Reflecting upon *Next Generation Science Standards* Disciplinary Core Ideas

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| TABLE IV.5 Relevant NGSS disciplinary core ideas for teaching about climate change**\*** | | | | |
| Learning Progressions for Physical Science | | | | |
|  | **K-2** | **3-5** | **6-8** | **9-12** |
| **PS4.B Electromagnetic radiation**  **(Relevant to physics opening unit on the nature of light phenomena)** | **Objects can be seen only when light is available to illuminate them.** | **Objects can be seen when light** **reflected from their surface enters our eyes.** | **The construct of a wave is used to model how light interacts with objects.** | **Both an electromagnetic wave model and a photon model explain features of electromagnetic radiation broadly and describe common applications of electromagnetic radiation.** |
| **PS3.A Definitions of energy** |  | Moving objects contain energy. The faster the object moves, the more energy it has. **Energy can be moved from place to place by** moving objects, or through sound, **light,** or electrical currents. **Energy can be converted from one form to another form.** | Kinetic energy can be distinguished from the various forms of potential energy. **Energy changes to and from each type can be tracked through physical or chemical interactions**. **The relationship between the temperature and the total energy of a system depends on the types, states, and amounts of matter.** | **The total energy within a system is conserved.** Energy transfer within and between systems can be described and predicted in terms of energy associated with the motion or configuration of particles (objects).  Systems move toward stable states. |
| **PS3.B Conservation of energy and energy transfer** | **Sunlight warms Earth’s surface.** |
| Learning Progressions for Earth and Space Science | | | | |
| **ESS2.D Weather and climate** | **Weather is the combination of sunlight, wind, snow or rain, and temperature in a particular region and time. People record weather patterns over time.** | **Climate describes patterns of typical weather conditions over different scales and variations. Historical weather patterns can be analyzed**. | **Complex interactions determine local weather patterns and influence climate**, including the role of the ocean. | **The role of radiation from the sun and its interactions with the atmosphere, ocean, and land are the foundation for the global climate system. Global climate models are used to predict future changes, including changes influenced by human behavior and natural factors**. |
| **ESS3.D Global climate change** | See PS3.B:  **Sunlight warms Earth’s surface** | See PS3.B: **Energy can be moved from place to place by** … **light..**. **Energy can be converted from one form to another form.** | **Human activities affect global warming. Decisions to reduce the impact of global warming depend on understanding climate science, engineering capabilities, and social dynamics.** | **Global climate models used to predict changes continue to be improved, although discoveries about the global climate system are ongoing and continually needed** |
| **• Bolded statements are addressed in this course.** | | | | |