MUSEO NAZIONALE SCIENZA E TECNOLOGIA LEONARDO DA VINCI

EDUCATIONAL MODULE

Visions of Future Food

In a nutshell

'Visions of Future Food' proposes a visioning process developed in several stages, starting with the creation of a concept map, an experimental activity about proteins in insect-based food, and the expression of future scenarios using artistic tools. The intervention of a food system stakeholder such as a researcher can support participants' exploration of the topics and help them formulate hypotheses about the future.

Food 2030 focus

What for?

To explore and understand the food system
To train or educate people on food system transformation.

For whom?

For educators in formal and informal education and researchers to use with high school and university students

How long?

1 hour 30 minutes

Created by

Educational staff of the National Museum of Science and Technology Leonardo da Vinci (Milan, Italy)

Something to share?

Leave us a comment about this tool on the FIT4FOOD2030 Knowledge Hub.
You can also contact Sara Calcagnini, calcagnini (at) museoscienza (.) it

This tool was developed as part of the FIT4FOOD2030 project; find this tool and many more on the FIT4FOOD2030 Knowledge Hub.

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How to cite?

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What will you gain from this?

As an educator or facilitator, you can use this module to reflect with your students on the links between different areas of the food system. It will activate and use students' abilities and competences in reading and interpreting the systemic dimension of food and its development in the future.

After participating in this module, your students should be able to:

- Understand the concept of a "systemic perspective" referring to the food supply chain, in order to read and interpret the food system as:

- A complex of relations and connections between parts, in order to improve an interdisciplinary approach to the comprehension of researches and developments in this field.
- A dynamic and growing network, as the comprehension of the development process can foster a responsible and sustainable transformation

- Visualize future scenarios with novel foods

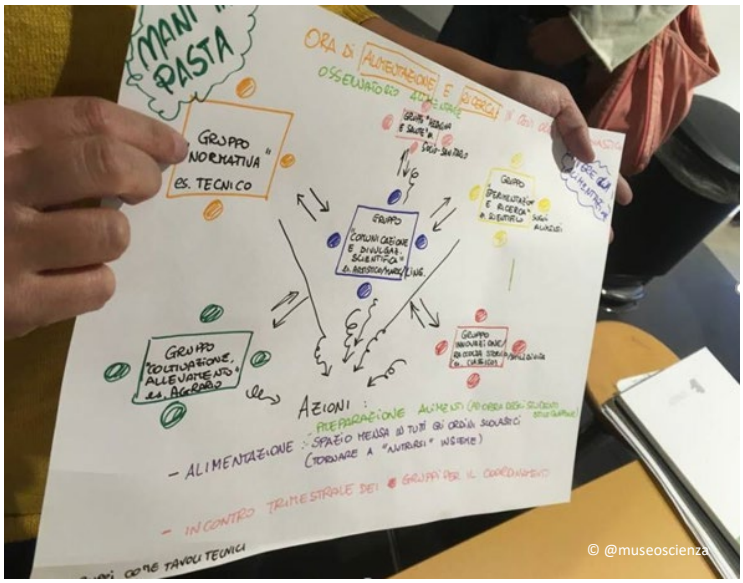
- Experiment a stronger emotional engagement linked to the topic of food system.

VISIONS OF FUTURE FOOD

This activity alternates individual work and group work with plenary sessions mediated by a facilitator. Your participants will go through three different but inter-connected phases:

- The creation of a Personal Meaning Map of the food system,
- An experimental activity about proteins in insect-based food, and
- A visioning activity that starts from a crucial question: 'What will be the future of food?'. This can be explored in three different contexts: food consumption, food production and food purchase.

The participation of a guest speaker can help the exploration of these themes with alternative tools and help participants formulate hypotheses and draw a vision of the future.



A vision of future food created by participants.

