

Physics & Technology – "The Pizza Box Power Station"

Topic: Heat Transfer (Radiation, Conduction, Insulation) & Renewable Energy **CAPS Grade:** Grade 7 (Heat Transfer) & Grade 9 (Energy & The National Grid) **Relevance:** With **Load Shedding** being a daily reality, understanding solar thermal energy is a critical life skill.

Materials:

- **The Oven:** An empty pizza box (or any flat cardboard box).
- **Reflector:** Aluminum foil (shiny side).
- **Window:** Cling wrap (plastic food wrap).
- **Insulation:** Old newspapers.
- **Absorber:** Black paper or a black plastic bag placed at the bottom.
- **Test Food:** A marshmallow or a slice of bread with cheese.

The "Frugal" Solution

You don't need a Bunsen burner or electricity to cook. You just need to trap the sun. This teaches the Greenhouse Effect and Solar concentration.

The Procedure

1. **The Cut:** Cut a flap in the lid of the pizza box (leave one side attached). Fold the flap up.
2. **The Reflector:** Cover the inside of the flap with foil (shiny side out). This reflects sunlight into the box.
3. **The Trap:** Tape cling wrap over the opening you made in the lid. This lets light in but traps heat (like a car window on a hot day).
4. **The Heat Sink:** Line the bottom of the box with black paper/plastic. Black absorbs heat.
5. **Insulation:** Stuff rolled-up newspaper around the sides to stop heat from escaping.
6. **The Test:** Put the cheese/marshmallow inside. Close the lid. Point the flap at the sun. Wait 20–30 minutes.

The Lesson Takeaway

Students learn how **Radiation** (sunlight) turns into **Thermal Energy** and how **Insulation** keeps it there. It creates a mini-greenhouse.
