

Introducing solar cooking to Bedouin via high school physics education.

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Background:

Can we bring solar cooking to
the Bedouin?

How about via kids like these?



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Midreshet Ben-Gurion, Negev, Israel

Satellite Campus
of BGU

Environmental High School,



Circumstances

Campus and village population – western style living.

Surrounding areas – Bedouin.

Traditional way of cooking is open fire.

Arid to semi-arid conditions (90mm annual rainfall).



A. Environmental high school is a boarding school for grades 8 to 11.

Solar cooking is an excellent subject for teaching physics, addressing:

Concepts of radiation, its spectral distribution, transmission through glass, the laws of reflection and heat transfer (conduction, convection, radiation).

How better to instruct than via project-oriented teaching?

→ learn – understand – build – and test solar cookers.

B. How can we get the Bedouin interested in solar cooking?

→ perhaps via the students of the Bedouin school?

Putting **A** and **B** together delivers the following benefits:

- teach high school kids physics
- awaken their interest in alternative energy in general
- interest the Bedouin children in the 'power' from the sun, in the hope their parents will start to find it interesting also.
- encourage contact between the two populations of widely different background.

A. Physics education at the high school: 1st semester: weekly 1.5 hour lectures to 10th graders with physics and mathematics orientation.

2nd semester: students develop designs based on these lectures and build their own models and test them.

B. Collaboration approved by the school principles of the two schools. Teachers of the Bedouin school are supportive.

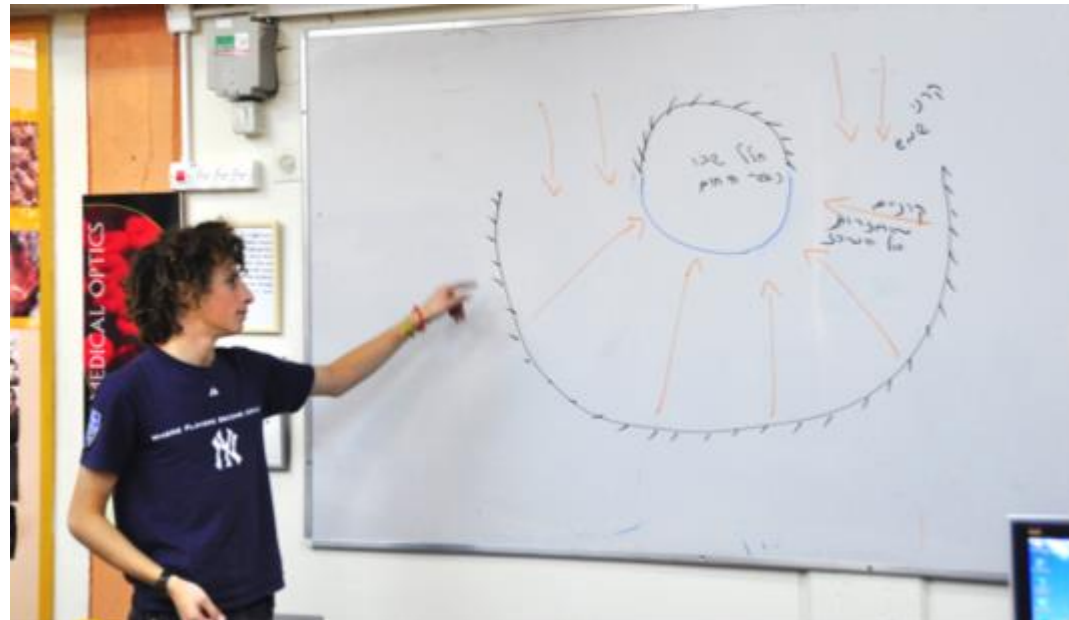
→ A select group of students presents their work at the Bedouin school.

