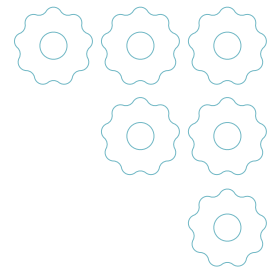
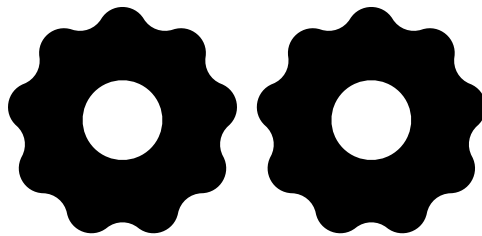
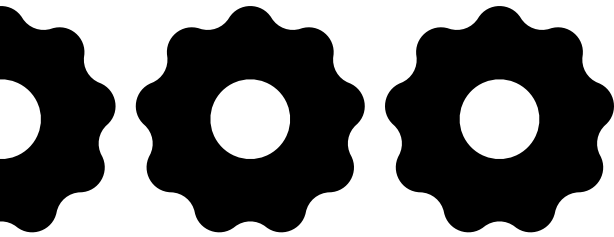
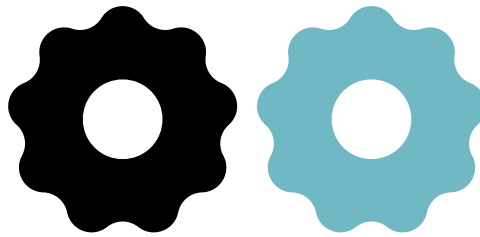
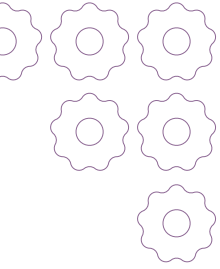
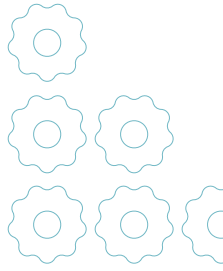


RESEARCH SKILLS

TARGET AUDIENCE 14 to 18 years



MAKE IT WORK! MODULE 3

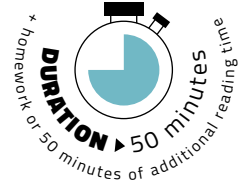


SHORT SUMMARY During this lesson, the students investigate the repair options, lifespan, consumption etc. of electrical and electronic devices on the basis of a research question they choose themselves.

REQUIRED PRIOR KNOWLEDGE Students are familiar with the basic principles and frameworks with regard to dealing sustainably with electrical and electronic devices (design phase, circular economy, R strategies, dormant devices, etc.).



RESEARCH SKILLS



LEARNING OUTCOMES

- > Students are able to formulate a research question with regard to the production, consumption and repair of electrical and electronic devices.
- > Students know how to find specific answers to questions with regard to the production, consumption and repair of electrical and electronic devices.
- > Students understand how their choices with regard to the production, consumption and repair of electrical and electronic devices can contribute to facilitating a more circular economy.

MATERIALS REQUIRED

- > A whiteboard or flip chart
- > Market research worksheet (appendix 1)

TO DO BEFOREHAND

- > Read the Background Information document attentively. This text gives you the what, why and how of the subject and the didactic knowledge and insights you need to work with this module.
- > Choose those elements from the module that suit your students best and are most compatible with previous and planned lessons.
- > Encourage the students to write any questions they have about the topic on a flip chart. Tell them you will discuss these questions during this class. Were any questions written down on the flip chart before this lesson? Select all questions about the production, consumption and repair of electrical and electronic devices and write them down on the whiteboard or flip chart before the start of this class.



LESSON PLAN

1 – STIMULUS

Ask the students to suggest as many in-depth questions about the repair options and lifespan of electrical and electronic devices as possible.



- > What do we want to know more about?
- > What exactly do we want to know about this issue?

