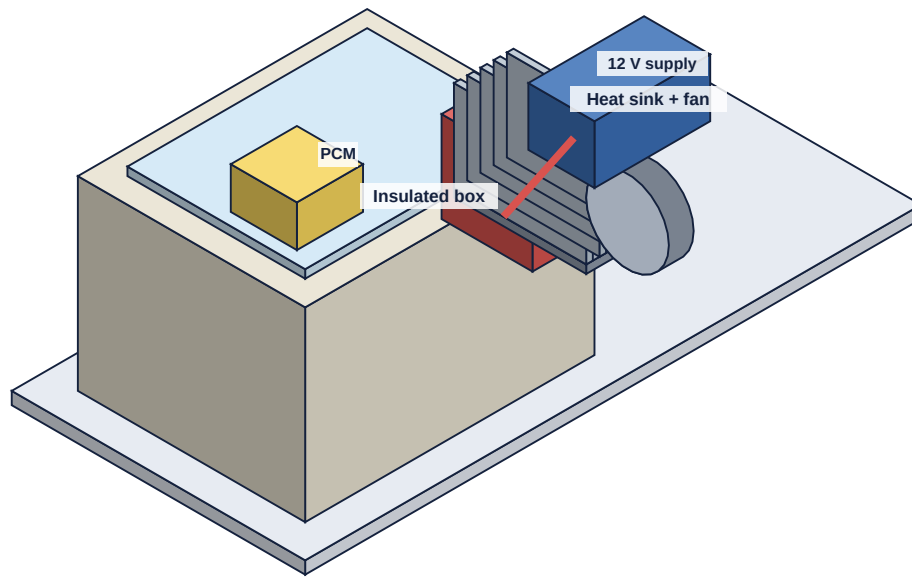


Peltier Cooling Box with Phase Change Material (PCM)

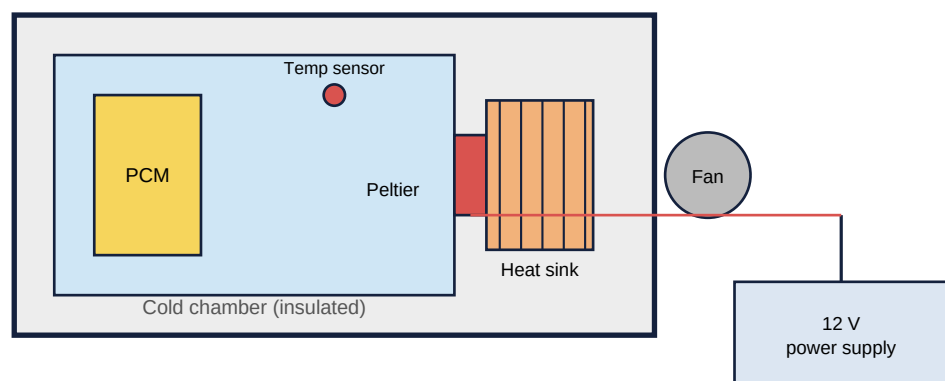
Short Project Guide

Domain	Level	Approx. component budget	Workshop feasibility	Build + test time
Thermal / Energy	Easy-Medium	Rs. 8,000 - 12,000	High	4-6 weeks



3D concept view (illustration, not to scale).

Cold side faces the box, hot side faces the heat sink + fan



Block diagram / sketch (not to scale). Your final build will look different depending on your design and materials.

OBJECTIVE

Compare cooling time and how long the box stays cold with and without PCM, and find the COP at different supply currents.

HOW IT WORKS (IN SIMPLE WORDS)

When DC current passes through a Peltier module, one face becomes cold and the other hot. A heat sink and fan remove heat from the hot face. A PCM block inside stores cold, so the box stays cool longer even when power is off.

MAIN PARTS YOU WILL NEED

- Insulated box (thermocol / PUF sheet)
- Peltier modules with heat sinks and fans
- DC power supply
- PCM (paraffin or similar) in containers
- Temperature sensors and thermal paste

CAN YOU BUILD IT IN YOUR COLLEGE WORKSHOP?

Cutting, drilling and simple assembly. Very little machining is needed. How well you cool the hot side decides your results.

RESULTS YOU CAN EXPECT

- Cooling (pull-down) curves with and without PCM
- COP vs current
- Hold-time improvement with PCM

QUESTIONS YOU SHOULD BE ABLE TO ANSWER IN VIVA

- How does the Peltier effect work?
- Why is the COP of a thermoelectric cooler low?
- How does PCM help in this project?
- What limits the temperature difference?

Want to build this project? The full package gives you the complete guide: detailed design, step-by-step build plan, parts list with specifications, testing procedure, report material, PPT and viva preparation. Message us on WhatsApp: **WhatsApp: +91 8171053962**