

**Grade 2**  
**Unit 3: Earth's Systems**  
**Disciplinary Core Idea: Earth's Systems**  
**Investigation 3**

### **Overarching Questions**

- What do scientists use to show people how the natural world works?
- How would Yakutat look from a bird's eye view?
- Where would tourists want to go in Yakutat?

### **Overarching Goals**

Students will understand that maps are tools which display where things are located and that Yakutat is made up of different landforms and bodies of water (mountains, islands, beach, sandbar, lake, river, fjord/strait, harbor, ocean) that can be identified, described by various characteristics and sketched on a map. Students will also be able to construct their own maps using information obtained from various sources (text, text features, and other media).

### **Objectives**

#### ***Next Generation Science Standards***

[2-ESS2-2] Develop a model to represent the shapes and kinds of land and bodies of water in an area.

[2-ESS2-3] Obtain information to identify where water is found on Earth and that it can be solid or liquid.

- After instruction and observing different models the student will be able to construct a labeled map that displays where things are located, at the proficient level of a teacher made rubric.
- After instruction and obtaining information from different sources the student will be able to sketch, label and match various landforms (including land and water bodies) found in Yakutat to their descriptions, at the proficient level of a teacher made rubric.
- After instruction and obtaining information from text and demonstrations the student will be able to compare the differences between liquid and ice and provide examples where each is found in Yakutat, at the proficient level of a teacher made rubric.

### **Vocabulary**

#### **Water**

**Liquid-** Flows and can be poured easily. Very difficult to hold.

**Ice-** Water in solid form. Keeps its shape and doesn't flow or spread out on its own.

**Landforms-** Natural feature (part) of Earth's surface

**Water body-**

**Characteristics**

### **Materials**

#### **Lesson 1: Pre-Assessment- What do you know?**

- Pre-Assessment- 2-ESS2-2/3 written (1 per student)
- Glue and/or double sided tape
- Science notebooks

#### **Lesson 2: Traditional Knowledge**

- The Forces of Nature: A Statement of Problems (Volume 2 p. 808-809 in “Under Mount St. Elias: The History and Culture of the Yakutat Tlingit by de Laguna- Available in YSD library)
- Spirits and Beings in the World (p. 816) **and** The World (pp. 816-17) (Volume 2 p. 894 in “Under Mount St. Elias: The History and Culture of the Yakutat Tlingit” by de Laguna- Available in YSD library]
- Bodies of Water (Volume 2 p. 817-818 in “Under Mount St. Elias: The History and Culture of the Yakutat Tlingit” by de Laguna- Available in YSD library)
- Part 1: Guide for Using and Enjoying this Book (Pp. 7-16 in “Keepers of the Earth” by Michael Caduto and Joseph Bruchac)
- Once Upon a Place Activity (pp. 22-23 in “Keepers of the Earth”)

### Lesson 3: What is an Outdoor Guide?

- Student worksheet: Career Profile (1 copy per student)
- Science A-Z Career File: Outdoor Guide

### Lesson 4: What are maps?

- “Me On the Map” by Joan Sweeney (book)
- TeachersPayTeachers: Me on the Map activity
- Science A-Z Graphic Organizer: KWL
- Hand lenses
- Globe (5)
- Geography Terms Poster (5 total)
- Landform Discovery Pack Model
- Bee replica
- Beluga whale replica
- Science A-Z How Rainbows Form diagram
- Science A-Z Types of Precipitation
- DK Workbook: Geography (pp. 4-5, 7, 10)

#### **Supplementary Materials**

- The Complete Book of Maps and Geography
- Follow that Map! (Book by Scot Ritchie)
- Landform and Water Bodies Map

### Lesson 5: What types (forms) of water can we find in Yakutat? Where can we go kayaking in Yakutat?

#### Day 1

- Glaciers (Volume 2 pp. 818-819 in “Under Mt. Saint Elias: The History and Culture of the Yakutat Tlingit” by de Laguna- Available in YSD Library and excerpt attached to investigation)
- The Legend of Glaciers in Yakutat (Volume 2 p. 894 in “Under Mt. Saint Elias: The History and Culture of the Yakutat Tlingit” by de Laguna- Available in YSD Library and excerpt attached to investigation)
- Science A-Z Graphic Organizer: KWL (1 per student)
- Science A-Z Wordsmart (1 sheet per student)
- Comparing Solids and Liquids worksheet (1 copy per student)
- AKSCI Investigating Matter, Cool Balloons
- Science A-Z Non-fiction: Solids, Liquids, Gasses (1 copy per student)

#### Days 2-4

- Geography Terms Poster (5 total)
- Map of Yakutat (5 total)
- Landform Discovery Pack Model
- Science A-Z Graphic Organizer: KWL
- TeachersPayTeachers: Landforms and Bodies of Water Activity (pp. 9, 30-32, 35-37)

- DK Workbook: Geography (pp. 12-14 & 33)
- “Sources of Water” by Rebecca Olien (11)
- AKSCI Growth of a River lesson plan
- AKSCI Identifying and Locating Lakes and Rivers

#### Lesson 6: Where can we go sightseeing in Yakutat? (What landforms do we have in Yakutat?)

- Geography Terms Poster (5 total)
- Landform Discovery Pack Model
- Science A-Z Graphic Organizer: KWL (1 per student)
- TeachersPayTeachers: Landforms Posters and Bingo (p. 12)
- TeachersPayTeachers: Landforms and Bodies of Water Activity (pp. 10-11, 16-17, 26, 28, 34, 48)
- DK Workbook: Geography (pp. 11, 15, 16, 33)
- Science A-Z Focus Book: Valley
- Science A-Z Focus Book: Coast
- Learning about Mountains reading (1 copy per student)
- The Story of Mount Saint Elias and Mount Fairweather visual (1 copy per student)
- AKSCI Mountains and Valleys lesson plan
- ASKSC Islands Lesson plan

#### **Supplementary Materials**

- Elementary Science: Landforms by Visual Learning Company

#### Lesson 7: How can we make a travel guide?

- TeachersPayTeachers: My Landforms Travel Guide
- Crayons/colored pencils
- Science notebooks
- Laminated posters from TeachersPayTeachers: Landforms and Bodies of Water Activities (pp. 26, 28, 34, 35, 36, 37)
- Laminated Posters from TeachersPayTeachers: Landforms Posters and Bingo (p. 12)