Write down the questions as they are raised on the left of the whiteboard or of a flip chart. Make sure there is enough space for six columns to the right. Possible questions include:

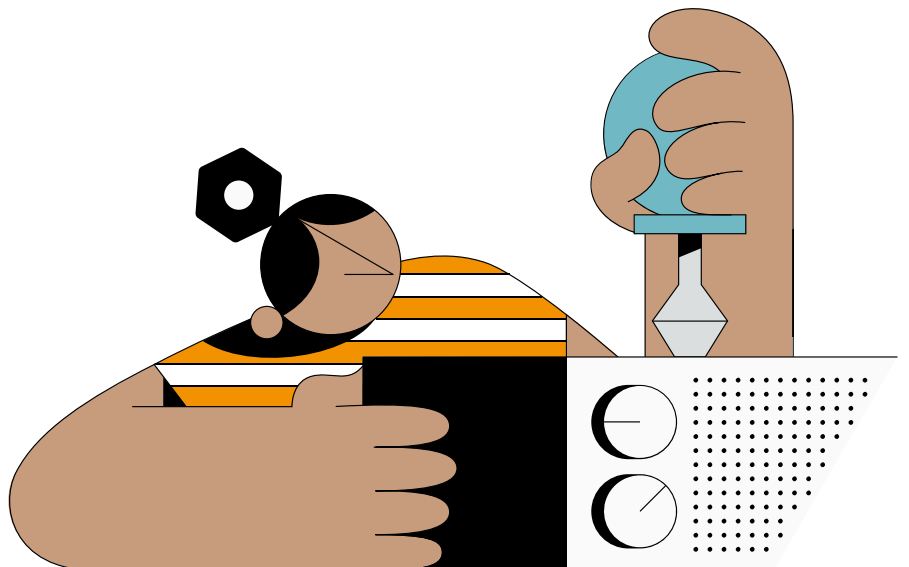
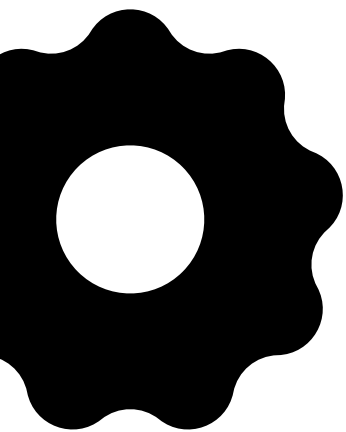
- > Why can't I disassemble *device X* myself?
- > How long will I be able to run the latest programs/apps/games on my *device Y*?



TIP



To help students come up with questions, you could take out the *Route Map* and/or the stock photos from module 2 and briefly recap the conclusions from the previous lesson or lessons.



2.1 – The most interesting question

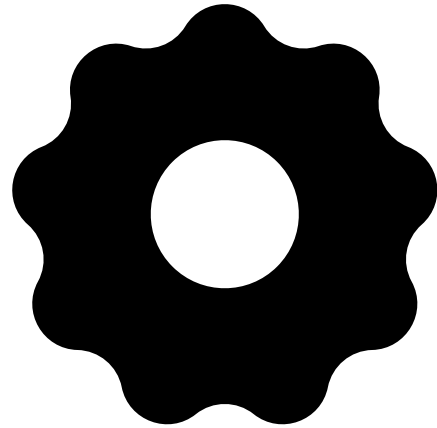
Use the *De interessantste vraag* (*The most interesting question*) (© Djapo)¹ method to reflect more closely on the questions and select the most interesting ones.

Discuss the questions on the whiteboard or flip chart with the class.

- > Which are closed-ended questions? Could we turn them into open-ended questions?
- > Which are open-ended questions? Could we turn them into closed-ended questions?
- > Are these questions value-neutral?

Select the most interesting questions together and explain why these questions are the most interesting ones to research. Cross out questions that are not considered sufficiently interesting.

