**\*\*Park Name**

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| [Devils Postpile National Monument](http://www.nps.gov/depo/) |

**\*\*Lesson Plan Title (255 characters maximum)**

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| --- |
| Exploring Climate Science: Research Projects |

**\*\*Essential Question and Quick Lesson Description**

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| --- |
| In “Exploring Climate Science (Research Projects),” students showcase what they learned throughout the unit by completing a final project based on climate change.Students will be able to create a hypothetical research proposal that examines the potential impacts of climate change on the local community. |

**\*\*Lesson Grade Level: (Check One of the following)**

\_\_\_ Lower Elementary: Pre-Kindergarten through 2nd Grade

\_x\_\_ Upper Elementary: 3rd Grade Through Sixth Grade

\_\_\_ Middle School: Sixth Grade Through Eighth Grade

\_\_\_ High School: Ninth Grade through Twelfth Grade

\_\_\_ College Undergraduate Level

\_\_\_ Graduate Level (Masters, PhD)

\_\_\_ Adult Education

**\*\*Lesson Subject: (Check As Many as Apply)**

\_\_ Social Studies

\_\_\_ Math

\_x\_ Science

\_\_\_ Literacy and Language Arts

\_\_\_ Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Feature Image for Lesson**

**This will be shown next to your lesson on the Education Portal. Provide filename and location below.**

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| In folder |

**Alt Text for Feature Image**

**If the image does not display, what description do you want to appear in its place?**

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| --- |
| Glacial polish on the top Devils Postpile |

**\*\*Common Core Standards:**

**Want more information about Common Core? Go to [http://www.corestandards.org/](http:///h)**

|  |
| --- |
| Grade Level: 3-5 Subject Area: Science RI.5.1: Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.RI.5.7: Draw on information from multiple print or digital sources, demonstrating the ability to locate an answer to a question quickly or to solve a problem efficiently. RI.5.9: Integrate information from several texts on the same topic in order to write or speak about the subject knowledgeably. W.5.8: Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources.W.5.9: Draw evidence from literary or informational texts to support analysis, reflection, and research.  |

**\*\*State Standards:**

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**Additional Standards(s) (255 characters maximum): Does this lesson meet additional standards?**

**e.g. Next Generation Science Standards, National Council for Social Studies Standards, Advanced Placement (AP) Courses, International Baccalaureate (IB) Courses, Next Generation Science Standards**

|  |
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| 5-ESS3-1 |

**Thinking Skills (Check As Many as Apply)**

The thinking skills listed below are based on Bloom’s Taxonomy. Consider your lesson procedure and activities. Then check off the thinking skills that students will experience through your lesson.

X **Knowledge** – Recalling or recognizing information ideas, and principles

X **Comprehension** – Understand the main idea of material heard, viewed, or read. Interpret or summarize the ideas in own words.

X **Application** – Apply an abstract idea in a concrete situation to solve a problem or relate it to a prior experience.

X **Analysis** – Break down a concept or idea into parts and show the relationships among the parts.

X **Creation** – Bring together parts (elements, compounds) of knowledge to form a whole and build relationships for NEW situations.

X **Evaluation** – Make informed judgments about the value of ideas or materials. Use standards and criteria to support opinions and views.

**Complete Lesson File**

**Is there a downloadable file (or PDF) for this lesson plan? If yes, provide filename and location:**

**Be sure your PDF or other file meets universal accessibility requirements, most PDFs do not.**

|  |
| --- |
| <http://www.nps.gov/depo/forteachers/classrooms/research-projects.htm> |

**Lesson Duration**

 **Time to complete this lesson plan in minutes (25 characters maximum)**

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| 60 minutes |

**\*\*Background Information for Teacher**

**What important content, contextual, or practical information and background knowledge does the teacher need to successfully implement this lesson?**