#### Lesson 8: Post-Assessment- What did you learn?

- Post-Assessment: 2-ESS2-2/3 written (1 per student)
- Post-Assessment: 2-ESS2-2/3 oral (optional)
- Glue and/or double sided tape
- Science notebooks

### **Time frame**

- Two Weeks
- 8, forty-minute lessons

### **Overall Procedure**

# Investigation 1

## **Lesson 1: Pre-Assessment- What do you know?**

**Estimated time:** 1, forty-minute lesson.

**Teacher Prep:** Print and make 1 copy per student of the *Pre-Assessment 2-ESS2-1* worksheet and paste Parts 1 and 3 in students' science notebooks. You can cut out and store the definitions listed under Part 2 in Pixie Cups or Ziploc bags for students ahead of time or have them cut out the definitions on their own during the lesson. Have glue sticks and colored pencils/crayons available for students

### *Elicit/Engage*

- Tell the class they are about to begin a whole new investigation over the next few weeks! This time each student is going to play the part of an outdoor guide that works out of Juneau. The City and Borough of Yakutat has just hired the team for a very special mission. Starting in the summer of 2015 some changes and big opportunities came down the docks and into the town of Yakutat. Two cruise ships dropped off tourists for a few hours to explore the cultural and natural resources the community has to offer. The tourists came from all over the world to see Alaska and had an amazing time watching the St. Elias Dancers greet them with song and dance as well as learning about Yakutat's culture and history during van tours around town. Tourists had such a good time the cruise ships plan to come back during summers in the future! This all being said the City and Borough of Yakutat need to start planning now for upcoming visits so that the tourists have enough to do during the short time they are in town. The one thing the cruise ship companies have asked is that there be more activities involving kayaking and canoeing as well as sightseeing of the area's different landforms. The tourists are very adventurous and they want see Yakutat from the water, land and sky!
- The City Manager has asked that the team develop a Landform Travel Guide that describes different water bodies and landforms that tourists can visit when they want to go kayaking and sightseeing. In addition, the City Manager asks that the outdoor guides include a map that shows where these areas are located in Yakutat.
- The team of outdoor guides have much to learn and do! Before the outdoor guides can get started on this new project the City Manager asks that team take an assessment to show what they know already. This is not a test but a way to know what team member's need to learn before they begin working on their travel guides.
- Refer the class to the worksheets in their notebooks and begin the assessment.

## **Lesson 2: Traditional Knowledge**

**Estimated Time:** 2, forty-fifty minute lessons

**Teacher Prep Option 1:** Invite an Elder or guest speaker from the YTT Cultural Center or community into the classroom to speak on themes related to the Overarching Question and/or Cultural Perspectives (heat/substances) stated below. It is important to note that the 'heritage cultural perspectives' were adopted from the Sealaska Heritage Institute Curriculum in order to provide an overall context as well as connections to the science investigation and should be adapted accordingly to reflect the culture of Yakutat.

### **Overarching Investigative: How did the Tlingit display important ideas?**

- **Heritage Cultural Perspective (on Models)**

Traditionally, the Native people of Southeast Alaska created models of clan houses, which were used to construct the actual houses. Dolls were made to represent children and their clothing. In addition, some jewelry forms were models based on actual items, such as ceremonial shields. Models of canoes were created to provide guidance in the making of actual canoes.

- **Heritage Cultural Perspective (Communicate)**

Native people use totem poles, crests, house posts and screens, ceremonial hats, and other regalia to communicate family histories and origins. When Native people communicate through traditional oratory, recognition and acknowledgement of the opposite moiety is customary.

**Teacher Prep Option 2:** Read over and familiarize yourself with the following excerpts from Volume Two of de Laguna's "Under Mount St. Elias: The History and Culture of the Yakutat Tlingit": *The Forces of Nature: A Statement of Problems* (p. 808-809), *Spirit Beings in the World/The World* (Volume 2 pp. 816-817) and *Bodies of Water* (pp. 817-816). The lesson begins with a discussion of the Tlingit worldview towards the Earth and the spiritual inhabitants of the land, which can be delivered by an Elder, instructors of YTT or the Educator. All three volumes of de Laguna's work can be found in the Yakutat School District Library while scanned copies of the excerpts are included with this investigation. Read over the *Once Upon a Place* activity (pp. 22-23) in "Keepers of the Earth" by Michael Caduto and Joseph Bruchac, which will follow up a local myth about glaciers as well as section *Part 1: A Guide for Using and Enjoying this Book* (pp. 7-17) for more information on how to deliver stories and conduct outdoors activities from a traditional perspective. Place the following objects in front of the classroom: a toy (stuffed animal or plastic figurine), basketball, globe, large rock, cup with water and plant. Draw a Venn diagram on the board, labeling one end as *Human* and the other as *Objects*.

### Engage

- At the beginning of the lesson ask a volunteer to come to the front of the room and sit quietly next to the objects. Ask the class to take a moment to silently observe the objects and human being in front of the room before comparing how they are alike and different with a neighbor.
- As a class discuss the similarities and differences between the objects and human and record students' ideas in the Venn diagram written on the board. You may need to remind students that a Venn diagram is one type of graphic organizer that people use to write down their ideas when comparing how two things are alike and different from one another. The large circles represent the characteristics of each object that are different from one another, while the middle section (where the circles overlap) represents the characteristics that are similar or the same.
- After recording students' ideas on the board, ask the class to sit still and close their eyes for a moment. Once the class has had sufficient time to sit still with eyes closed, ask students to volunteer what they noticed during that moment. Was it completely dark and quiet in their heads? If not, what did they hear or see? Have students' volunteer their observations before turning back to the Venn diagram on the board.
- Explain that over the course of the investigation as the class learns more about bodies of water and landforms such as glaciers or mountains, students will hear you or guest speakers use the word *yēk* when referring to these natural features. Ask the class to volunteer what they know about this particular term and write it in the center of the Venn diagram.
- Explain that *yēk* is a word in Tlingit that means spiritual power. Long ago Tlingit believed, as many still do today, that everything in the world and universe is alive. Some people may think that something is alive only if it moves or talks. Scientists have other ways of defining what it means to be alive or living. The Tlingit thought that everything from mountains, glaciers, rocks and plants to man-made objects and activities was considered alive and therefore had a spirit inside of it. Just like we hear our voices or see images inside our heads, which lets us know we are alive and

thinking, the rock, plant or stuffed animal in front of the room were considered by the Tlingit to act the same way.