- > Which version of the question is the most interesting, the open-ended or the closed-ended one? Why?
- > Are value-neutral questions more interesting than 'value-laden' questions? Why or why not?
- > Which questions best take the context of the research into account?
- > Do the questions suggest or imply certain answers?
- > Should research questions contain any implied information? Why or why not?
- > Do the questions exclude certain answers? Is that a bad thing?
- > Is it OK for questions to be carefully delineated? Why or why not?



TIP

Ask the students to answer their closed-ended questions to make them realize that asking yes-no questions is unlikely to provide them with sufficient information.

Reflect on the steps that the students have gone through and ask for their experiences with regard to their thinking processes.

- > Was it difficult to think of questions? Why or why not?
- > Are there differences between the answers to open-ended questions and the answers to closed-ended questions? If so, what are they?

¹ – The *De interessantste vraag* (*The most interesting question*) method is part of the *Creatief denken* (*Creative Thinking*) method by Djapo. Creative thinking means generating other ideas than those you would normally have. It means departing from the well-trodden pathways in your brain, and so discovering new connections between two elements or contexts that you had not seen before. For more on creative thinking, visit www.djapo.be

2.2 – Research question

Go over the interesting questions on the whiteboard or flip chart and discuss with the class which ones could be good research questions. Draw six columns to the right of the questions. Place one criterion for a good research question at the top of every column:

- › **It must be a question**
- › **Relevant:** the question has to be relevant to the subject
- › **Feasible:** it must be possible to answer the question by doing research
- › **Defined, sufficiently precise:** the question clearly indicates where you are going to research what and with whom
- › **Concise and one question only:** the question consists of a single, clearly researchable question
- › **Unambiguous:** the question is clear

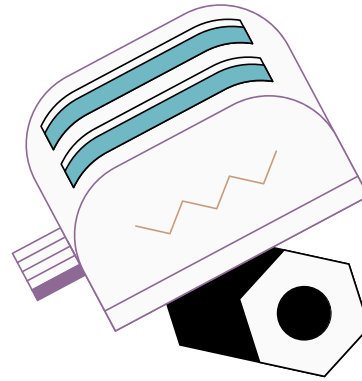
Go over the questions with the students and tick the criteria that each question meets. Questions that meet all the criteria are possible research questions.

Possible research questions about **dormant devices:**

- › How many dormant devices do we have at home?
- › How can I return my dormant devices to the material cycle in as time-efficient a way as possible?
- › Where will my discarded *device X* go after I've handed it in to a recycling centre?

Possible research questions about **repairing broken devices or having them repaired:**

- › What kinds of electrical and electronic devices are easiest to repair yourself (disassemble, availability of parts and online manuals, etc.)?
- › What are the conditions for keeping the legal warranty after I have opened my *device X* of brand *Y* to try to repair it myself?
- › Where can you have *device X* repaired in *region Y*? What are the differences in cost, time, etc.?
- › Where will our school laptops go if they break?



Possible research questions about **conscious consumer choices:**

- › What factors determine my choice to buy a new *device X*?
- › What brands of *device X* offer easy-to-access repair options?
- › Where were the raw materials used to produce my *device X* mined?
- › What electronics manufacturers transparently describe the entire production process of their *device X* on their website?
- › What brand or model of *device X* has the best repair score on www.indicereparabilite.fr?
- › How long does the average support coverage for new software for *device X* last and how does this relate to the mechanical lifespan of the device itself or its battery, etc.?

Possible research questions about a **repair score:**

- › What could the criteria be for a repair score for electrical and electronic devices?
- › What are the criteria for the 'Indice de réparabilité' for electrical and electronic devices in France?

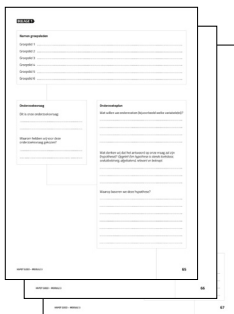
Possible research questions about **greenhouse gas emissions, value retention and cost:**

- › What generates lower greenhouse gas emissions: repairing a broken *device X* or replacing it with a new, more energy-efficient *appliance X*?
- › What retains more of the value of materials: recycling or repairing electrical and electronic devices?
- › What is more expensive: repairing a broken *device X* (or having it repaired by the manufacturer) or replacing it with a new *device X*? Why?



