

Earths Changing Climate: Connecting Relationships

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| Grade/Grade Band: 6th Grade | Topic: Earths chaining climate | Time: 60 minutes |
| <p>Brief Lesson Description: Students will be combined into groups with individual tasks designed to incite discourse and strategic communication of knowledge.</p> | | |
| <p>Specific Learning Outcomes / Objectives: Students will connect Sea-Level to be a major negative effect of climate change. Utilize different media, (readings, simulations, data and videos to identify a proper claim, provide evidence and give reasoning behind chosen evidence). Identify background knowledge from prior units to connect new scientific concepts.</p> | | |
| <p>Prior Student Knowledge: Vocabulary:</p> <ul style="list-style-type: none"> • Sea-Level Rise • Temperature • Energy • Precipitation • CO2 • Methane | | |
| <p>Connections to Standards MS MS-ESS1-3: Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.</p> | | |
| <p>Performance Expectation(s):</p> <ul style="list-style-type: none"> • Identify correlations between temperature, ice melting and Sea-level rise. • Analyze data from NASA's "My Data, Oceans Circulation" tools & Sea-Level Video. • Analyze data from Amplify Earths Changing Climate Simulation • Utilize reading and annotation strategies | | |
| <p>Science & Engineering Practices: Planning and Carrying Out Investigations Planning and carrying out investigations in 6-8 builds on K-5 experiences and progresses to include investigations that use multiple variables and provide evidence to support explanations or solutions.</p> | <p>Disciplinary Core Ideas: ESS2.C: The Roles of Water in Earth's Surface Processes</p> <ul style="list-style-type: none"> • Variations in density due to variations in temperature and salinity drive a global pattern of interconnected ocean currents. (MS-ESS2-6) | <p>Crosscutting Concepts: Cause and Effect</p> <ul style="list-style-type: none"> • Cause and effect relationships may be used to predict phenomena in natural or designed systems. (MS-ESS2-5) |
| <p>Common Core Standards – Math and/or ELA: ELA: Students will work in partners of four with rotating tasks every 6 minutes. Group work may be completed while using each other for support. Students on the Amplify sim are modeled their expectations for the laptop and what criteria they should see on the screen (example: more methane gas). Modeling CER's, use of sentence starters, and visual representation and graphic organizers.</p> | | |
| <p>5E Lesson Plan</p> | | |
| <p>Lesson Materials:</p> <ul style="list-style-type: none"> • Projector & Lesson Slides • Student Paperwork • Pencils • Chromebooks | | |

Engage

Targeted objective from above: identify background knowledge from prior units to connect new scientific concepts.

Details of teacher actions and student learning:

- Students will have a Do Now for the first five minutes of class documenting their thoughts on the Amplify Science Simulation. "How does the ice differ before and after the increase in gasses?" Students have identified their interest in using the simulation to model their ideas and possible outcomes of the real world.
- Students will be shown data/graphs on sea level rise and create their own claims as to what could be causing sea-level rise.
- Based on prior unit/knowledge student answers may vary from "Ice-melting" to "an increase in temperature" to "More extreme weather or high pressure"

Differentiation: Students with IEP/504's will have opportunity for alternative assignment during rotation. In this case, each student will be able to display their strengths during class.

Assessment: Monitoring of student progress and observational notes during "Laps" around the room. What are students having trouble with? This will drive reclassifications or next steps for tomorrow's lesson.

Explore

Targeted objective from above: Utilize different media, (readings, simulations, data and videos to identify a proper claim, provide evidence and give reasoning behind chosen evidence).

Details of teacher actions and student learning: Teacher will coordinate the following and provide 7-8 minute intervals for students to complete each task before rotation.

- Student 1 will read an article and underline the facts regarding ice-melting in the polar caps. Students will answer questions such as "What was the main cause, described in the article, that leads to the polar caps melting?" "What organisms are negatively affected by the polar caps melting?" "What gasses have you studied that contribute to the polar caps melting?"
- Student 2 will explore the Weather patterns simulation and write the criteria for HEAVY rain fall. "What temperature differences are needed for an air parcel to rain heavily?" "What pressure differences or contributions lead to heavy rainfall?" How does an increase in rainfall lead to an increase in sea-level rise?" "What natural disasters can you associate with heavy rainfall and how will that affect communities or ecosystems?" Student will also look at data from My Nasa Data to identify correlations between temperature and rainfall.
- Student 3 will explore the Climate Change simulation and record the criteria for ice-melting. Student 1 and 3 may work together on the simulation and reading as their topics overlap. "What gasses increase the ice/polar caps?" "What gasses decrease/melt the polar caps?" What combination of gasses melts the polar caps the fastest. Does population have an effect on the icecaps melting?"
- Student 4 will use the My Nasa Data website materials such as "Ocean Circulation" and Sea level rise with video. "Where are the oceans garbage patches found? About how much of a rise in sea."

Differentiation: Students will be provided with visuals on where to find assignments on a slide.

