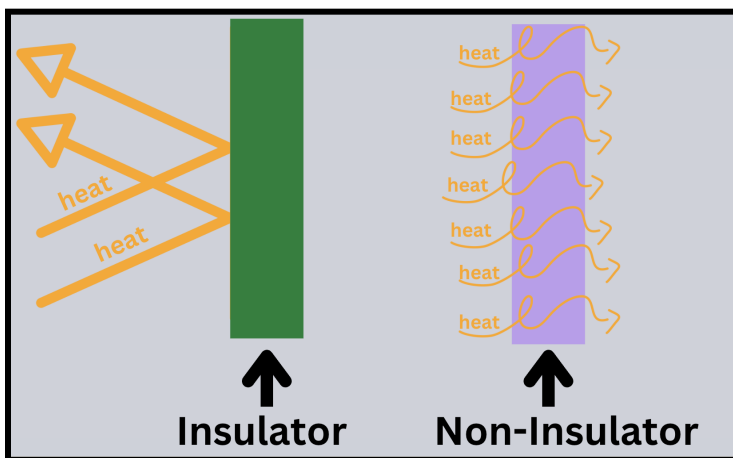




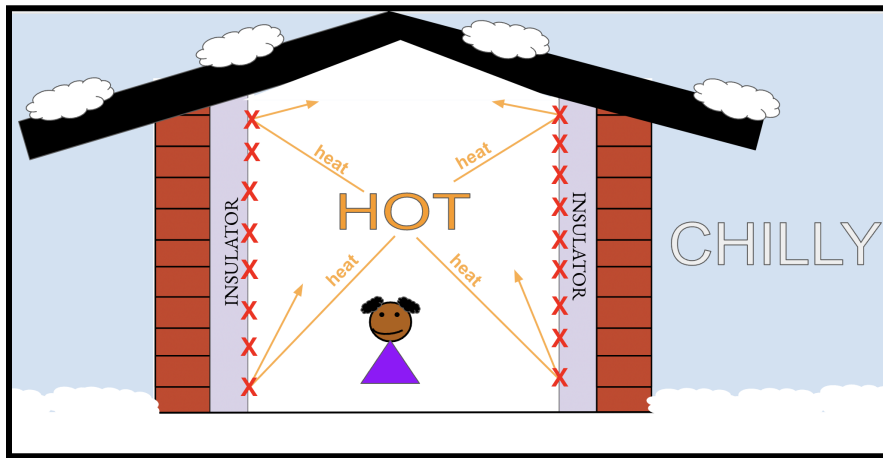
STEM Kits To Go: All about Insulation!

Let's think about the ways buildings keep us warm and cozy even when the weather outside may not be cozy at all. Did you know that even though buildings have things like heaters and air conditioners to keep us warm or cool in the winter and summer, they are also designed so that they don't change inside temperature very easily? Sure, you may turn on the heat in your home when it gets cold, but usually it has to be pretty cold outside before a building's inside temperature starts to change. This is because buildings are built with materials called **insulators** to keep the inside temperature the same, even when the outside temperature changes.

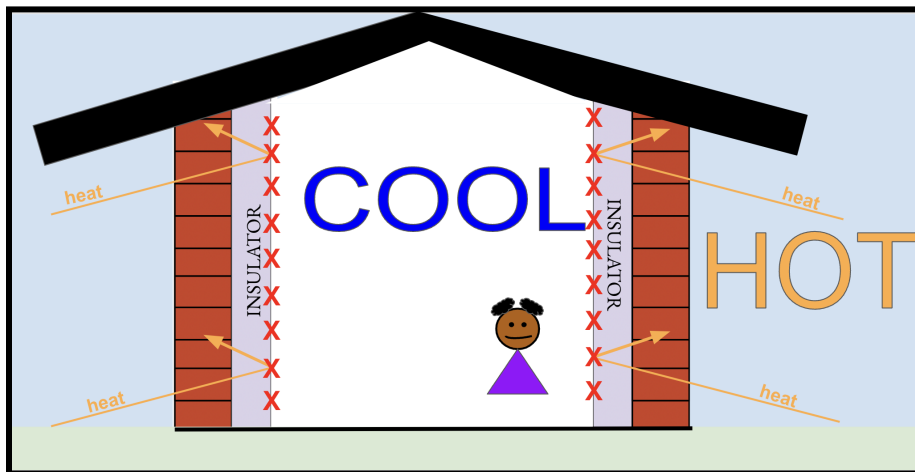
Think of an insulator as a wall that prevents heat from passing through it. Have you ever sat in front of a fire or a heater to warm yourself up? These things can warm you up because heat can travel! That's right, heat can travel from a fire or space heater to your body, which is why you may feel a little bit warmer after sitting in front of a fire for a few minutes.



But what happens if we don't want heat to travel too far? For example, what if everytime we wanted to get warm and cozy in our room, the heat from our heater eventually escaped through our walls, only keeping our room warm for a little bit? We would have to use a lot more energy (turn the heater up higher) to keep our room warm for longer. But if our room was built with insulators in the walls, the insulators would prevent heat from escaping and keep the heat trapped in our room.



Insulators can also help keep us cool in the summer! Not only do insulated walls prevent heat from escaping from the inside of a building, they also prevent heat from entering a building. So if it's a really hot day outside, insulators in your walls prevent heat from outside from traveling inside and making the inside of the building super hot.



Take out the cardboard from your STEM kit as well as some scissors and tape from home. First, let's build the box! Fold the box and tape the bottom so it can stand up on its own. Let's imagine this box is our very own super special clubhouse! Our clubhouse is super fun to play and hang out in, however it isn't insulated very well. This means that whenever we turn the heat on inside the clubhouse, it escapes through the walls which wastes energy (i.e. we need to turn our heat on higher to keep our clubhouse warm). In your STEM kit you should find a bunch of different materials that will help you insulate your cardboard clubhouse (newspaper, felt, aluminum foil etc.) You can use as much (or little) of the materials as you would like, but the goal here is to insulate the walls of your cardboard clubhouse so heat cannot escape through the cardboard.

Now let's see how well insulated they are. To test how well insulated our clubhouses are, we are going to use these hand warmers, which produce heat, to heat up the inside of our cardboard clubhouse! Remove the hand warmers from the envelope, shake them vigorously to get warm. Next find the putty. This is a special putty that changes color when it heats up! So if we put our putty on top of our insulated cardboard box we can figure out if heat is escaping through the cardboard walls, because if heat escapes through the walls, then the putty will heat up and change color.

If our cardboard clubhouse is well insulated, should heat escape from the cardboard walls? No! Should the putty change color? No!

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