Inviting a guest speaker

Experts from across the food system (e.g. researchers or other types of stakeholders) can be invited for a facilitated dialogue with participants. Their contributions can take different forms: as reflections on participants' Personal Meaning Maps and their Food System visions, more general reflections on the future perspectives of food, or the challenges and opportunities of food science.

Thematic area

Food systems, future and novel food, food consumption, food production, food purchase

Target audience

High school students, university students

Age of participants

16-20 years old

Number of participants

20

Number of facilitators

1 (optional: 1 food system expert)

Prior knowledge required for participation

No prerequisites.

GETTING PREPARED

Set the scene

You can use this activity in a variety of settings: during school classes, at orientation events for Science, Technology, Engineering and Mathematics (STEM) careers or during Open Days held at universities and research centres.

It can take place in an ordinary room, a classroom or a science lab. Ideally, tables and chairs are grouped together to create 4 workstations suitable for 5 people to work together. A table at each workstation is needed to place the material for the activity. Moreover, one of the walls in the room can be used to display the conceptual maps so that they are visible to everyone.

Participants at a workstation.

Materials

- 10 g chopped meat (e.g. beef, pork, chicken)
- 10 g dried insects (e.g. flour worms)
- 10 g fruit (or any other food without protein)
- 2 pipettes
- 1 test tube (minimum capacity 10 ml, with stopper) of copper sulphate solution (see Annex B),
- 1 test tube (minimum capacity 25 ml, with stopper) of sodium hydroxide solution (see Annex C)
- 12 beakers (minimum capacity 100 ml)
- Post-its, 2 different colours, 60 each
- 25 A3 white sheets of paper
- 100 g of moldable paste or clay (per participant)
- 20 or more felt pens of different colours

FLOW

STEP 1: Preliminary preparation
STEP 2: Group management
STEP 3: Introduction & Creation of a Personal Meaning Map of the Food System – Part 1 *(10 minutes)*
STEP 4: Experimental activity *(15 minutes)*
STEP 5: Expansion of the Personal Meaning Map of the Food System – Part 2 *(15 minutes)*
STEP 6: Creation of a vision *(30 minutes)*
STEP 7: Conclusion *(20 minutes)*

FACILITATOR TIPS

Carrying out the experimental activity

- Stimulate as much as possible the participation of each student and try to avoid demonstrations.
- Encourage hypotheses, descriptions of the phenomena or any other comments before and during the experiment.
- Make sure not to unveiling the results of the experiment before all the participants have shared their considerations and comments.
- Alternate practical tasks with questions and debate.
- Make sure to get familiar with the main scientific features of the experimental activity proposed, Annex B and Annex C.