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| Water is essential for life on Earth. Relative water availability is a major factor in designating habitats for different living organisms. In the United States, things like agriculture and water rights are hot topics. Current models predict that average global temperatures are going to continue to rise even if regional climate changes remain complex and varied. These changes will have an impact on all of Earth's systems.Studies have shown that climate change is driven not only by natural effects but also by human activities. Knowledge of the factors that affect climate, coupled with responsible management of natural resources are required for sustaining these Earth systems. Long-term change can be anticipated using science-based predictive models making science and engineering essential to understanding global climate change and its possible impacts.National Parks can serve as benchmarks for climate science trends and effects over time because they are protected areas void of human influence. Understanding current climate trends will help set students up to be successful in interpreting and engaging in discussions about climate change, which will lead to informed decision making.\**Depending on how deeply you would like to explore the activities of the lesson, this lesson could take anywhere between one and three 40 minute lessons. For example on day one, you could explain the project and students could begin work. On day two, students could continue preparing their work and then begin working on their presentations, and on day three students could finish their presentations and share with the class. Conversely, you could do a quick introduction, give students 30 minutes to prepare their grant proposals and then have a quick whip around, share-out, thereby concluding the lesson in a day. The times below are based on one 45 minute lesson.* |

**\*\*Important Vocabulary and Terms with Definitions:**

**What terms and academic language will students have to know to participate in the lesson? Lessons typically include 5 to 15 terms and definitions.**

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**\*\*Lesson Preparation: What preparation does the teacher need to do before the lesson? What supplies or materials should be gathered?**

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| Teachers will need access to the internet, a computer, and a projector for displaying the videos for the class.Write the following questions on the board or projector so the all students can see them:How have climate changes influenced human activities? How could Mammoth Lakes(or your community) be affected if the climate continues to change?Prepare the following videos:[A Way Forward: Facing Climate Change](http://video.nationalgeographic.com/video/way-forward-climate)[California Department of Water Resources: Snow Surveying](http://www.water.ca.gov/newsroom/video/education.cfm) (.wmv file) |

**\*\*Lesson Hook or Preview: What activity, video, song, or other experience could get the students excited about the lesson and thinking about the topic? Is there a way to make the lesson important to their lives or link the lesson content to what they already know?**

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| Explain to students that they will be thinking like a climate scientist today and using what they have learned the past two weeks to create their own climate monitoring project. Explain how in the real world it costs money to conduct research. To get money, scientists apply for grants. Grants are free money that organizations give to scientists to help the planet. Place fake money on table (See Materials Section). There is only enough grant money for two groups to do their project. The two best grant proposals will be awarded the funding and will be able to make a difference in the world. |

**\*\*Procedure: List the instructions the teacher should follow as Step One, Step Two, Step Three, etc.**

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| 1. Pass out worksheets 8.1, 8.2, and 8.3 (In materials section). Read through the papers explaining sections if necessary. Be sure to discuss Grant Proposal Rubric. Explain that grant proposals will be scored using the rubric. Have students score worksheet 8.2 (the model) and discuss the scores given.
2. Ask what could you research? Brainstorm research ideas as a class.
3. Student work time (Students can work in groups, pairs, or individually according to teacher preference). *It may be helpful to have computer time available in case students need more background knowledge about a topic. See Additional Resources section for web links that may helps students.*
 |

**\*\*Assessment: How can teachers tell that each individual student has met the objective? How will teachers see if each student knows the answer to the essential questions or has mastered the skills? Below, include below a brief description of how to use the assessment. Later in this template you are provided with the opportunity to upload a digital copy of the assessment for teachers to print and use.**

|  |
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| Have students share their ideas. Depending on time, some options include:1. Doing a quick whip around/share out
2. Putting proposals on tables and doing a gallery walk of proposals
3. Student presentations to the class
4. Creating a poster for a mini science fair, etc.
 |

**Lesson Materials: Any worksheets, photos, primary source, scientific data, maps, graphic organizers, or PowerPoint ‘s should be described and attached using the template below. Please create additional materials boxes if necessary.**

**Material #1**

**Title (255 characters maximum):**

|  |
| --- |
| Worksheet 8.1: Grant Proposal Rubric |

**Summary (how does the material function in the lesson?):**

|  |
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| Explains the sections of the grant proposal and how each proposal will be evaluated. |

**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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**Material #2**

**Title (255 characters maximum):**

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| Worksheet 8.2: Climate Science Project Instructions |

