This is an example of what we mean by Interactive Storyboard. It is the final document that the Originating LGU, Peer Reviewer LGU, and any other Partners will see and approve prior to beginning development of an interactivity.

Outdoor Adventure: Volcanoes and Geysers

Storyline Storyboard Sample

Title (50-chars)	Outdoor Adventure: Volcanoes and Geysers
Learning Objectives (for guidance, not display)	After this activity, you will be able to: • List the three conditions that must be present for geyser formation. • Describe the process of geyser formation. • List the parts of a volcano. • Describe how a volcano is formed and what causes it to erupt. • Build a lava flow model. • Build a geyser model.
About the activity	Go on a virtual camping trip in Yellowstone National Park to learn how geysers and volcanoes are formed. Then put your knowledge into practice by building your own geyser and lava flow models at home. Bring a friend along to experience the fun—and the eruptions!
Grade(s)	3, 4, 5, 6, 7, 8, 9
Topic(s)	Career Exploration, Engineering, Environmental Science, Physics, STEM
Estimated time	2hrs
Attribution	Brought to you by Purdue University

Supplies	These simple supplies are all you'll need for the **geyser activity**: • A two-liter bottle of diet soda • Mint Mentos • a Pencil These simple supplies are all you'll need for the **lava flow activity**: • An empty water bottle • Drill and drill bit the diameter of the straw • Glue, preferably silicone or hot glue • Large straw • Scissors • Baking dish • Funnel • ¼ c. baking soda • ¼ c. water • Red food coloring • ¼ c. vinegar • Several measuring cups • Dish soap

Support for instructional designers to align the Storyline or animation activity with the 4-H Positive Youth Development rubric:

- Each 4-H activity must align with the **four required 4-H Positive Youth Development indicators of the 4-H Positive Youth Development rubric**.
- Several of the required indicators (and some of the optional indicators) naturally fit in-person or hybrid learning experiences better than online-only learning experiences.
- Therefore, it is anticipated that instructional designers may struggle with how to design for and align with the four required 4-H Positive Youth Development indicators when creating Storyline or animation activities.
- The storyboard template below is intended to support designers through this design challenge by creating a framework for a **hybrid learning experience**.
- This template is not intended to replace the 4-H Positive Youth Development rubric but to be a companion to it. Design with the 4-H Positive Youth Development rubric in hand.

- Although only a **suggested approach**, this template allows the Storyline module or animation to teach the content in a typical eLearning fashion and then transition into the hybrid learning activities at the end via the **choice board.**
- The goal of the choice board approach is to give the designer ample breathing room in which to create hybrid experiences that align well with the 4-H Positive Youth Development rubric without requiring the body of the eLearning module to go too many directions.
- The choice board in this template has been designed to give learners up to **four options:**
    1. Reflection Activity
    2. Investigate and Explore Activity
    3. Sharing Activity
    4. Career Connections Activity
- The bulleted questions under each option are intended to provide support and spark ideas. They are not intended to be overly prescriptive.
- Although four options are given in the choice board section, **make adjustments where necessary**. For example, it makes sense to include reflection questions and career connections within the body of the Storyline or animation module, do so and delete those options from the choice board.
- It's more important that the required 4-H Positive Youth Development elements are present rather than where they are placed. Do what makes sense.

Slide #	Narration script	On-screen text, animation, interactives, and visuals	Notes
1.		Title page with Start button. Course Title: Outdoor Adventure: Volcanoes and Geysers	
2.	Hey, there. I'm Mateo, and this is Charlie. We just set up camp here in Yellowstone National Park and are about to explore volcanoes and geysers. Want to come along?	Scene: Camping scene with tent, trees, etc. Daytime. Teen boy with his dog. Sound effects and animation: Dog barks and wiggles when he's introduced.	**PYD rubric: Promotes belonging** Designer: Please add a screenshot of the background and character graphics.
3.	What would you like to explore first: volcanoes or geysers? Go ahead and select your choice, and then we'll get started.	Closeup of a graphic of map showing two locations: volcanoes and geysers. **On-screen instructions:** Select either geysers or volcanoes.	**PYD rubric: Openness to Challenge and Discovery, Finding a Spark, Encourages Engagement or Youth Voice** Designer: Please add a screenshot of the map graphic.