Assessment: Student progress on handouts and overall skills displayed on each task, analyzation, note taking skills, graph making and connections on open ended questions.

Explain

Targeted objective from above: Identify background knowledge from prior units to connect new scientific concepts.

Details of teacher actions and student learning:

Vocabulary Terms:

- Sea-Level Rise, Hydrosphere, Climate Change, Temperature.
- Students will have key vocabulary boxes throughout the lesson they will define along the teacher in guided notes. Students will also draw visuals as to what each of these words mean.
- Student vocabulary and lessons are prefaced with “why do we care today?” We care because sea-level rise affects all people from different backgrounds and experiences, as it is part of the climate change we face today. The more informed we are about climate change, then we can make informed decisions to better the environment.
- Students can use the guided questions to answer their individual work, and will later face vocabulary matching lists as part of a study guide for future assessments. Students use the 2 notices and 1 wonder technique in order to make sure they are reading proactively.

Differentiation: Students will be modeled on vocabulary use during explanation, on the projector, of scientific explanations and/or student exemplary models.

Assessment: Collection of classwork will indicate work habits for the class, and any improvements on monitoring techniques needed by next class periods.

Elaborate

Targeted objective from above: Utilize different media, (readings, simulations, data and videos to identify a proper claim, provide evidence and give reasoning behind chosen evidence).

Details of teacher actions and student learning:

- Students will turn and talk in their groups to re-evaluate their initial claim as to why sea-level rises.
- Students will be working with their peers to create an evidence diagram with their collected evidence from simulations, modeling and reading.
- This will help them build upon their CER’s for the end of chapter focus tasks. (Open ended writing prompts).
- Trend and Fluctuation will be introduced as vocabulary terms when displaying graphs based on each of their topics in class.
- Each graph will evaluate the effects of temperature, ice caps melting, precipitation and population impact on sea-level rise. Students will be taking notes on the increase of sea-level rise as well as identify any connections between topics to differentiate between correlation and causation.
- In real life scientists will look at data to identify correlations and determine plans to decrease and/or slow down climate change. Students will face this question after looking at the graph data.

Differentiation: Students will have a sentence starter when about 6+ more students show struggling in responses to guided questions. This can also improve pacing for students who may be stuck on an essential question for too long.

Assessment: Use of guided work when presenting students with alternative exemplar responses. Students should be changing answers and improving their own for one minute upon presentation. Reflected in work collection.

Evaluate

Targeted objective from above: Students will connect Sea-Level to be a major negative effect of climate change.

Details of teacher actions and student learning:

- Students will be given an exit ticket prompt, 3 multiple choice. Students will have been modeled how to go about answering multiple choice questions and evaluate their options from least to most likely.
- Students also engage in a chapter focus task, an open ended question to gauge student understanding of the chapter question and evaluate their current skill level/understanding before moving on.
- Student work will also be collected and looked at for comparison from the exit ticket to the do now.
- An Exemplar of Possible student responses that have criteria for “Check for Understandings/CFU’s”, and major key words in sentences. Students will be able to meet criteria as teacher monitors and walks around. If students are struggling to begin their open ended response than the teacher may provide a sentence starter for students.

Differentiation: Students with IEP’s/504’s will be provided sentence starters within their guided notes.

Assessment: An exit slip within the handout/packet. Exit ticket will have 1 Open ended response, students will be able to use Claim, evidence and reasoning to identify that “an increase in ice melting, temperature, Precipitation and sea-level rise are interconnected/correlated.

Citations: (APA format)

Homepage. Amplify. (2022, October 21). Retrieved October 30, 2022, from <https://amplify.com/>

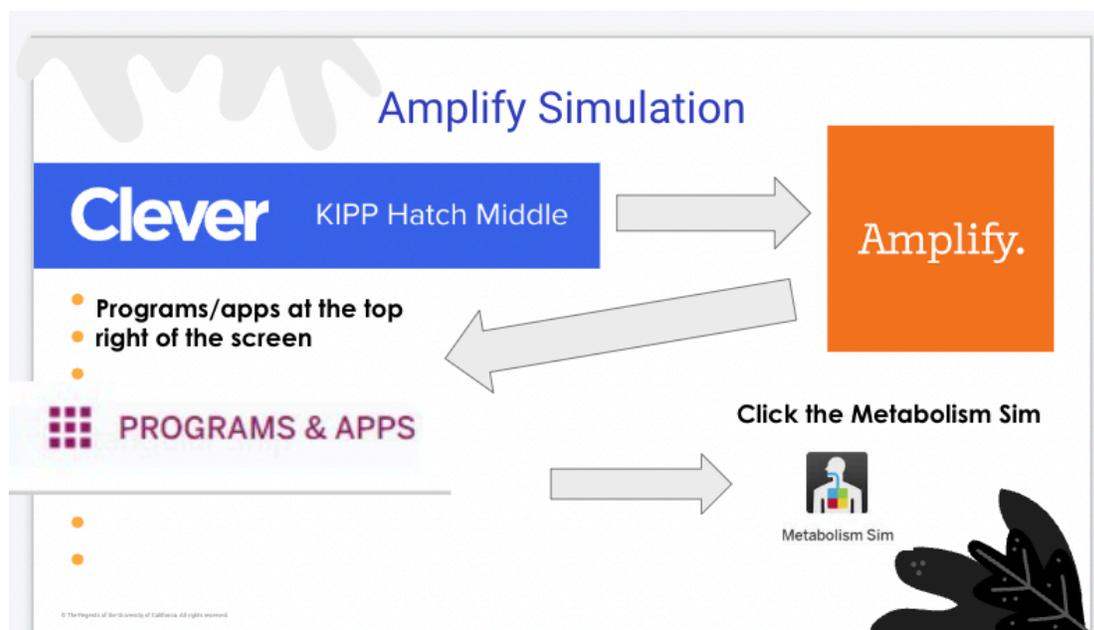
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Understanding Sea Level. (n.d.). *My NASA data.* NASA. Retrieved October 30, 2022, from <https://mynasadata.larc.nasa.gov/basic-page/understanding-sea-level>

