

SAVE THE PENGUINS

If I had a set of Box Corrugated Mailers, Sealed Air Bubble Wrap, Smart-Fab Color Sheets, Scotch Cushion Wrap, and the Advantus Desk Lamp, my students would be able to design and construct prototype dwellings for penguin-shaped ice cubes based on knowledge gained from prior experiments conducted on materials that will slow down the rate of melting.

I am a fourth grade science teacher, and I teach three different classes each day. I am always looking for ways to incorporate hands-on activities, which will develop problem-solving skills in order to empower my students to participate in an increasingly scientific and technological world. According to the National Science Teachers Association, elementary school students learn best when they are involved in first-hand exploration and inquiry/process skills are nurtured, instruction builds directly on the student's conceptual framework, content is organized on the basis of broad conceptual themes common to all science disciplines, and mathematics and communication skills are an integral part of science instruction.

Save the Penguins is a series of three activities, which embody these NSTA principles, investigating the transfer of thermal energy. The students and I first investigate how changes in penguins' ecosystem in the southern hemisphere are due to climate change. The warmer temperatures, in part due to global warming, are causing the penguins to abandon their eggs on the beaches in order to cool off in the ocean. When this happens, the seagulls come and steal the eggs. The National Park Service there is building shelters for the penguins so they don't need to leave their nests as often.

The first of the three activities demonstrated that some materials are better insulators than others by giving each of 6 groups bottled water and a different type of material to cover each one. The students compared the starting temperature of the bottled water to the temperature after 30 minutes. They were then able to determine which material was the most effective to the least effective at keeping the drinks cold.

The second activity introduced the students to the concept of heat transfer through conduction by having each student hold a metal spoon and

a plastic spoon and placing a penguin-shaped ice cube on each. This activity demonstrates that heat transfers from areas of higher temperatures to areas of lower temperatures through conduction, and that some materials are better conductors than others.

The third and culminating activity involves the students creating a dwelling that reduces heat transfer and keeps a penguin-shaped ice cube from melting. They use the Design Process Loop, which involves the students identifying the problem, brainstorming solutions, designing, testing, and redesigning. The students are expected to use their knowledge from the previous activities to help them in their designs. The students would all be given the same size boxes made from the *Corrugated Mailers*, and would have a choice of materials such as *Sealed Air Bubble Wrap*, *Smart-Fab Color Sheets*, and *Scotch Cushion Wrap*, to encase their penguin dwellings. The completed penguin dwellings would then be placed under the *Advantus Desk Lamp* for thirty minutes. The weight of the penguin-shaped ice cubes are compared before and after to see which penguin dwelling design worked the best. And, at the completion of this unit, students are encouraged to brainstorm ways to decrease their energy use and help reduce risks from a warming climate to both human and animal populations.

Thank you for the opportunity to apply for this grant. Having funds to purchase these materials would ensure that the students in all three of my science classes would be able to participate. And, as I stated before, I truly believe that my students learn science best when they are getting first hand experiences to explore and investigate their world.

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