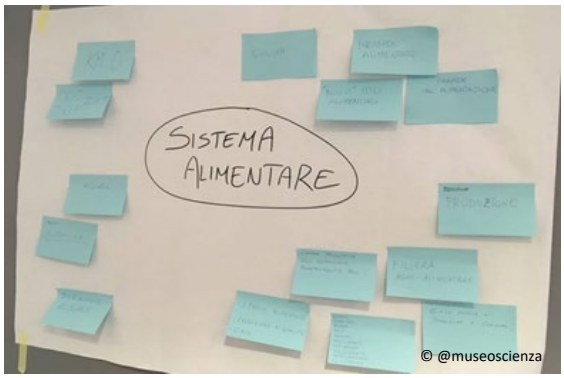
If a guest speaker is involved

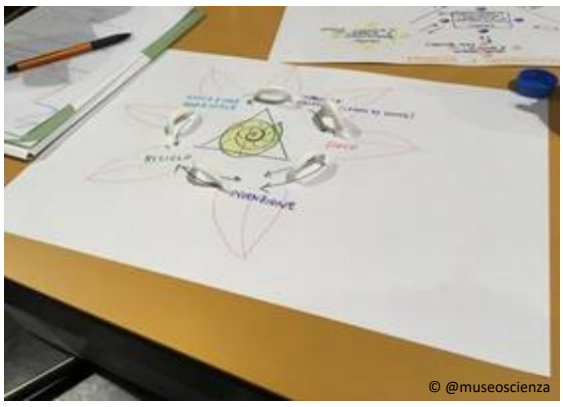
- Ask participants about their perceptions of the guest speaker's profession giving them the floor; it is often interesting and can stimulate debate.
- Give participants the possibility to spontaneously ask questions of the guest; they are often interested in personal aspect of the stakeholder/researcher's life, on their professional career and their academic experience, elements that can stimulate participants' attention.
- Suggest to the guest to alternate their interventions with some questions that will further stimulate participation.

Resources

You can dive deeper into the key areas of the workshop: the Personal Meaning Map tool and the concept of food systems.

You might also be interested in this brief guide with facilitation tips from the FIT4FOOD2030 project:
https://knowledgehub.fit4food2030.eu/facilitatorstips





Photographs illustrate, from top to bottom: first iteration of a Personal Concept Map (STEP 3); the experimental activity (STEP 4); the expansion of the Personal Concept Map (STEP 5); an example of a vision of future food (STEP 6).

STEP 1: PRELIMINARY PREPARATION

BEFORE THE ACTIVITY STARTS

Before the activity starts, prepare the copper sulphate solution (Annex B) and the sodium hydroxide solution (Annex C) and place all the materials necessary for the experimental activity at the workstations.

STEP 2: GROUP MANAGEMENT

AS PARTICIPANTS ARRIVE

Divide participants into four groups and invite them to take a seat at the workstations, ensuring there is a maximum of 5 participants per workstation.

STEP 3: INTRODUCTION & CREATION OF A PERSONAL MEANING MAP OF THE FOOD SYSTEM (PART 1)

10 MINUTES

The first part of the activity is focused on exploring all the key areas of the complexity of the food network, starting from participants' experiences and knowledge. The Personal Meaning Map is the tool used to create the very first scenario of participants' ideas on food system.

To introduce the theme "Food System", prepare a sheet the size of a large poster labelled 'FOOD SYSTEM'. Explain that the purpose of the activity is to create a cognitive map to stimulate the discussion. Ask participants to write on a post-it a key word (associated with a certain experience) which is related to the idea of food system. It's important to use post-it of all the same colour in this first phase. Each participant individually writes 2 or 3 key words then, starting from a volunteer, participants share and shortly explain the chosen words and, at the same time, attach the post-it on the map. In case of similar words or experiences, participants can join other explanations.

It's possible to gather and to cluster words and concepts, naming each group of words after a short plenary negotiation on the possible choices. The next phase is dedicated to expanding and deepening the knowledge about the elements which the map is composed by, through the experimental activity. The map is now left in the background and will be reconsidered after the hands-on phase.

TIPS & TRICKS

Make the most of the mix of ingredients: At first the food system is an abstract concept for participants, then it starts to be filled with content in the generation of a personal meaning map. The experimental activity on protein introduces the strong emotions of handling raw meat and insects and triggers discussions on culture, economics, and future research. The visioning exercise that follows allows all output generated to be conveyed in a tangible object, to artistically create connections and discuss them with others in an act of storytelling about the sustainable food systems of the future.

STEP 4: EXPERIMENTAL ACTIVITY
15 MINUTES

Introduces this next step as a tool to stimulate new ideas or new questions on the food system. Starts with questions such as:

- 'What do insects contain?'
- 'Why, in your opinion, are insects are considered as one of the novel foods of the future?'

Write down participant hypotheses and propose to find the answer through experimentation. Give each group the following instructions to work with:

Put the chopped meat, the insects and the fruit in three different beakers (one for each substance).
Add the reagents to each beaker, in the following way:
3 parts of sodium hydroxide and 1 part of copper sulphate (7,5 ml of sodium hydroxide and 2,5 ml of copper sulphate). Wait for few minutes and observe the change in the colour of the reagent when in comes into contact with the different types of food.

