

Mini Room Heater

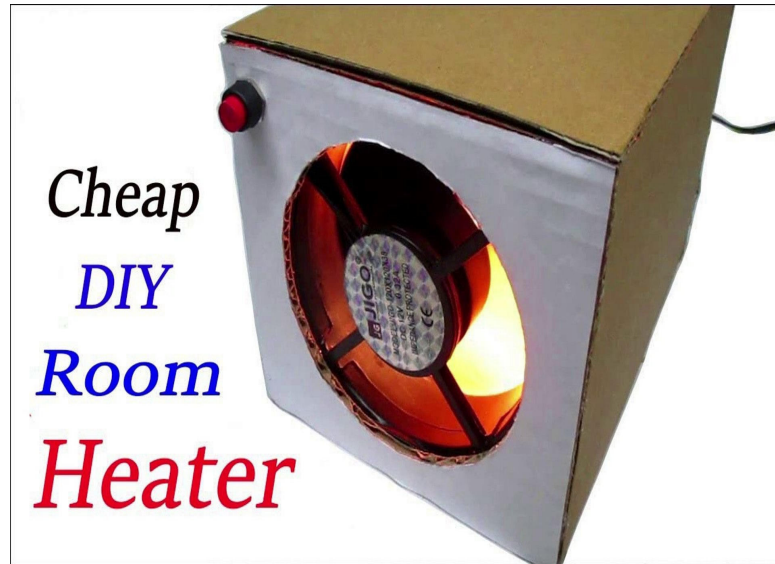
Big Idea: make a small room heater at home very easy for winter. it's a cheapest mini room heater for the winter season

Design Challenge:

Start your personal homemade heater to enjoy some comforting warmth anywhere. The project is genuine fun with some common materials, often remains obsolete.

Introduction

Staying warm is one of the major concerns during the cold winter season. Every year, we have to spend a lot of money on heating systems and the cost of staying warm with these devices can really be a financial burden for many of us. Well, not every time. If you are clever and innovative enough, you can actually heat your house with a little fuel cost.



Understand

- What is the heat energy ?
- Define temperature ?
- Determine Types of Heat Transfer ?

STEAM integration

- Math :** Solving equation - Convert from Celsius to Fahrenheit.`
- Science :** Heat energy - Temperature - Heat transferring - Electric circuit.
- Technology:** Power point presentation about the capstone.
- Art :** Design a logo for the capstone
- Engineering** Design the mini room heater box

Sets Practice

Q.1

Q.2

Q.3

Q.4

Describe your steps:

Q.5

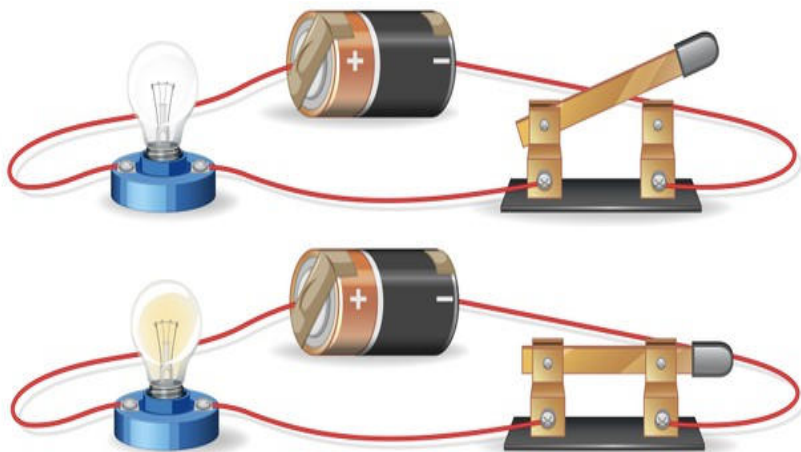
Q.6

Understand

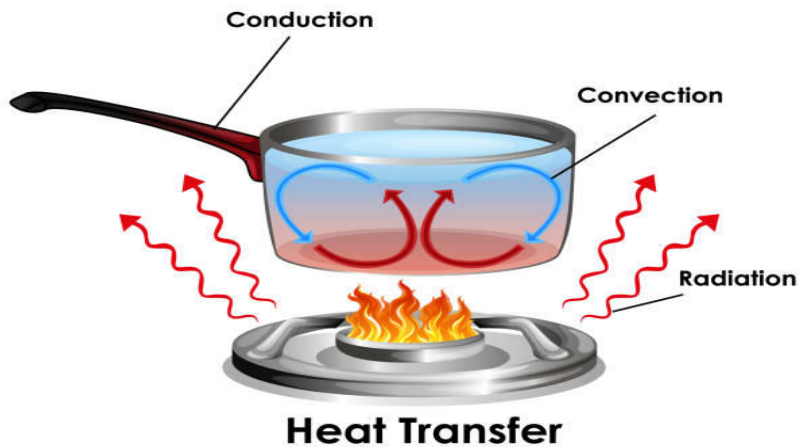
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- This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins or other markings on the paper.