- Tell the class that the Tlingit thought the sea and other bodies of water (such as rivers and lakes) were considered alive and had spirits. The Tl'uknaxadi would call the Ocean and Breakers their friend and always talk to it saying things like, I am no different from you. There is a story about the Alsek River, which is said to be related to the Tl'uknaxadi and Tluk<sup>w</sup>axadi people. Two girls were searching for seagull eggs one day at the mouth of the river in Dry Bay. One was called Tl'uknaca, the granddaughter of a Tl'uknaxadi man, while her friend was a Cankuquedi girl. The story goes that the girls were suddenly overcome by a flood of water which had come from snow that was melting higher up the river. Tl'uknaca called out to the water, "Save me grandfather! Bring me to shore!" She lived but her friend drowned. It is thought that Tl'uknaca was saved because she spoke to the water (p. 817, 2009, de Laguna).

#### Explore

- Tell the class they are going to do an activity outside. Implement the *Once Upon a Place* activity (p. 11 of "Keepers of the Earth").

### **Lesson 3: What is an Outdoor Guide?**

**Estimated time:** 1, forty-fifty minute lesson

**Teacher Prep:** Print and make 1 copy per student of the *Science A-Z Career File: Outdoor Guide* as well as the *Career File* worksheet. Glue worksheets into students' science notebooks. Have available colored pencils and crayons.

#### Explore

- Tell the class they are ready to begin their investigation! Ask the team to recall the role they have to fulfill over the course of the investigation as well as the overall mission for the City and Borough of Yakutat. ([An outdoor guide that is responsible for writing a Landform Travel Guide and map for tourists visiting Yaktuat from the cruise lines](#)) As a group, come up with a team name and write it on the board.
- Explain that before the team can dive into the investigation head-on, the outdoor guides must learn a little more about their role. Ask members to volunteer ideas of what they think outdoor guides do for a living and write these ideas on the board. Hand out the *Career File: Outdoor Guide* reading to the team's members and explain that they will read more about the role of an outdoor guide together before filling out worksheets glued inside the science notebooks. Students should look over the pictures, captions and bold font on the *Career File* before writing down predictions in their notebooks about the role of an outdoor guide.
- Read over the *Career File: Outdoor Guide* as a group.

#### Explain

- After completing the reading review the role of an outdoor guide:
  - What do guides usually enjoy doing when they have free time?
  - What is the role of a guide?
  - What characteristics make guides really good at their job?

#### Extend

- Have students fill out the *Career File* worksheet in their notebooks.

### **Lesson 4: What are maps?**

**Estimated Time:** 2-3, forty-fifty minute lessons

**Teacher Prep:** Print and glue 1 copy per student of the Science A-Z Graphic Organizer: *KWL* worksheet. Make an enlarged version of the KWL on a sheet of chart paper. Refer to the You will be implementing the



TeachersPayTeachers: *Me on the Map* activity for this lesson, so read over the resource attached at the end of this investigation to familiarize yourself with the activity's procedure and to organize the necessary materials. The "Me On the Map" book by Joan Sweeney is included in the kit. Have the following materials available for the engagement component of the lesson which will involve a small group exploration activity: Globes (1 per group), Geography Terms Poster (1 per group), hand lenses, bee replica, beluga whale replica, Science A-Z How Rainbows Form and Types of Precipitation diagrams and the Landform Discovery Pack Model. Refer to the DK Workbook: *Geography* workbook and make 1 copy per student of the following worksheets (if conducive glue each copy into students' science notebooks): Geography (p. 4), Maps (p. 5), Globes: The Big Picture (p. 7) and Map Keys (p. 10). Write the question of the lesson on the board: What are Maps?

### *Elicit*

- Begin the lesson by asking the team of outdoor guides to state the question they will try and answer during this lesson ([What are maps?](#)) Have the team open their notebooks to the Science A-Z Graphic Organizer: KWL worksheet and record their ideas and current knowledge about maps under the "K" column of the worksheet.
- Call the team's attention to discuss what members wrote down on their worksheets. Record students' knowledge under the "K" column of the enlarged KWL chart then ask the team to recall the purpose of their investigation. ([The team of outdoor guides have been hired by the City and Borough of Yakutat to put together a Landform Tour Guide and map that describes the local landforms and waterbodies around Yakutat so that tourists, interesting in kayaking and sightseeing, have more information when they come visit during the summer months](#)) Ask the team to take a moment to write down things they need to know and learn over the course of the investigation in order to accomplish their task for the City under the "W" column of their worksheets. Have students discuss their ideas as a class and record their ideas under the "W" column of the enlarged version of the KWL chart.

### *Engage*

- Explain that the team will now observe and compare two different scientific models. Ask students what they think a scientific model is and as you listen to their responses line up the following models in front of the classroom: Globe, Geography Terms Poster, Landform Discovery Pack Model, bee replica, beluga whale replica and Science A-Z How Rainbows Form and Types of Precipitation diagrams.
- Allow the team a few minutes to explore the different models before reinstating the question; what are scientific models? Listen to students' responses and follow-up by explaining that a scientific model is a representation of something in the natural world. Models are made so that we can learn new things about the natural world. Ask the team to volunteer some things they learned by studying the models.

### *Explore*

- Tell the team of outdoor guides that today they will learn about one particular type of model. Remove the models except the globe and poster. Ask the team what type of model the globe and poster represent. ([Maps](#))
- Organize the team of outdoor guides into groups of 3-4 and distribute 1 globe, 1 Geography Terms Poster and hand lenses to each group. It may be best to distribute the models one at a time so that students can focus on each before comparing the two. The outdoor guides should study each model closely to figure out what it is trying to show before comparing how the two maps are similar and different from one another. Provide sufficient time for students to study the different maps and discuss observations with their teammates.

