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Complementary Material and Hints for the UN SDG no 03



SDG no 03: Good Health and Well-being

Ensure healthy lives and promote well-being for all ages

1. Introduction to the topic

Good health and well-being have probably not ever had such a meaning to the people of modern countries since the COVID-19 pandemic. But what means good health and well-being. Especially the last can be a very vague term. For some people, well-being is defined, if they don't have to wake up anymore in the middle of a war and if they can afford three meals a day. For others, well-being is defined by owning a Ferrari, vacation in the Maldives and a 300m² apartment...

Fact is, that in modern countries huge investments in always more sophisticated medical equipment are taken while the majority of people on this planet have hardly any possibility to meet a doctor. How good health and well-being can be achieved for every human being, this is a very challenging and complex issue. I'm convinced, in STEM-teaching this SDG goal and all others, too should not stand alone, but should always be taught and explored in a multidisciplinary way.

For this SDG no 03, one can connect with colleagues in subjects like:

History	Politics	Sociology	Economics
Ethics	Religion	Geography	Biology
Philosophy	Psychology	Music	

(The order of the topics is random and has no implication of a ranking!)

If you click on one of the [hyperlinked words](#), it will lead you to ideas for a multidisciplinary teaching in the text. With such a precious potpourri of fields and competences, you can introduce your students to the very much multifactorial aspects of good health for a population and their well-being. They should be able to understand, that a good performance and wellbeing has its direct link to health and vice versa. You may introduce them to the interesting approach of Bhutan, the country which has - instead of a Gross National Product (GNP) a Gross National Happiness (GNH) Index. (—> sometimes called: Gross Domestic Happiness)

With this SDG, teachers have a good opportunity to rise some really profound questions; for example:

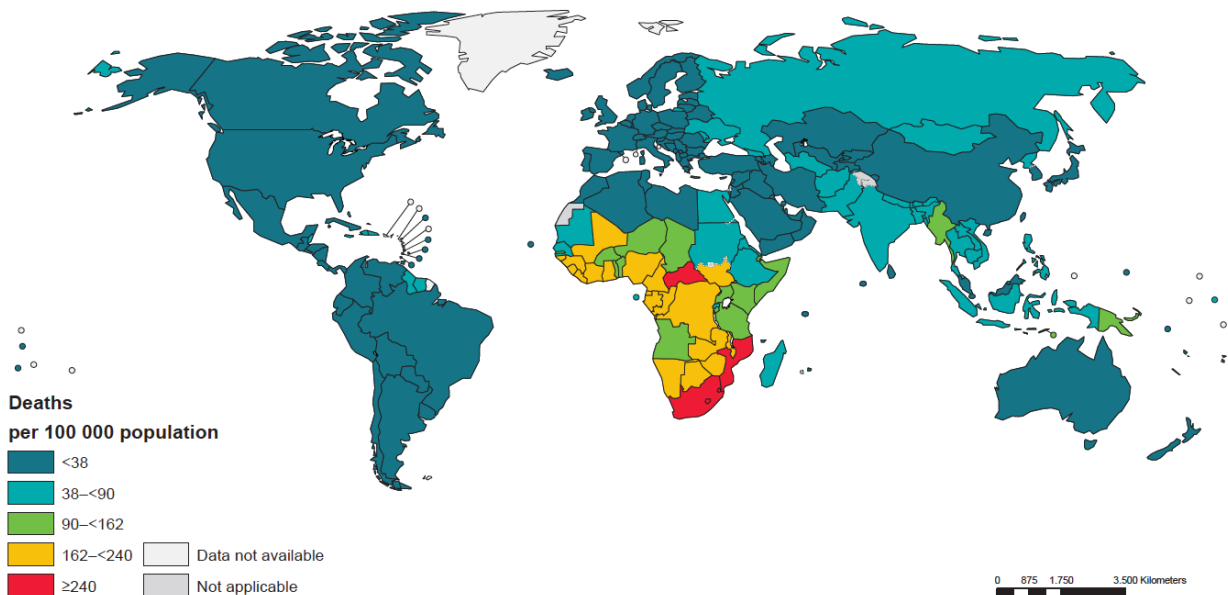
What does the high-tech-medicine of rich countries say about their people's relation to the death?

