Defining Problems Activity #1: Heat Transfer

1. Give students a copy of the Heat Transfer Sheet (from the University of North Dakota, PDF format). The full case study is available from the National Center for Case Study Teaching in Science.
   After students have read the narrative, have them write a statement that DEFINES THE PROBLEM and then list the CONSTRAINTS of the challenge.
2. After students have finished, lead a discussion of what was written.

Related Crosscutting Concepts:

- Patterns
- Cause & Effect
- Scale, Proportion & Quantity
- Systems & System Models
- Structure & Function
- Energy & Matter
- Stability & Change

Related Disciplinary Core Ideas:

- Core Idea PS1: Matter and Its Interactions
  - PS1.A: Structure and Properties of Matter
- Core Idea PS3: Energy
  - PS3.A: Definitions of Energy
  - PS3.B: Conservation of Energy and Energy Transfer
  - PS3.C: Relationship Between Energy and Forces
  - PS3.D: Energy in Chemical Processes and Everyday Life
- Core Idea ESS2: Earth's Systems
  - ESS2.D: Weather and Climate
- Core Idea ETS1: Engineering Design

        - ETS1.A: Defining and Delimiting an Engineering Problem
        - ETS1.B: Developing Possible Solutions
        - ETS1.C: Optimizing the Design Solution
- Core Idea ETS2: Links Among Engineering, Technology, Science, and Society
        - ETS2.A: Interdependence of Science, Engineering, and Technology