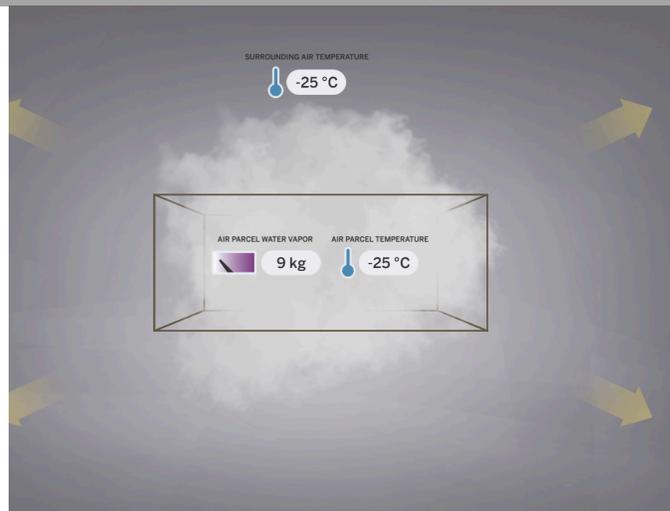
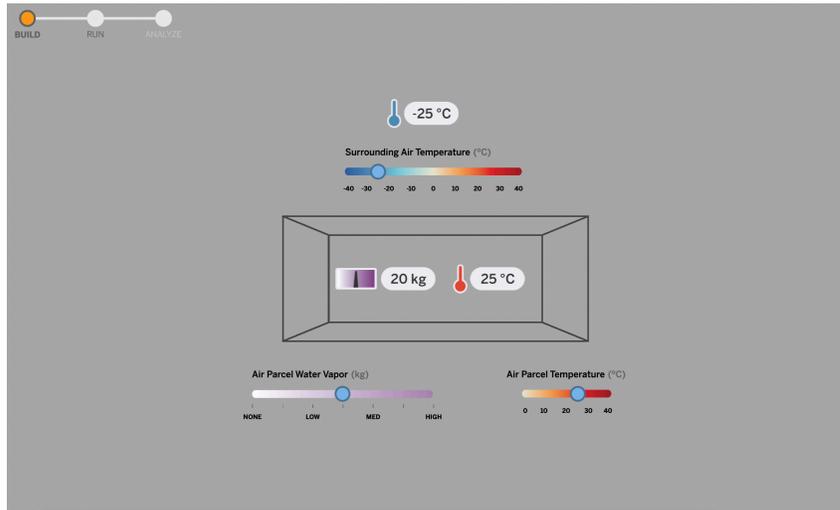
Comparing Winds Surface Ocean Currents. (n.d.). *My NASA data.* NASA. Retrieved October 30, 2022, from <https://mynasadata.larc.nasa.gov/mini-lessonactivity/comparing-winds-surface-ocean-currents>

*** Attached handouts, slide decks, rubrics, and anything else needed to successfully implement this lesson. ***

Example slide for how students will visually know how to get into simulations



IMAGES FROM AMPLIFY
 WEATHER PATTERNS SIM
 BUILD (SETTINGS FOR SIM), RUN (THE SIM), ANALYZE (DATA MAKING) IMAGES FROM AMPLIFY



| Air Parcel Temperature | |
|------------------------|------------|
| Starting | 25 °C |
| Final | -25 °C |
| Difference | 50 °C |
| Energy | |
| Energy Transferred Out | 78 MJ |
| Water | |
| Total Water | 20 kg |
| Form of Water | |
| Water Vapor | 9 kg |
| Liquid Water (Cloud) | 4 kg |
| Liquid Water (Rain) | 5 cm, 7 kg |
| Rainfall Level | Mild |

IMAGES FROM AMPLIFY
WEATHER PATTERNS SIM
NORMAL GAS LEVELS, HIGH CO2, HIGH SULFUR DIOXIDE IMAGES FROM AMPLIFY