Empathize

- How we can make a simple electric circuit ?
- Classify the types of energy ?



- What is the convection ?
- What is the conduction ?
- What is the radiation ?

[illegible]

Ideate

- What are the different ways you can design your project?
- How will you embed the math into your project?
- Use the Ideate templates to come up with two to four different ways to design your project.



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Ideate

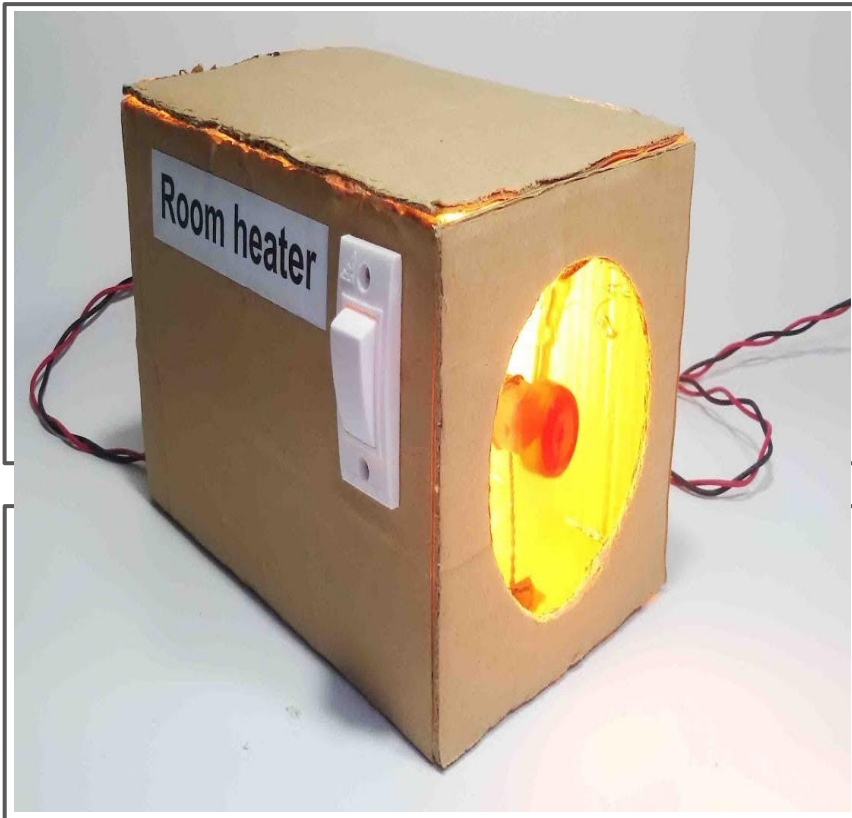
Idea 1



Idea 2



Idea 3



Idea 4





Prototype

- Choose your one best idea from the Ideate
- Why did you choose this version over others? What do you like about this version?

[illegible]

Heat –

the movement of thermal energy from hotter to cooler objects



Temperature-

The measure of how hot or cold something is



Insulator –

an object that does not conduct heat well



Examples – Wood, cloth, plastic

Types of Heat Transfer

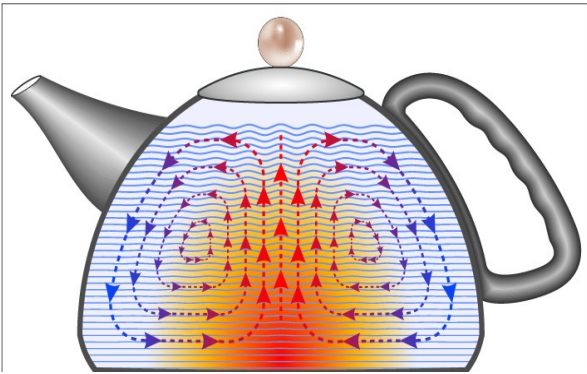
Heat is transferred from one object to another three different ways: conduction, convection, and radiation.



Conduction

Conduction is the transfer of heat energy within a solid object or between two or more objects that are touching.

