

Module 1



THE NATURE OF ENVIRONMENTAL SOCIO- SCIENTIFIC ISSUES

Worksheets



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Activity 1.1: Should wind power plants be set up everywhere?



Work in groups and homework



30 mins

Discuss the questions below in your group. You can also carry out an internet research.

- What are the advantages of installing wind power plants?
- What are the disadvantages of installing wind power plants?
- Would you accept a wind power plant near your house?
- As a politician, would you press ahead with wind power plants or not? If not, what alternatives would you suggest?
- Carry out a research in the internet.
- Have a look at the author of any source you found and see if the source is biased by opinion or not.
- Elaborate on the connection between the question above and scientific facts. What other aspects influence the decision on the question above?



Individual work and in pairs



5 + 10 mins

Reflect on the questions below and then share the results with your neighbour:

- In how far is it important to reflect on such issues?
- In how far does such a task relate to STEM education? What do you think?
- Do you think dealing with such questions is included in your syllabus? If so, how?



Activity 1.2: Should the SARS-Covid-2 vaccination be obligatory?



Work in groups



20 mins

- Are you for or against the SARS-Covid-2 vaccination?
- How do proponents argue?
- How do opponents of vaccination argue?
- What are the scientific facts?
- Which topics are normally dealt with in relation to vaccination at school?
- To what extent do these topics prepare students in dealing with the question „Should the SARS-Covid-2 vaccination should be obligatory?“
- What is missing?





Activity 1.3: Comparing the two examples with “traditional tasks”



Work in groups



20 mins

Have again a look at the two examples (wind power plants and the SARS-Covid-2 vaccination):

- To what extend are such tasks different to „traditional“ tasks?
- What are their features?





Activity 1.4: How to proceed when dealing with SSI



Work in groups



15 mins

Have again a look at the two examples from the beginning (wind power plants and the SARS-Covid-2 vaccination):

- How do we have to proceed when dealing with a socio-scientific issue? What has to be taken care of specially?
- Set up a list of steps that need to be taken.





Activity 2.1: What are the aims of mathematics and science education?



Discussion in groups



15 mins

- What are the objectives of mathematics education from your perspective?
- What are the objectives of science education from your perspective?
- What do they learn when dealing with tasks like example 1 and example 2?



	Activity 2.2: What does citizenship education mean in relation to science and maths education?	
	Work in groups	
		20 mins
<ul style="list-style-type: none"> • Is something like citizenship competence included in our syllabus? If so: Where and how? • What could citizenship education in relation to science and mathematics mean? 		





Activity 2.3: What are possibilities and limitations of mathematics and science?



Individual work,
Work in groups



10+20+ 15 mins

Please reflect on the following questions individually

- What can mathematics and science offer to find solutions to global challenges?
- What can mathematics and science not offer to solve global challenges?

Afterwards consider in pairs the myths about mathematics and science as displayed in the table below. In how far do they reflect reality? Correct them, if you think they are not correct.

After working on the myths, discuss the following questions:

- Should maths and science education give students insight into possibilities and limitations of maths and science and clarify myths?
- If so, how? If not, why?
- How can dealing with environmental SSI contribute to this?

Myths

Hypotheses become theories which in turn become laws



Scientific laws and Other such ideas are absolute

A hypothesis is an educated guess

A general and universal scientific method exists

Evidence accumulated carefully will result in sure knowledge

Science and its methods provide absolute proof

Science is procedural more than creative Correction

Science and its methods can answer all questions

Scientists are particularly objective

Experiments are the principal route to scientific knowledge

Scientific conclusions are reviewed for accuracy

Acceptance of new scientific knowledge is straightforward

Scientific models represent reality

Science is a solitary pursuit

Science and technology are identical





Activity 3.1: What do students learn when dealing with SSI?



Work in groups



(15' +10')

This is an exemplary task for students, solve the exercise yourself.



Everywhere in Europe people try to avoid junk mail in their mailbox by using “NO JUNK MAIL” stickers. However, often people do not use such stickers on throw any advertisement directly in the trashcan. This produces unnecessary waste of paper. In Amsterdam it is now forbidden to put junk mail in the mailbox as long as it is not explicitly allowed with a special sticker. The city reported, since then the paper waste decreased significantly.

How would such a ruling effect your city? Discuss how much paper waste could be avoided and which other effects (i.e. economical) may play a role?

Afterwards discuss the following questions:

- What do students learn when dealing with such a task?
- Should SSI be included in science and mathematics lessons? Why?





Activity 3.1: What do students learn when dealing with SSI?

(Alternative task)



Work in groups



(15' +10')

This is an exemplary task for students, solve the exercise yourself.



While discussions about climate change are heating up and divide our country, electric cars become more and more popular throughout our society.

Critics of electric cars often argue that the need for rare earth elements in batteries makes their life cycle assessment worse than the LCA of Diesel cars.

Do you think an electric car is the better option? Start with a list of pros and cons for electric and diesel cars. Do research on this topic and argue carefully in the end.

Afterwards discuss the following questions:

- What do students learn when dealing with such a task?
- Should SSI be included in science and mathematics lessons? Why?





Activity 3.2: Homework: How to design a lesson dealing with this SSI?



Homework



**90 mins + 15 min
presentation of homework**

- Plan a science lesson dealing with the SSI

