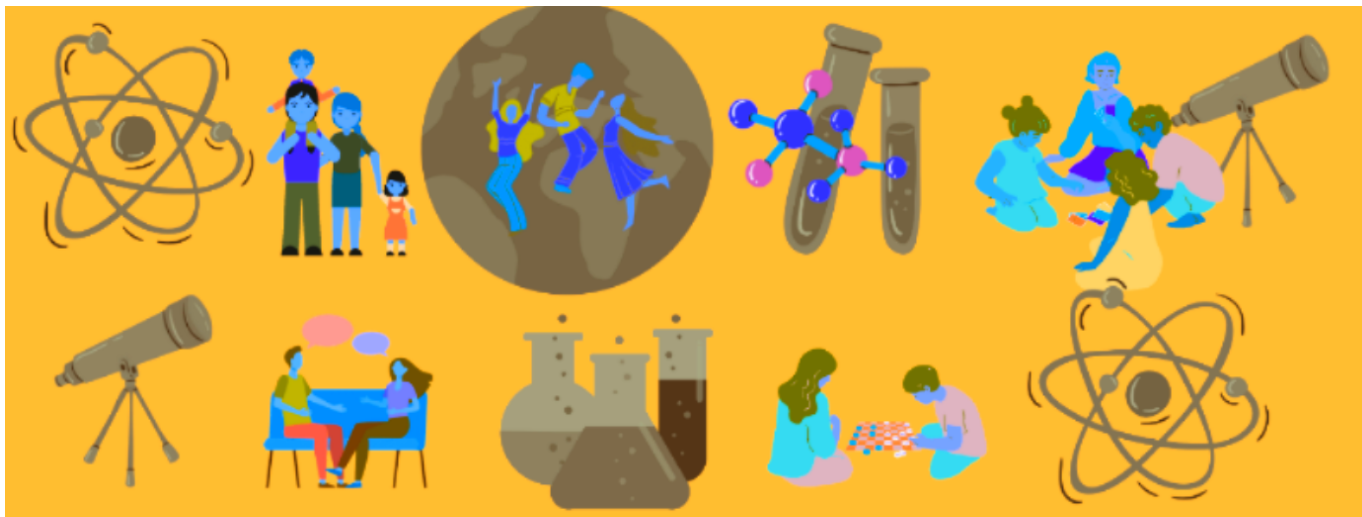# CITIZEN SCIENCE AND ETHICS

DESCRIPTION OF THE LEARNING SCENARIO
PREPARED BY VILNIUS TECH

As citizen science projects increase and continue to largely benefit the scientific communities, issues with the relatively new scientific practice arise. Questions about quality control and ethical dilemmas challenge Citizen Science projects and constantly pushes it to prove its robust scientific methodology. In addition, this scientific practice is getting more popular and widely accepted that we anticipate the need for citizen awareness of all of these ethical concerns. Not only would this awareness push towards the best ethical practices by researchers and citizens, it would also allow for critical examination of research, intentions, and the personal responsibility in society.

This lesson plan will encourage students to critically evaluate citizen science projects, and understand ethical challenges and concerns within this practice. It is done through posing forward situations and questions that challenge some of the norms and open the eye to potential ethical dilemmas.

THE LEARNING SCENARIO WAS PREPARED UTILIZING MATERIALS BY MAREN.

WORKFLOW OF THE LEARNING ACTIVITY

ENGAGE

Students should read the attached article prior to class. Begin the class with the Defining and understanding citizen science, methodology, ethical concerns in research.
Watch the 5 Mins trailer about crowdsourcing and address the questions on the handout.

EXPLORE

Students will research opinions about scenario #3 prior to debate. Alternatively this could be given as homework after dividing class into groups and assigning roles.

EXPLAIN

Use the Handout to explain the activities to the students and clarify the discussion and debate protocols.
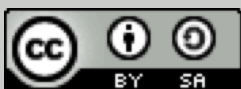
ELABORATE

Students will elaborate through arguing and supporting their assigned roles and positions in the debate.

EVALUATE

Students will share and exchange ideas with their classmates and groups. You could also evaluate their created lists and group work.

DIVIDE THE CLASSROOM INTO GROUPS: YOU CAN DECIDE THE SIZE AND NUMBER OF GROUPS DEPENDING ON YOUR CLASS SIZE. IDEALLY YOU WOULD HAVE 5TO 7 MEMBERS IN A GROUP.

ACTIVITY 1

Watch this 5 mins clip

- **Discuss and explain** what is Citizen Science. Refer to Article assigned as pre-read.
- **List** ethical issues you see and notice in this trailer.
- **Appoint** a Moderator and a Notetaker in your group.
- **Brainstorm** for 5 mins in your groups the important ethical issues you see in CS. (come up with an example or a description of the ethical issue and why it is so).
- In your groups, **discuss** in what ways is CS similar/different from crime solving.
- **Explore** the strengths and limits of comparing CS to crime solving.
- **Exchange** and **share** your groups findings with the whole class.

