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| **TGC Fellow Unit Template**  |
| **Prepared by:** Elise Bostic **School/Location:** PREP Academy/ Denver, Colorado  |
| **Subject:** Earth Science **Grade:** 9 **Interdisciplinary Unit Title:** Current and Future Impacts of Climate Change to Earth System **Time Needed:** 15-20 days |
| Unit Summary: * **Unit Introduction:** Melting Away Photo Essay and Climate Change KWL Chart (1-2 days), Flipgrid post about current knowledge of climate change, questions they have about climate change, and ideas they have to lessen the impact of climate change in their community
* **Inquiry Lab:** Students will conduct a climate change lab to model one of the following phenomena: 1) melting ice and sea level rise 2) carbon dioxide and air temperature or 3) sea ice and ocean temperature (2-3 days)
* **Science of Climate Change:** Students will learn the science behind climate change from 3-5 non-fiction text and various video clips. Students will answer comprehension questions and keep track of their learning using various graphic organizers. Students will take a 10 question quiz at the end of this portion of the UbD. (8-10 days)
* **Global Connection to Climate Change:** Students will research how various countries are currently responding to climate change and participation in global climate change agreements (The Paris Agreement). Students will keep track of their learning using a graphic organizer. (1-2 days)
* **Debate:** Students will be assigned a country (one that is taking steps toward mitigating climate change) to represent and will argue how their country’s plan of action is a model for others. Students will be required to research one country and present various points, supported by evidence, to present during the in-class debate. (2-3 days)
* **Reflection:** Students will complete a two-three paragraph of their learning which includes future steps (an action plan) that they can take to mitigate climate change in their community. (2 day)
* **Share Out:** Students will complete a second Flipgrid sharing their learning. These videos will be shown to other teachers and school staff.
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| STAGE 1: Desired Results |
| ESTABLISHED GOALS:* Explain the science behind climate change using evidence
* Compare and contrast the way various countries respond to climate change
* Develop a clear and realistic plan of action to mitigate global climate change

GLOBAL COMPETENCY:* Communicating ideas
* Knowing and understanding multiple perspectives
* Using critical and comparative thinking skills
* Problem-solving abilities
* Understanding global issues

 TECHNOLOGY USED:* Computers for research
* Some sort of digital portfolio/info graph/college for their reflection

 RESOURCES:* **Unit Introduction:** [Melting Away Photo Essay](https://www.globalonenessproject.org/library?load=15)
* **Inquiry Lab**: [Climate Change Inquiry Labs](https://pmm.nasa.gov/education/sites/default/files/lesson_plan_files/climate%20change%20inquiry/Climate%20Change%20Inquiry%20TG.pdf)
* **Science of Climate Change**: [Denver Public Schools Climate Change LDC Teacher Resources](https://drive.google.com/drive/u/0/folders/0B244Wkqh3wtETDJQRXZ4Vk9JcWM)
* **Global Connection to Climate Change:** [Climate Action Tracker](http://climateactiontracker.org/)

[ParisAgreement](http://unfccc.int/paris_agreement/items/9485.php)* **Debate:** [Classroom Resources for Debates](http://www.educationworld.com/a_lesson/lesson/lesson304b.shtml)
* **Reflection:** [Flipgrid](https://info.flipgrid.com/)
 | *Transfer* |
| *Students will be able to independently use their learning to:* * Investigate the science of climate change
* Investigate environments beyond their own
* Gain a deeper understanding of how different countries are responding to climate change
* Develop a realistic plan to mitigate the impacts of climate change

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| *Meaning* |
| UNDERSTANDINGS*Students will understand that:** The science of climate change is complex and data must be examined to fully understand the changes on Earth.
* Different countries have responded to climate change differently, as shown through policies and actions taken
* Climate changes result from alterations in Earth’s energy balance, which can have positive or negative impacts on ecosystems.
* Climate change is an issues that impacts all organisms on Earth.
 | ESSENTIAL QUESTIONS:* What is the science behind climate change?
* How do different countries respond to climate change?
* How can the impact of global climate change be mitigated?