### *Explain*

- Call the group's attention to the front of the class to discuss students' observations.
  - What did they observe about the globe? Poster?

- What does the globe represent? What does the poster represent?
- How are the two maps similar? How are the maps different?
- Explain to the team that globes help us visualize the shape of Earth as well as see different water bodies, continents and the names of countries. Could we find our way to a friend's house using a globe? **(Most likely not, we would need a map that zooms in on one area of the Earth)**. The poster zooms in on one area of the Earth so we get a better view of the land. We can see the different types of landforms and water bodies and where they are located in relation to one another.

#### *Explore/Explain*

- Tell the team of outdoor guides they are ready to begin the lesson's main activity, which will explore maps even further.
- Implement the TeachersPayTeachers: *Me on the Map* activity.

#### *Extend*

- Tell students they are going to apply some of their new knowledge about maps. Distribute the *DK Geography* worksheets and read the excerpts at the top of each worksheet as a team and have members complete the worksheets either individually or in pairs. Review the following concepts about maps with the team of outdoor guides once the team has completed all four worksheets:

A Map is:

- A picture that shows information about a place
- Gives information about the place or how to get from one area to another
- Can show information about a small place (neighborhood) or a large place (cities or the whole world)

#### *Evaluate*

- Have the team of outdoor guides refer to the Science A-Z Graphic Organizer: *KWL* worksheet in their notebooks and ask the team to recall the question they wanted to answer by the end of the lesson. **(What are maps?)** Tell the team members to think for a moment on what they over the course

### **Lesson 5: What types (forms) of water can we find in Yakutat? Where can we go kayaking in Yakutat?**

**Estimated Time:** 2, forty-fifty minute lessons

#### **Day 1-2**

**Teacher Prep:** The beginning of the lesson begins with an engagement activity that involves discussing the traditional perspective of glaciers and a retelling of *The Legend of Glaciers in Yakutat*. The engagement activity can be given either by an Elder, a member of the Yakutat Cultural Center (contact Gloria Wolfe) or you. If you decide to implement the activity, read and familiarize yourself with the following excerpts from Volume 2 of "Under Mount Saint Elias: The History and Culture of the Yakutat Tlingit" by Frederick de Laguna, which can be found in the high school library or attached at the end of the investigation: *Glaciers* (p. 818-819) and *The Legend of Glaciers in Yakutat* (p. 894). The engagement activity will be followed up by the AKSCI: *Investigating Matter, Cool Balloons* lesson plan, therefore read over and familiarize yourself with the procedure as well as an additional set of materials (not listed here). Note that the "Solids, Liquids, and Gas" book by Ginger Garrett is replaced by the Science A-Z Non-fiction: *Solids, Liquids and Gasses*. Print 1 copy each of the following worksheets and glue into students' science notebooks: Science A-Z Graphic Organizer: *KWL* and *Comparing and Solids and Liquids*. Write the following question on the board: What forms of water can we find in Yakutat? Have available 2 sheets of chart paper: draw out an enlarged version of the KWL chart on one sheet and a Venn Diagram comparing solids and liquids on the other.



### Elicit

- Begin the lesson by telling the team of outdoor guides it is time to put their skills to the test! Over the next two weeks the outdoor guides will work together to collect information on different bodies of water and landforms from various resources (such as reading materials and demonstrations) so that by the end of the two weeks the team will have enough information to write a travel guide as well as create a map for future tourists. Much learning needs to be done between now and then so the team must be ready to work and have fun throughout the process!
- Tell the team they will begin the mission by investigating areas around Yakutat where tourists can go kayaking or canoeing. However, before they can jump head first into this part of the investigation the outdoor guides must first learn a bit more about water. Ask a member from the team to volunteer aloud the first question that needs to be answered. ([What forms of water can we find in Yakutat?](#))
- Have the team open their notebooks to the Science A-Z Graphic Organizer: KWL worksheet and write down what they know about water, its different forms, and where it can be found in Yakutat under the “K” column of the chart. Tape the large sheet of chart paper with the KWL chart on a flat surface in front of the room. Once students have had a chance to record their ideas on the worksheets have a group discussion about what is already known about water as well as where it can be found around Yakutat. Write students’ ideas under the “K” column of the chart. Ask the team if there is any more information they need to know or want to learn about water that could help them with their task and write down their ideas on the large KWL cart.

### Engagement

- Tell the team that the Yakutat Tlingit believed that glaciers had spirits, which were very sensitive so people had to be very careful with what they said or did around them. A long time ago the glaciers were much larger than they are today, some extended as far out as the rivers that flow into the ocean. When the Tlingit had to float down the Alsek River, which is a little further out from town than Harlequin Lake, people would wear their best clothing in order to keep the glacier that arched over the river happy. It was believed that glaciers did not like strangers looking at them so people would wear sunglasses or black pitch around their eyes and faces. Glaciers were thought to be very clean and also sensitive to bad smells such as old clothes burning or even decaying logs. It was said that Hubbard Glacier, which used to cover Yakutat Bay, receded because a dead log was thrown into a crevasse, a large crack that starts at the surface and goes down into the glacier. About 100 years ago people came to Alaska and Yakutat looking for gold. One man who was trying to get to the Alsek River by walking along the Nunatak Glacier had fallen into a crevasse. Over time his body decayed and started to smell very badly, which is what the Yakutat Tlingit thought caused the glacier to retreat almost 6 miles! (pp. 818-819, de Laguna, 2009).
- Explain to the team of outdoor guides that you (or a guest speaker) are going to tell a very old Tlingit legend of how the glaciers came to be in Yakutat.

#### Legend of Glaciers at Yakutat

*It appears that years ago everybody died belonging to one tribe except(ing) a woman and her daughter. This little girl was in the habit of going into the woods with the children of the other tribe to play with their dolls, and on one occasion she gave all her lunch away to the other children. When she found she had nothing to eat, she asked them what she was going to eat, when they got angry and threw what she gave them at her.*

*This made the little girl cry, and she went and told her mother, and she went and told her mother, when she found her in shedding tears, but being a woman she wanted revenge, so she blew her nose in her hand and threw it towards the other children with the wish that they be turned into ice.*

*And they were immediately turned into the glaciers that are around Yakutat. She also took one of the rocks she used to heat water with and threw it into the same direction, with the wish that it turn into stones on the glacier. This accounts for the soft (sic) stones on the glacier, so the Indians say. (p. 894, de Laguna, 2009)*

- Have a short discussion with the team regarding the legend:
  - What did the little girl do when she went into the woods? Why did she start crying?
  - How did the little girl's mother get revenge on the children? What could the children have done differently so that this didn't have to happen to them?
  - Have you ever seen a glacier? What did it look like?