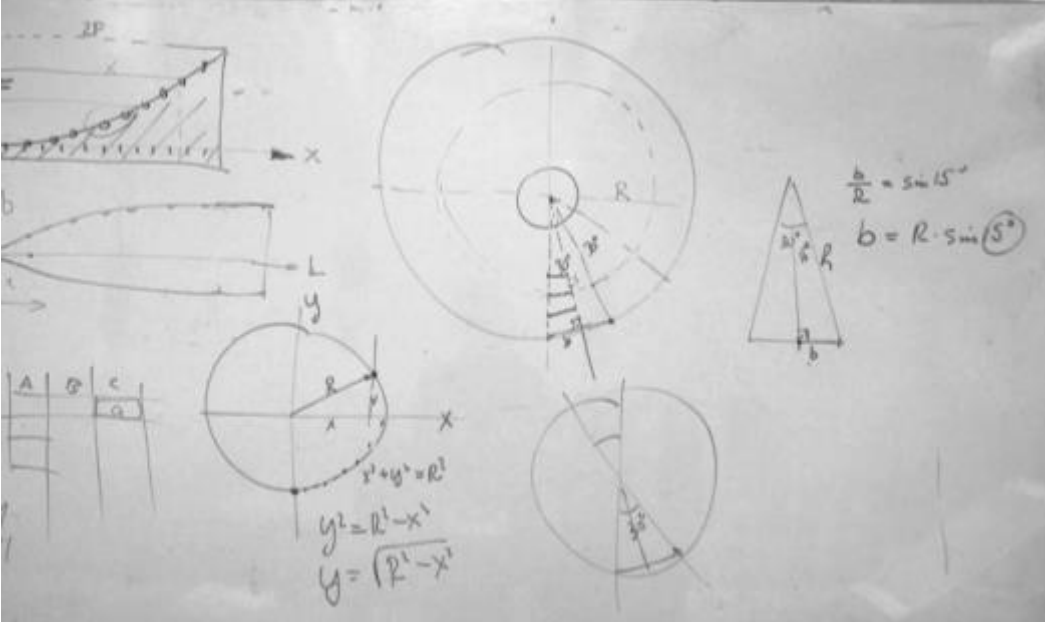
At the high school:

In one year two groups formed: one designed a paraboloidal concentrator, the second a spherical concentrator. The designs were presented by the students in class and discussed by teachers and students.

In a second year, the students designed box- and panel cookers.

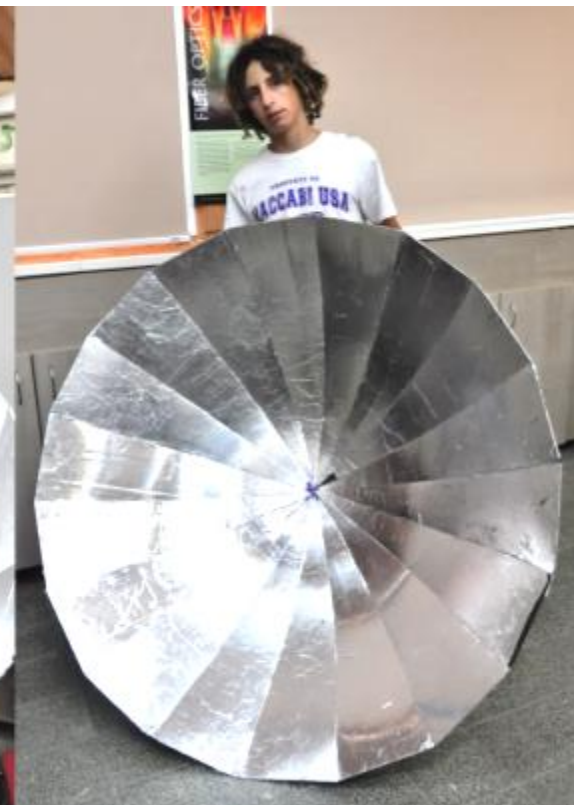
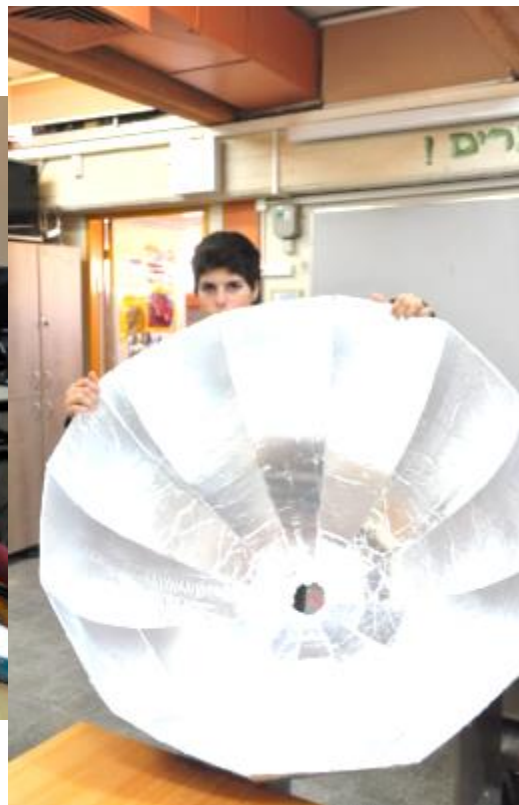
Student explains his idea for a cooker