How desirable is longevity taking into account, that we are already now over-consuming our planets natural resources?

What has to be granted that everybody can profit from this SDG?

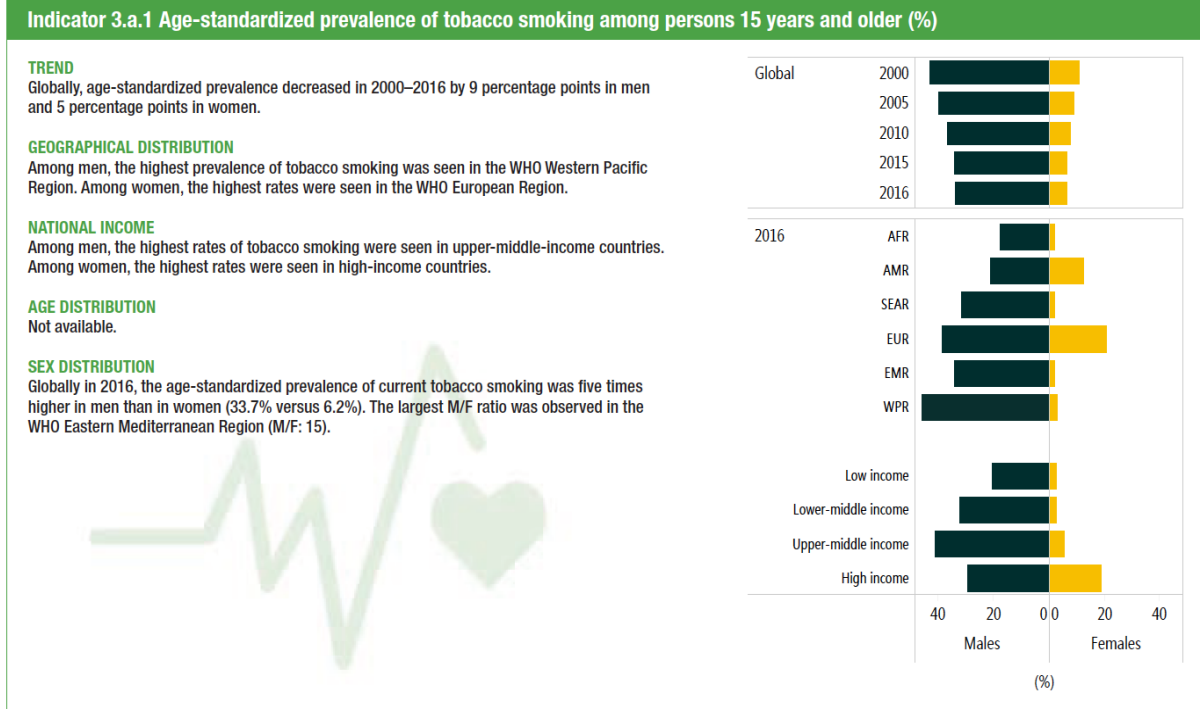
(Health)-statistics, too can be the starter of having interesting and profound discussions. (1, 2,)

Fig. 4.1
Deaths per 100 000 population from infectious diseases covered by SDG Target 3.3, 2016*



* Thresholds based on Jenks natural breaks optimization. Hepatitis includes acute hepatitis, cirrhosis due to hepatitis B and C, and liver cancer secondary to hepatitis B and C. Source: WHO (2018) (2).

