Supplemental Resource

*High School Earth Science Unit*

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| **Stage 1 – Desired Results**  |
| **Established Goals** | **Transfer**  |
| **NGSS HS-ESS3-5**Analyze geoscience data and the results from global climate models to make an evidence-based forecast of the current rate of global or regional climate change and associated future impacts to Earth systems. **CCS RST.11-12.7**Integrate and evaluate multiple sources of information presented in diverse forms and media to address a question or solve a problem. | *Students will be able to independently use their learning to…*\* Students present and argue appropriate solutions to problems, including drawing from multiple sources of scientific evidence and information.  |
| **Meaning**  |
| **Understandings***Students will understand that…* \* Various components of the Earth system interact in complex ways to regulate climate. \* Weather influences humans, and humans influence weather.\* Science involves ways of knowing, requiring empirical evidence, logistical arguments, skepticism, and peer review. \* We revise scientific ideas over time as new evidence emerges.  | **Essential Questions***Students will keep considering…* \* How does weather vary across the world? \* What effect does weather have on human life? \* How do humans affect weather on a local scale?\* How do humans affect weather on a global scale?\* How can we use scientific data to argue for solutions?  |
| **Acquisition**  |
| *Students will know…* \* Weather/climate distinctions\* Weather maps and graphs\* Fahrenheit/Celsius conversions\* Weather concepts with related vocabulary (e.g., *altitude*, *air pressure, precipitation, humidity, atmosphere, temperature*)\* Sentence structures/clauses (i.e., *cause/effect, compare/contrast*)\* Problem/solution discourse | *Students will be skilled at…* \* Analyzing weather-related data in weather maps and graphs.\* Interpreting weather patterns and events using data analyses. \* Comparing and contrasting climates and weather patterns in various regions around the world. \* Developing and arguing solutions to weather-related problems. |
| **Stage 2 – Evidence** |
| **Evaluative Criteria** | **Assessment Evidence** |
| \*Thorough investigation\*Evidence-based findings\*Multiple sources\*Effective presentation\*Convincing argument | **Performance Task(s)****The Weather Channel**Your goal is to demonstrate the effects of weather on human life. You and your team are being interviewed for a job at the Weather Channel. The search committee is particularly interested in finding a team that can investigate how weather affects various aspects of human life around the world (e.g., climate change, severe weather). Your challenge is to select one aspect of human life (e.g., sports, child rearing, travel) and draw from multiple sources of evidence to make your argument about the effects of weather. You will produce a 10-minute video segment to share with the committee. To further demonstrate your qualifications for global weather reporting, use other languages in addition to English.  |
| \*Thorough analyses\*Accurate findings\*Diverse media\*Scientific language | **Supplementary Evidence**\* Article analyses: Reading and responding to scientific articles\* Graph analyses: Layers of atmosphere temperature and pressure\* Map analyses: Weather maps around the world lab\* Data analyses: Temperature change over 25 years in global cities |
| **Stage 3 - Learning Plan** |
| *Pre-assessment*\*Carousel brainstorming using translanguaging to glean students’ background knowledge from home, community, and school (e.g., watching weather segment of the news, checking weather app before getting dressed in the morning, previous learning about water cycle and precipitation)\* Multilingual word wall and personal glossaries: Using students’ background knowledge, start display of related weather terms in multiple languages (e.g., rain with related translation into all students’ L1). Students begin personal glossaries with disciplinary language that they already know.  |
| **Learning Events**\* Context-specific hook (journal with sentence frames and discussion): How does weather affect your life? How does it compare with other places that you have lived in or visited? \* Model disciplinary language to make scientific claims/arguments and justify the claims with evidence, including overall organization of argument with specific sentence frames and key words.\* Analysis partners, Round 1: Teacher-selected pairs analyze graphs on relationship between altitude, temperature, and pressure, including conversions between Fahrenheit and Celsius. \* Analysis partners, Round 2: Each pair selects a severe weather event to read, analyze, and discuss related research using a graphic organizer. Pairs will exchange their written analyses with another group to then analyze and critique the other group’s interpretations. \* Global inquiry teams: L1-based groups analyze weather maps of one continent of their choice (i.e., North America, South America, Africa, Europe, Asia, Australia) using a graphic organizer.\* Expert groups: Graphing the average temperature in a city over the past 25 years (i.e., Chicago, USA; Santo Domingo, Dominican Republic; Gulu, Ghana; Sarajevo, Bosnia; Yangon, Myanmar; Santiago, Chile); jigsaw by city, then mixed groups (one student per city) compare results.\* Performance task preparation and completion: Students work in small groups to design, research, rehearse, and perform the 10-minute video segment regarding weather events and human impacts. Graphic organizers, bilingual dictionaries, and other supports available. | *Formative Assessments*\* Journal with specific prompts across unit (e.g., *What are the signs of global climate change?*)\* Personal glossaries with academic vocabulary, including translation into L1 and visuals \* Observations during instruction using student checklist and anecdotal notes\* Daily checks for understanding on progress toward learning objectives |

Source: Jillian Hartmann, *Using* *Understanding by Design in the Culturally and Linguistically Diverse Classroom* (pp. 108-109), by A. Heineke and J. McTighe, 2018, Alexandria, VA: ASCD. Copyright © 2018 by ASCD.