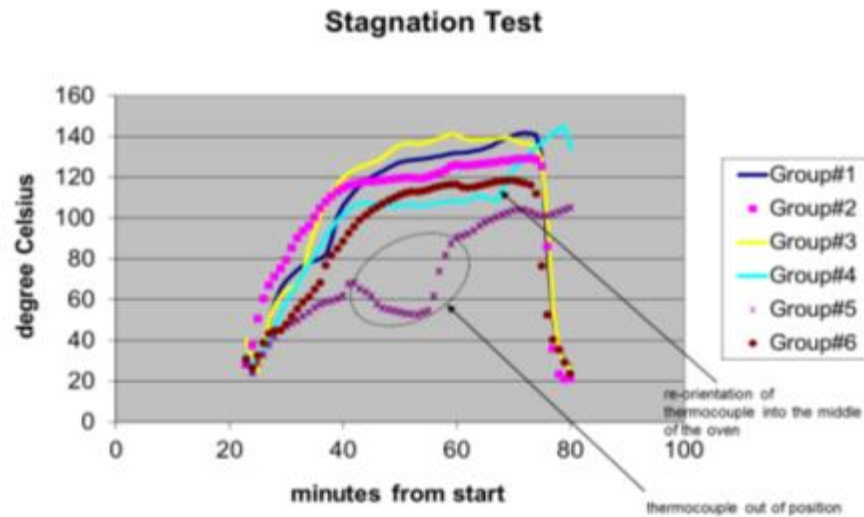


designing the petals for the concentrators

Materials: 4mm hollow polycarbonate sheet, aluminum foil, white glue, and masking tape.



Another class: high school students designed, built and tested box or panel cookers





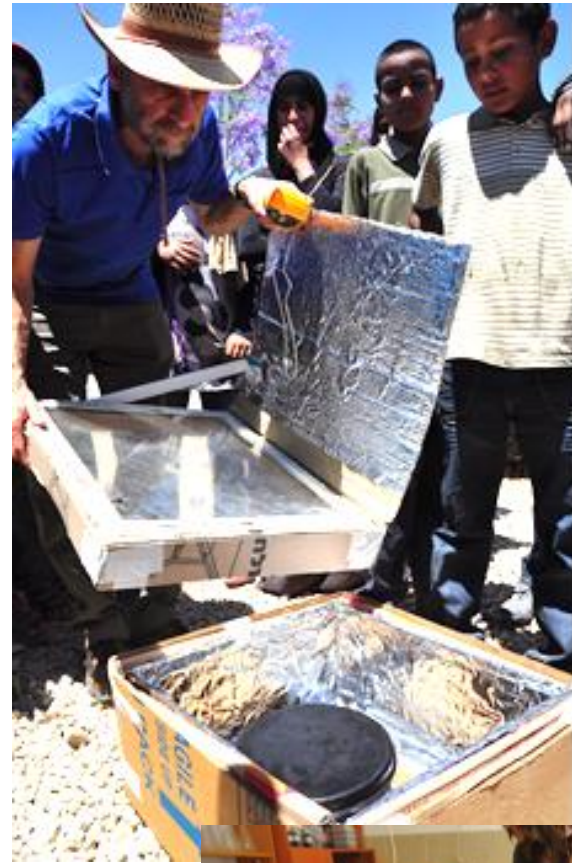
presentation of devices at the
Bedouin school – year 1



hot tea from the sun

presentation of devices and
construction of panel cookers at the
Bedouin school – year 2

6 groups of 3
students each were
formed, each to
built one panel
cooker



Testing of panel cookers at the Bedouin school.



Results and lessons learned:

- High engagement of students, good feedback.
- The construction of the concentrating cookers took too much time, better build box cookers. We believe students did learn well.
- Excitement at the Bedouin school, full collaboration from the teachers.
- We feel that it was important to make contact with the community.
- Long term result: quite uncertain, possibly no further penetration of solar cookers in the community, however it is not possible to know how the experience affects the thinking and behavior of the participants in the future – it may be rather indirect, yet we believe

it was a worthwhile investment and is suitable to similar situations where modern and rural societies coexist.

Acknowledgement:

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