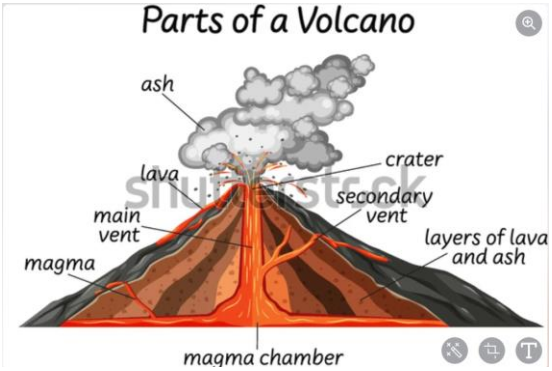
			Branch the course. Visited states.
Geyser Content Branch			
4.	Did you know that Yellowstone has one of the world's most famous geysers? It's true. Watch the video to see it in action. **Narration for video clip:** A natural geyser is a hot spring that erupts periodically, forcibly ejecting hot water and steam out of the Earth's surface. Yellowstone's famous geyser is named Old Faithful because its eruptions are predicable.	Video clip of Old Faithful from Yellowstone National Park. Add narration. https://elements.envato.com/old-faithful-geyser-B6D48J9  **Add on-screen keywords/phrases to the video clip, timed with narration:** Natural geyser, hot spring, erupts, ejects hot water and steam, Old Faithful	
5.	What has your experience been with geysers? Read and answer each question. Then select the Submit button.	Scene with character, dog, and conversation bubble with question. Use same look and feels as Slide 14. Submit button. **Questions with interactive answer (slider or hotspots)** • Have you ever seen a geyser in real life? Yes/No • Are there geysers in your state? Yes/No/Don't know **On-screen instructions:** Read and answer each question. Then select the Submit button. **Text for layer:**	**PYD rubric: Openness to Challenge and Discovery, Finding a Spark** After kids have answered the questions, display the layer.

		If these questions have sparked your curiosity, take a moment to open an internet browser and research geysers in your state.	
6.	Seeing the video of Old Faithful makes me curious to learn more about geysers. You, too? Let's dive into the science behind it by examining these questions: • What conditions must be present to create a geyser? • How are geysers formed, and • What causes them to erupt? What would you say if we explore these questions together? Let's go!	Graphic of nature/trees with a geyser (not erupting but with steam escaping from the vent). Characters on screen, shown with the dog on a leash. Static image here but graphics will be reused and animated on a later slide (Slide 10). **On-screen text, timed with narration:** • What conditions must be present to create a geyser? • How are they formed? • What causes them to erupt?	**PYD rubric: Promotes Belonging, Supports Growth Mindset, Supports Positive Emotions** **PYD rubric: Learning objectives for geysers** Designer: Add screenshot of graphics
7.	Only a few places on few places on Earth have the conditions necessary to create geysers. That's amazing, isn't it? What do you think those conditions might be? Go ahead and take a guess. Select as many conditions as you think relate to the formation of geysers, and then select the Submit button.	Image of geyser in background. Submit button. https://elements.envato.com/view-of-old-faithful-eruption-PTBY7WH  **On-screen instructions:** Select as many conditions as you think relate to the formation of geysers, and then select the Submit button.	**PYD rubric: Supports Growth Mindset, Supports Transcendent Awareness**

		On-screen choices: Heat Water Steam Pressure Cold Oxygen	
8.	Let's compare your guesses to the three necessary conditions. Select each item to learn the three conditions that must be present for geyser formation.	**On-screen instructions:** Select each item to learn the three conditions must be present for geyser formation. **Reveal on-screen text associate with each condition:** Heat, Water, Pressure	**PYD rubric: Supports Growth Mindset** Designer: Let's do something fun and engaging here. Maybe three GIFS, one for heat, water, and pressure? Open to ideas. Once decided, please add a screenshot of a graphic mockup.
9.	Let's take it a step further and explore how heat, water, and pressure work together to form a geyser. Go ahead and move the slider to each position to see how a geyser is formed. **Narration clips for each slider position:** **Position 1:** none **Position 2:** Geysers have an underground cavity filled with water and a vent on the Earth's surface.	Slider interaction in which kids build a graphic geyser. **On-screen text at the top of the slide, timed with narration:** Heat + Water + Pressure **On-screen instructions:** Move the slider to each position to see how a geyser is formed. **Each position on the slider adds the follow:** • A new graphic component is added • Narration clip for that slider position is triggered • On-screen text/labels timed with narration clip is added. Once added, text remains on screen. • Also, use arrows to label the parts of the graphic	**PYD rubric: Openness to Challenge and Discovery, Encourages Engagement or Youth Voice** Designer: Please weigh in on this interaction. Also, please add a screenshot of a graphic mockup. **Animation:** If possible, can the steam, boiling water, hot rocks, and eruption be animated? I'm thinking steam could be swirling

