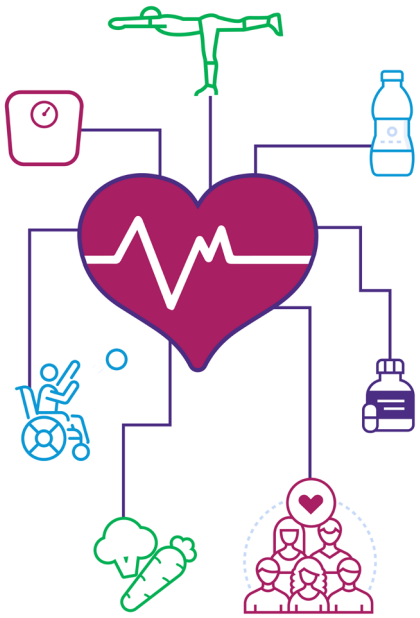
# CITIZEN SCIENTIST



## AGE RANGE

10–13

## OVERVIEW

Students will first explore the world of citizen science and learn several ways citizens like them are contributing to health and science. Students will analyse elements of their environments that either contribute to noncommunicable diseases (NCDs) or help reduce the risk of developing NCDs, and then they will work together to develop an action plan that outlines how they can help contribute to the reduction of NCDs in the future.

## TIMING

45–60 minutes

## OBJECTIVES

Students will:

- Learn the role citizen science plays in health and science
- Analyse their environments for risks related to NCDs
- Develop an action plan that outlines how to reduce the risk of developing NCDs

## MATERIALS NEEDED BY STUDENTS

- Pencil
- **Citizen Science: Brainstorm Grid** student handout, one per student*
- **Citizen Science: Action Plan** student handout, one per student*

## MATERIALS NEEDED BY VOLUNTEER

- Device with Internet access and Web camera if presenting virtually
- Chalk or whiteboard marker if presenting in person

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## VOLUNTEER PREP

1. Read through the activity instructions to familiarise yourself with the content. Note that lessons are designed to last 45–60 minutes, but each situation will be unique. Use the Lesson At-A-Glance as a guide on how long to spend on each section.
2. Prepare all materials before your session. Communicate with your host educator in advance so he or she is able to prepare students and help prepare the space.
3. Decide before your session whether you are going to have students work independently, with a partner, or in small groups. Engage your host educator in determining the best method and classroom setup for your group.
4. Write the list of citizen science projects on the board.

## VIRTUAL FACILITATION PREP

If you are presenting this lesson virtually, please note the following additional preparation steps that might be necessary:

1. **Materials Note:* Communicate the list of materials needed by students to your host educator in advance so he or she is able to prepare students and make sure they each have the required handouts. There are facilitation options below for virtual situations in which students do not have access to the handouts.
2. This activity is written for virtual facilitation by one volunteer. If more than one volunteer will virtually present together, it is recommended that you speak with your host educator regarding his or her preferences and limit the number of volunteer presenters to three. It is also recommended that volunteer groups assign sections and practise before their virtual sessions.
3. Prior to your session, coordinate with your host educator regarding the preferred e-meeting platform (i.e., Zoom, Skype, Ring Central, Google Hangout, etc.). Determine who will be responsible for setting up the meeting credentials. Also, determine whether students will be on camera, using the chat feature, muted, etc. so you are better able to plan.
    - If possible, consider planning a practise session with your host educator to work out any issues prior to your session.

## SUGGESTIONS FOR IMPLEMENTING VIRTUAL MEETINGS

- **Lighting:** Backlighting prevents your audience from seeing you clearly. Make sure that you have lighting in front of you to ensure that you are seen.
- **Camera Placement:** Try to make sure that your camera is placed at eye level. This helps to create eye contact and engagement with your audience. You can use books or other items to lift your computer (if using a laptop).
- **Sound:** Make sure that you do a quick sound check before beginning your session. Ensure that you can be heard and that participants will not hear an echo effect. Consider the usage of headphones equipped with a speaker.