#### Explore/Explain

- Implement the AKSCI: *Investigating Matter, Cool Balloons* lesson plan.

#### Extend

- Ask the team of outdoors guides to open to the *Comparing Solids and Liquids* worksheet in their science notebooks. Post the enlarged Venn diagram you drew out earlier on chart paper in an area of the classroom that it is visible to all students. Have students fill in the Venn diagram either independently or in pairs, then discuss and share notes as a class. Make sure students record the following characteristics on their worksheets:

##### Water as a Solid

- Has a specific shape
- Shape stays the same when moved from place to place
- Takes up a certain amount of space

##### Water as a Liquid

- Can be poured
- Does not keep the same shape when moved from place to place
- Cannot be squeezed into smaller space

#### Evaluate

- Once students have completed the *Comparing Solids and Liquids* worksheet, have them refer back to the Science A-Z Graphic Organizer: *KWL* worksheet in their notebooks to fill out the "L" column of the chart with what they learned about the different states of water.

### Days 3-5

**Teacher Prep:** Print and glue 1 copy per student of the following worksheets from Science A-Z Graphic Organizer: KWL, TeachersPayTeachers- *Land & Water: Landforms and Bodies of Water Activity* resource **and** DK Workbook (Geography) into students' science notebooks: Graphic Organizer- KWL (Science A-Z), Bodies of Water-Lake (p. 30 in TeacherspayTeachers), Bodies of Water-Ocean (p. 31 in TeachersPayTeachers), Bodies of Water-River (p. 32), Ocean (p. 15), River (p. 15), Lake (p. 22), Bodies of Water Venn Diagram (p. 9), Rivers (p. 12 in DK workbook), Lakes (p. 13 in DK workbook), Oceans (p. 14) and Physical Maps (p. 33).

**Teacher Prep:** Print and laminate the following pages from the TeachersPayTeachers: *Land & Water: Landforms and Bodies of Water Activity* resource: What is a River? (p. 35), What is a Lake? (p. 36), and What is an Ocean? (p. 37). Since the following AKSCI lessons, *Growth of a River* **and** *Identifying and Locating Lakes and Rivers*, will be implemented read and familiarize yourself with the lessons' procedures and organize additional materials that are needed. You will also need the Geography Terms posters (5), Map of Yakutat (5), as well as four separate sheets of large chart paper with the following written on each: KWL chart, Lake Information (title), River Information (title), Ocean Information (title), Ocean and River Venn diagram. Write the following question on the board: Where can we go kayaking in Yakutat? You may also want to refer to the following website to familiarize yourself with the different types of maps: <http://geography.about.com/od/understandmaps/a/map-types.htm>.

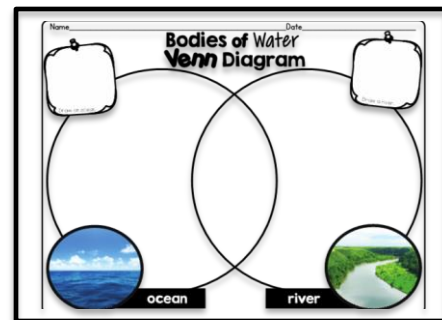
Example of layout of chart paper:

KWL Chart		
Learned	Want to Learn	Learned

**River Information**

**Ocean Information**

**Lake Information**



#### Elicit

- Begin lesson by asking the team of outdoor guides the question they will try and answer over the next few lessons. ([Where can we go kayaking in Yakutat?](#)) Have members of the team open to the Science A-Z Graphic Organizer: KWL worksheet glued in their science notebooks and record ideas to the question under the “K” column of the chart. Post the large KWL chart in a location of the room that is visible to the entire team. After students have had sufficient time to record their ideas, call their attention to the front of the room and ask them to volunteer ideas of where tourists visiting Yakutat can go to kayak. Record students’ prior knowledge under the “K” column of the chart.

#### Explore

- Organize the team into small groups of 3-4 students and pass out the 1 Geography Terms poster to each group. Students should observe the posters as a group for a couple of minutes and identify different bodies of water that tourists would be able to kayak in. As a class discuss the names of the different water bodies ([Lake, river, ocean, ect.](#)). Ask the outdoor guides to take a moment to record a definition under the “K” column of the KWL worksheet of a lake, ocean and river.

#### Explain

- Post the laminated TeachersPayTeachers (What is a River?, What is an Ocean? What is a Lake?) posters in an area of the room that is visible to the entire team and explain that these posters display the definition and picture of each water body. Have volunteers come up one at a time and read the definition out loud. Ask the team to volunteer areas in town where they have seen one of these water bodies and to describe what it looked like.

#### Explore

- Explain that people use different types of maps depending on the information they are looking for, such as ones that display the roads, highways and buildings in an area or a climate map, which

shows the temperature range. Pass out the maps of Yakutat to each group. The type of map each group is looking at now is called a physical map. Ask the guides to take a moment to observe the maps and figure out what type of information can be found on physical maps. [\(Physical maps display the landscape features of an area such as the mountains, rivers, lake and water\)](#) Have students study the physical map of Yakutat and identify the following water bodies in their groups: lakes, ocean, rivers. Discuss the characteristics of each feature as a team as well as the names of specific water bodies in Yakutat. Ask the outdoor guides to predict what state (liquid or solid) these water bodies are in and to write it on an available page in their notebooks.

