FabCitizen
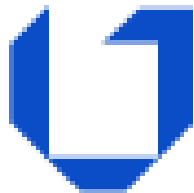
Bringing Citizen Science into Schools
Marathon, 02.07.2023

Our Partners

The FabCitizen project: Outcomes

- Create Pedagogical and Competency frameworks for Citizen Science for grade 5-9 including links to existing curricula

- Establishing FabLabs & Maker Spaces as the main environment for Citizen Science projects

- Build open learning scenarios and materials for Citizen Science from fifth to ninth grade as Open Educational Resources

- Build Learning Scenarios for Citizen Science and in related disciplines (such as biology, geography, …).

The Key Question

How can Citizen Science improve learning and teaching science in schools?

- How to improve scientific thinking?
- How to involve the community?
- How to create fun projects?

Citizen Science?

- Collecting hydrological data / waste locator

- Collecting data on light emissions

https://www.plasticspotter.nl/

http://www.myskyatnight.com/

Citizen Science?

- **The Mosquito Atlas:** Catching mosquitos + morphological / genetical identification

http://www.citizen-science-germany.de/citizen_science_germany_projekte_7.html

- **SETI:** Extraterrestrial intelligence

https://setiathome.berkeley.edu/

Citizen Science? Gaming and Apps

- **SeaHero:** Games to collect navigation data on human orientation / dementia

- **Plantnet:** Pictures / identification / geographical distribution of plants

https://plantnet.org/en/

http://www.citizen-science-germany.de/citizen_science_germany_projekte_7.html

Citizen Science Hubs

- https://www.zooniverse.org
- https://eu-citizen.science/projects
- https://www.spotteron.net/ (commercial tool for CS projects)
- http://scistarter.org and for education (lots of projects) https://scistarter.org/education
- https://www.reinforceeu.eu/
- https://bigoprogram.eu/

Citizen Science

- Involving citizens in science / research projects
- Involvement of volunteers in the scientific process (Bela, 2017)
- Terminology not well defined (Eitzel et al, 2017)
- Tool vs. movement vs. social capacity?
- Scientific and / or educational objectives?

- Need to develop a common understanding of Citizen Science

(Eitzel et al, 2017)

Barriers and challenges

- Participants as data collection servants
- Many CS projects lack methodological rigor
- The data accuracy is low
- There are not enough quality assurance mechanisms for data collection
- Lack of technological or methodological skills of the participants
- CS projects are not taken seriously in the scientific community
- Data analysis and interpretation is a specialists' skill

Generic skills

Pedagogical skills

Attitudes

Personal and interpersonal competencies

IT competency

Upper categories of the CS competency set

Communication and collaboration

Scientific competencies

Data management

| Scientific investigation lifecycle | Scientific knowledge | Scientific thinking | Data management life cycle | Data handling | Data knowledge | Data security and ethics | Data quality |
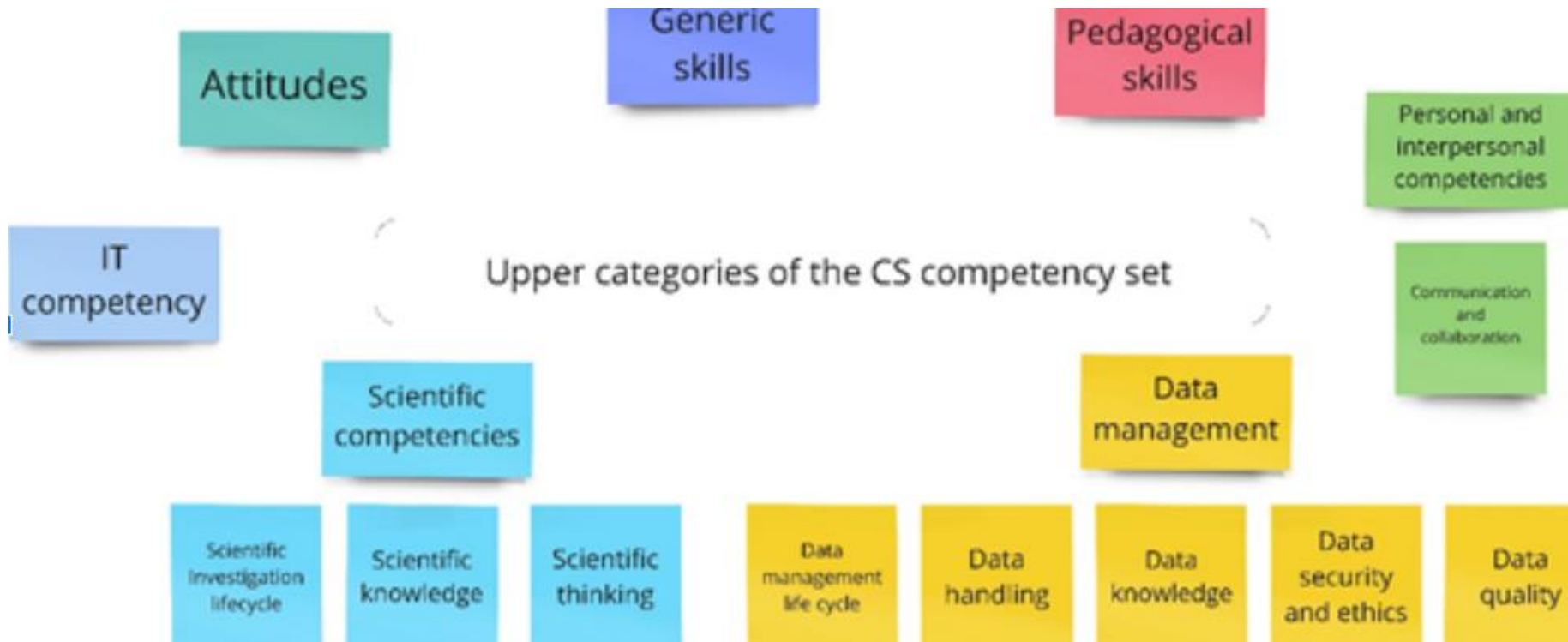
Some sample critical competencies

