EXERCISE: Direct and indirect sunlight

Part of the Solar Energy module

EXERCISE Direct and indirect sunlight (Making a solar hot water system) *Part of the Solar Energy module*

Description of the exercise

In this activity you will build your own solar hot water system. You will compare the heat generated by direct sunlight to indirect sunlight.

Problem

When energy is becoming scarce, it is important to use other resources. In this activity students will learn the power of solar energy.

Timeline

The exercise will take approximately three hours to complete.

Target Audience

Students and employees who have completed the theory on the Solar Energy module and have knowledge of Solar Energy.

Goal

Heating water using solar energy.

Learning outcomes

Understanding how solar energy works and what the difference in strength is between direct and indirect sunlight.

Evaluation

Results:
Measure the temperature each hour and compare the two boxes.

Why have I used black bags?
What are the drawbacks of this method of heating?
Which of the 2 bags is warmer? Why is this?
Where could you use this form of heating in real life?

Technology

No specific technology is being used.

Methods

1. Place 1 litre of water into a plastic jug.
2. Pour 500mL of water into each black garbage bag, record the starting temperature of each, and put a knot in each end to keep them closed.
3. Place each of the black garbage bags into a plastic box.
4. Put the clear plastic lid over the top of the plastic boxes.
5. Place one in direct sunlight and leave one on the bench in the classroom for at least one hour. (Leaving them for 2-3 hours would be better.)
6. Record the temperature at one hour intervals for three hours. (Untie the knot and place the bulb of the thermometer in the water or make a small cut in the black garbage bag and push the bulb of the thermometer through this. Take care not to spill any of the water.)

Team

This exercise can be executed by a single person or in small groups

Resources

You will need:
Thermometer
Large plastic jug
Water
Two small black garbage bags
Two boxes with clear plastic tops
A sunny location

Safety: Care needs to be taken when recording the temperature of the water. Water left in the sun for long periods of time can get very hot.