



Smithsonian

Staying Warm



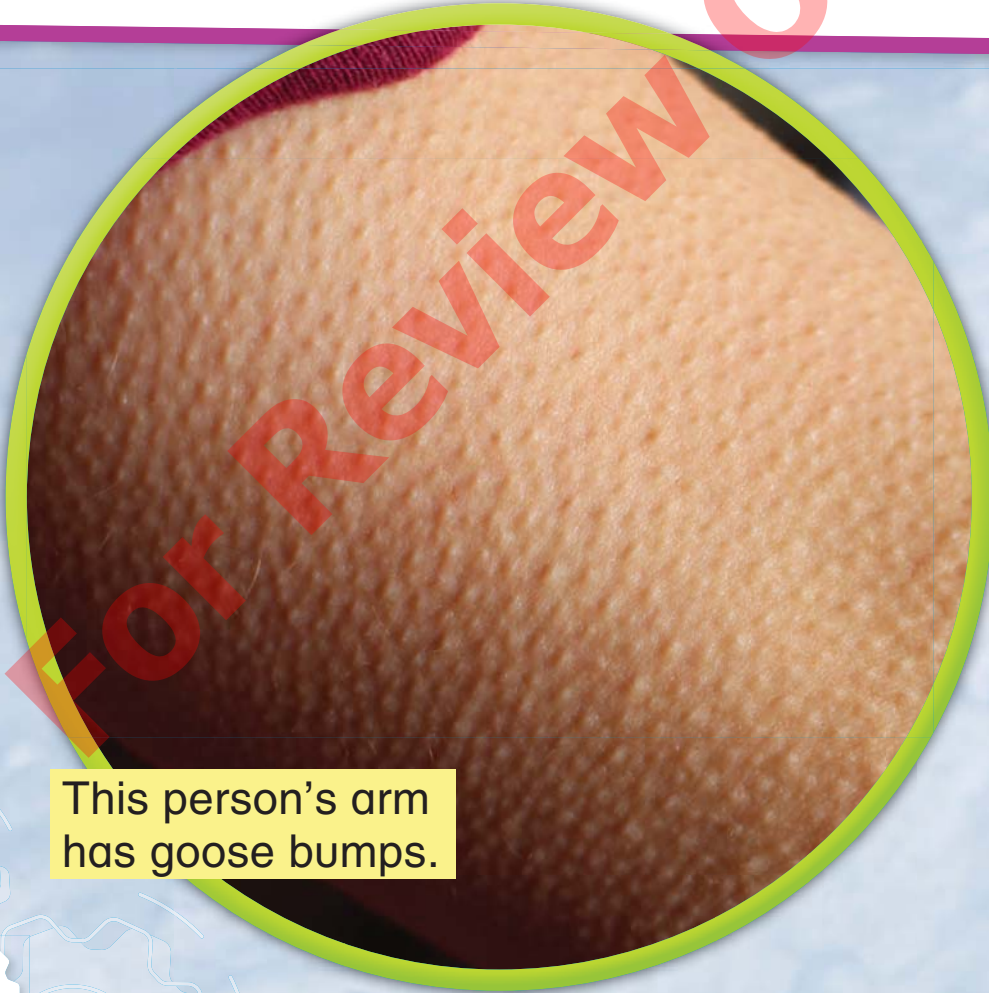
Elizabeth Austen

Table of Contents

Too Cold.....	4
Warming Up	6
Hot Stuff.....	18
STEAM Challenge	20
Glossary.....	22
Career Advice.....	24

Too Cold

The air is cold. Your skin has tiny **goose bumps**. It is time to warm up!



This person's arm has goose bumps.



Warming Up

When it is cold, people may want to warm up. There are many ways to do it.



Blowing warm air on your hands may warm them up.



Science

Shaking and Shivering

People may **shiver** when they are cold. Shivering happens when muscles twitch. They twitch to make heat.

Cover Up

People's bodies make heat. Clothes and blankets help bodies keep their heat. Good **shelter** does too.



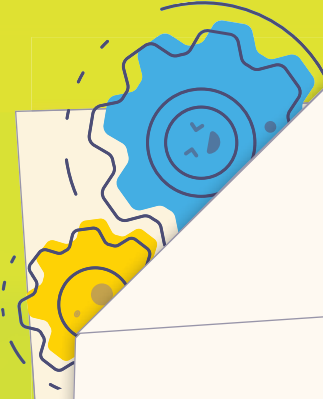
A thick sweater helps keep in body heat.



Technology & Engineering

Hand Warmers

A reaction happens inside hand warmers. The reaction gives off heat. Warm hands help the whole body feel warm.



STEAM CHALLENGE

The Problem

Your class is on a field trip far from shelter. All of a sudden, the weather gets very cold. You need shelter to stay warm. There are trees all around you. You have blankets. But there are not enough for everyone. What do you do?

The Goals

- Design a model of a shelter about the size of a sheet of paper.
- Design a model with sticks, clay, leaves, yarn, and/or fabric.
- Design an entrance to the shelter that is big enough to fit your hand through.





Research and Brainstorm

Why do people need to stay warm? How does shelter help keep people warm?



Design and Build

Draw your plan. How will it work? What materials will you use? Build your model!



Test and Improve

Place your hand inside your shelter. Place a bowl of ice outside your shelter. Blow on the ice toward your shelter. Can you feel the cold air? Can you make it better? Try again.



Reflect and Share

Why is it important for the whole class to be in the shelter? What else could the class do to get and stay warm?