

TABLE 1 Chill Out! curriculum [50-minute class per day].

Module	Brief descriptions of some activities
1. Invention [Days 1–2]	<p>Invention warm-up activity, Digital Device Stand Design Challenge, gallery walk; evaluate whether the stands can help users with various needs</p> <p>Introduce invention and the invention problem and brainstorm users whose needs are not met with standard lunch box</p> <p>Choose users for the lunch box invention</p> <p>HomeFun activity: Share inventions from your original areas</p> <p>Form invention teams [groups of three] where the team members have diverse expertise, model how to work in teams</p> <p>Ask students to bring shoe boxes to school for the invention project</p>
2. Thermal energy transfer [Days 3–6]	<p>Hands-on science labs and demonstrations that teach thermal energy and different types of heat transfer, e.g., the demonstration about convection as in Figure 1</p> <p>Discuss problems and solutions related to thermal energy transfer in the context of food safety and transportation</p> <p>Explore the design and materials of containers to keep food/drink cold in everyday life</p>
3. Thermal conductivity of materials [Days 7–9]	<p>Shortening Mitten lab to teach insulation and conduction</p> <p>Watch a video and discuss how Emperor penguins minimize the amount of heat loss to cool ocean water</p> <p>HomeFun activity: share traditional clothing that keep warm or cool in students' original regions, areas, and cultures.</p> <p>Thermal Resistance Efficiency lab to explore the thermal properties of various materials</p>
4. Lunch box prototyping [Days 10–11]	<p>Design, build, test, and revise a lunch box using shoe boxes that will keep cold food from warming up</p>
5. Peltier brainstorming [Days 12–13]	<p>Learn about heat island, thermoelectric effect, removing heat from the system, and Peltier tiles</p> <p>Build a Peltier cooling unit that is made of a Peltier tile sandwiched between two heat sink fans</p> <p>Brainstorm ways to use Peltier tiles in lunch boxes</p>
6. Poster for Patent Application [Days 14–15]	<p>Learn about what is patent and patent application</p> <p>Create a poster that includes elements of patent application for lunch box inventions</p> <p>Extend the invention experience to other everyday examples</p>