World health statistics 2019, p. 24, (2)



World health statistics 2019, p. 35 (2)

SOURCES:

1. Density of physicians worldwide: <https://www.indexmundi.com/g/r.aspx?v=2226&l=de> , last accessed 2021/05/13
2. World health statistics 2019: monitoring health for the SDGs, sustainable development goals: <https://www.who.int/publications/i/item/world-health-statistics-2019-monitoring-health-for-the-sdgs-sustainable-development-goals> , last accessed 2021/05/13

2. How to implement SDG 1 with STEM education?

a. Science

Together with your colleagues in **Biology, Psychology and Sociology** you could initiate a health challenge for the whole school. Students and teachers would have the opportunity, to investigate their own habits on different aspects influencing their personal health - such as sleep quality, social media consumption ([2b](#)), smoking, drinking, eating habits, sports or no sports, social live, peer groups etc.

The students should learn AND self-experience, that if they do focus on basic parameters for a healthy (healthier) life, that they can improve their mental strength too and vice-versa. They could be taught in installing some daily routines for improving their health and mindset. Our body's health is very much dependent on a healthy psyche. The immune-system drops dramatically if people are suffering from mental stress or disorders. Each illness stands for a symbol - an imbalance of the psyche. Teach students to have their own, positive affirmations to become more self-aware and self-confident. What ancient natural healers already knew hundreds of years ago, the field of Psychoneuroimmunology ([3](#)) is about to confirm for the last 30 years. This relatively young field combines with interdisciplinary research the study of the interactions among neural and endocrine function, behavior and immune processes. Neurological studies have also shown, that installing new habits will need about 66 days. So, it is important to give accurate time and space to a such holistic project! ([4](#))

With the Vernier Sensors in combination with a graphing calculator your students can measure very well some of their own crucial physiological data. This would give a nice opportunity to work together with a [Mathematician](#).

b. Technology

Together with an **Ethicist** explore how sophisticated the field of medicine should allowed to be, considering the dilemma of the SDG 12- that all this auxiliary equipment is having a huge ecological backpack (Material Input, MI, ([5](#))) as its raw material is sourcing mostly from countries where medical care is poor and the exploitation of the natural resources to build the rich countries high-tech-medicine is harming those people's health. (more to discuss with [Ethicists...](#))

In this context, a T³ resource fits well: *Rover, a Sm@rt Wheelchair*, from Alexandre Gomes ([6](#)).

A very nice summary on the importance of technology on promotion of health education you can find in this paper from Maria del Carmen Ortega-Navas ([7](#))

As the quality of health starts with the quality of our natural environment, it is indispensable to put efforts in restoration of polluted environments- some of which are today only (half-way) possible with a technical approach. Think on all the plastic floating in our oceans - harming many animals and as micro particles swallowed by fishes, therefore introduced in the food chain ending up within our body. Together with a Biologist you could explore the impact of our

Plastic-World on fauna and flora and try to build a Plastic-collecting-machine for oceans or lakes. ([8](#), [9](#))

c. Engineering

What can already all be done with 3D printing? Printing bones, hearts, skins?! Say: printing cells!? ([10](#), [11](#))

Having a complex operation but no skilled/trained Surgeon to conduct it? No worries, the Surgeon doesn't need to be on place anymore. She/he can execute the surgery from a different place / country operating a surgery robot. ([12](#), [13](#))

—> *Explore* the latest innovations in the medical field with your students- but never forget to discuss the MIPS of all this „nice tools“ and the impact on others there production does have!

Together with an **Ethicist** and/or **Philosopher** discuss if there should be a limit of how far inventions should go- respectively new innovative, life-prolonging ideas should be executed.

Why people in western countries do have such troubles to address the limitation of life? Why they don't like to talk about death? ([14](#), [15](#))

Did our western religion influence / limited this ability?

Methodological hint

Form small groups- each group is working on a different perspective to this subject. They have to formulate arguments, statements, points of view. In a second round, you can let them go into a dispute /discussion (may be with audience)

Let them conduct Interviews: Students will learn, what questions they do have to formulate to get valid answers —> Asking good / appropriate /fitting questions to me is one of the most precious competence students can have/acquire.

d. Math

Together with a **Biologist**, you could measure the students own health data with f.ex. Vernier Sensors ([16](#)) and then introduce your learners to data processing. What do data reveal? Are they interconnected? During last year of the Pandemic people were left with a lot of numbers and statistics. Fortune the ones who can read and interpret this. Pass to your students these skills, too.