ACTIVITY 2

In your groups read each Scenario and discuss the questions attached to the scenario:

SCENARIO 1

A group of 10 high school students are looking to improve their resumes before applying to college. They decide to participate in Citizen Science projects to show their efforts, commitment and many other qualities that their participation implies. After a little bit of research, they decide to join MAREN and contribute to the Milkweed study. At first, the students were excited to learn and contribute to a real life research project. However, as their responsibilities piled up and college applications were approaching, it was a little too late to collect the data. Not submitting the data was not an option for they didn't want to disappoint their teacher, who is in the middle of writing their college recommendation letters. After they discussed their options, the students decided to submit false data that they would make up.

What kind of impact does such behavior have on the quality of the research results? In addition to the specific project and data impacted, consider citizen science projects in general and the scientific community ?

What measures can be taken by researchers to prevent, identify and mitigate such problems with data ?

Suggest three measures that could be taken by other parties that would help make CS immune to such problems.

SCENARIO 2

A governmental citizen science project aims to investigate the importance of a rainforest. This rainforest is in a central location and is being considered as the site for a power plant that will provide electricity for the entire region. Due to its central location, the government believes that locating the power plant in this rainforest will reduce the overall impact on land necessary to meet the electricity needs of the population. The citizen science research project aimed to study the ecosystem and the species abundance in the rainforest; citizens were asked to submit data on what species they observe at different times.. Some citizens were against the destruction of their rainforest and have decided to alter the data they submit so it results in the cancellation of the power plant project.

Do you think this is a good citizen science project? Reflect on what makes a good citizen science project!

Clearly the citizens saw more value in keeping the rainforest than in the power plant, do you think there is ever a time when falsifying or making up data is justified?

What other forms of bias could threaten the reliability of citizen science research projects?

ACTIVITY 3

Debate scenario #3.

SCENARIO 3

Debate statement: Citizen science should be a part of a social contract.

As the scientific community, governments and the general public begin to realize the great importance of citizen science and the benefits of it, efforts to systematically incorporate citizen science into society began. First, schools started to require it as part of their curricula. Now, one legislator is proposing that Citizen Science participation become a mandatory part of every citizen's social contract. The exact form of the proposal is yet to be determined, but the idea is that all citizens would be expected to complete some citizen science hours that could be analogous to community service, military service, or even to paying taxes. For example, the country benefits from all of these activities, but at some level, so do the individuals who engage in them.

You will be divided into three groups: groups ideally consist of up to 7 members. Group size can be adjusted according to class size.

| GROUP A	GROUP B	GROUP C
YOU SUPPORT THE IDEA AND WOULD LIKE TO LOBBY FOR IT.	**YOU ARE AGAINST THIS PROPOSAL AND WILL FIGHT AGAINST IT.**	**YOU ARE FACT CHECKERS GROUP THAT MAKES SURE FACTS STATED THROUGHOUT THE DEBATE ARE RELIABLE AND TRUE.**

In your groups, take 25 mins to research and prepare for a 15 minute debate where you backup your stance. Your research can involve looking up articles, arguments, facts and/or formulating your own opinions.

Teacher/Instructor will be the moderator of the debate where they: (1) Open the Debate by stating the topic of the discussion; (2) Moderate any conflicts or heated one on ones that might emerge; and (3) Keep track of time and make sure all teams have equal time to speak and express their position.

Group C: You have the power to interrupt any team at any time to correct their stated facts. You are also allowed to fact check arguments throughout the debate.

Debate timing will be as follows: 25 mins of Research and preparation; 1 min to pitch their opening statement where they clearly state their stance and 15 mins discussion and debate.

Teams can directly address arguments, pose questions and/or respond to any argument. Each group is to autonomously divide labour and roles within the group bearing in mind the representation of each member of their group.
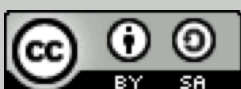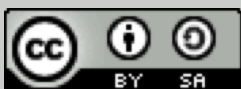
ACTIVITY 4

Compiling a List of Ethical Issues.

CREATE A LIST OF ETHICAL ISSUES IN CS DISCUSSED TODAY.

ADD TO THE LIST OF ETHICAL ISSUES THAT MIGHT OCCUR IN CITIZEN SCIENCE AND WE HAVEN'T DISCUSSED.

IN YOUR GROUPS, CHOOSE 3 ETHICAL DILEMMAS AND PROPOSE SOLUTIONS, COURSES OF ACTION THAT COULD BE TAKEN BY RESEARCHERS, CITIZENS, GOVERNMENTS TO ADDRESS THE CONCERN!