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- **Connecting With Your Audience:** Remember to try to connect with your audience, which can be challenging in a virtual environment. Connect with them using quick stories or humour. Some suggestions have been included.
- **Troubleshooting:** It is OK to make mistakes or have technology issues. If you have a technology hiccup or things don't go as planned, do your best to reconnect and move forward with your lesson. The best thing you can do is be prepared by testing your Internet connection and sound and video settings prior to your session!

## LESSON AT-A-GLANCE

| Section | Activity | Approximate Time in a 45-Minute Session | Approximate Time in a 60-Minute Session |
|---|---|---|---|
| **Engage** | Volunteer introductions and student engagement questions | 3–4 minutes | 4–6 minutes |
| **Learn** | Noncommunicable diseases | 3–4 minutes | 3–5 minutes |
| | Community initiatives | 3–4 minutes | 3–5 minutes |
| **Apply** | What is citizen science? | 2–3 minutes | 3–5 minutes |
| | **Citizen Science: Brainstorm Grid** | 13–15 minutes | 18–21 minutes |
| **Challenge** | **Citizen Science: Action Plan** | 10–15 minutes | 10–15 minutes |
| **Discuss** | Share action plans | 5 minutes | 5–7 minutes |
| **Reflect** | Reflection on learning | 2–3 minutes | 4 minutes |

## PROCEDURE

### Engage

1. Take **1–2 minutes** to introduce yourself and Abbott to the class. Explain that you are here on behalf of Abbott's *Future Well Kids* programme. Abbott is a global healthcare company that makes products like medical devices, diagnostic machines, nutrition bars, and generic medications, and the company has a local presence here near them. Tell them that you are excited to help students live fuller lives through better health and teach them healthy habits that they will be able to use their entire lives. Try to share a fun fact about yourself to help the students get to know you—such as ways you, your friends, and your family help to keep each other healthy.

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2. For approximately **1–2 minutes**, engage students in the upcoming lesson by asking one or more open questions. The following questions may be used to get students thinking about their upcoming learning experience and do not have right or wrong answers:
    - What do you think of when you hear the phrase 'citizen science'? (Let the students know that they will get a chance to explore what this means in more detail in a moment.)
    - Have you ever done anything to help others in your community?
    - Can you think of things in your home, school, or community that could make you sick? Keep you healthy?

**VIRTUAL FACILITATION OPTIONS**

- If students are on video and able to use microphones, allow them to offer their answers to each other or put them in the chat box.
- If students are not using video or microphones, encourage students to write their answers down to reference later.

## Learn

3. Discuss with students how noncommunicable diseases are prevalent in all of our communities and threaten over 41 million people around the world each year.[1]
4. Explain to students that a noncommunicable disease, or NCD, is any disease that is not contagious and cannot be spread to others, unlike communicable diseases such as the flu. Some examples of NCDs are type 2 diabetes, high blood pressure, and heart disease.
5. Clarify that an NCD is often the result of a lifestyle choice, such as lack of physical activity or nutrition choices.
6. Instruct the students to consider aspects of their community that might encourage a lack of physical activity or poor nutrition choices. On the flip side, ask them to begin to consider aspects of their community that might encourage people to be physically active or to make positive nutrition choices.
    - *Note:* If you are facilitating this activity in person, ask students to think about the questions, pair up with a partner, and share their thoughts with their partners. If virtual, students can just begin to think about it in preparation for the next activity.
7. Invite 2–3 volunteers to share their initial thoughts. If students are reluctant to volunteer, move on to the Apply section.

**VIRTUAL FACILITATION OPTIONS**

- If students are in a virtual situation in which they do not have access to the handouts:
    - Display your grid handout via webcam or screen share and talk through the steps.
    - Students can document their examples on a sheet of paper or in a shared or live document.

[1] http://bitly.ws/dQEP

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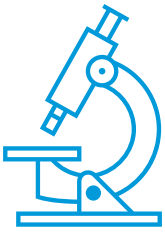
## Apply

8. Explain to students that citizen science is science or research that is conducted by amateurs, or people who are not professional scientists. Often, it involves gathering information in order to help a population or community or to answer an important question. Increasingly, students just like them are beginning to take on the role of citizen scientists.

