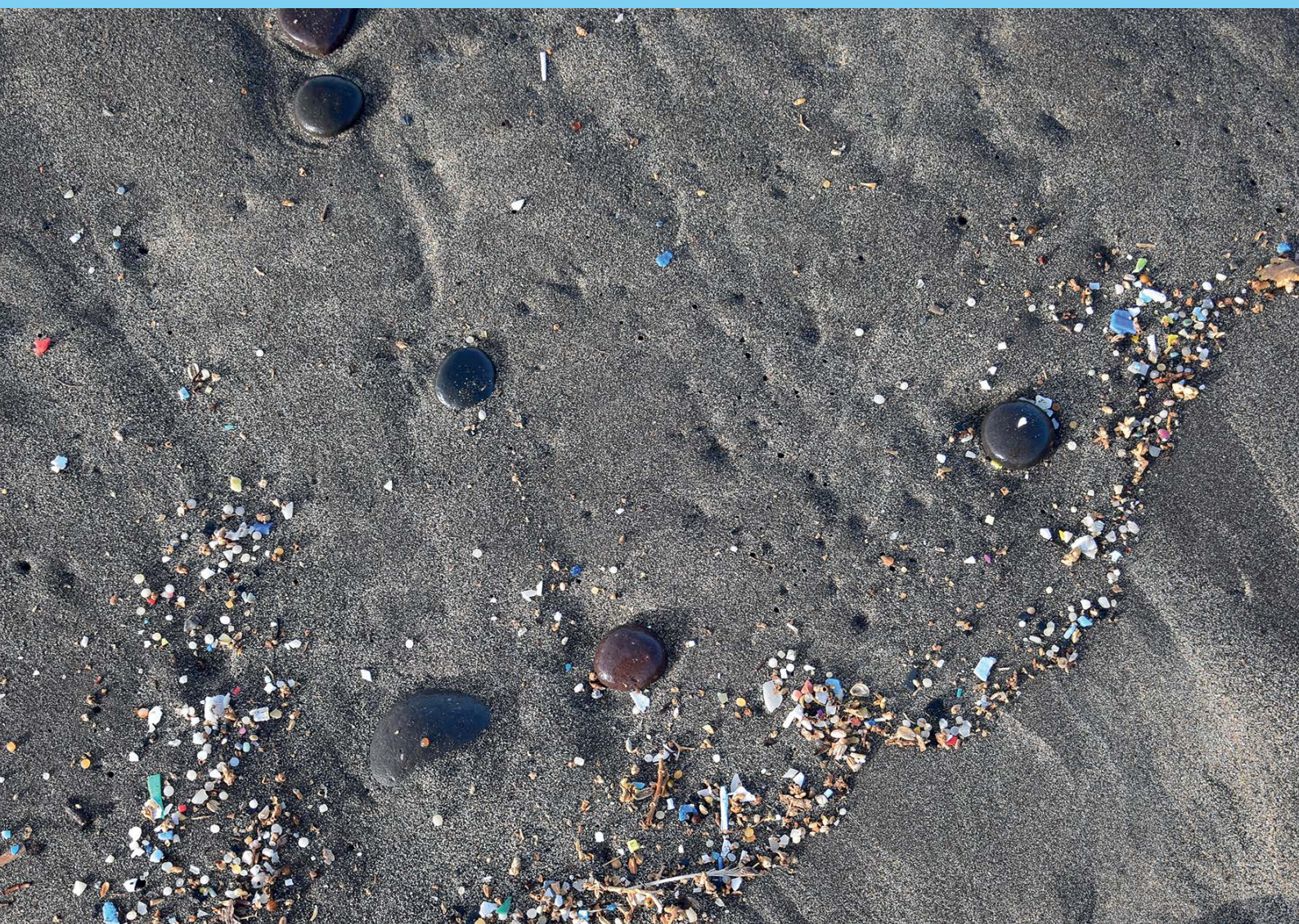
National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

Making Innovation Safe. By Design.