- Scientific thinking
  - Formulating research questions

- Data handling
  - Interpreting data

- Attitudes
  - Positive attitude towards science

- IT competencies
  - Programming and data handling

- Communication
  - Community involvement

- Sustainability
  - Socially responsible issues (eg food waste)

How to implement this into schools?

- Open Educational Resources
  - Learning materials with an open (creative commons) license

- Open Educational Practices
  - Learning Scenarios = Lesson Plans
  - Experiences

- FabCitizen
  - More than 100 scenarios in different subjects
  - Combining science, IT and citizen science
  - https://fabcitizen.eu/learning-scenarios/

Key benefits

- Combining future competencies
  - Programming, making, IT
  - Data handling
  - Social competencies
  - Social responsibility

- Free to use scenarios

- Lesson plans + work sheets
  - Copy & adapt

- Community support & involvement

- Join our hands-on workshops ☺

The Key Question

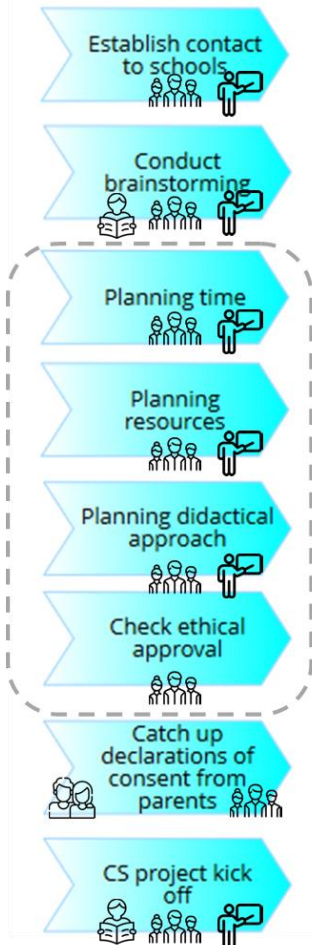## How to develop a Citizen Science project?

- Let us develop our own CS project
- Topic: Food waste but feel free to choose your own
- Find a small group and start brainstorming
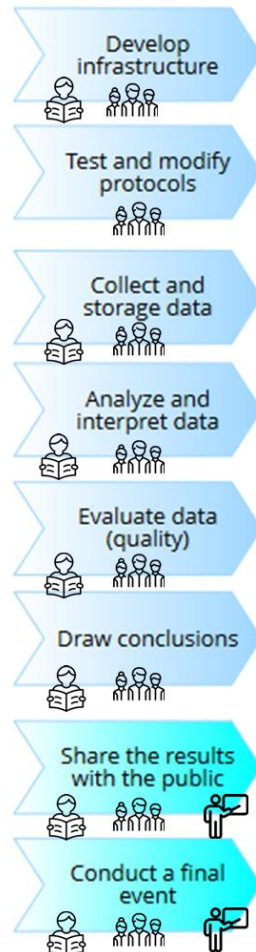- Use the template
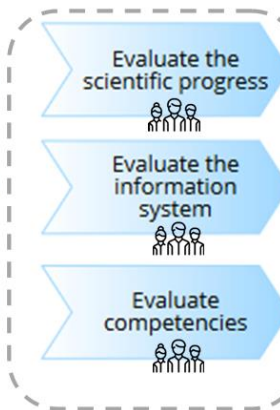
Workshop Method

