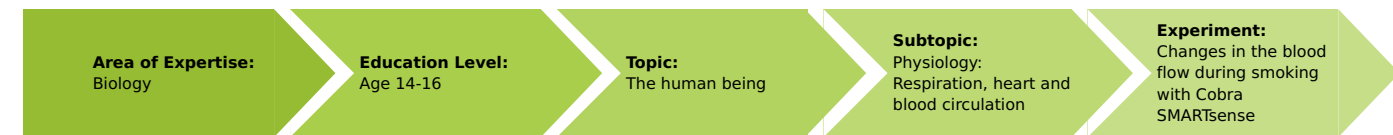


Changes in the blood flow during smoking with Cobra SMARTsense (Item No.: P4020469)

Curricular Relevance



Difficulty



Easy

Preparation Time



10 Minutes

Execution Time



10 Minutes

Recommended Group Size



2 Students

Additional Requirements:

- Tablet with measureApp
- Cigarette, alternatively: cold tap water

Experiment Variations:

- Alternatively, use a PC with measureLAB (14580-61)
- Alternatively, use a Cobra4 Mobile-Link (12620-10)

Keywords:

Skin temperature, Heavy and moderate smokers, Occasional smokers, Non-smokers

Teacher information

Introduction

Principle

Cigarette consumption influences the diameter and therefore the circulation of the peripheral blood vessels. This experiment studies the change of the finger temperature during smoking. It is a simple and effective method to create hard data which shows the effect of smoking on the human physiology.



Fig. 1: Change in the skin temperature during smoking with SMARTsense

Tasks

1. Determine the physiological impact of smoking by skin temperature measurement.
2. Discuss how the temperature curve differs with reference to the test person's regular smoking habits.

For obvious reasons – **instead of animating students to smoke** – the same effect can be achieved when the students place their free hands in a bowl with cold tap water for the duration of the measurement. This reduces blood circulation in all extremities and the temperature drops.

Equipment

Position No.	Material	Order No.	Quantity
1	Cobra SMARTsense - Temperature, - 40 ... 120 °C	12903-00	1
2	Rubber bands, 50 pieces	03920-00	1
3	USB charger for Cobra4 Mobile-Link 2 and Wireless/USB-Link	07932-99	1
Additional material:			
4	Tablet		1
5	PHYWE measure App		

Android

iPad



Changes in the blood flow during smoking with Cobra SMARTsense (Item No.: P4020469)

Introduction

Principle and task

Principle

Cigarette consumption influences the diameter and therefore the circulation of the peripheral blood vessels. This experiment studies the change of the finger temperature during smoking.



Fig. 1: Change in the skin temperature during smoking

Tasks

1. To prepare a curve showing the change in skin temperature during smoking.
2. To discuss different curves depending on the smoking habits of the test person.

For obvious reasons – **smoking is a severe health hazard, reducing quality of life and life span both for smokers and their fellow students** – the same effect can be achieved when the students place their free hands in a bowl with cold tap water for the duration of the measurement. This reduces blood circulation in all extremities and the temperature drops.

Equipment

Position No.	Material	Order No.	Quantity
1	Cobra SMARTsense - Temperature, - 40 ... 120 °C	12903-00	1
2	Rubber bands, 50 pieces	03920-00	1
3	USB charger for Cobra4 Mobile-Link 2 and Wireless/USB-Link	07932-99	1
Additional material:			
4	iPad		1
5	PHYWE measure App		



Android

iPad





Set-up/Procedure and Evaluation

Set-up

- Start PHYWE measureAPP .
- Switch on the temperature sensor by pressing the power button until the bluetooth LED blinks. Ensure that Bluetooth is activated on your device.
- Select your SMART sensor under the tab 'Sensor' in the measure App . In the graph window, the measurement automatically shows the temperature as a function of time.
- Fasten the temperature sensor with a rubber band onto the hand so that its tip has contact with the fingertip (Fig. 1).

Procedure

- Start recording of the measurement with the measureAPP  by pressing . Wait until the temperature shows a constant value.
- After 1 minute start smoking resp. put your hand into cold tap water.
- Smoke the cigarette/leave your hand in the cold water for 5 minutes. Longer times do not give better results.
- The measurement can be terminated after the skin temperature has reached its initial value by pressing the stop button.
- Save the measurement.

Result and evaluation

Result and evaluation

- The temperature drops during smoking from 30 °C to less than 28 °C, i.e. by more than 2 °C. When the cigarette is finished the skin temperature very gradually increases again to its initial temperature.
- Smoking causes the vessels to constrict, which leads to less circulation and therefore a drop in the skin temperature. This phenomenon can be observed especially in the extremities (cause for smoker's legs, smoker's hands). In the Internet you can easily find pictures of deformed limbs which will definitely deter you from smoking.
- The results depend greatly on the test subject.

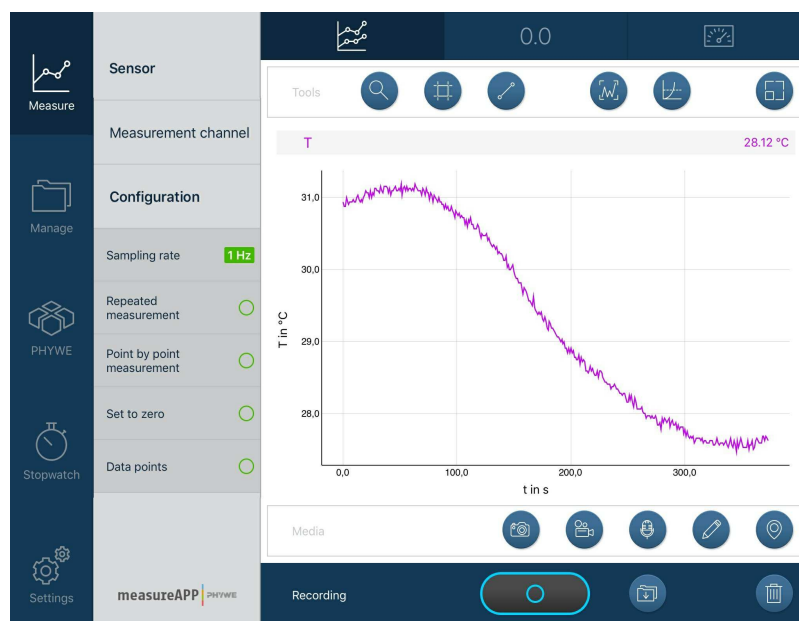


Fig. 2: Change in the skin temperature during smoking