Explore your position within a systems view on safety



Introduction

Here you will find exercises that will help you explore a systems view on safety. We encourage you to adjust the exercises to your own project, class, or circumstances. You can select the exercises that fit your needs best.
If you want to know more about the challenge behind Safe-by-Design, you can watch the animation or lecture.

Understanding the innovation phases and the life-cycle

FOR OR | 15 MIN | OR | ALL LEVELS

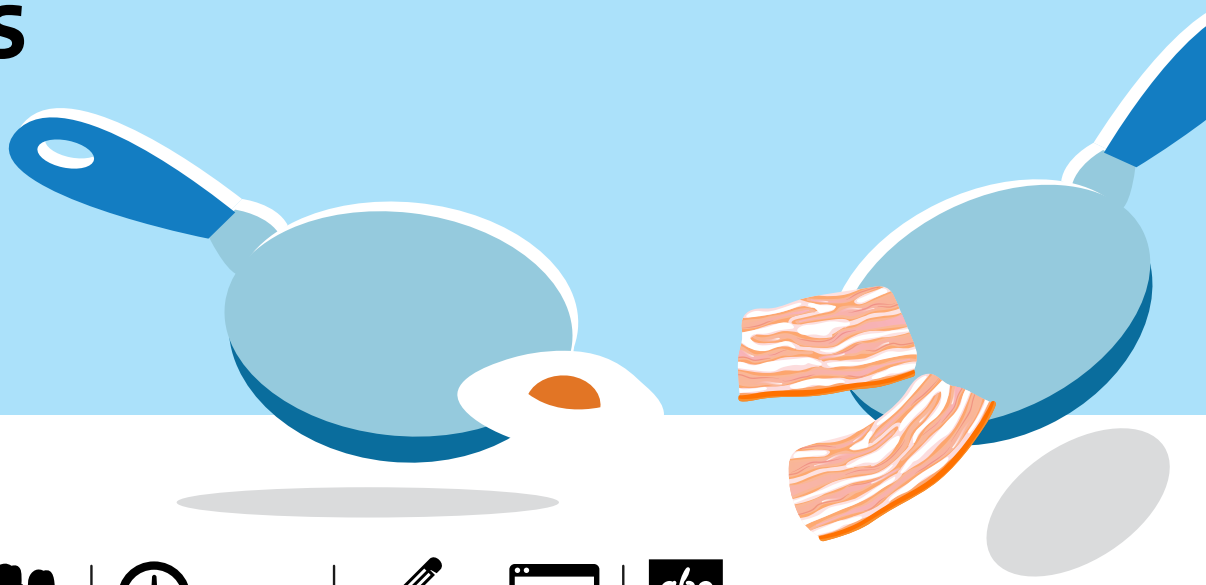
The animation *A systems view on safety illustrated* presented several ideas.

First, describe the most important ideas presented in the animation in your own words words.

Next, in which design phase(s) or stage(s) of the product life cycle are you – as a student, researcher, employee, consumer, or in another role – personally involved? Describe your roles and activities.

Finally, which expertise do you have to contribute to the safety of the innovations you work on, or may work on in the future? For which expertise related to safety do you need to collaborate with others?

Circles



FOR OR | 45 MIN | OR | ALL LEVELS

Needed: computer or paper and several coloured pens

If you study or work in research or innovation, you are part of a bigger innovation system. In this innovation system, you can distinguish between what concerns you and what you can influence. Imagine two, nested circles. The inner circle is the *circle of influence*, which contains what you can do, change, control, or influence. Examples are your field of study, where you work, or what skills you learn. In the innovation system, the design decisions you make fall within the circle of influence. The outer circle is the *circle of concern*, which contains things that you cannot change or influence but are interested in, worry about, hope for, etc. Examples are the decisions your boss makes or what will happen with the results of your work after your internship is finished. In the innovation system, the design context falls within the circle of concern.

