**Unit Essential Question:** *How do people use technology to survive in regions with different climates?*

You will be designing a product that makes it more comfortable for people to live in a region with an extreme climate. After each task, you will return to the table below to organize what you learn as you go through the unit. By the end of the five tasks, you will have all this information to use for your culminating project. For each activity, be sure to include answers to **ALL** the questions provided.

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| Lift-Off Task: Extreme Conditions | Research a few different regions with an extreme climate (too hot or too cold). As a group, choose one of these regions to focus on for your culminating project and describe the extreme climate there. Then individually,   * Define the **problem**: Why is it difficult to live in this region? * Identify the **criteria** for a successful solution: How will you know your product has solved the problem? * Identify the **constraints** of solving this problem: What might make it hard to solve this problem? |
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| Task 1:  Climate, Part 1 – Heating the Earth | Research the region you selected.   * Where is it located on Earth? * How can its location on Earth explain the typical temperature in the region? * Draw a Sun-Earth model to show and explain a major cause of your region’s climate. |
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| Task 2:  Climate, Part 2 – Oceans and Atmosphere | For the region you selected:   * Construct a model to explain how atmospheric and oceanic circulation affect the climate in your region. |
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| Task 3:  A Water Molecule’s Journey | Think about the region you selected.   * What are some ways that water is a part of your region’s climate? * Using words or a model, describe the processes that create the water conditions in your region. |
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| Task 4:  Thermal Energy Transfer | Think about the climate in the region you selected.   * Will your product need to help people stay warm or cool down? * Would this require increasing the kinetic energy of the particles or decreasing the kinetic energy of the particles? Explain. * Based on your explorations, how might you be able to make this possible? What factors should your product consider? |
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| Task 5:  Extreme Living Conditions | You now have a revised prototype of that product!   * Draw a labeled diagram of your final product.   + Show how thermal energy transfer is either minimized or maximized. * Explain how it works. * Describe how you combined best characteristics from different designs to create a product that best meets your criteria and constraints.   + Cite the data that supported your decisions. |
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