



# Citizen Science

**science for everyone**

**A guide for teachers and support providers**



**Would you like to increase opportunities for your pupils to...**

- **Learn outdoors?**
- **Get involved in hands-on activities to increase their science, numeracy & technology skills?**
- **Become better connected to their local environment?**
- **Improve their health and wellbeing?**

**...then Citizen Science is for you!**

## **What is Citizen Science?**

Citizen Science is the participation of the public in the collection of environmental information that contributes to expanding our knowledge of the natural environment. Across the world, volunteers gather a wide range of data vital to protecting and improving our environment, from recording ancient trees to counting earthworms.

Citizen Science is much more than just science. It's fun, it promotes a healthy, more active lifestyle and it delivers lifelong skills. It's about building the values of stewardship, responsibility, citizenship and equality and a sense of power to change the world for the better. Through participating in projects which monitor the local environment, people learn about the value of their local greenspaces and how to take action to protect and improve their local environment for wildlife and the local community.

# How Citizen Science fits with Curriculum for Excellence

Citizen Science is interdisciplinary, fits with existing curriculum subjects, encourages citizenship and meets requirements for outdoor learning:

([http://www.educationscotland.gov.uk/images/cfeoutdoorlearningfinal\\_tcm4-596061.pdf](http://www.educationscotland.gov.uk/images/cfeoutdoorlearningfinal_tcm4-596061.pdf) ). It provides a wide range of hands-on resources for teachers to use practical techniques to develop the skills of scientific investigation and helps young people to apply and interpret numerical information and gain confidence in the use of technology.

Through Citizen Science young people become better connected to nature and participate in activities which contribute to a healthy lifestyle. Schools can establish productive links with the local environment and the community, working with local people to learn and use new skills.

## Delivering Curriculum for Excellence

**Participating in Citizen Science provides opportunities for learners to:**

### Science

- develop the skills of scientific inquiry and investigation using practical techniques and recognise the impact that the sciences make on life, the environment and on society
- develop an understanding of the Earth's resources and the need for responsible use of them
- develop as a scientifically-literate citizen with a lifelong interest in the sciences
- establish the foundation for advanced learning and future careers in the sciences

### Social Studies

- develop an understanding of the natural heritage of Scotland and its impact on our lives
- develop an understanding of the principles of citizenship
- learn how to locate, explore, link features and places locally and further afield

### Technologies

- take responsible, ethical actions to improve the lives of others and the environment
- gain the confidence and skills to embrace and use technologies and broaden awareness of how mathematics and science are used in the technology

### Numeracy & Maths

- understand the application of mathematics and its impact on our society
- develop essential numeracy skills
- interpret numerical information, use it to make reasoned evaluations and informed decisions
- apply skills and understanding creatively and logically to solve problems

### Literacy

- communicate, collaborate and build relationships
- extend and enrich vocabulary

# Citizen Science School Resources

Help us learn more about the state of your local environment by participating in these surveys:

**Water:** Studying river water quality, pollution and flooding. Measuring a local watercourse and its flow rates through activities such as:

- **SEPA Floodline** – Scotland’s direct flood warning service. Gives you details on what to do in the event of a flood and check your flood risk. <http://www.floodlinescotland.org.uk/>
- **Ready for Emergencies?** – Education Scotland’s website is a valuable source of teaching and learning material in relation to emergencies and community resilience. It provides activities for the classroom and outdoors and covers themes relating to flooding and severe weather. <http://www.educationscotland.gov.uk/readyforemergencies/flooding/index.asp>
- **Yellow Fish Campaign** - many drains lead directly into local burns and rivers. Pouring unwanted liquid wastes down the drain can cause pollution and kill fish, birds and other wildlife. You will find these drains around your school buildings. Yellow Fish is very simple; volunteers mark drains with a stencilled yellow fish. <https://www.gov.uk/government/publications/avoiding-pollution-yellow-fish-scheme>

**Air:** Measuring air quality around us by identifying different lichens on trees, some of which are sensitive to air pollution. Activities include:

- **OPAL air quality survey** - <http://www.opalexplornature.org/AirSurvey>

**Biodiversity:** measuring the numbers of native or non-native species in our local environment. A wide range of activities includes:

- **Buglife** - take part in various bug surveys - [www.buglife.org.uk/activities-for-you/wildlife-surveys](http://www.buglife.org.uk/activities-for-you/wildlife-surveys)
- **Plantlife** – learn your local plants with the first steps survey - [http://www.plantlife.org.uk/scotland/things\\_to\\_do\\_in\\_scotland/firststeps](http://www.plantlife.org.uk/scotland/things_to_do_in_scotland/firststeps)
- **Butterfly Conservation** – record the butterflies around you with the butterfly identifier - <http://butterfly-conservation.org/2258/butterfly-and-moth-identification-guides.html>
- **Froglife** – wildlife spotting and recording – <http://www.froglife.org/info-advice/wildlife-spotting/>
- **Bumblebee Conservation Trust** - get involved in BeeWatch and BeeWalk surveys - <http://bumblebeeconservation.org/get-involved/surveys/>
- **RSPB** - lots of bird surveys for you to join – <http://www.rspb.org.uk/thingstodo/surveys/>
- **Woodland Trust Scotland** – take part in the ancient tree hunt – <http://www.woodlandtrust.org.uk/visiting-woods/ancient-tree-hunt/>
- **BTO** - lots more bird surveys for you to join – <http://www.bto.org/volunteer-surveys>

**Soils:** surveying the earthworm population and testing soils makeup using this survey:

- **OPAL soil and earthworm survey** - <http://www.opalexplornature.org/soilsurvey>

**Climate:** Help investigate ways in which we affect the climate and how the climate may affect us.

- **Weather and climate change** - Education Scotland’s website is a valuable source of teaching and learning material in relation to climate change - <http://www.educationscotland.gov.uk/weatherandclimatechange/>
- **OPAL climate survey** - <http://www.opalexplornature.org/climatesurvey>

- **Met Office rain gauge making info** - <http://www.metoffice.gov.uk/education/kids/>
- **Met Office Weather Observation Website** - <http://www.metoffice.gov.uk/climate/uk/wow.html>

**Land Use:** study the changing landscape around you to see the impacts on our wildlife through changes in farming intensity, urbanisation and our industrial heritage. This will give perspective to the conservation work that needs done and what has already been achieved.

## Additional Resources

A wide range of national schemes and online resources are available to provide teachers with materials for lessons, to expand topics and to upload any gathered data.

- **Scotland's Environment Web** –looking for information, data and resources relating to Scotland's environment to use in your classroom? - <http://www.environment.scotland.gov.uk/get-learning/>
- **SEPA river levels** - see the real-time levels of rivers across Scotland  
[http://www.sepa.org.uk/water/river\\_levels/river\\_level\\_data.aspx#](http://www.sepa.org.uk/water/river_levels/river_level_data.aspx#)
- **MET Office** – weather observation on the web - upload photos and weather data from your local area - <http://wow.metoffice.gov.uk/>
- **Natural History Museum** - Open Air Laboratories – A range of easy-to-do scientific surveys with supporting resources - <http://www.opalexplorenature.org/>
- **John Muir Award** - a flexible environmental award scheme focussed on wild places - <http://www.jmt.org/jmaward-home.asp>

## Scotland Counts Support Network

The Scotland Counts project co-ordinates a network of volunteer organisations, charitable trusts and agencies which provide teachers with support to carry out Citizen Science activities, either in class, online or in the field.

To find out about the Scotland Counts Support Network in your area and to access further resources, contact:



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