Protection from the cold. Why do we wear clothes? with Cobra SMARTsense

Biology > Human Physiology > Cardiovascular system

Difficulty level	Group size	Preparation time	Execution time
easy	2	10 minutes	20 minutes

This content can also be found online at:

http://localhost:1337/c/6135fcd1fd803000038590ee

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PHYWE

Teacher information

Application

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Measure the heat in a glove

We all know it: when it starts to get cold outside around September or October, the shorts are stowed away in the wardrobe and the clothes are adapted to the weather. If it gets even colder, gloves, hats and scarves also find their way onto our bodies.

But how does this protection from the cold actually work? Why do we wear clothes and how do clothes affect the temperature directly on our skin?

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Other teacher information (1/3)

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Prior knowledge

The students should already know that there are warm and cold organisms on earth. It is also useful if they know the normal temperature of a human being.

Scientific Principle

With more clothing, the temperature of the body is kept constant in cold temperatures.

Other teacher information (2/3)

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Learning objective

Students should recognize that the temperature inside a glove rises quickly, while the temperature of the hand without the glove remains constant.

Tasks

The students measure the temperature on the surface of the hand once with and once without gloves and compare the values with each other.

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Other teacher information (3/3)

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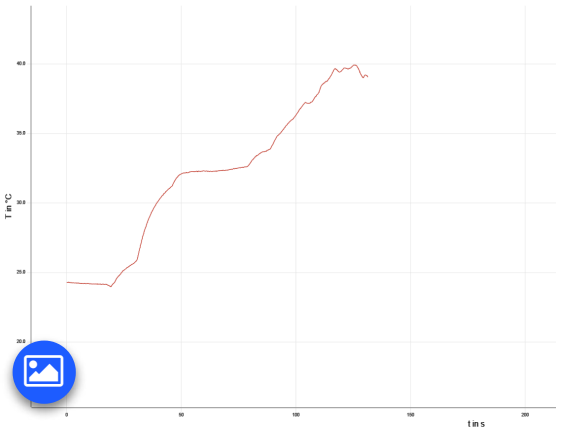
Notes on implementation

- The SMARTsense Temperature sensors should be left at room temperature for some time before starting the experiments.
- To speed up the experiments, it is a good idea to have the students do some athletic exercises such as squats or something similar while wearing the gloves and taking the temperature.
- A curve is shown on the right as an example. As the temperature is influenced by glove thickness, season and other factors, it should however only be regarded as a guide value.



Temperature in the glove

Safety instructions

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- The general instructions for safe experimentation in science lessons apply to this experiment.

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Student Information

Motivation

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We all know it: when it starts to get cold outside around September or October, the shorts are stowed away in the wardrobe and the clothes are adapted to the weather. If it gets even colder, gloves, hats and scarves also find their way onto our bodies.

But how does this protection from the cold actually work? Why do we wear clothes and how do clothes affect the temperature directly on our skin?

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Tasks

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1. Measure the temperature on the surface of your flat palm.
2. Measure the temperature inside your closed fist.
3. Measure the temperature on the surface of your flat palm while wearing a glove.
4. Measure the temperature of the gloved hand with and without exercise and compare the temperature curve.

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Equipment

Position	Material	Item No.	Quantity
1	Cobra SMARTsense - Temperature, - 40 ... 120 °C (Bluetooth)	12903-00	1
2	measureAPP - the free measurement software for all devices and operating systems	14581-61	1

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Structure (1/2)

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For measurement with the **Cobra SMARTsense sensors** the **PHYWE measureAPP** is required. The app can be downloaded free of charge from the relevant app store (see below for QR codes). Before starting the app, please check that on your device (smartphone, tablet, desktop PC) **Bluetooth** is **activated**.

iOS

Android

Windows

Structure (2/2)

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Test setup

- Turn on the Cobra SMARTsense Temperature by pressing the power button. The sensor will be detected automatically.
- Select the Cobra SMARTsense Temperature in the measureAPP.

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Procedure

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- Take the SMARTsense Temperature Sensor and place it on your flat hand (top right image).
- Start the measurement.
- Stop the measurement after approx. 120 seconds.
- Repeat the experiment, but this time hold the sensor in your closed hand.
- Repeat the experiment, but this time put on a glove (picture below right).

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Report

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Task 1

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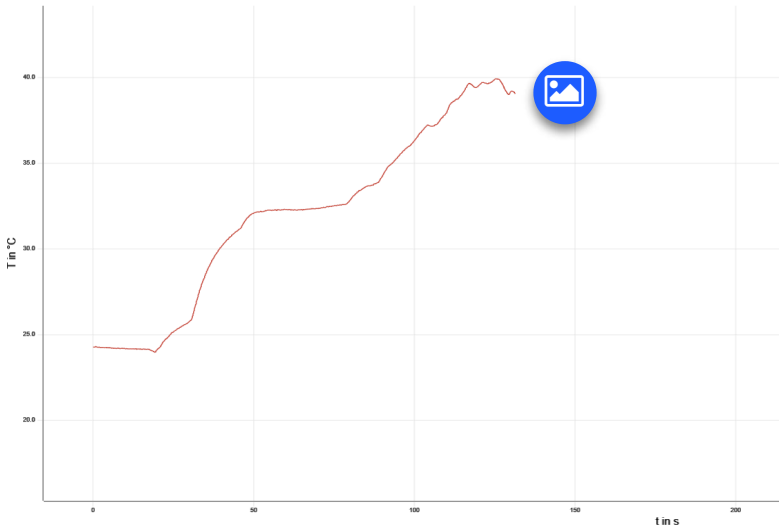
The curve on the right shows the situation in the glove. It is particularly noticeable that the temperature rises above the actual body temperature.

○ True ○ False

Check



Task 2

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Why do we wear clothes?

- ☐ Thermal regulation
- ☐ Shame
- ☐ Status symbol
- ☐ Appearance

Check

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Task 3

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Choose the correct statements.

- ○ The temperature in the glove rises the highest, followed by the closed fist, followed by the open hand.
- ○ The temperature rises highest in the open hand, followed by the closed fist, followed by the glove.
- ○ The temperature in the fist rises the highest, followed by the glove, followed by the open hand.

Check

Slide	Score / Total
Slide 15: Glove	0/1
Slide 16: wear clothes	0/4
Slide 17: Temperature in the glove	0/1

Total 0 / 6

Solutions Repeat

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