9. Reference the list of citizen science projects[2] on the board that have to do with public health. Remind students that these projects are completed by non-professionals, ordinary citizens, and sometimes even kids! Highlight that the final project on the list is part of *iTech Explorers*, which engages students aged 10–20 to solve problems relating to:



   - Air quality testing
   - Water quality monitoring
   - Effects of wildfire smoke on lung health
   - Effects of light pollution
   - Best ways to support informed decision-making in health care
   - Discovering forms of antibiotics in dirt
   - Helping map neuron data through video games
   - Effects of bedtime technology on sleep patterns

10. Direct students' attention to the **Citizen Science: Brainstorm Grid** handout. Remind them of the ideas they came up with a few minutes ago. Explain that now you want them to think of specific examples for the four boxes. These specific examples will form the basis of their action plan.

11. Take **1–2 minutes** to review the grid with students before they begin. They should first understand that their community can include their homes, school, churches, and neighbourhood or town. Also, reinforce that there is no set number of responses for each box and that each box does not have to have the same number of examples.

**HALFWAY POINT**

12. Give students **8–10 minutes** to compile their examples and document them in their grid. If you are facilitating this activity in person, you may choose to allow students to work with a partner or in groups.

13. When students have finished compiling their examples, give them **2–3 minutes** to review all of their responses and ask them to circle the one that they feel is most pertinent in terms of the likelihood of citizens developing or preventing an NCD. This single example will be what they build their action plan around.

[2] https://en.wikipedia.org/wiki/List_of_citizen_science_projects

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14. While students are discussing, move around the room to help when necessary. If groups are having difficulty deciding on a single issue, remind them that while they might have several valid issues to choose from, the focus is on only one today. You can suggest they choose the most important one or randomly choose one (close their eyes and point, flip a coin, rock paper scissors, etc.).

### Challenge (Assigned Volunteer(s)_____)

15. Tell students that they are now going to create an action plan that will either support a community effort to help keep citizens healthy or change a situation that increases their risk of developing an NCD.
16. Referencing the **Citizen Science: Action Plan** handout, explain each section and answer students' questions. Then, instruct them to write the example they circled on their grid in the first box.
17. Provide students with **7–12 minutes** to complete their action plans.
18. While they are working, volunteers should move around the classroom and provide students with feedback or assistance. Alternatively, if students are working in groups, a volunteer can be assigned to each group to engage with students through the duration of the activity or participate with students in the activity.

#### VIRTUAL FACILITATION OPTIONS

- If students are in a virtual situation in which they do not have access to the handouts:
  - Display your action plan handout via webcam or screen share and talk through the steps.
  - Students can document their plans on a sheet of paper or in a shared or live document.

### Discuss

19. Invite each student or group to share their plan with the class. After one group has shared, the students can 'popcorn' to another group. To 'popcorn' means the student will call out the next student or group, which should 'pop' up and begin reading the next action plan. Continue this activity until all students have shared their plans.
    - *Note:* If students are working independently or you are short on time, ask 2–3 volunteers to share their action plans.
20. Ask students to think like citizen scientists. What information or data could they gather that could support their action plan? What might they observe in their community that could tell them if their plan was making a difference? If time allows, invite them to share with the group or with a peer sitting nearby.

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### Reflect

21. To facilitate students' reflections on their experiences during the session, ask one or more of the following questions:
    - Did you notice that more students chose to support a positive example or replace a negative one? Why do you think that is?
    - What did you learn from hearing your classmates' action plans?
    - Do you believe you can help your community stay healthy? Explain.
22. Before you leave, thank the classroom teacher and students for allowing you to join them, and encourage them to apply what they have learned during this activity by sharing their plans with their families.

## EXTENSION IDEAS FOR EDUCATORS

- Students can conduct research on the various elements of their examples and action plans in order to solidify and execute their plans.
- Facilitate students' engagement with community leaders and/or officials about their action plans and initiatives aimed at keeping the community healthy and reducing its risk of developing NCDs.