Preparation phase
- Establish contact to schools
- Conduct brainstorming
- Planning time
- Planning resources
- Planning didactical approach
- Check ethical approval
- Catch up declarations of consent from parents
- CS project kick off

Starting phase
- Formulate research question
- Concise competency set
- Assess competencies
- Provide training for teachers
- Provide training for students
- Conduct small trials
- Evaluate trials and training

Activities
- Develop infrastructure
- Test and modify protocols
- Collect and storage data
- Analyze and interpret data
- Evaluate data (quality)
- Draw conclusions
- Share the results with the public
- Conduct a final event

Evaluation phase
- Evaluate the scientific progress
- Evaluate the information system
- Evaluate competencies

Improvement and future planning phase
- Establish contact to schools long-term
- Solicit feedback from the participants
- Sustain the project founding

Legend
- Community
- Researcher
- Teacher
- Student
- Parents
- School specific processes
- Standard CS processes
- Competency-orientated processes

Find our scenario

- https://fabcitizen.eu/search-learning-scenarios-in-progress-2/
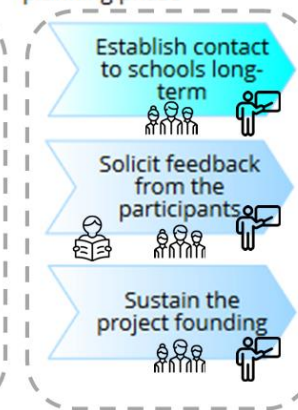
- Search for Citizen science scenarios

Search Learning Scenarios

On this page you can search for all Learning Scenarios and other website content. For example choose your preferred language from the drop down menu.

| All Categories ▾ | All Competencies ▾ | All Technologies ▾ | All Grades ▾ | All Lengths ▾ |

All Categories
CitizenScience Scenarios
Learning Scenarios
News
Templates
Uncategorized

All Languages ▾   All Pedagogical Approches ▾   **Submit**

Workshop Method

Task 1: Brainstorming on Citizen Science

Discuss in groups of 4 people a possible Citizen Science projects with the following constraints

- Topic is for educational purposes (preferably in between grades 5-10)
- Topic is related to food waste / nutrition / …
- Topic is fun :-)
- The topic should be defined in 1-3 research questions
-

List possible topics here:

- …
- …
- …
-

Research Questions:

- …
- …
-

Workshop Method

Task 2: What are the main competencies / learning outcomes in such a project?

- The following areas should be covered:
  - Food waste / subject-related competencies
  - Scientific thinking (e.g. formulating research question, organizing experiments, …)
  - Data handling (e.g. collection, using excel to cluster data)
  - Attitudes
  - Communication (e.g. to involve families)
- Possible competencies: https://fabcitizen.eu/wp-content/uploads/2022/01/Competency-framework-CS-DL-SL-competencies.pdf
-

Workshop Method

Task 3 What are the target groups / communities who could be involved?

- Consider the primary target groups (participating in the full process) as well as potential supporters (helping, supporting, …).

- Sample target groups are
    - Students between grade x and y
    - Teachers from subject A and B
    - IT expert
    - Parents
    - School administrators
    - Enterprises
    - NGOs
    - ….

Workshop Method

Task 4.1 Describe the phases / learning activities and the outcomes

- Please try to develop a rough structure of your CS project. Also, relate again or refine the learning objectives / outcomes addressed in task 2.

- Possible learning activities are
    - Contextualization - setting the context for the topic
    - Self study - exploring learning materials / texts for certain topics
    - Defining research question
    - Planning experiments
    - Learning to develop an app
    - Reflecting
    - Collecting / analyzing / interpreting data
    - …..

Workshop Method

Task 4.2 Collect possible Open Educational Resources

- There are many resources around which can be re-used, adapted and modified freely. Check out for example
    - http://cota-project.eu (on Basic Digital Competencies)
    - http://fabcitizen.eu (on CS scenarios, also App Inventor issues)
    - https://www.fao.org/save-food/news-and-multimedia/news/news-details/en/c/1156940/ readers on food waste for children
    -

Workshop Method

Task 5: Create your CS outline and project plan

Task 6 Realize the project

Task 7: Validate and reflect

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https://tinyurl.com/fcmarathon2023

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