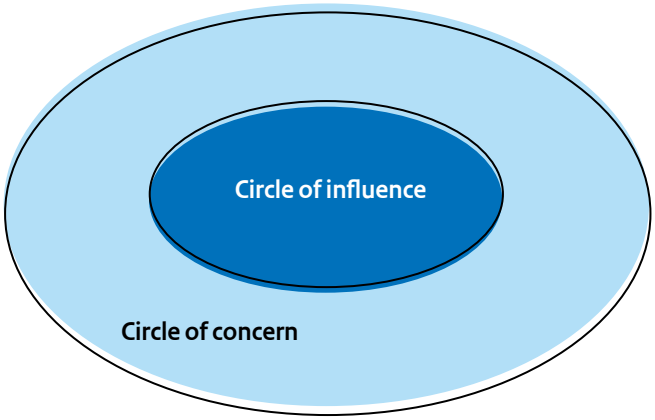
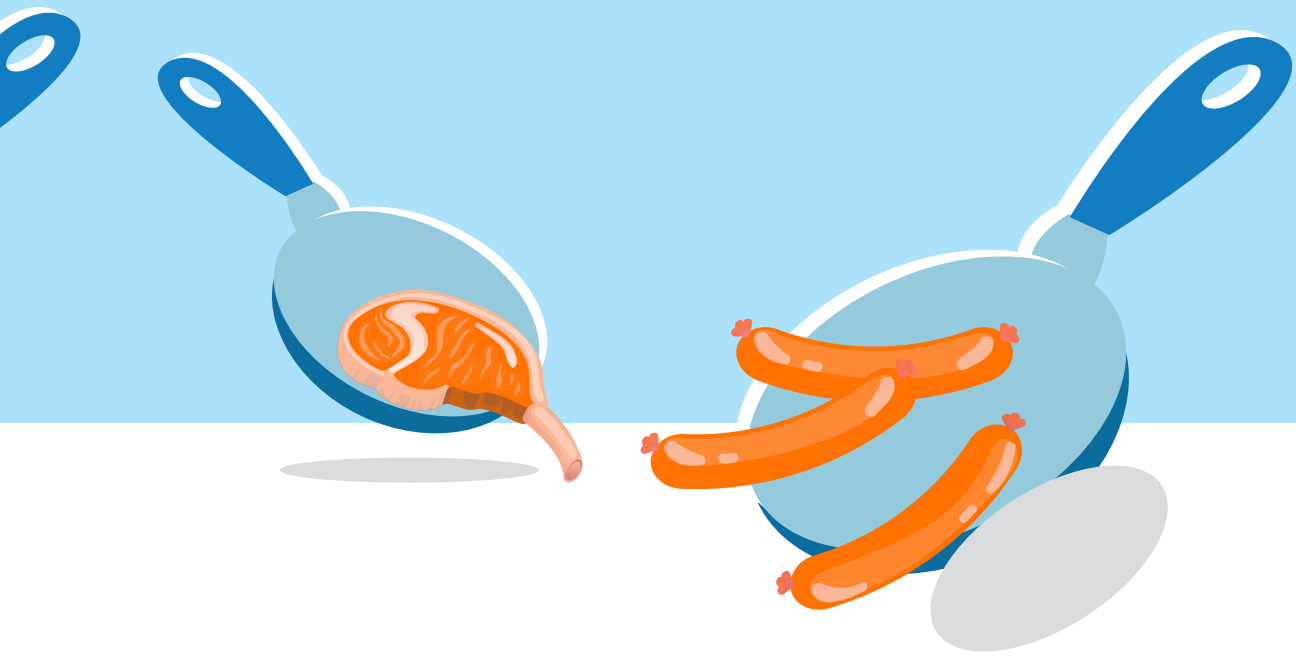


Figure 1. Circles of concern and influence

Step 1. Draw a small circle labelled 'influence'. Draw a large circle around the circle of influence and label this large circle 'concern'. Now, imagine that you are an engineer in the food industry. Focusing on (potential) safety issues or measures, write down what falls within the circle of concern and what within the circle of influence. Also, write down how you as an engineer could expand your circle of influence to address the safety concerns.