If your students keep suggesting the same kinds of questions, you could tell them about different types of research questions and ask them to come up with at least one research question for each category. Possible research questions² are:

- > Counting and measuring questions: *How much/many ...?*
- > Questions involving assessment: *What do you prefer?*
- > Comparative questions: *Which ... the most: or?*
- > Questions about consequences: *What will happen to ... if?*
- > Questions about connections: *Is there a connection between ... and ...?*
- > Questions about experience: *How does it feel for ... to ...?*
- > Questions about opinions: *Do/does ... think that ...? Why or why not?*



2.3 – (Market) research

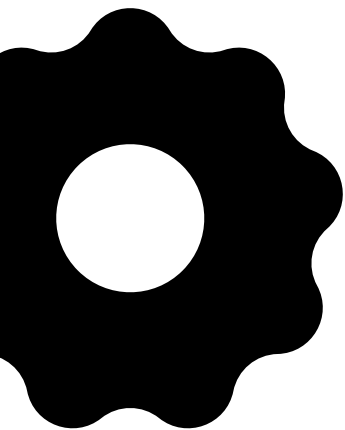
Divide the class into groups of three to six students. Each group chooses one research question. The groups then draw up a research plan (division of tasks, deadlines etc.) using the workbook, particularly the questions (appendix 1).

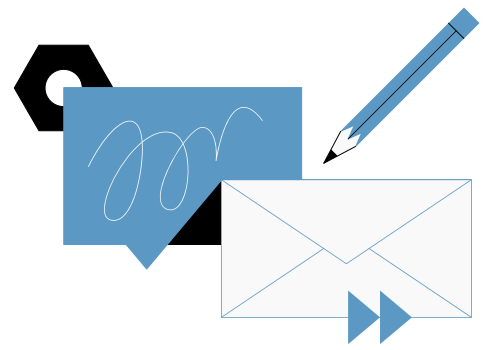
The groups can carry out their market research as homework or during the class, with or without guidance (50 minutes additional time required).

ATTENTION!

The market research for this class is highly discipline-specific: market research that the students may be required to do for their Economics class could be totally different than research for their English or Geography classes. If students have questions that touch on any other disciplines, ask a colleague from the discipline in question for assistance.

The research can take the form either of gathering information – for example online – or of inventorying the environment – for example by counting and photographing dormant devices at home. The answer to certain research questions may even require a visit to a recycling centre or a Repair Café.





TIP

Clearly delineate the students' online research or help them get started by suggesting a number of handy, informative and reliable websites and tools as sources of information:

Repairing broken devices

- > Find Repair Cafés and professional repairers in the vicinity of your school on [this map](#) on the Sharepair website.
- > Consult [the guidance tool](#) on the Sharepair website to find advice about repairing a device or having it repaired. The tool offers general information about repair options, such as your consumer's rights within the warranty period, repairing devices yourself, having them repaired in a Repair Café or by a professional repairer, 3D printing for repair, etc., as well as specific diagnostic and repair advice for several product categories, including blenders, toasters, laptops etc.
- > The Sharepair website offers background information on [3D printing of spare parts](#) (when 3D printing is an option, what you have to look out for, where you can have it done, etc.).
- > Members of [Restarters.net](#) are currently building an [English-language knowledge database for repairs](#) using the Fixometer tool, and they are logging repairs carried out during the events they organize, including the ecological and social impact of their work.
- > The [fixit.com](#) website offers manuals to repair your broken devices yourself. It also has [a tool](#) to compare smartphones and tablets for repairability.

Conscious consumer choices

- > The [HOP website](#) has information about how and why manufacturers apply the strategy of planned obsolescence.

