

**STEMkey**  
Module IO4



# **Human anatomy and physiology with smartphones**

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## **Activity 1: Know your smartphone**

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## Module IO4. Human anatomy and physiology with smartphones

### Activity 1. Get to know your smartphone

**Objectives:** Students will learn how to use their smartphones as a laboratory “Swiss army knife”

**Background:** Smartphones can be used in laboratory and field work in many ways by application of their sensors. Because smartphones can differ the first step is to recognize and test their capacities.



Work in groups and home work



90 min

### Learning Outcomes

**After the activity students will achieve:**

**Knowledge:**

- Understanding of the various features and functions of smartphones that can be used to learn and explore human anatomy and physiology.
- Knowledge of camera operation, including taking photos and videos, adjusting settings, and using various modes.
- Familiarity with smartphone internet connectivity, including accessing web browsers, conducting online searches, and evaluating online resources.
- Awareness of mobile apps as they relate to human anatomy and physiology, their availability, and their potential usefulness for learning.

**Skills:**

- Technological literacy: students develop skills in using the features and functions of their smartphones, including the camera, internet connection, and app installation.
- Camera skills: student will improve their ability to take clear and meaningful pictures and videos while considering lighting, focus and composition.
- Online research skills: students gain skills in conducting online research, evaluating the credibility of sources, and accessing reputable online resources related to human anatomy and physiology.
- Digital organization: students will learn to use note-taking apps and organizational features on their smartphones to create and organize digital notes, bookmarks, and folders for efficient access to resources.

**Attitude:**

- Appreciation for smartphone features: Students will develop an appreciation for the versatility and potential of smartphones as valuable tools for learning and exploration in the area of human anatomy and physiology.
- Openness to Technology Integration: students develop a positive attitude toward integrating technology into the classroom and recognize its benefits for enhancing the learning experience.

- Resourcefulness: students cultivate a resourceful mindset by actively seeking out and using technology to access relevant information and resources for the study of human anatomy and physiology.
- Responsible Smartphone Use: Students develop a sense of responsibility and respect for appropriate smartphone use in the classroom and adhere to school and classroom policies.

### Interdisciplinary Approach

Incorporating interdisciplinary approaches into the "Learn Your Smartphone" activity allows students to develop a comprehensive understanding of the broader implications of smartphone use beyond the immediate context of anatomy and physiology. These approaches promote critical thinking, ethical awareness and a multi-dimensional understanding of the impact of technology on individuals and society.

IO4 Activity one can be used as an introductory section in any comparative science activity when smartphones are used beyond the role of interfacing with the Internet or for communication. This knowledge and experience can be considered as lifelong knowledge and goes far beyond curricula. Furthermore, the use of the same sensors and applications in different contexts can lead to making connections that are not visible in the curricula. It is also predictable that at least some of the activities can be a bridge to curiosity, and initial findings from measurements can lead to critical evaluation or even reflection.

### Description of the session

#### 1. Pre-lab activities

The teacher should instruct students to bring their own smartphones to school. The teacher should advise them that the phones should be fully charged. Optionally, they can ask the students to download and install a Phyphox app on their own device. Part of the pre-lab activities can be to introduce ethical principles and guidelines for smartphone use that respect students' privacy. The teacher must ensure that everyone understands the rules to be applied. Optionally, teachers can provide school tablets or smartphones. In case they use the Wi-Fi, teachers should also provide passwords and usernames. Pre-lab activities should be adapted to local rules and regulations. Make sure your smartphone is fully charged before coming to class.

1. Download and install the Phyphox app on your smartphone. If you already have it, make sure it is up to date.
2. Familiarise yourself with the smartphone usage guidelines you have received from your teacher. These guidelines respect your privacy and ensure responsible use.
3. Be prepared to follow any specific rules and regulations on smartphone use at your school.

#### 2. Working in the lab/classroom

Students are instructed to explore the capabilities of their smartphones. They should be instructed to download Phyphox if they have not already done so. Optionally, other apps can be suggested for download. Due to the variety of smartphones and their different operating systems, each teacher should make a decision about which platforms to use.

Task 1: Launch the Phyphox app and identify the sensors available on your smartphone. Make a note of the sensors you find.

Task 2: Experiment with the camera and a sensor on your smartphone:

Explore the capabilities of the camera. Determine the range ISO, the compression format (raw, jpg, etc.) and the resolution (number of pixels).

Choose a sensor from the list you identified in Task 1. This is the sensor you will use for your experiments.

Tasks for experimentation: Choose one of the following basic principles used in research: 1) observation, 2) counting, 3) measurement.

### 3. Homework and assignments

In this assignment, you will engage in pre-lab activities and conduct experiments using the sensors on your smartphones. The aim is to familiarise yourself with the possibilities of your smartphone's sensors and explore their potential for scientific experiments.

#### *Example of an observation:*

Choose an object (e.g. a plant, an object) to observe with the selected sensor. Use the sensor to collect data about the object's behaviour, changes or properties. Record your observations and all relevant sensor data.

#### *Example of counting:*

Find something that can be counted with the selected sensor (e.g. the number of steps, people passing by).

Place your smartphone in a suitable position to capture the events you want to count.

Perform the counting task with the sensor and record the data.

#### *Example of a measurement:*

Choose a physical quantity that you can measure with the selected sensor (e.g. temperature, light intensity).

Design an experiment to measure this quantity under different conditions.

Collect data from your experiments and analyse the results.

Submission:

Write a report summarising your activities, observations and results during the experiment.

### 4. Summative evaluation

Write a report summarising your activities, observations and results during the experiment.

Include the following sections:

Introduction: explain the purpose of the task and the reasons you chose it (observing, counting or measuring).

Methods: Describe how you carried out the experiments, including the set-up and sensors used.

Results: Present your observations and data, including any graphs or tables.

Discussion: Interpret your results, discuss the challenges you faced and think about the possible applications of smartphone sensors in scientific research.

Conclusion: Summarise your main findings from this assignment.

Remember to follow ethical guidelines and respect the privacy of people in your experiments.

Follow any additional instructions from your lecturer regarding submission guidelines.

