THE JOURNEY

OF YOUR SMARTPHONE

TERMS OF USE

THANK YOU

for choosing our material.

Authors:
Jaqueline Adler, Marion Karlsen, Michael Pauer-Nagy

Project support:
Prof. Florian Danhel

Design elements:
Canva

Imprint:
Competence Centre for STEM and Digitality (K:MID)
University College of Teacher Education Vienna
Grenzackerstrasse 18
A-1100 Vienna

GUIDE
FOR THE TEACHER

Introduction:
"The Journey of Your Smartphone" offers the opportunity to teach sustainability by using smartphones. The teaching material consists of a total of six workstations. This guide offers suggestions for carrying out the activity.

Requirements:
Pupils need basic skills in using a smartphone (scanning QR codes, taking photos).
Pupils need advanced reading comprehension skills.
Pupils are familiar with a workstation-based method and are used to working independently.

Material:
Smartphone-Puzzle
Mobile devices

Duration:
Teacher's judgement required. Estimated duration: 5h.
Stations can be spread over several days or be part of a project week.

Learning objectives:
Pupils learn about the journey that a smartphone goes through.
Pupils recognise the necessity of recycling.
Pupils can independently access and critically reflect on information from texts or videos.

GUIDELINES
FOR THE TEACHER

Preparation:
Room design: Think about how the classroom can be optimally set up for a workstation-based method.

Materials and Resources:
Prepare all materials in advance; check whether technical devices are working properly and are charged.

Implementation:
Explanation of the workstations: talk about rules, procedures and expectations.

Differentiations:
Differentiations can be made, especially when varying the duration to different days. The documents can be adapted to different language levels.

Get to work:
The students work independently at the stations. If they have any questions, they can use the dictionary with the most important, possibly unclear words or ask their teacher.

Supervision and feedback:
The teacher should actively observe the pupils during the process in order to be available for questions and assistance. During the station activity, the children can be given the opportunity to record any unclear points on a poster, which can be used to work on further topics once the station activity is complete.

Good luck using this material in your classroom!

STATION 1

DEVELOPMENT

DEVELOPMENT
OF A SMARTPHONE

01

It takes about a year to produce a new mobile phone.
Every year, companies like Apple and Samsung show off their new mobile phones.
First they make a test model to see what the mobile phone might look like.
Then they think about what colours and materials they want to use.
The technicians then put all the important parts together.

After that, they make about 80 cell phones for testing.
They check whether the smartphone is strong and works well.
They test it with water, dust and heat.
The buttons are pressed many times and also the screen is tested many times.
The camera and the sound also have to be tried out.
After many tests, the final phone is ready for mass production.
This means that a lot of cell phones are manufactured.

02

03

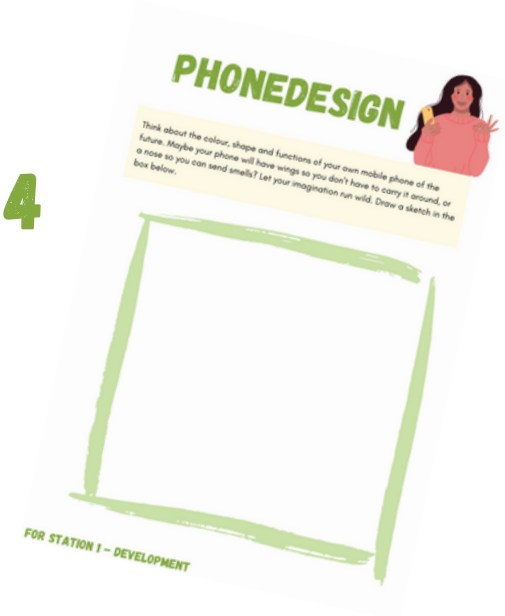
It is checked whether all cell phones have the same quality and whether they work as they should.
After 9 months, you can then buy the phone in the store.
But the work doesn't stop there, because broken smartphones need to be repaired.

There are updates so that the phone continues to improve and doesn't get old too quickly.
Updates improve the functions and eliminate errors in the software.

TASK:

04

Now that you know what to look for when designing a mobile phone, it's time to design your own mobile phone. Take a look at the mobile phone design page in your logbook and draw your own mobile phone of the future!



SCAN ME:

Share your result with others!
Take a photo of the mobile phone you have drawn.
Scan the QR code. Upload it!

Software = any program that runs on a mobile phone. These can be games, for example, but also programs for writing.

STATION 2

MINING RAW MATERIALS

RAW MATERIALS
FOR SMARTPHONES

01

Go on an exciting journey. Join Marvin to find out why a new mobile phone is not always a good thing.
Try to find the correct solution word and write it down on the "Mining Raw Materials" page of your logbook.

SCAN ME:

(This game works best on a computer.)

STATION 3

MANUFACTURING

MANUFACTURING

THE INTERVIEW

01

We interviewed Zang Hu, who makes smartphones in China, especially for you. Unfortunately, the parts of the interview are a bit out of order. Can you put the interview in the right order? Use the template in your logbook!

My name is Zang Hu. I am pleased to meet you.