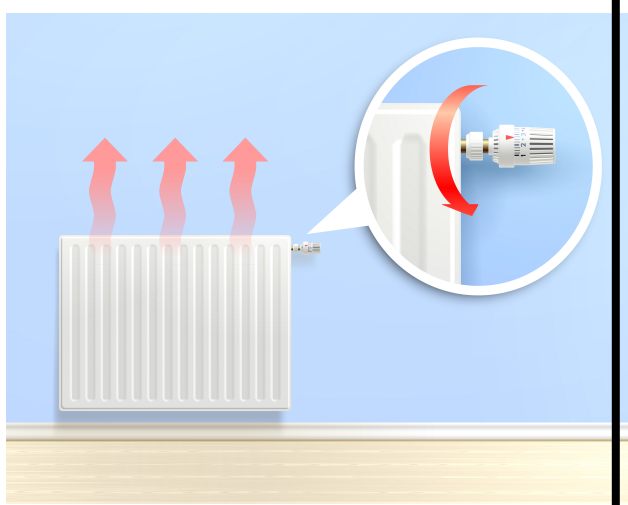
Example: A hand getting burned when touching a hot pan is an example of conduction.



Convection

Convection is the transfer of heat energy within liquids and gases by hotter molecules rising and cooler molecules falling.

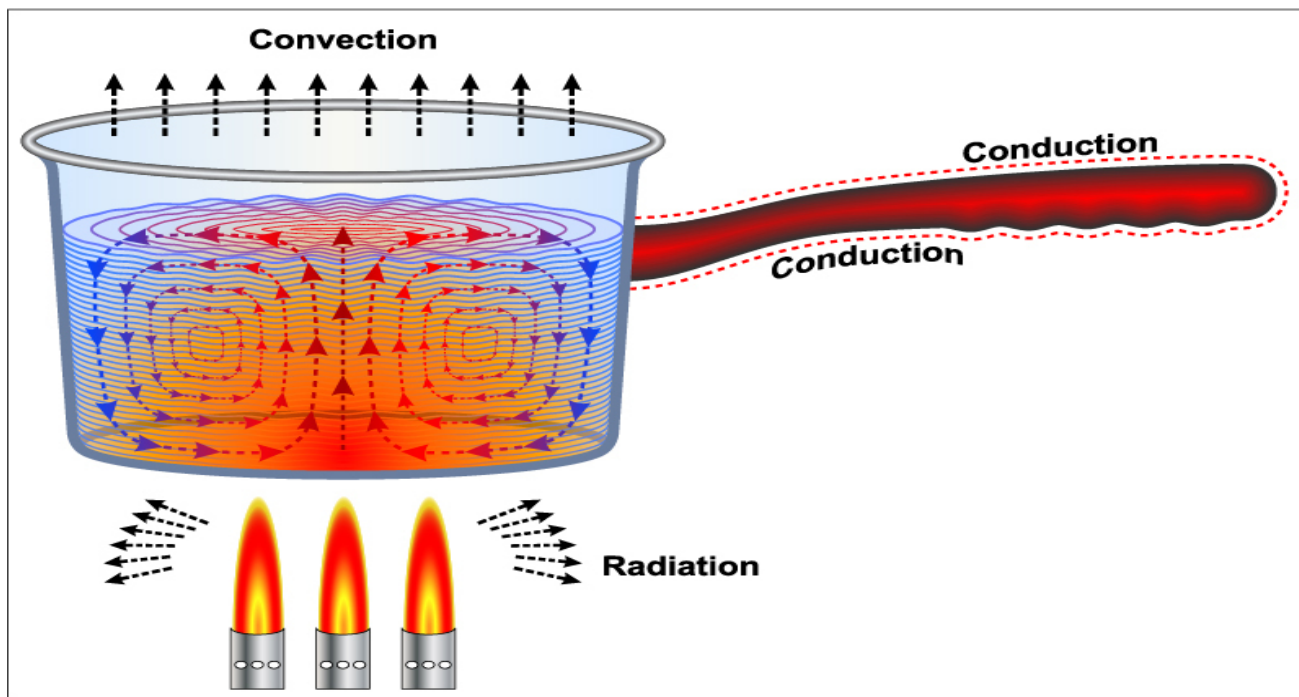
Example: The warm water vapor that rises into the air during evaporation is an example of convection.



Radiation

Radiation is the transfer of heat energy by electromagnetic waves.

The Sun's heat and heat from a fire are both examples of radiation.