The following results can be expected:

- Meat: the reagent turns purple
- Insects: the reagent turns purple
- Fruit: the reagent doesn't turn purple (it remains light blue)

The observed phenomena can be explained in the following way:

In the presence of proteins, the reagent turns purple. In the absence of proteins, the reagent maintains its original colour (light blue). Copper ions (copper sulphate) react with the protein peptide bond, giving an intense purple colour in a basic solution (sodium hydroxide). Insects and meat, therefore, contain proteins. Fruit does not contain proteins (negative control).

Once the experiment is finished, stimulate some additional reflection on the protein content of foods, without providing explanations but by posing questions to the participants. Shares in plenary the observations of the participants, going back to the initial questions ('What do insects contain?' and 'Why are they considered as one of the foods of the future?')

Questions help the reflection and the comparison between usual foods (meat, fruit) and novel foods (insects). They can be, e.g.:

- Which colour do you observe?
- Why did the food change its colour?
- What these foods have in common?

STEP 4: EXPANSION OF THE PERSONAL MEANING MAP OF THE FOOD SYSTEM (PART 2)
15 MINUTES

Ask the participants if the experimental context has aroused some other impressions or reflections and if they need to enrich the map, by adding other words. To do that, participants use the second-colour post-it.

Alternatively, you can also ask the invited researcher or food system stakeholder to lead this part of the activity. In order to facilitate the discussion, the post-its can be clustered and a key word can be associated to each cluster. They can also make comments and discusses about the map together with participants, aiming in particular to:

- Establish connections between the emerged themes and the world of the Research (present scenarios, boundaries, critical issues);
- Let the interdisciplinarity of themes and interconnections emerges;
- Expand the map, if needed, by adding missing themes.

Invited guests can also present to participants at this stage an object related to their research or activity, to stimulate their imagination and project them in a new scenario.

"Our piloting with school students showed us that teachers recognise the education value - which might not seem immediately obvious - listing both the topic and the delivery of the activity as valuable. Nutrition is an important topic for teachers, but one that is usually treated sectorially and without considering perspectives such as ethics and sustainability. Moreover, the fact that the module is not a top-down lesson but is oriented towards more competencies-focused work and the active engagement of students was is appreciated, not in the least because it is not as common in the education sector as teachers would find desirable."

The team at the National Museum of Science and Technology Leonardo da Vinci

STEP 5: CREATION OF A VISION
30 MINUTES

The arrangement of each workstation now changes: on each table, place the clay or mouldable paste, felt pens and sheets.

To present the next step, you as the facilitator and the invited researcher or food system stakeholder can briefly introduce a few key aspects:

- System are dynamic networks, rather than static ones, so they continuously evolve and change. The upcoming challenges have to consider the best ways in which the system should grow: in a regular and harmonic way. In this way the system could remain sustainable.
- Beside analysis and comprehension of the themes, "visioning" can be considered as one of the main tools that helps the positive change and the design of future scenarios. The visioning exercise is a form of free-imagination practice.

The facilitator should prompt the discussion by asking: what will the food of the future look like? What will your typical meal contain in the future?

In order to answer these questions, participants have to:
- Imagine situations that reflect expectations, ideals, values connected to the questions.
- Represent the vision using different materials (colours, paper, written words, mouldable paste), choosing the medium that suits the most their expressive style, in order to unlock their creative input.

Once the concept of 'vision' is clear to the students, invite them to use the time left (around 30 minutes) to sum up their ideas, to image a future scenario and represent it concretely using the materials available.

STEP 6: CONCLUSION
20 MINUTES

Invites each participant to present and share their personal vision. Together with the invited researcher or food system stakeholder, discuss the inputs that emerged, to identify the different elements that are part of a systemic vision of the food system.