Good day! Thank you for allowing us to interview you. What is your name?

To begin with, we would like to know where most mobile phones are made?

Not very good. We have to work long hours, the pay is poor and sometimes dangerous for our health.

And what are the working conditions like in a factory where you also work?

In the Chinese city of Zhengzhou. Around half of all iPhones made in the world are built here.
That's about 500,000 a day.

500,000 pieces? Is that really a lot?

Thank you for giving us such exciting insights into your professional life. We wish you all the best and stay healthy!

Most mobile phones are produced here in China. Many workers build the smartphones in factories. These smartphones are also sold in Europe.

Yes, there are many. You could cover a football field with 500,000 pieces.

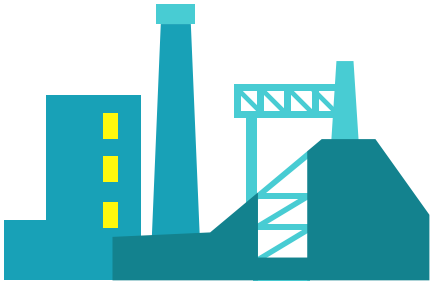
Where is the factory you work in?

You're welcome, thank you! I hope that my words will make a few people use smartphones more consciously.

STATION 4

PRODUCTION

PRODUCTION
OF A SMARTPHONE



01

Most smartphones are assembled in China. The conditions under which people work there are often not very good. Many people work 12 hours a day, 6 days a week. In addition, toxic chemicals that are harmful to health are often used in production.

Companies such as Apple, Samsung and Nokia manufacture in China.

Have you ever thought about how many smartphone there are in the world? Have you ever thought about how many there are in your family or among your friends?

02

That's what this station is all about!

Read the task on the next page carefully - have fun!

FERMI – TASK:

03

Choose one of the following questions and work on it:

1) How many phones are there in the whole school?

Help:

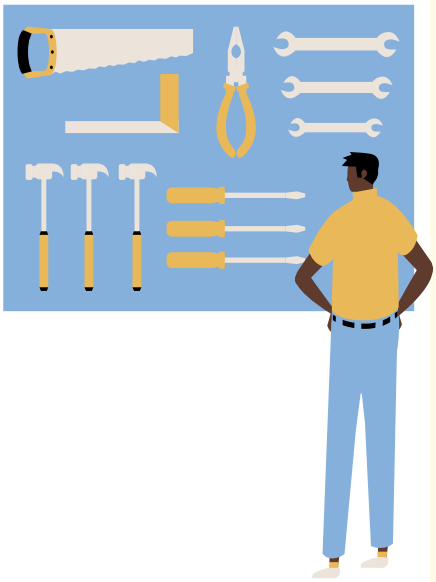
- Think about how many smartphones there are in your class?
- Think about how many children go to your school?

<u>or</u>

2) It takes 20 minutes to produce a mobile phone. How many mobile phones are produced in a week?

Help:

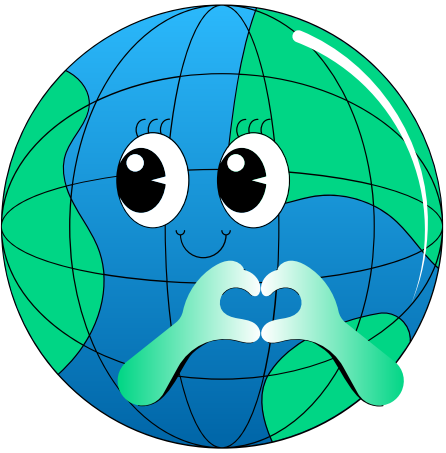
- Think about how many hours a person has to work in the factory each day.



Info: This task is a FERMI task. That means it's a math problem for which you don't have exact numbers. You can calculate however you want and however you like – there is no wrong answer. Write down your solution on the right sheet in the logbook! Good luck!

STATION 5

SALES



01

There is a lot of trade with smartphones in Europe. Most people use a large number of digital devices such as smartphones, tablets, Bluetooth accessories (headphones), games consoles, etc.

Electronic devices use electricity, which has to be produced and is responsible for CO^2 emissions. This in turn damages our climate.

In order to have access to our data at all times, it is stored in large server farms.

TASK:

Think about how many digital devices you or your family use at home and make a note of them.

Watch the video and note how you can help produce less CO^2 emissions when using digital devices.

02

You can watch this video with automatically generated subtitles in your language.

WHERE ARE THE SERVER FARMS?

Look at the map carefully and note which server farms are in Europe.

Server farms = huge depots, where a lot of computers and data are stored. Always need to be cooled.

STATION 6

E-WASTE

01

Electronic waste from many countries often ends up in Africa illegally. However, it is not disposed of properly in landfill sites, but simply dumped.
People without protective clothing take this highly toxic waste apart to extract raw materials and resell them.

Not only is the disposal of e-waste harmful to the health of the people who break it down unprotected, but the soil, water and air around the illegal dumps are also poisoned because there are no filters or protections.

TASK:

02

Scan the QR code to find out how you can help reduce e-waste.