	Position 3: Underground rocks surround the water. **Position 4:** The rocks become hot and increase in temperature. **Position 5:** Then the hot rocks cause the water in the cavity to boil. **Position 6:** Next, the boiling water creates steam and causes pressure to build. As pressure builds, steam escapes through the vent in the Earth's surface. **Position 7:** Finally, extreme pressure forces a lot of steam and hot water to erupt through the vent in the Earth's surface.	**Graphics of each slider position:** • **Position 1:** Begin with a graphic showing the Earth's surface and the dirt underneath. • **Position 2:** Add an underground cavity with water and a vent on the Earth's surface. • **Position 3:** Add rock surrounding the water underground • **Position 4:** Add heat to the rocks • **Position 5:** Add boiling to the water • **Position 6:** Add steam in the cavity, show pressure building, and add a little steam escaping through the vent on the Earth's surface • **Position 7:** Add more pressure and show steam and water shooting through the vent on the Earth's surface. **On-screen text/labels with arrows for each slider position:** • **Position 1:** None • **Position 2:** Underground cavity with water, vent • **Position 3:** Rocks • **Position 4:** Heat • **Position 5:** Boiling water • **Position 6:** Steam and pressure • **Position 7:** Steam and hot water erupt	and escaping, the water boiling, the rocks pulsing slowly in red, and the eruption shown. Let's talk through ideas.
10.	Whoa! That's impressive! [To the dog] Hold on there, Charlie. Settle down. [To the learner] Always be careful around geysers. The boiling water and steam are	Reuse the same graphics from Slide 6, but this time show the geyser animated and erupting. Characters on screen. Boy is holding the dog's leash. **Animated dog:** Barks and acts excited when the geyser erupts. If you can show	**PYD rubric: Supports Prosocial Orientation and Transcendent Awareness** Designer: Add screenshot of graphics

	extremely hot and can cause serious injury… or worse. It's best to stay back, watch your step, and respect nature.	the dog lunging toward the geyser in excitement, that would be awesome.	
11.	Given what you have learned about geysers today, what might happen if a tire were under too much pressure? Type your prediction in the space provided. Then select the continue button to compare your prediction with the provided answer.	Text entry field and a CONTINUE button. Reveal the correct explanation. **On-screen text for text entry field:** What might happen if a tire is under too much pressure? **On-screen text for provided answer:** An overinflated tire is filled with too much air, making it more inflexible and less likely to withstand jolts and bumps while the vehicle is moving. At best, an overfilled tire will wear unevenly. At worst, the tire may blow out, resulting in a car accident. This is why recommended tire pressures are printed on the tires themselves—so we don't get it wrong! **On-screen instructions:** Type your prediction in the space provided. Then select the continue button to compare your prediction to the provided answer.	**PYD rubric: Supports Growth Mindset** Course navigation: Go back to Slide 3 or advance to the activities section.
Volcano Content Branch			
12.	Great choice! Before we're finished with this section, you'll be able to list the parts of a volcano, describe how a volcano is formed, and explain what causes volcanoes to erupt. Let's dive in!	**On-screen text for learning objectives:** • List the parts of a volcano • Describe how a volcano is formed • Explain what causes volcanoes to erupt	**PYD rubric: Learning objectives for volcanoes**

13.	First, the parts of the volcano… Select each term to learn about each part of a volcano.	Labeled graphic with click-to-reveal definitions. https://www.shutterstock.com/image-vector/part-volcano-illustration-1804121278  **On-screen instructions:** Select each term to learn about each part of a volcano. **Terms and definitions/images for the click-to-reveal:** **Magma:** Magma is molten rock (hot, melted rock) under the Earth's surface. **Magma chamber:** A magma chamber is an area below the Earth's surface where magma collects. **Lava:** Lava is molten rock (hot, melted rock) that has exited the Earth's surface during eruption or through a vent. https://elements.envato.com/vertical-shot-of-exploding-burning-lava-near-a-vol-3AL9JWA	To be consistent with the content from the LGU, some changes need to be made to the labels on the graphic: • Change the term *crater* to *Main vent.* • Remove the existing label titled *Main vent.* • Change *ash* to *ash and rocks* • Add a label pointing to the black area and label it L*ava field*