- After discussing the physical map turn the team's attention to the following worksheets in their notebooks: Bodies of Water (Lake), Bodies of Water (Ocean), Bodies of Water (River). Tell the class they now know the different types of water bodies tourists are able to kayak in Yakutat and how to identify them on a physical map. Now its time to learn a bit more about each.
- Tell the team they will read a book together as a class to learn more about lakes, rivers and oceans. As you pass out 1 copy of, "Sources of Water," to each outdoor guide have them take a moment to read the title and study the pictures and captions inside the book. Post the labeled sheets of large chart paper in an area of the room that is visible to all students. Go around the room and have the guides make a prediction what they think the book is about.
- Tell the team that as they read through the book together, you will stop at certain sections and have the guides take notes on lakes, oceans and rivers on each of the worksheets in the science notebooks. Explain that this is called researching a topic of interest, a practice all scientists are familiar with and spend a lot of time doing. Scientists cannot begin any experiment or investigation without researching (reading, studying, asking experts in the field) what is already known about a topic that interests them. Ask the outdoor guides why it is important for scientists to research a topic they find interesting and want to learn more about? [\(There may already be information available that can answer their question and the scientist can go ahead formulate a new questions about the topic that there is less information on.\)](#)

#### *Explain*

- Read through the book, "Sources of Water" by Rebecca Olien and pause at the following sections: Oceans and Seas (p. 9), Lakes and ponds (p. 12) and Rivers and Streams (p. 14). As students' volunteer important information from each section, record it on the appropriate sheet of chart paper before having students record the information on the worksheets in their notebook. You may want to post the laminated *Landforms and Bodies of Water Activity* posters on the board and have students record the definition of each water body on their worksheets as well.

#### *Extend*

- After reading through "Sources of Water" as a class, ask the team of outdoor guides to open their science notebooks to the *Bodies of Water Venn Diagram* worksheet. Review the concept of the Venn diagram and have students complete the worksheet alone or in pairs before reviewing it as a class.

#### *Explore/Explain*

- Tell the team of outdoor guides they will now observe a few demonstrations about two water bodies in particular: rivers and lakes. Implement the AKSCI lessons (*Growth of a River* and *Identifying & Locating Lakes and Rivers*) and pause between activities so that students are able to record additional information they have learned about rivers and lakes on their worksheets. Additional worksheets from TeachersPayTeachers resource (titled Ocean, Rivers and Lakes) should already be glued into students' notebooks in case additional space is needed to record notes.

#### *Extend*

- Tell the team they are going to practice their map-making skills using their new knowledge of different water bodies that are found in Yakutat. Have team members open their notebooks and completed the following worksheets from the *DK- Geography* workbook: Rivers (p. 12), Lakes (p. 13), Oceans (p. 14) and Physical Maps (p. 33). After students have completed the worksheets review them, along with the facts at the top of the sheets, as a class. As you review the *Physical Maps* worksheet, distribute the Map of Yakutat to each outdoor guide and ask the team why it is considered a physical map. (Have team members write their names on their map since these will be used later in the investigation.) Review and model on the board the concept of a map key before instructing the outdoor guides to make one of their own on the Yakutat maps. **(A map key is a tool that connects meaning to each color, symbol, line or shape that is shown on a map.)** Explain to the team that they will construct the entire key with the exception of the symbols, which will come later. The key needs to include the following however students can include more if they wish: Lake, river, ocean, mountain, valley, island and beach.

### *Evaluate*

- After completing the AKSCI activities, tell the team of outdoor guides they have done a lot of work as well as learned a lot about different bodies of water. Students should open their notebooks to the Science A-Z KWL worksheet and answer the following question under the “L” column of the KWL chart:
  - What is a lake? Is the water in lakes liquid or solid?
  - What is a river? Is the water in rivers liquid or solid?
  - What is an ocean? Is the water in oceans liquid or solid?
- Discuss what the team of outdoor guides learned as a class. Ask the team’s members to state if their earlier predictions about the state of water bodies (liquid or solid) were correct and to elaborate

## **Lesson 6: Where can we go sightseeing in Yakutat? (What landforms do we have in Yakutat?)**

**Estimated time:** 9, fifty-minute lessons

**Teacher Prep:** This component of the investigation implements the AKSCI *Mountains and Valleys* and *Islands* lesson plans therefore it is important to read-over and familiarize yourself with the procedures as well as organize the list of materials outlined under both lessons since these have not been included under the listed materials for the overall investigation. Print and glue the following worksheets from the Science A-Z, TeachersPayTeachers *Land & Water- Landforms and Bodies of Water Activity* **and** DK-Geography resources into students’ science notebooks: Graphic Organizer: KWL (Science A-Z), Landform-Mountain (p. 16 in TeachersPayTeachers), Landform-Valley (p. 17), Coast (p. 48), Land & Water Match (p. 10), Scale (p. 11 in DK Geography), Mountains (p. 15), and Islands (p. 16).

**Teacher Prep:** Print and laminate the following posters from the TeachersPayTeachers resources: What is a Valley? (p. 26 of Landforms and Bodies of Water Activity), What is a Mountain? (p. 34), What is a Coast? (p. 28), and Island (p. 12 in Landforms and Posters Bingo). Write out the definitions for each of the four-landform types on colored pieces of construction paper. Print and make sufficient copies of the Science A-Z Non-Fiction readers (*Coast and Valleys*), *Learning about Mountains* reading, as well as 1 copy per student of *The Story of Mount Saint Elias* and *Mount Fairweather* worksheet. Have the Geography Terms poster (5), Map of Yakutat (5) and Landform Discovery Pack Model available throughout the lesson. Write the following question on the board: What landforms do we have in Yakutat? On four separate sheets of large chart paper write the following on each: KWL chart, Mountain Information (title), Valley Information (title), Coast Information (title), Island Information (title) and Landform & Water Body diagram.

Examples of chart paper layout:

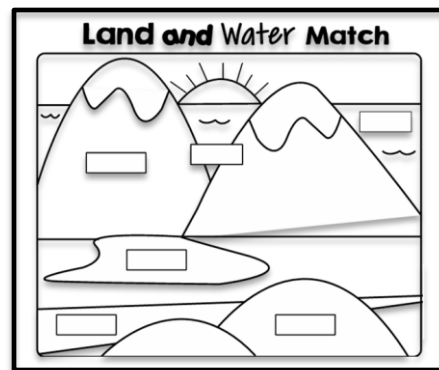
KWL Chart		
Learned	Want to Learn	Learned

**Mountain Information**

**Valley Information**

**Coast Information**

**Island Information**



## Days: 1-2

### Engagement

- Hand out 1-copy per student of *The Story of Mount Saint Elias and Mount Fairweather* visual to each student. Tell students that the Yakutat Tlingit believed that mountains had spirits called 'ca tu qwani,' which were the grandparents of the mountain goats. Sometimes hunters would find themselves in dangerous situations on the mountain and these spirits would tell the goats which hunters to rescue (p. 819, de Laguna, 2009).
- Tell the team of outdoor guides you are going to tell them a very old legend about two specific mountains in Yakutat and to refer to the map that was just passed out to get an idea of where the legend takes place.