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| Acquisition |
| *Students will know:** What variables distinguish various world climates
* What Earth’s energy balance means
* What factors change Earth’s energy balance
* What factors control climates
* How climatologists predict climate changes?
* What natural hazards result from climates and climate changes
* What technology monitors and predicts climate changes
 | *Students will be able to:** Accurately describe climate change using scientific terms
* Debate, in details, one country’s response to climate change
* Develop a plan to mitigate global climate change in their community
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| **Stage 2 - Evidence** |
| **Assessment** | **Evaluation Criteria (Learning target or Student Will Be Able To)** |
|  Assessments **FOR** Learning: | * Participation and ideas regarding “Melting Away” photo essay
* Climate change KWL Chart
* Inquiry lab participation and lab analysis
* Graphic organizers and comprehension questions after non-fiction readings
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| Assessments **OF** Learning: | * Multiple-choice climate change assessment
* Preparation and participation in debate
* Digital reflection (including plan of action for student’s local community)
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| **Stage 3 - Learning Plan** |
| **Summary of Key Learning Events and Instruction:****Week One**: Students will be introduced to climate change through pictures and be asked to share their current knowledge through a FlipGrid. Additionally, students will complete a climate change inquiry lab.**Week Two and Three**: Students will complete a variety of readings and graphic organizers to help better understand the science behind climate change. Students will complete a multiple choice quiz at the end of this portion of the unit. **Week Four:** Students will begin to look at climate change through a global lens and compare and contrast how various countries are responding to climate change. Students will participate in a debate as well as a final reflection. The debate and the final reflection will be moderated and viewed by members of the school community.  |

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| **TGC FELLOWS UBD Lesson Template** |
| Lesson Title: How Various Countries Responds to Global Climate Change Subject: High School Earth Science Prepared by: Elise Bostic Materials Needed: Computers, Focus Country Graphic OrganizerGlobal Competency: Recognizing Perspectives  |
| **W**here is the lesson going?(Learning Target or SWBAT) | Students will be able to describe the strengths and weaknesses of one country’s climate change action plan, in writing, by completing a graphic organizer using content specific language.   |
| **H**ook: | **T**ailored Differentiation: |
| * During the mini-lesson I will show students two brief videos about the Paris Climate Accord:
	+ [History of Paris Agreement](http://time.com/4801344/paris-agreement-climate-deal-donald-trump/)  (3:11)
	+ [Bill Nye Discusses Coal and Climate Change](http://www.msnbc.com/the-last-word/watch/bill-nye-on-trump-s-climate-orders-clean-coal-is-a-myth-908849731869) (5:00)
	+ [President Trump’s on Paris Accord](https://www.npr.org/2017/06/01/531090243/trumps-speech-on-paris-climate-agreement-withdrawal-annotated) (about minute 5:00 to 7:00 and 12:00 to 14:00)
* As a class, we will discuss the Paris Agreement and I will introduce students to the website which rates countries based upon compliance with the Paris Agreement.
 | Struggling Learners: * Students will be placed in heterogeneous pairs to help struggling learners.
* Students will be given an example of a completed graphic organizer.
* The graphic organizer for students with IEPs will be adjusted (reduced number of boxes and sentence starters)

Advanced Learners:* Students who complete their graphic organizer early should begin preparing for their debate on why their country has the best climate change action plan.
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| **E**quip: |
| * Students will work in pairs and view the website: [Climate Action Tracker](http://climateactiontracker.org/) and complete a graphic organizer about one of the following countries: Bhutan, Costa Rica, Ethiopia, India, or the Philippines (these countries have a 2 degree C compatible rating
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| **Rethink and revise:** |
| * Students will identify strengths and weaknesses of their country’s plan and begin to prepare for the class debate.
* Students will conduct further research on the specifics of their country’s climate change action plan to understand the science behind the plan.
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| **Evaluate:**  |
| * Students will share their completed graphic organizers with another group and receive feedback.
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| Notes:  |
| **O**rganization:  |
| * Have computers charged before class.
* Load videos that will be shown to the class before class.
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