Repair score

- › The following websites offer information about the 'Indice de réparabilité' or repair index that was introduced in France in 2021. This index is based on 5 easily measurable and verifiable criteria: repair information, ease of disassembly, availability of replacement parts, price ratio between reserve components and a newly purchased product, and product-specific criteria:
 - › <https://repair.eu/news/the-french-repair-index-challenges-and-opportunities/>
 - › <https://www.indicereparabilite.fr/>

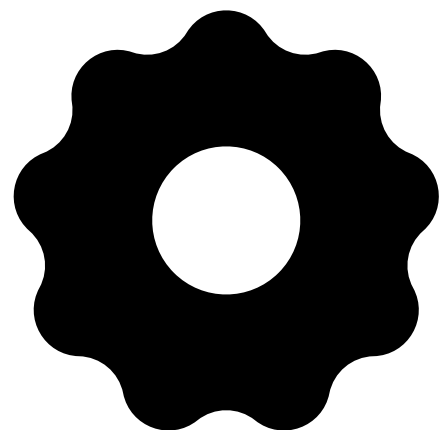
Greenhouse gas emissions, value retention and cost

- › The educational website [Materials Matter](#) tells your smartphone's life story.
- › Read about the ecological, economic and sociocultural impact of mining on the [Catapa website](#).
- › The English-language documentaries '[Death By Design](#)' and '[The E-waste Tragedy](#)' demonstrate the often-dramatic impact of the production process and waste stream of electrical and electronic devices on our living environment and communities.
- › [The EEB report](#) explains how we can save a lot of greenhouse gas emissions by using our smartphones, washing machines, vacuum cleaners and laptops longer.

3 – CONCLUSION

Reflect on the assignment.

- › What was our hypothesis?
- › Has our hypothesis been confirmed?
- › Did this surprise you? Why or why not?



Names of group members

Member 1

Member 2

Member 3

Member 4

Member 5

Member 6

Research question

This is our research question:

.....

.....

Reasons we chose this research question:

.....

.....

Research plan

What are we going to research (for example what variable or variables)?

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.....

.....

.....

What do we think the answer to our question will be (hypothesis)? *A hypothesis must be checkable, unambiguous, clearly defined, relevant and concise!*

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What is this hypothesis based on?

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.....

.....

What tasks have to be done to **prepare** properly for our research?
 What materials do we need for this?
 Which member of the group is in charge of carrying out this task?
 When must the task be finished (intermediate deadlines)?

Task number	Task	Material	Person in charge of task	Deadline
<i>Example</i>	<i>Draft a survey</i>	<i>Google Forms</i>	<i>Name of student</i>	<i>... / ... / ...</i>

What tasks have to be done to **carry out** our research?
 What materials do we need for this?
 Which member of the group is in charge of carrying out this task?
 When must the task be finished (intermediate deadlines)?

Task number	Task	Material	Person in charge of task	Deadline
<i>Example</i>	<i>Have respondents complete the survey</i>	<i>A notice on the online educational platform</i>	<i>Name of student</i>	<i>... / ... / ...</i>

Research findings

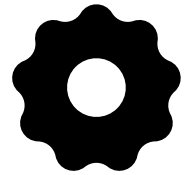
Was our hypothesis confirmed? Why or why not?

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ACKNOWLEDGMENTS

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This teaching pack was created in the context of the [European Sharepair project](#) and was commissioned by the City of Leuven, Apeldoorn and Roeselare, in cooperation with Repair&Share and Maakbaar Leuven with the support of the Flemish government.

We would like to thank:

the City of Leuven, for their confidence in us and their valued partnership;

Adriaan Dirickx (a teacher at GO! Redingenhof campus), for his enthusiasm and valued feedback;

Brian Heffernan for his assistance in preparing the English translation of the original Dutch-language material;

James Pickstone of The Restart Project for providing feedback on the English version of the educational package;

our partners, Repair&Share, Maakbaar Leuven and the municipalities of Apeldoorn and Roeselare for their expertise on the subject and their feedback.