*The Indians believe that the mountains were people in the olden times and St. Elias and Fairweather were married. Fairweather was the woman and St. Elias was the man. They had lots of slaves, work people and children. During a family quarrel they separated, Mt. St. Elias travelled west and took a lot of slaves and men with him and from these the range of mountains were formed between Mt. St. Elias and Fairweather. The mountains to the east of Fairweather are their children (p. 819, de Laguna, 2009).*



- Ask the team to close their eyes and visualize themselves as their favorite bird or as an airplane high up in the sky. As they fly freely above Yakutat what do they see? Does their home look different now then what they are used to from ground level? Ask the guides to open their eyes and refer to the visual you handed out earlier. Is this what they saw during their flight? How does it look different?
- Explain that the legend they just heard mentions the directions Mt. St. Elias and Fairweather went after they divorced. Ask the team to recall the directions Mt. St. Elias and Fairweather went and to then label those directions on their maps. (Mt. St. Elias went west and Mt. Fairweather went east) Ask the team to name the direction of the ocean and the mountain closest to the top of the page and to label these on their maps as well (Ocean is south and the mountain at top of page is north)

### *Elicit*

- Begin lesson by stating that the team has done a lot of work over the last few lessons to learn about the different bodies of water around Yakutat that could be spots for tourists to go kayaking. Review the three different bodies of water that the team of outdoors guides learned about as well as the names of specific places in Yakutat that represent each type of water body. Explain that is now time for the team to focus on areas around Yakutat that tourists from another part of Alaska or the world would enjoy visiting either by foot, boat or plane. Ask the team of outdoor guides to brainstorm either with a partner or in small groups where tourists could to sightseeing in Yakutat, then discuss these ideas as a team and record them on the board.
- Ask a member from the team to state out-loud the question the team will try and answer over the next few lessons. (What landforms do we have in Yakutat?) Explain that before the team of outdoor guides can study Yakutat's landforms they must have knowledge about an important topic that many team members do not know a lot about at this point. Ask a volunteer from the team to state the name topic out-loud. (Landforms) Write the following question on the board: What are landforms?
- Ask the outdoor guides to open their science notebooks to the *KWL* worksheet and write down as much as they can about landforms under the "K" column of the chart. Post the KWL chart on the board then discuss and record team members' ideas under the "K" column of the chart. What other information does the team need to know about landforms? Record students' ideas under the "W" column of the chart.

### **Days: 3-6**

#### *Explore*

- Begin lesson by diving the team up into small groups of 3-4 students and distribute 1 Geography Terms poster to each group. Groups are to study the posters together and write down the names of as many landforms that they can find in their science notebooks. Have a group discussion with the team and record their ideas on the board.

#### *Explain*

- Write the definition of landform on the board: **Any natural formation of rock and dirt, found on Earth's surface.** Go through the list on the board as a team and cross out suggestions that don't classify as a landform. Outdoor guides can contribute more suggestions to the list during this activity. Once ideas have been exhausted make sure the following landforms have made it on the list and circle each: Mountains, Valleys, Coast, Islands. Tell the team because there are so many different types of landforms they will only have time to focus on the four from the list that have been circled. Post the laminated posters on the board and cover up the definitions. Call on four volunteers to come to the front of the room for an activity that involves matching the definitions for each landform, written on colored sheets of construction paper, the correct

poster. Hand each volunteer a colored sheet of construction paper (with a few pieces of tape) and allow him or her enough time to match the definition written on their sheet to one of the landform posters. Once volunteers have completed the task ask teammates to review the work (one at a time) and change anything that looks incorrect. Conclude the activity by correcting any incorrectly paired posters/definitions and read off each to the team of outdoor guides.

### Explore/Explain/Extend

- Divide the team into groups of 3-4 students and distribute the Geology Terms Poster to each. Group members should study the poster together and identify the mountains and valleys. What does each landform look like? Where are they found? How are mountains and valleys the same and how are they different? Discuss the student' observations as a class before distributing the Map of Yakutat to each group and repeating the activity with a different map. During the group discussion, ask members of the team to volunteer idea of how the two maps they were just observing where different and similar to one another. Which map would tourists prefer using to get around Yakutat and why? Which map would does team prefer to use when learning about landforms and water bodies and why?
- Tell the team of outdoor guides they are ready to learn about two landforms: Mountains and Valleys.
- Implement the AKSCI *Mountains and Valleys* lesson plan, substituting the book *Ladybird First Facts About the Earth* by C. Arnold with the Science A-Z Focus Book: *Valleys* and *Learning about Mountains* reading. You can find the material for this reading as well as a supplementary video about mountains online at: <http://easyscienceforkids.com/all-about-mountains/>. Find points during the lesson to pause and have students reflect on the material they have learned about mountains and valleys. Have students record their ideas on the appropriate worksheets (that correspond with these themes) glued into their science notebooks first and then have a group discussion about each theme, taking care to record students' ideas on the charts labeled *Mountain Information* and *Valley Information*.

### Extend

- Tell the team they are going to practice their map-making skills using their new knowledge of different water bodies that are found in Yakutat. Refer students to the DK: *Geography* worksheets (Scale and Mountains) glued inside their notebooks. Have the team members fill it out on their own before discussing the answers and facts on each sheet as a class. Pass out the Yakutat Maps to each student and have them draw in the symbols for the following landforms and water bodies: lake, ocean, mountain and valley.

### Evaluate

- Tell the team of outdoor guides they have done a lot of work as well as learned a lot about mountains and valleys. Students should open their notebooks to the Science A-Z KWL worksheet and answer the following questions under the "L" column of the KWL chart:
  - What is a landform?
  - What are mountains? What mountains do we have in Yakutat?
  - What is a valley? Describe valleys you have seen in Yakutat.
- As a class, discuss what the team of outdoor guides learned and write their ideas on the enlarged KWL chart.

