

P4- Experiment Procedure “Life sign measurements”

GENERAL INFORMATION

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SHORT EXPERIMENT DESCRIPTION

The aim of this experiment is to collect data of the students themselves in order to promote understanding of the different biological processes whilst performing certain tasks. The students on the mission will also have sensors in the habitat. Find different activities for the students, compare and analyse the collected data. This data can then be used for task- / technique-optimising, thereby promoting astronaut efficiency during the mission.

HARDWARE CHECKLIST

| | |
|--|---------------------------------------|
| | Lebexy Fitness Tracker |
| | Cell phone (App Store or Google Play) |

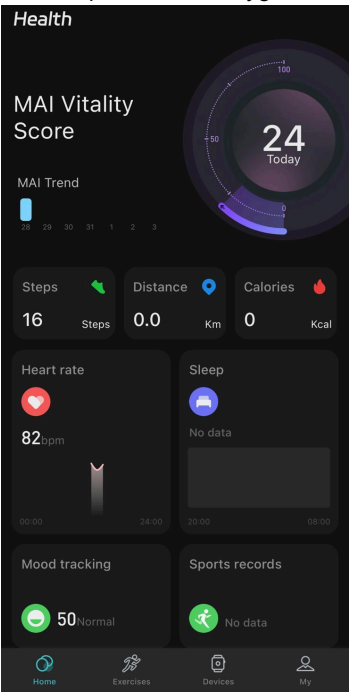
SETUP

| Step | Action | NOTES | Duration | Check |
|------|---|---|----------|-------|
| 1 | For cell phones, scan QR code with the accompanying user manual and download the app. | Follow instructions for account creation as well as following bluetooth connection Data on gender, birthday, etc. can be skipped | 5 min. | |
| 2 | Ensure fitness device is charged according to USB charging protocols in user manual |  | ? | |
| 3 | For other systems, follow above protocol according to instructions | | 5 min. | |

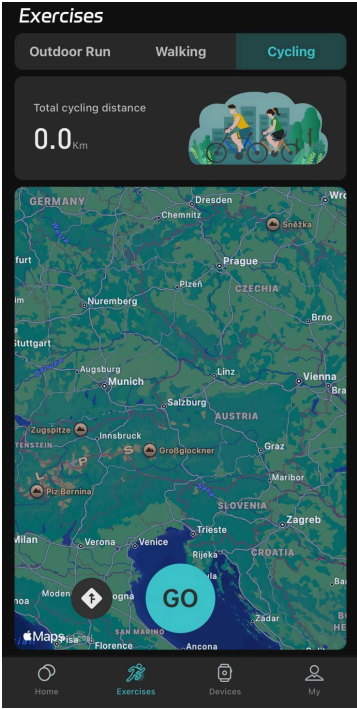

PROCEDURE “LIFE SIGN MEASUREMENTS”

PROCEDURE

LIFE SIGN MEASUREMENTS

| Step | Action | NOTES | Duration | Check |
|------|---|--|----------|-------|
| 1 | Let students put on and activate fitness trackers | *Ensure device is properly connected to cell phone using Bluetooth | 3 min. | |
| 2 | Let students perform different activities and collect data | <p>Document different data outputs including steps, distance, calories, heart rate, sleep, mood tech, sports, blood oxygen</p>  | 1 – 2 h. | |
| 3 | <p>Analyse different data and find possible reasons for these outcomes</p> <p>Compare data sets between students and find possible explanations for data differences / similarities</p> | <p>Which activities lead to a high heart-rate? Which activities were most fatiguing?, etc.</p> | 30 min. | |

PROCEDURE “LIFE SIGN MEASUREMENTS”

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|---|---|---------|--|
| |  | | |
| <p>4 Together, find ways to optimise activities, e.g. concerning fatigue</p> <p>Repeat step 2 to test hypotheses</p> | | 20 min. | |
| <p>5 Compare data sets to previous ones</p> | Has the data changed? If so, how? | 10 min. | |
| <p>6 Disassemble fitness device</p> | <p>*May be difficult to separate, gently jiggle side to side while pulling out away from connection to release</p>  | 2 min. | |
| <p>7 As teacher, educate students on schedule and activities that astronauts must follow (see “resources”)</p> <p>With students, find possible purposes for the listed activities</p> | Why are these activities so important for the astronauts? Why do the astronauts need to follow strict schedules? | 30 min. | |

Resources:

PROCEDURE “LIFE SIGN MEASUREMENTS”

<https://outpost42.esa.int/blog/the-astronaut-daily-schedule/>

<https://www.nasa.gov/podcasts/houston-we-have-a-podcast/the-astronaut-schedulers/> (podcast in both written and audible form)

https://www.esa.int/Science_Exploration/Human_and_Robotic_Exploration/Astronauts/Daily_life

<https://youtu.be/-Y04Zic1-r4> (video: life on board the ISS, ~11 min.)

https://youtu.be/_ikouWcXhd0 (video: running in space, ~3min.)

<https://www.ardalpha.de/wissen/weltall/raumfahrt/iss-raumstation-astronaut-leben-weltall-100.html> (in German)