APPENDIX A: IN-DEPTH SHEET ON VISIONING

Visioning about a desired future can be an important stimulus for change. It can be the first step in creating a powerful strategy to achieve a desirable future or a particular purpose. In a visioning process, various stakeholders are brought together, that are involved in the environment of the addressed topic, thus visioning is a participatory tool to develop a shared vision of the future. Two central questions in a visioning process include: ''Where are you now''? and ''Where do you want to be in the future''? The aim of a visioning process is to develop written and visualized statements of long-term goals and strategic objectives in the interested field.

Regarding outputs, visioning is a method for generating a compelling vision of a preferred future. Thus, the outcome of a visioning process includes some pictures that communicate in a very powerful way the preferred future and benefits of the future. A visioning process can also help to show the interdependencies between different factors that shape the future. Ultimately, visioning can lead to recommendations and even transformations of for instance policies, priorities, strategies, investments, socio-economic and research and innovation systems, behaviours and attitudes, education, products and services.

Visioning is typically used after a problem and situation analysis has been completed (although this is not a necessity for your workshop) and before the detailed planning and decision-making process with the involved stakeholders has started. Whereas the results of the problem and situation analysis serve as the definition of State A (Where are we now?), the outcomes of a visioning workshop describe a future State B (Where do we want to be?). Visioning is a process and visioning activities can be organized at any stage of the pathway. In any case, the visioning process should be implemented before decisions on e.g. Lab activities are made. It can last one or several days, even months, depending on the complexity of issues faced.

[from: Facilitation script visioning City Labs- Extension to module 4 of 'Deliverable 1.1 Tools and training for setting up a transformative network']

APPENDIX B: PREPARATION OF THE COPPER SULPHATE SOLUTION

Materials

- 1 one glass bottle with stopper or beaker (600 ml capacity)
- 15 ml capacity test tubes with stoppers
- 1 funnel
- 1 spatula
- anhydrous copper sulphate
- distilled water

Copper sulphate is a light blue coloured crystal powder.

Preparation

Take the container with copper sulphate and a plastic test tube with a stopper.
On the test tubes there is a scale, from 1 to 15 units. In case of powdered substances, 1 unit corresponds to 1 cm^3.
With a funnel, introduce the anhydrous copper sulphate in the test tubes, up to reach 5 cm^3.
Pour the content in the bottle or in the beaker and add distilled water up to reach 250 ml.
Mix the solution continuously and vigorously in order to let the salt melt completely.
Copper sulphate has low solubility; for the complete dissolution of the salt is required a waiting time of at least 30 minutes. At the end of the process, the copper sulphate solution appears limpid and light blue.
For the experimental activity, pour the solutions in the test tubes as needed.

Safety and disposal

Read the anhydrous copper sulphate safety sheet carefully to use it safely and dispose of it properly.

APPENDIX C: PREPARATION OF THE SODIUM HYDROXIDE SOLUTION

Materials

- 1 one glass bottle with stopper or beaker (600 ml capacity)
- 15 ml capacity test tubes with stoppers
- 1 funnel
- 1 spatula
- sodium hydroxide
- distilled water

Sodium hydroxide is in form of solid, white and odorless pellets.

Preparation

Take the sodium hydroxide and a test tube with stopper.
On the tube there is a scale, from 1 to 15 units. In case of solid substances, 1 unity corresponds to 1 cm^3.
With a funnel, put the pellets in the tubes up to reach 10 cm^3.
Pour the content in the bottle or in the beaker and add distilled water up to reach 250 ml.
Mix the solution continuously and vigorously in order to let the pellet melt.
Sodium hydroxide presents high solubility and is an exothermic substance: an increase of temperature of the solution may happen during the process.
At the end of the process, the sodium hydroxide solution appears limpid and colourless.
For the experimental activity, pour the solutions in the test tubes as needed.

Safety and disposal

Read the sodium hydroxide safety sheet carefully to use it safely and dispose of it properly.

Coordinated by:

VU VRIJE UNIVERSITEIT AMSTERDAM

Partners

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