- CO₂-gas sensor to measure the concentration in the exhaled air
- Heart rate sensor
- EKG sensor

Health is directly related to happiness - and there is a proverb: „All good things are Three“. Explore the number Three for example triangles and shapes in nature ([17](#))

Together with a **Music** teacher, explore Triads, they are very popular in music - and music is math, isn't it? Can you code a triad with TI Innovator and Rover? See the following material on T³-Resources ([18](#))

Are there not existing „happy numbers“? ([19](#))

(Well, practicing Math seems to make happy and therefore it is healthy, too! :-)

In this context too, one can deal with big data – for example. in the context of COVID-19: See the material on T³-Resources ([20](#))

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3. Connecting this SDG with other SDGs

Methodological hint

Encourage your students, to present the different links and dependencies in a *Concept Map*. This is a powerful tool, not only to show how things are linked together, but it shows you, if the student can make the links and name the dependencies. (21)

Some ideas:

- SDG 01: Poor people are vulnerable with health issues
- SDG 02: hunger weakens the body, the immune-system, the psych etc.
- SDG 04: people with severe health issues can probably not go to school anymore
- SDG 06: available and clean drinking water is a key issue for health
- SDG 07: with no or unreliable energy-supply many hospitals cannot function
- SDG 08: people with health issues are ejected from a working system
- SDG 10: inequalities can provoke psychological stress and therefore people become more vulnerable to other health issues
- SDG 12: if the production of high-tech medical equipment is not responsible and violating the environment, other people's health is threatened as they are suffering the impacts of the mining industry.
- SDG 15: Land grabbing and land violation provoke stress

Trying to reduce mankind's negative impact on our planet with the help of the 17 SDG's, can be a really good idea to make positive impacts. There is a stumbling block to overcome: If enterprises, governments and individuals in their pursuit of following the SDG's are just focusing on one single or may be two SDG's, there will be a huge rebound effect with other goals. So, the crucial point really is, to have always all SDG's in mind, if a new project or idea is launched.

How the SDG 03 is affected, if one is **only focusing** on one of the following goals:

- **SDG 8:** Economic growth requires access to raw materials like rare minerals or agricultural products and cheap production. Due to power disparities (indigenous) people are getting exploited and treated unfairly. (low salaries, land grabbing).
- **SDG 9:** Industrial infrastructures have to be built somehow. The resources for all this originate mostly from our soils. Therefore, every object has a material footprint. A applicable measure to quantify this impact is the MIPS (Material Input per service Unit) (—> see SDG 12) Most resources are taken from places, where people are most vulnerable (mining, land loss).
- **SDG 12:** Modern societies are defining their wealth through consumption and economical wealth. Again, here is the measure of MIPS the central focus one should put on! Discuss with your colleagues from the **Sociology / Psychology**, why possession can't make men sustainable happy. Discuss, how the addiction to many technical gadgets of our daily life make people ill. Enroll projects with your students on minimalism, on sharing economy, and discuss about renunciation and modesty. Enroll projects with your students on minimalism, on sharing economy, and discuss about renunciation and modesty.
- **SDG 16:** The mindset of the modern economy and the pursuit of permanent growth makes this goal unreachable. because life becomes even more stressful and it enhances more and more the worldwide pollution. Look up the complementary material for SDG 08, too. There, the exponential function will be discussed.

Methodological hint

Let the students do *scribbles* about this subject. Where do they see the negative influence of only focusing on for example SDG 12 (22)

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21. Creately.com, The Ultimate Guide to Concept Maps: From Its Origin to Concept Map Best Practices, <https://creately.com/blog/diagrams/ultimate-concept-map-tutorial/>, last accessed 2021/04/08

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