### Days: 7-9

#### Elicit

- Begin lesson by telling the team of outdoor guides they have learned a lot of information so far about different sites around Yakutat that tourists can go to either for kayaking trips or sightseeing exhibitions. Ask the team to recall the types of different water bodies they've learned and

discussed about in class as well as the names of specific areas in Yakutat that tourists could go to kayak. The team also learned about different areas where tourists could go sightseeing. Ask the outdoor guides to recall the definition of a landform and the two types of landforms they've learned about in class so far. (Any natural formation of rock and dirt, found on Earth's surface. Mountains and valleys. ) How could tourists get to these landforms in Yakutat?

- Post the TeachersPayTeachers posters, *What is a Mountain?* and *What is a Valley?*, on the board then ask a volunteer from the team to describe the characteristics for each landform. ("A mountain is a landform that is raised high above the surrounding land." "A valley is low land between mountains or hills.")

#### Explore/Explain

- Distribute the Geology Landforms poster to small groups of 3-4 students and have the outdoor guides identify mountains and valleys. Remind the team's members that there are two other sightseeing areas in Yakutat that would be of interest to tourists.
- Ask the team to recall the final two landforms they will learn about over the next few lessons. (Islands and beaches) Post the TeachersPayTeachers posters, *Islands* and *Beaches*, on the board and read over the definitions of each. (An island is "a piece of land that is surrounded by water on all sides." A coast is "a sandy or rocky area that connects land with a body of water.")
- Pass out the Science A-Z Focus Book: *Coasts* to each team member, and instruct them to take a moment to read or look over the title, table of contents, pictures and captions in the book before writing a prediction in their science notebooks about the book's topic.
- Explain that team members must pay close attention as they read through the book together because they will be responsible for recording information from the reading onto a worksheet, labeled *Coasts*, in science notebooks. Write the following questions on the board and explain that the team will take notes based on these particular questions:
  - What is a coastline?
  - Describe some of the ways that waves can shape the land.
  - Why are tide pool good places to find animals?
  - Imagine a beach that has some black sand and some white sand. Using what you read, how do you think this beach formed?
  - What are the names of sandy and rocky beaches in your community? Describe what one of these beaches look like.
  - **Focus Question:** How does the ocean change the land along a coast? Explain how a rocky coastline can turn into a sandy beach over time.
- Read the Focus Book together as a group. Pause after each section to review content and allow students time to answer the questions in their notebook. Review students' notes as a class and record information from the book onto the *Island Information* chart.

#### Elicit

- After completing the Focus Book, tell the team they ready to learn about the fourth and final landform: islands. What is an island? What are the names of islands in Yakutat and what do they look like? How could tourists get to an island and what would they see there? Instruct the outdoor guides to take a moment and draw their version of an island in their notebooks.

#### Explore/Explain

- Implement the AKSCI *Islands* lesson plan.

#### Extend

- Tell the team they are going to practice their map-making skills using their new knowledge of different water bodies that are found in Yakutat. Refer students to the DK: *Geography* worksheet (Islands) glued inside their notebooks. Have the team members fill it out on their own before

discussing the answers and facts on each sheet as a class. Pass out the Yakutat Maps to each student and have them draw in the symbols for the following landforms and water bodies: river, coast and island.

### *Evaluate*

- Tell the team of outdoor guides they have done a lot of work as well as learned a lot about coasts and islands. Students should open their notebooks to the Science A-Z *KWL* worksheet and answer the following questions under the “L” column of the KWL chart:
  - What is a coast?
  - Name 1 sandy and 1 rocky coast in Yakutat. What are some things tourists can see and do on the coast?
  - What is an island?
  - Name 1 island in Yakutat. How would tourists get to this island?
- As a class, discuss what the team of outdoor guides learned and write their ideas on the enlarged KWL chart.
- Instruct students to complete the TeachersPayTeachers *Land & Water Match* worksheet in their notebooks. Review the answers as a team.

## **Lesson 7: How can we make a travel guide?**

**Estimated Time:** 2, fifty-minute lessons

**Teacher Prep:** Print and make booklets for each student of the TeachersPayTeachers: *My Landforms Travel Guide*, which should include pp. 1-2 (one copy of each page), p. 6 (six copies), and 1 sheet of construction paper for students to draw their maps. Post the following laminated posters from the TeachersPayTeachers resources on the board: *Landforms and Bodies of Water Activities* (pp. 26, 28, 34-37) and *Landforms Posters and Bingo* (p. 12). Have available throughout the lesson colored pencils, crayons as well as students’ notebooks.

### *Elicit*

- Tell the team of outdoor guides the time has come to put their knowledge and skills to the test! Over the next couple of lessons each outdoor guide will construct their own Landform Travel Guide for the City and Borough of Yakutat. The Borough plans on distributing these guides to tourists visiting Yakutat over the summer that are interested in learning about the areas in Yakutat that are great for kayaking or canoeing as well as sightseeing. Explain that the outdoor guides now have more than enough knowledge about the various bodies of water and landforms to fill an entire tourism guide with interesting information!
- Tell the team that before they begin the activity it would be best to quickly review all of the different types of water bodies and landforms the outdoor guides learned about. Divide the team in half and split the terms between each group. The members of each group are to write 2 sentences describing each landform and/or water body in their notebook (this can be based on memorable facts, a definition or a general description) then present their information aloud to the other half of the class.

### *Extend*

- Distribute 1 copy of the *My Landforms Travel Guide* booklet to each student and instruct him or her to begin the activity. Remind the team that they will need to draw a physical map of Yakutat on the last page of their guide.

## **Lesson 8: Post-Assessment**

**Estimated Time:** 1, forty-minute lesson

**Teacher Prep:** Print and glue 1-copy per student of the Post-Assessment into students' science notebooks. An oral assessment and rubric is available to supplement the written component.

*Evaluate*

- Tell the team outdoor guides they have done great work. All of the information they have collected is very valuable and useful to the people of Yakutat. Explain that the last step of the investigation is to take an assessment that demonstrates just how much they learned.
- Administer the assessment to the team of outdoor guides.