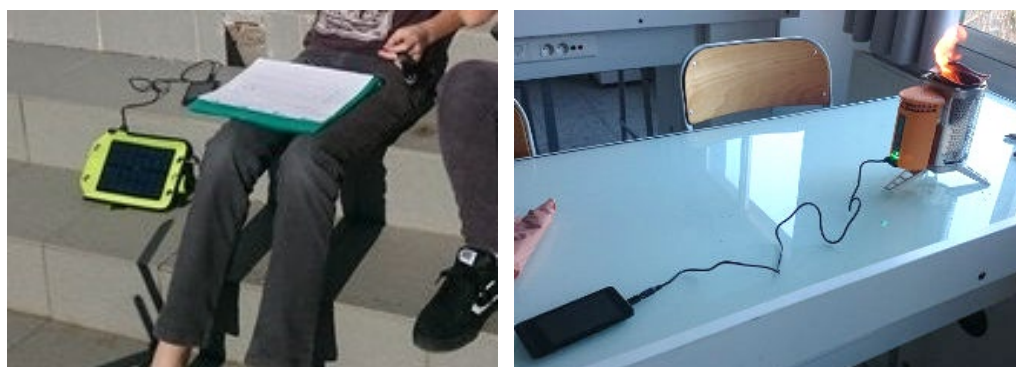


Introductory activity

Cooking with sunlight and producing electricity using Peltier modules

Existing devices

Like engineers, the first task for students is to study different existing phone chargers: a solar charger; a combustion charger using a Peltier module that allows you to cook while charging a phone, e.g., a BioLite device; and a classical charger.



Charging a phone with a solar charger (left) and a BioLite charger that uses combustion and a Peltier module (right).
Image courtesy of the author

Students develop energy diagrams for the photovoltaic cells and the Peltier module. They then compare the characteristics of these different phone chargers and measure their respective charging times.

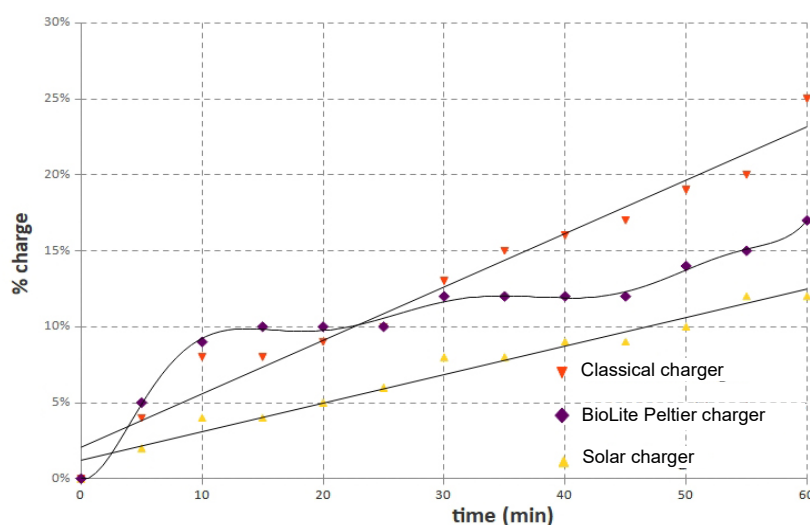


Image courtesy of the author



Discussion

The Peltier module charger provides students with an example of a thermoelectric converter. You can then discuss how to improve on this and whether there are other ways to provide heat for the Peltier charger. Have the students heard of solar cookers? These can be introduced, and you can discuss replacing both the cooking and heating function of the wood burner with solar power.

As the Peltier charger module can cook and charge, they set their target as the same characteristics, namely: $P = 2 \text{ W}$ and $U = 5 \text{ V}$.