## UK DEPARTMENT FOR EDUCATION STANDARDS & GUIDANCE

**UNITED KINGDOM**

Physical Health and Mental Wellbeing Guidance (Primary and Secondary)

- **Physical Health and Fitness (Primary)**

  Pupils should know:
  - the characteristics and mental and physical benefits of an active lifestyle
  - the importance of building regular exercise into daily and weekly routines and how to achieve this; for example walking or cycling to school, a daily active mile or other forms of regular, vigorous exercise
  - the risks associated with an inactive lifestyle (including obesity)
  - how and when to seek support including which adults to speak to in school if they are worried about their health
- **Healthy Eating (Primary)**

  Pupils should know:
  - what constitutes a healthy diet (including understanding calories and other nutritional content)
  - the principles of planning and preparing a range of healthy meals

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- the characteristics of a poor diet and risks associated with unhealthy eating (including, for example, obesity and tooth decay) and other behaviours (e.g. the impact of alcohol on diet or health)

- **Physical Health and Fitness (Secondary)**

  Pupils should know:

  - the positive associations between physical activity and promotion of mental well-being, including as an approach to combat stress
  - the characteristics and evidence of what constitutes a healthy lifestyle, maintaining a healthy weight, including the links between an inactive lifestyle and ill health, including cancer and cardiovascular ill-health

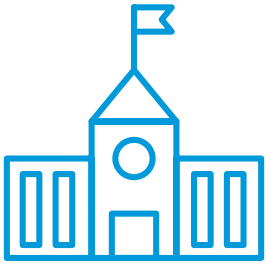
- **Healthy Eating (Secondary)**

  Pupils should know:

  - how to maintain healthy eating and the links between a poor diet and health risks, including tooth decay and cancer

English KS3

- Pupils should be taught to speak confidently and effectively, including through using Standard English confidently in a range of formal and informal contexts, including classroom discussion.
- Pupils should be taught to speak confidently and effectively, including through giving short speeches and presentations, expressing their own ideas, and keeping to the point.
- Pupils should be taught to speak confidently and effectively, including through participating in formal debates and structured discussions, summarising and/or building on what has been said.
- Pupils should be taught to write accurately, fluently, effectively and at length for pleasure and information through:
  - writing for a wide range of purposes and audiences, including: ...notes and polished scripts for talks and presentations...
  - summarising and organising material, and supporting ideas and arguments with any necessary factual detail
  - applying their growing knowledge of vocabulary, grammar and text structure to their writing and selecting the appropriate form



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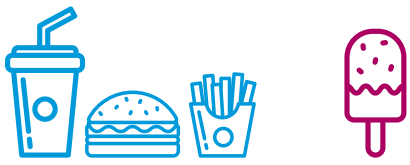
## CITIZEN SCIENCE: BRAINSTORM GRID

| | |
|---|---|
| Things in my community that **encourage** being physically active:<br>• _____<br>_____<br>• _____<br>_____<br>• _____<br>_____<br> | Things in my community that **discourage** being physically active:<br>• _____<br>_____<br>• _____<br>_____<br>• _____<br>_____<br> |
| Things in my community that **encourage** making positive nutrition choices:<br>• _____<br>_____<br>• _____<br>_____<br>• _____<br>_____<br> | Things in my community that **discourage** making positive nutrition choices:<br>• _____<br>_____<br>• _____<br>_____<br>• _____<br>_____<br>  |

# CITIZEN SCIENCE: ACTION PLAN

| My example **encourages / discourages** (circle one) **physical activity / positive nutrition choices** (circle one) |
|---|
| (Write example here)<br> |

| My example should be **continued / discontinued** because... (circle one) |
|---|
| |

| In the box below, write your plan for continuing and enhancing a positive example or replacing and remediating a negative example. Be as specific as possible. |
|---|
| |

| My plan will help reduce my community's risk of developing NCDs because... |
|---|
| |