Make a video explaining in your own words the 5 points you need to consider. Upload your learning video to your e-portfolio.

THROW AWAY? BUT RIGHT!

Before you throw away your smartphone, think about whether you have really used all the options.

Finally, watch the video about sustainability and smartphones. Scan the QR code.

You can watch this video with automatically generated subtitles in your language.

Electronic waste = old, no longer used electrical devices
illegal = against the law
landfill = dumping ground

DICTIONARY

ENGLISH	EXPLANATION
analog	not digital : not computerized
digital	electronic media
Electronic waste	Electronic waste, or E-waste is electronic equipment that is being thrown away. It includes phones, computers, and other electronics that have passed their time and are not used any more.
Fiber optic cable	The idea of “higher, faster, further” dominates the digital information society. However, the ultimate limit of information transmission has been reached with the speed of light. An optical fiber (fiber optic cable) enables faster data transmission over longer distances without additional amplification.
global	around the world

DICTIONARY

ENGLISH	EXPLANATION
illegal	against the law/forbidden
Media	News, originally from Latin and means “the middle”. These include language, books, telephone, newspapers, radio, television,...
Messenger service	Apps such as WhatsApp, Signal
Landfill	A landfill site, also known as a tip, dump, rubbish dump, garbage dump, or dumping ground, is a site for the disposal of waste materials
Server farm	A server farm provides the combined computing power of many servers by simultaneously executing one or more applications or services. A server farm is generally a part of an enterprise data center or a component of supercomputer.

DICTIONARY

ENGLISH	EXPLANATION
Software	all programs that run on a smartphone. Games can also be programs for writing.
Streaming	Streaming is the process in which video and audio data are prepared so that they can be viewed while they are being downloaded from the Internet. When streaming, the user does not have to wait until an audio or video file has been completely transferred.
Sustainability	Consume only as much as can regrow in nature.

LOGBOOK

THE JOURNEY OF YOUR SMARTPHONE

NAME: _____

LOGBOOK
WELCOME

Welcome to your personal logbook for this journey. Here you will find some important information before you start. At some workstations you will need to write or design something. You will find the necessary documents here in this logbook. At the bottom of each page you will find a note telling you for which activity the template is required.

Please also choose a role so that the journey runs smoothly and without problems:

ROLE	NAME
WRITER	
TIMEKEEPER	
TABLET MANAGER	
PUZZLE COLLECTOR	
LOGBOOK MANAGER	
READER	

PHONEDESIGN

Think about the colour, shape and functions of your own mobile phone of the future. Maybe your phone will have wings so you don't have to carry it around, or a nose so you can send smells? Let your imagination run wild. Draw a sketch in the box below.

MINING RAW MATERIALS

FOR SMARTPHONES

02 SOLUTION WORD:

Write the letters of the story on the line.

_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _

03 IDEAS

Write down your own ideas on how you can help protect the environment.

_____

_____

_____

_____

_____

_____

_____

_____

PROCESSING

THE INTERVIEW

01

02

03

04

05

06

PROCESSING

THE INTERVIEW

07

08

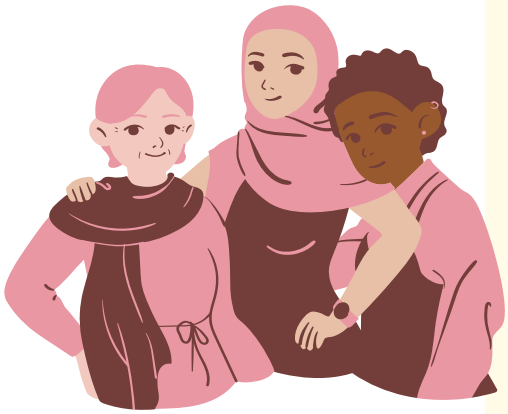
09

10

SOLUTION FERMI - TASK

IF THERE IS STILL TIME:

CONVERSATION



Did you know that women do most of the work in factories but are paid much less?

What do you think about it?
What are your thoughts on this?

SCAN ME!

Smartphone Quiz

THE JOURNEY

OF YOUR SMARTPHONE

TEAM YELLOW

THE JOURNEY

OF YOUR SMARTPHONE

TEAM RED

THE JOURNEY

OF YOUR SMARTPHONE

TEAM BLUE

THE JOURNEY

OF YOUR SMARTPHONE

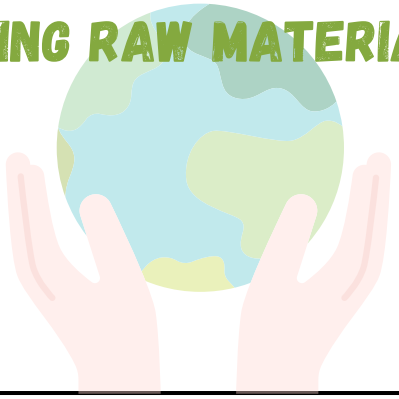
TEAM GREEN

STATION 1

DEVELOPMENT

STATION 2

MINING RAW MATERIALS



STATION 3

MANUFACTURING

STATION 4

PRODUCTION

STATION 5

SALES

STATION 6

E-WASTE