		 **Main vent:** A vent is an opening in the Earth's surface where lava escapes, rocks are erupted, and gasses are emitted. The main vent is located at the top of the volcano. https://elements.envato.com/crater-of-nyiragongo-volcano-in-eruption-J8ERHYN 	

		Secondary vent: Secondary vents are openings in the Earth's surface on the sides of the volcano. Lava can flow out of secondary vents, too. https://elements.envato.com/lava-P6SZAMJ  **Ash and rocks:** Volcanic ash is a mixture of rock pieces, dust, minerals, and volcanic glass. Ash can travel through the air and cause problems for humans and animals. https://elements.envato.com/bromo-volcano-eruption-on-java-island-in-indonesia-PTJ6WZ5 	

		Lava rock: As lava cools, it changes into solid rock. Often large areas of hardened, black rock can be seen around volcanos, indicating where lava had flowed during previous eruptions. https://elements.envato.com/lava-P6J4VKB 	
14.	Now for the fun part. Are you ready to see a real volcano in action? As you watch the video(s), see if you can identify the parts we just learned. Add instruction text…	**Option 1: Airpano image** https://www.airpano.com/360photo/volcano/ (See #5) **Option 2: Stock video from Shutterstock/i-stock** https://www.youtube.com/watch?v=y9J7RUzlkz4&t=4s (Insta360 video from YouTube) Insta360 embedded into Storyline: https://360.articulate.com/review/content/32fb37ef-768f-4edb-a3c4-2af5a8895384/review **Option 3: Stock video(s) from Shutterstock/i-stock**	This slide isn't finished. This is where we're either going to do one of the 3 options listed. Pros and cons of each approach are detailed on a Teams post.

		https://www.shutterstock.com/video/clip-1069399684-geldingadalur-volcano-eruption-reykjanes-peninsula-iceland-flowing (Shows lava flow and volcano from a distance) https://www.shutterstock.com/video/clip-1069399561-geldingadalur-volcano-eruption-reykjanes-peninsula-iceland-flowing (Shows lava creeping toward people) https://www.shutterstock.com/video/clip-1069399627-geldingadalur-volcano-eruption-reykjanes-peninsula-iceland-flowing (Drone goes over top; see crater well) https://www.istockphoto.com/video/fagradalsfjall-volcano-eruption-lava-in-4k-dlog-gm1316494739-404220302 (Great close up of molten rock) https://www.youtube.com/watch?v=ReOIJFFT9kw Lava flow is incredible. Use external link? **Content to emphasize once the approach is decided and we know if we can use markers or not:** • Parts of the volcano previously learned. • Volcanic eruptions can be explosive, gentle lava flows, or anything in between. • All volcanoes have one thing in common: magma. • Magma is pushed up through cracks in the Earth's crust and forced to the surface. • As magma shoots or spills out of the vent, it becomes lava. • Lava flow creates changes to the surface of the Earth.	

15.	Wow. Wasn't that incredible! Have you ever seen anything like that before? I'm curious. What has your experience been with volcanoes? Read and answer each question about your experience with volcanoes. Then select the Submit button.	Scene with character, dog, and conversation bubble with question. Use same look and feels as Slide 5. Submit button. **Questions with interactive answer (slider or hotspots)** • Have you ever seen a volcano in real life? Yes/No • Are there active volcanoes in your state? Yes/No/Don't know • Are there any inactive or ancient volcanoes in your state? Yes/No/Don't know **On-screen instructions:** Read and answer each question about your experience with volcanoes. Then select the Submit button. **Text for layer:** If these questions have sparked your curiosity, take a moment to open an internet browser and research volcanoes in your state.	**PYD rubric: Openness to Challenge and Discovery, Finding a Spark, Supports Transcendent Awareness** After kids have answered the questions, display the layer. Course navigation: Go back to Slide 3 or advance to the activities section.
Activities Section			
16.	Now that we know a thing or two about volcanoes and geysers, let's build one of each. Both of these at-home activities would be fun to do with a friend or family member. [To the dog] What do you think, Charlie? Looks like Charlie's up for it! Select the activity you'd like to try first.	**On-screen instructions:** Select the activity you'd like to try first. **Two learner choices:** Build a geyser Build a volcano Characters on screen. Animate the dog, add barking when addressed.	**PYD rubric: Promotes Belonging and Supports Developmental Relationships** Activity Branching. Use visited states.
Build Your Own Geyser Branch			

