------------|---|

¹ The Short Performance Assessment (SPA) and the Assessment Rubric adapted from the Stanford NGSS Assessment Project <http://snapgse.stanford.edu/>

Name _____

Touring Iceland's Water

Watch the [Viator Travel video on South Iceland](#). In addition to **ice** you should be looking for any references to **water** (liquid or solid) in the environment.



1. In the following transcript of the video **highlight** (or circle) all words that refer to **water**. Also circle all forms of **water** in the pictures. You will use this information to complete a chart on page 2.

Today we're taking a day trip from Reykjavik to explore South Iceland. One of the most beautiful parts of the country. We'll be seeing gushing waterfall black sand beach, and even hiking across a glacier. I'm at the top of a 200-foot waterfall. It's absolutely breathtaking. It's in the middle of this lush countryside with sheep on the side, birds flying underneath the waterfall. Just stunning.



Reynisfjara Beach is one of the most famous sights to photograph in Iceland. One of the really unique parts about this is it has black sand from the volcanic ash and there's so much to see here. I'm gonna go check it out. I can't even believe this cave. It looks like the rocks could fall on you any second. It's slightly terrifying and totally amazing.



definitely get wet.

This farm is at the base of Eyjafjallajokull which is a glacier topped volcano which erupted in 2010 spreading ash all around the valley. I have my crampons, my pick axe, and I am ready to climb this glacier.

In a country full of waterfalls, Seljalandsfoss is one of Iceland's most photogenic. It's also one you can get closest too. One of the cool things about this waterfall is that there's a footpath that runs all the way around it. But make sure to wear a rain jacket because. You'll



There's two things you want to watch out for when you're climbing the glacier, the crevasse and also the melange which means melt which is formed by water, rushing water underneath. What blows me away about Iceland is the contrasting landscape you have. This glacier right next to these rolling hills. It's like nothing I've ever seen before in my life.

From serene countryside to gigantic glaciers, it's no wonder why South Iceland is legendary for its beauty.



Patterns in Iceland's Water

2. Organize all the forms of water you saw in the video in the table below.

| Water Location (e.g. Ocean) | Water Form |
|-----------------------------|-----------------|
| | Solid Liquid |

3. Why do you think Iceland has so many different forms of water? Give at least two reasons to explain your answer.

Assessment Rubric - Question 1

| | 1 | 2 | 3 | 4 |
|----------------------------|--|---|--|--|
| Description of performance | Students circle or highlight 2 or 3 of the words and images that contain the forms of water and or only correctly identify the state of 2 or 3 | Students circle or highlight 5-4 of the words and images that contain forms of water (waterfall, glacier, glacial melt) and or only correctly identify the state of 3-2 (solid or liquid) | Students circle or highlight all of the words and images that contain forms of water (waterfall, glacier, glacial melt) but only correctly identify the state of 5-4 (solid or liquid) | Students circle or highlight all of the words and images that contain forms of water (waterfall, glacier, glacial melt) and correctly identify the state (solid or liquid) |

Assessment Rubric - Question 2

| | 0 | 1 | 2 | 3 |
|----------------------------|--|---|--|---|
| Description of performance | Student does not attempt to answer the questions | Students attempts to explain why there are different forms of water on Iceland but does not give reasons to support their answer. | Student correctly explains why there are different forms of water on Iceland and gives one reason to support their answer. | Student correctly explains why there are different forms of water on Iceland and gives two reasons to support their answer. |

(assessment rubric created by Judy Sunner)

References

- Graphic: Dramatic glacier melt – Climate Change: Vital Signs of the Planet. (2015, October 15). Retrieved November 9, 2020, from https://climate.nasa.gov/climate_resources/4/graphic-dramatic-glacier-melt/
- Home. (2020, October 08). Retrieved November 9, 2020, from <https://snappse.stanford.edu/>
- How Much Water Is on Earth? (2020, March 26). Retrieved November 9, 2020, from <https://spaceplace.nasa.gov/water/en/>
- Lawrence, E. (2016). *Covered in water*. NYC, NY: Bearport Publishing.
- NASA, P., Huyangshu, P., Reichner, P., & Images, P. (2020, May 19). Climate change. Retrieved November 8, 2020, from <https://kids.nationalgeographic.com/explore/science/climate-change/>
- Renfrew, D. (n.d.). KLEWS: Supporting Claims, Evidence & Reasoning. Retrieved September 21, 2020, from <https://www.teachingchannel.com/blog/klews>
- Retreat of glaciers since 1850. (2020, November 03). Retrieved November 7, 2020, from https://en.wikipedia.org/wiki/Retreat_of_glaciers_since_1850