**Summary (how does the material function in the lesson?):**

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| This worksheet will explain how to write the proposals and what should be included. Includes a sample proposal. |

**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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**Material #3**

**Title (255 characters maximum):**

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| Worksheet 8.3: Proposal Worksheet |

**Summary (how does the material function in the lesson?):**

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| Students can use this worksheet to write their proposals. |

**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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**Material #4**

**Title (255 characters maximum):**

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| Teacher Unit Evaluation |

**Summary (how does the material function in the lesson?):**

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| Provides teachers with an opportunity to provide lesson plan feedback. |

**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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**Material #5**

**Title (255 characters maximum):**

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| Student Unit Evaluation |

**Summary (how does the material function in the lesson?):**

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| Provides students with an opportunity to provide lesson plan feedback and assess what they’ve learned. |

**Material #6**

**Title (255 characters maximum):**

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| Fake Money |

**Summary (how does the material function in the lesson?):**

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| Optional visual to help students understand the concept of scarce funding.  |

**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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**Assessment Materials**

**How can teachers tell that each individual student has met the objective? How will teachers see if each student knows the answer to the essential questions or has mastered the skills? Attach below the assessment and, if applicable, a rubric or answer key.**

**Assessment**

**Title (255 characters maximum):**

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**Summary (how does the material function in the lesson?):**

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**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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**Assessment Rubric or Answer Key**

**Title (255 characters maximum):**

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**Summary (how does the material function in the lesson?):**

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**Downloadable file of this material in original format if possible, such as Microsoft word or PowerPoint (Provide filename and location)**

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**Supports for Struggling Learners**

**If a learner is struggling to understand the objective, essential question, or skills presented in the lesson, what can be done to help this learner? Is there a lower reading level version of text? Is there a more image heavy or simplified version of content? Can supportive devices be provided such as calculators?**

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| N/A |

**Extensions for Excelling Learners**

**If a learner is really excelling at the objective and skills presented in the lesson, what can be done to continue to challenge this learner? Can the student create a product or learn more in depth about the content?**

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| N/A |

**Additional Resources**

**Please list websites, references, or other materials for further research by interested students that is not already provided within the lesson.**

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| --- |
| **EPA kid friendly website all about the basics of climate change**<http://www.epa.gov/climatestudents/basics/index.html> **Website of games, activities, and other resources all about global warming**<http://globalwarmingkids.net/>**Provides information on animals impacted by climate change from around the globe**<http://www.wwf.org.uk/what_we_do/tackling_climate_change/impacts_of_climate_change/climate_change_and_animals.cfm> **Details impacts of climate change on various sea animals**<http://www.neaq.org/conservation_and_research/climate_change/effects_on_ocean_animals.php> **Website all about how kids can reduce energy consumption**<http://www.energystar.gov/kids> **Helpful slideshow on climate change, weather, and climate**<http://www.slideshare.net/allsaintsscience/5th-grade-ch-8-lesson-5-what-is-climate> |

**Related Lessons or Educational Materials**

**Is this lesson connected to other lessons within a unit? Is this lesson related to a field trip guide or activity? If so, list the website address or titled of these other materials below.**

|  |
| --- |
| Day 1- [Earth as a System](http://www.nps.gov/depo/forteachers/classrooms/earth-as-a-system.htm)Day 2- [Weather vs Climate](http://www.nps.gov/depo/forteachers/classrooms/weather-vs-climate.htm)Day 3- [Watershed](http://www.nps.gov/depo/forteachers/classrooms/watersheds.htm)Day 4- [Climate Science Data and Tools](http://www.nps.gov/depo/forteachers/classrooms/climate-science-data-and-tools.htm)Day 5- [Field Trip](http://www.nps.gov/depo/forteachers/classrooms/field-trip.htm)Day 6- [NPS Connections](http://www.nps.gov/depo/forteachers/classrooms/nps-connect.htm)Day 7- [Project Preparation](http://www.nps.gov/depo/forteachers/classrooms/project-preparation.htm)Day 8- [Evaluations](http://www.nps.gov/depo/forteachers/classrooms/presentations.htm) |