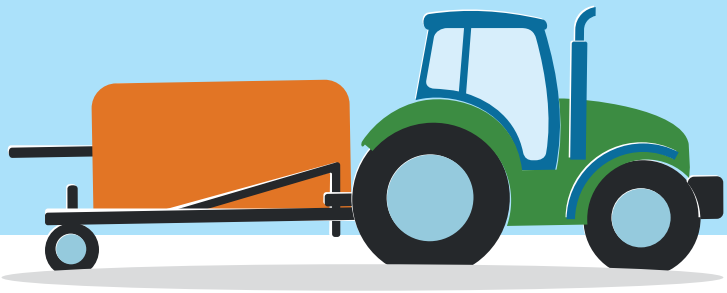
Step 2. Now, place yourself in the position of an executive in the food industry. With another colour, write down what falls within the circle of concern and what within the circle of influence. Focus on (potential) safety issues or measures.

Step 3. Repeat step 2, but now from the positions of a food safety inspector, a government policy maker dealing with food safety and food security, and a consumer. Use different colours for each.

Step 4. Did you write down different things? How would the food industry executive and the food safety inspector respond to the engineer trying to address safety concerns by increasing his circle of influence as specified in step 1? If the engineer did not convince you in either role, what would have been a successful argument or approach?

Step 5. Which lessons are important to keep in mind if you ever find yourself in a situation where you want to expand your circle of influence within the innovation system to make your work safer?

Simulation game: Safe-by-Design in the food industry



FOR | 60 -90 MIN | OR | ADVANCED

This exercise uses the circles of influence and concern developed in the exercise ***Circles****.*

You will need paper and markers to make nameplates for this exercise. If you prepare the roles in advance, you can also bring relevant props to the simulation game.

For this exercise each of you will use the circles of influence and concern to get into character of one of the roles (engineer, executive, food safety inspector, government food safety and security policy maker, or consumer). In character, you will take part in a high level policy meeting initiated by the government policy maker about the question: *What is needed to realise Safe-by-Design in the food industry's research and innovation system?* The aim of your discussion is to develop a list of concrete steps to realise Safe-by-Design in the food industry.

First, you will divide the roles you'll play and make a nameplate so others know which stakeholder you represent. Each stakeholder can be portrayed by a single student or by a group of students. Take a few minutes to look at the circles for your role and prepare for the discussion: are you, in character, for Safe-by-Design? What, if anything, is your ambition with Safe-by-Design? Which barriers or problems do you see? What is your strategy in the meeting? As this is a simulation of a policy meeting, the person or team assigned 'government policy maker' will also chair the discussion and take a couple of minutes to think how to chair the meeting.

Second, get into character and discuss the question: *'What is needed to realise Safe-by-Design in the food industry's research and innovation system?'* The objective of the discussion is to agree on a list of concrete steps that each party can take to contribute to this goal. The steps should be SMART. Take about 45–60 minutes for discussion and drafting the statement.

Finally, after you have drafted your shared statement, take the last 10–15 minutes to reflect on the discussion. How did portraying one of the stakeholders influence your view on how the research and innovation system can move towards Safe-by-Design?

It takes a village...

FOR OR | 30-45 MIN | OR | ALL LEVELS

Let's suppose that you are about to start working on a thesis or research project in your own field that is supposed to end in a product, like a substance, prototype of an appliance, (blueprints for) a building, etc.

First, draw a timeline from the start of the research project to product in your field. Mark the different research and innovation stages on the timeline and write down your main activities.

Next, write down for each stage what you can do to make to make the product safe. If possible, write down specific actions you can take, like using a Safe-by-Design methodology from your field (be specific). For some stages, you may be able to identify problems or barriers to working Safe-by-Design that you cannot solve (yourself). Write these down as well.

Then, for each stage, list all involved actors and write down their main goals. If you want, include in your list who interacts with whom and their relationships (e.g. frequently interact and collaborate, do not get along, never interact, etc.).