17.	Fantastic! Let's build a geyser together. To do this activity, you'll need the following supplies: • A two-liter bottle of diet soda • Mint Mentos • a pencil	You'll need the following supplies: • A two-liter bottle of diet soda • Mint Mentos • a pencil Consider using graphics or pictures of the supplies along with the list.	**PYD rubric: Listed Materials**
18.	Let's go over the instructions first. Select each button to learn how to build your own geyser. **Audio for Step 1:** With an adult's help, cut a tube of Mentos in half. **Audio for Step 2:** Keep the Mentos in the tube with your finger while you open the closed end of the Mentos package just enough to fit the eraser end of a pencil through. **Audio for Step 3:** Open a 2-liter bottle of soda. **Audio for Step 4:** Hold the tube of Mentos just above the soda bottle opening, but don't let a Mento fall in until you are ready.	Series of buttons and layers. Each layer has on-screen text, a picture, and an audio clip. **On-screen instructions:** Select each button to learn how to build your own geyser. **Button 1: Step 1** With an adult's help, cut a tube of Mentos in half. (Geyser Picture 1) **Button 2: Step 2** Keep the Mentos in the tube with your finger while you open the closed end of the Mentos package just enough to fit the eraser end of a pencil through. (Geyser Picture 2) **Button 3: Step 3** Open a 2-liter bottle of soda. (Geyser Picture 3) **Button 4: Step 4** Hold the tube of Mentos just above the soda bottle opening, but don't let a Mento fall in until you are ready. (Geyser Picture 4)	**PYD rubric: Clear Instructions** **Designer:** Need pictures showing each step of the activity. The final picture should not show the eruption, just the moment right before. We want the kids to discover what happens on their own. Visited states on buttons. Force the learners to click buttons in order. **Printable PDF:** Include both the supply list and instructions for the geyser activity. Include a note to do the project outside because it is messy.

	Audio for Step 5: Use a pencil to push the Mentos into the bottle as deep and as quickly as possible. Then stand back and observe what happens. **Audio for final instructions:** You can download and print the supply list and instructions, if needed.	**Button 5: Step 5** Use a pencil to push the Mentos into the bottle as deep and as quickly as possible. Then stand back and observe what happens. (Geyser Picture 5) **After all of the buttons have been visited, display the final on-screen instructions:** Download and print the supply list and instructions.	
19.	Just a heads, up. This activity is super messy, so do it outside and with an adult's permission.	Character on screen	Course navigation: Go back to Slide 16 or advance to the end section.
Build Your Own Volcano Branch			
20.	Nice choice. Let's build a volcano flow model together. For this activity, you will need the following supplies: • An empty water bottle • Drill and drill bit the diameter of the straw • Glue, preferably silicone or hot glue • Large straw • Scissors • Baking dish • Funnel • ¼ c. baking soda	To build a volcano, you will need the following supplies: • An empty water bottle • Drill and drill bit the diameter of the straw • Glue, preferably silicone or hot glue • Large straw • Scissors • Baking dish • Funnel • ¼ c. baking soda • ¼ c. water • Red food coloring • ¼ c. vinegar • Several measuring cups • Dish soap	**PYD rubric: Listed Materials**

