

# SAVE THE PENGUINS!

## Emperor Penguin Colonies Will Suffer As Climate Changes

Scientists project that two thirds of emperor penguin colonies will drop by 50 percent in the next century



Many scientists agree that the Earth is warming and that human activities have exacerbated the problem (NRC 2001; 2002). Engineers, scientists, and environmental groups around the globe are hard at work finding solutions to mitigate or halt global warming. The energy we use to heat and cool our houses comes from power plants, most of which use fossil fuels. The burning of fossil fuels has been linked to increased levels of carbon dioxide in the atmosphere, which in turn has been linked to increases in global temperature. This change in

temperature has widespread effects on Earth, including effects on the life of penguins. If homes were better insulated, they would require less energy for heating and cooling, reducing fossil fuel use and carbon dioxide emissions.

### Penguins

Penguins are in peril. As the Earth warms, the oceans warm, pack ice melts, and penguins lose habitat. They also lose food sources such as krill, which rely on the protection of pack ice and feed on the algae that grow underneath the ice (Gross, 2005). The emperor penguins in Antarctica are in severe decline due to climate change (Jenouvrier et al, 2008). South African penguins are actually leaving their nests to cool off in the water, placing their eggs at risk to attacks by gulls. Park rangers at Boulders Beach in Cape Town, South Africa, have created little semi-enclosed “huts” for penguins to nest in, which keep them cooler and protect their eggs from predation (Nullis, 2009).

### Your Challenge:

Create a dwelling for your penguin (being represented by an ice cube) that will keep the penguin from getting too warm (and melting) when exposed to increased temperature.

You have limited time and money!

## Materials

Scissors

Ruler

Stopwatch (on your cellular phones)

thermometer

### price list

Product Number	Product Type	Price per unit	Quantity needed	Total Cost
1	Acetate (clear sheet)	\$1.00/square		
2	Aluminum foil	\$1.00/sheet		
3	Cardboard	\$1.00/sheet		
4	Masking tape	\$1.00/20 cm		
5	Soft foam	\$1.00/sheet		
6	Popsicle sticks	\$1.00/4 sticks		
7	Rigid foam	\$2.00/sheet		
8	Rubber bands (if available)	\$1.00/5 bands		
9	String	\$1.00/20 cm		
10	Black construction paper	\$1.00/sheet		
11	Metallic wrapping paper	\$1.00/sheet		
12	Cotton balls	\$1.00/3 balls		
13	Fabric/Carpet/wallpaper	\$1.00/sheet		
14	Paint can circles (insulators)	\$1.00/bag		
15	Tooth picks	\$1.00/4 picks		
			Total	

Main Problem: Penguin population is declining due to Climate change.

Main Solution: To help penguins survive we are going to build a safe enclosure to protect them from the effects of global warming.

BUDGET: \$15.00

**Resources:**

Thompson, H. "Emperor Penguin Colonies Will Suffer as Climate Changes." *Emperor Penguin Colonies Will Suffer as Climate Changes*, 29 June 2014, [www.smithsonianmag.com/science-nature/emperor-penguin-colonies-suffer-climate-changes-180951890/](http://www.smithsonianmag.com/science-nature/emperor-penguin-colonies-suffer-climate-changes-180951890/). Accessed 2 Feb. 2017.

<http://cdn.pcwallart.com/images/cute-baby-penguins-in-love-wallpaper-4.jpg>

<https://www.youtube.com/watch?v=kA42VrqGKd4>

Engineering Design Process Graphic

[http://www-cdn.sciencebuddies.org/Files/5082/8/2013-updated\\_engineering-method-steps\\_v6b\\_noheader.png](http://www-cdn.sciencebuddies.org/Files/5082/8/2013-updated_engineering-method-steps_v6b_noheader.png)