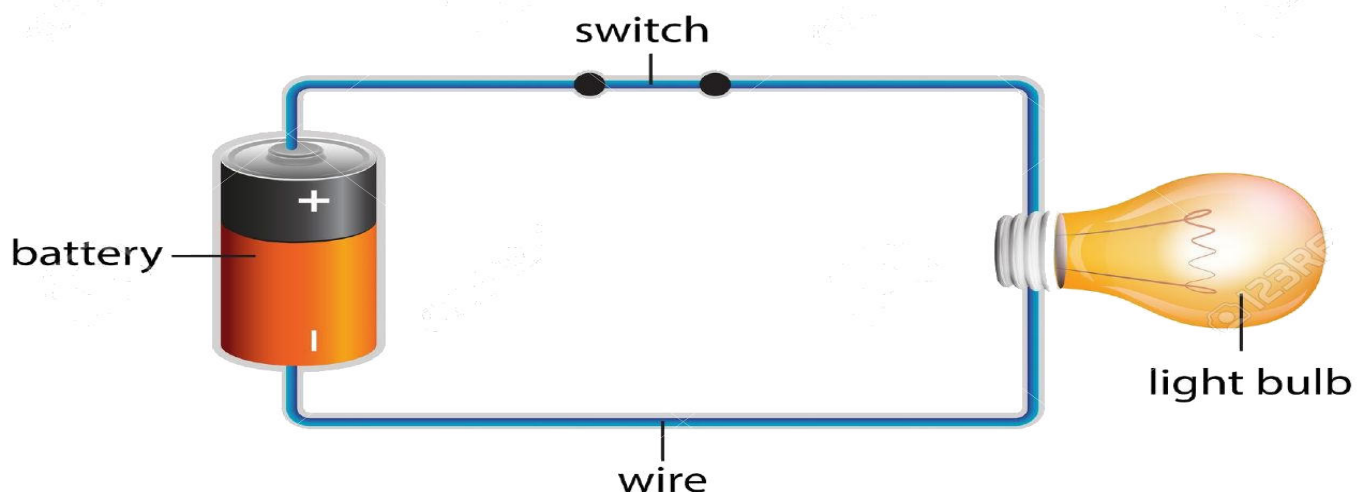


Conduction: the transfer of heat energy within a solid object or between two or more objects that are touching

Convection: the transfer of heat energy within liquids and gases by hotter molecules rising and cooler molecules falling

Radiation: the transfer of heat energy by electromagnetic waves

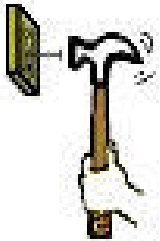
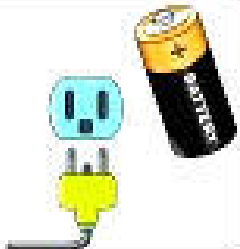
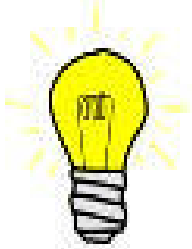


Simple Electric Circuit



Types of Energy:

M.E.L.T.S.

Energy is the ability to do work.
Energy comes in many different forms.

M Mechanical	Mechanical energy is movement. <i>Example: bicycle, scissors, wind-up toy, hammer, turbine, fan.</i>	
E Electrical	Electrical energy is caused by the flow of electrons in circuits. <i>Example: computer, TV, iPhone.</i>	
L Light	Light energy travels in waves through space. You see it. <i>Example: sunlight, lightbulb, fire.</i>	
T Thermal	Thermal energy is heat. <i>Example: sunlight, fire, oven, stove, microwave, heater.</i>	
S Sound	Sound energy is made by vibrations. You hear it. <i>Example: talking, singing, music.</i>	

STEM Lesson Checklist

	Self-Assessment - Developing (1) - Satisfactory (2) - Outstanding (3)
1. Aligned to Grade-Level Standards The lesson is aligned to appropriate state and/or national math, science, technology, and engineering standards.	
2. Multidisciplinary A true STEM lesson must integrate science, technology, engineering, and mathematics.	
3. Addresses Authentic Challenges The lesson presents students with real-world challenges or problems with practical and meaningful implications.	
4. Integrates 21st Century Skills The lesson encourages students to develop creativity, critical thinking, problem solving, and teamwork.	
5. More Than One Solution The lesson includes problems or challenges that have more than one possible solution.	
6. Uses the Engineering Design Process Any design, construction, or prototyping follows the steps of the engineering design process.	
7. Hands-On The lesson encourages hands-on manipulation of technology or materials to solve a problem or engineer a design.	
8. Integrates Technology The lesson incorporates technology in a way that is seamless and appropriate, simplifying rather than complicating the lesson.	
Overall Score	