	• ¼ c. water • Red food coloring • ¼ c. vinegar • Several measuring cups • Dish soap	Consider using graphics or pictures of the supplies along with the list.	
21.	Let's go over the instructions together. Select each button to learn how to build your own volcano. **Audio for Step 1:** Drill two holes in the side of a water bottle. **Audio for Step 2:** Cut two pieces of the straw, each 1-2 inches long. **Audio for Step 3:** Glue the two pieces of straw into the drilled holes of the water bottle. **Audio for Step 4:** Place the water bottle in a baking dish to catch the overflow. **Audio for Step 5:** Use the funnel to add ¼ cup of baking soda to the bottle.	Series of buttons and layers. Each layer has on-screen text, a picture, and an audio clip. **On-screen instructions:** Select each button to learn how to build your own volcano. **Button 1: Step 1** Drill two holes in the side of a water bottle. (Volcano Picture 1) **Button 2: Step 2** Cut two pieces of the straw, each 1-2 inches long. (Volcano Picture 2) **Button 3: Step 3** Glue the two pieces of straw into the drilled holes of the water bottle. (Volcano Picture 3) **Button 4: Step 4** Place the water bottle in a baking dish to catch the overflow. (Volcano Picture 4) **Button 5: Step 5** Use the funnel to add ¼ cup of baking soda to the bottle. (Volcano Picture 5)	**PYD rubric: Clear Instructions** **Designer:** Need pictures showing each step of the activity. The final picture should not show the eruption, just the moment right before. We want the kids to discover what happens. Visited states on buttons. Force the learners to click buttons in order. **Printable PDF:** Include both the supply list and instructions for the volcano activity. Include a note to have an adult use the drill and glue gun. Also, include a note to do the project outside because it is messy.

	Audio for Step 6: Add a few drops of food coloring to ¼ cup of water. Pour into the bottle. **Audio for Step 7:** Add a squirt of dish soap and swish the contents to mix. **Audio for Step 8:** Add ¼ cup of vinegar to the bottle. Then observe the results. **Audio for final instructions:** You can download and print the supply list and instructions, if needed.	**Button 6: Step 6** Add a few drops of food coloring to ¼ cup of water. Pour into the bottle. (Volcano Picture 6) **Button 7: Step 7** Add a squirt of dish soap and swish the contents to mix. (Volcano Picture 7) **Button 8: Step 8** Add ¼ cup of vinegar to the bottle. Then observe the results. (Volcano Picture 8) **After all of the buttons have been visited, display the final on-screen instructions:** Download and print the supply list and instructions.	
22.	Let's pause and talk about safety. This activity calls for the use of a drill and hot glue. For safety reasons, ask an adult to do this part of the project with you. Also, this activity is messy, so it should be done outside.	Graphic of male character with an adult. If the adult can hold a drill, even better. Bonus for sound effects (drill).	**PYD rubric: Supports Developmental Relationships** Course navigation: Go back to Slide 16 or advance to the end section.
End Section			
23.	What an adventure! I had fun, and I know Charlie did, too. How about you?	Show character and dog at the original camping scene (Slide 2) as if they've returned from their adventure. Include the map again to show completion of the two activities. Use sound effects of the dog barking when he's addressed.	Auto-advance to next slide.
24.	Here are some ways to go beyond what we've learned today. Try these at-home	Buttons for choice: **Button 1: Reflection Activity**	Designer: Include a screenshot of the choice board.

Go Beyond (Choice Board)	activities with family and friends! Do as many activities as you'd like and have fun!	**Button 2: Investigate and Explore Activity** **Button 3: Sharing Activity** **Button 4: Career Connections Activity**	
25. **Option 1**	No narration	**Reflection Activity** • What would you and your family need to do if you were told that a lava flow was about to flow into your neighborhood or where you're vacationing? • If your family were to take a trip to see Old Faithful, what safety advice could you share?	**PYD rubric: Openness to Challenge and Discovery, Encourages Engagement or Youth Voice**
26. **Option 2**	No narration	**Investigate and Explore Activity** There's still so much to learn! Do either of these topics sound fun to research? • Conduct research using the search terms ***geothermal activity in Yellowstone National Park*** and ***hydrothermal systems in Yellowstone National Park.*** • Investigate geysers that occur on Saturn and Jupiter's moons, and research volcanoes in space.	**PYD rubric: Openness to Challenge and Discovery, Encourages Engagement or Youth Voice**
27. Option 3	No narration	**Sharing Activity** • Ask your friends and family if they have ever been near a volcano or seen a geyser erupt. Ask them to share their experiences with you. • Share what you've learned about volcanoes with a friend, and together build a volcano model with modeling clay.	**PYD rubric: Supports Developmental Relationships and Promotes Belonging**
28. Option 4	No narration	**Career Connections Activity**	**PYD rubric: Supports Hopeful Purpose, Supports Goal Setting, Supports Finding a Spark**

		There are many careers related to geysers or volcanoes. Consider setting a goal to research the professions that sound interesting to you: • Volcanologist (volcano scientist) • Park Ranger • Hydrologist • Geothermal Engineer • Geologist	