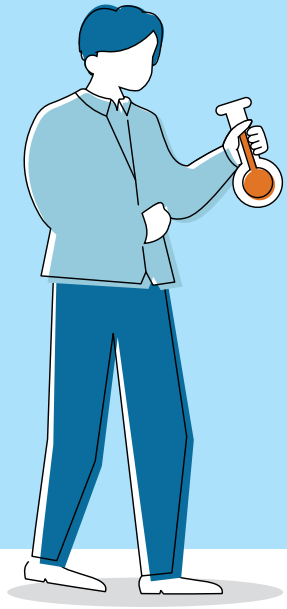
Next, for each stage, list all policies or rules and write down a few keywords about them.

Then consider whether any of the actors, policies or rules will significantly contribute to your product's safety and mark these with a '+'. If there are any actors, policies or rules that may be a barrier to your product's safety, mark these with a '-'.

You can look at the activities, actors, relationships, policies and rules as a community, like a village. Just like in a real village, it takes time, effort, and support from others to complete a project. And just like working on a project in a real village, in an innovation process you may need the cooperation of people who are uncooperative, have to deal with ivory tower-like institutions, or have to adjust to things you did not expect. The village you have outlined in the steps above is a part of the innovation system in your field.

Finally, look at the stages, actors and their relationships, and rules related to designing a safe product in your field and answer the following questions.

- What are the main barriers in your field that hinder wider adoption of Safe-by-Design?
- What are the main stimulating factors?
- If it takes a village to develop an idea into a product and you were the mayor, how would you govern this 'village' – the design or innovation process – to stimulate Safe-by-Design? Discuss whether, by collaborating with others in the innovation chain, you can overcome one or more of the problems or barriers that you identified earlier as outside of your personal scope of action.



SciFi your research part II: Building a world

FOR OR | 30+ MIN | OR | ALL LEVELS

This exercise builds on the SciFi story premise you developed in the exercise ***SciFi your research part I: Setting the scene****.*

Research and innovation do not take place in a vacuum. Therefore, the story premise you outlined in *SciFi your research part I: Setting the scene* needs to be situated in a future world. In SciFi, this world may include an innovation system, with facilities where researchers and innovators work. There also may be research funding agencies, managers, manufacturers, regulators, advocacy groups, consumers and the general public. The products of research and innovations and their safety are not limited to user safety; cascading effects can affect others, the environment, and society at large – potentially even after the product has been discarded or recycled. For a SciFi story, all the constituting parts of this system can be part of the world your story is set in.

Examples of stories and their stages
A SciFi story needs a convincing world, or stage, in which the story is set. Institutions (such as a corporation, the government, or rules and laws) and characters (the president, the villain, etc.) need to have believable values and goals that drive their actions. *The Matrix* would not have been the same if agent Anderson would have responded to Neo with a hippie-like attitude of love, peace and happiness. Agent Anderson tries to capture Neo, which fits with(in) the world of *The Matrix*. *Wall-E's* main character is a discarded robot and the main stage is the spaceship where people have adjusted to a life off of planet earth. In *Don't Look Up*, researchers face an influential businessman whose pursuits are directly opposed to theirs.

Take your story premise from module 1. Add the stage the story is set in to your premise. Make sure that you relate this stage to the science and technology in your premise. Use the following prompts:

- What is the state of the world at the beginning of the story? E.g. how are people living, how and by whom is the world run, how do people feel about their world?
- How do the main problems, challenges or conflicts become clear in your story and what does this reveal about your world?

- What are the institutions and their objectives and what are the characters and values and goals? Is there a corrupt president who secretly wants absolute power, a company without morals that produces a key technology, or a law-abiding soldier who wants to set right an injustice?
- How does the hero relate to this world? How does the hero respond when all hope seems lost?

In this exercise, you have created a believable system and world for your SciFi premise. In real life as a student, researcher or innovator, you yourself also are a part of a system. Which institutions and actors will influence your study or work the most in the years to come?

In the last part of the exercise *SciFi your research part I: Setting the scene* you were asked which questions about your own, present-day research and innovation and its impact came up in writing the story premise. How can you (and your colleagues) interact with the institutions and actors that influence your work to address these questions?

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Committed to
health and sustainability

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