# ACQ2_Mapping – Plan your Air Quality Campaign

**Activity**: Draw a map of your school

**Purpose**: Guide decision making on where to locate $NO_2$ Diffusion Tubes

**Educational Outcomes:** Encourages observational skills, spatial awareness, map reading, technical drawing to scale

**Curriculum links**: Links to Junior Cycle Science, Geography, and is a fundamental earth & environmental science skill

**Tools required**:

- If drawing by-hand - Pencil, paper, and ruler and local area map
- If using a computer - Microsoft Word (or other software to create a simple map)

**Additional tools:** Access to a computer to use Google Maps (satellite view) or Google Earth. Local maps or aerial photographs

**Supporting documents**: Air Pollution factsheet, Air Pollution and Weather factsheet and the GLOBE 'Making a Map' resource

## Introduction

You will be receiving three diffusion tubes for measuring nitrogen dioxide, a traffic-related pollutant. Your job is to decide **where** on the school grounds/surroundings to mount those tubes. This is a really important step in designing your study. How do you decide where to put your tubes?


Drawing a map of your study area (school) is part of the scientific process, focusing on

- Observations
- Asking Questions
- Developing Hypotheses
- Planning your Investigation

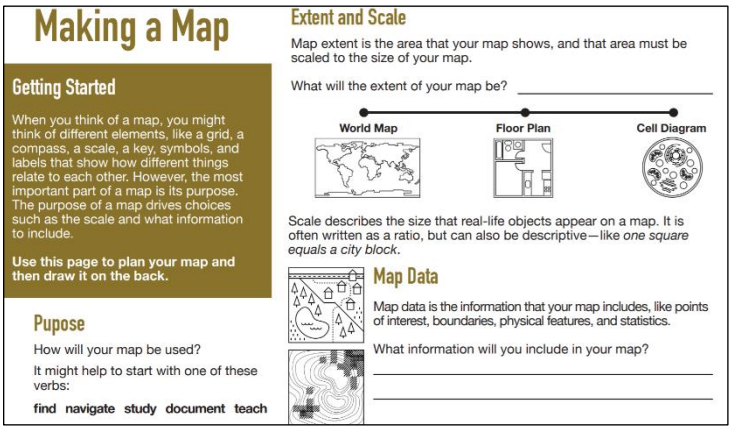
Map drawing is a skill that is often used in Earth and Environmental science investigations.

## Stage 1. Planning

Take a few minutes to discuss the purpose of the map and ask students what should be included in the map.

- What is the purpose of the map?
- What kind of information should I include?
- What area should I cover?

Feel free to use the GLOBE '[Making a Map]' resource.



Making a Map

Getting Started

When you think of a map, you might think of different elements, like a grid, a compass, a scale, a key, symbols, and labels that show how different things relate to each other. However, the most important part of a map is its purpose. The purpose of a map drives choices such as the scale and what information to include.

Use this page to plan your map and then draw it on the back.

Pupose

How will your map be used?

It might help to start with one of these verbs:

find navigate study document teach

Extent and Scale

Map extent is the area that your map shows, and that area must be scaled to the size of your map.

What will the extent of your map be? _____

World Map | Floor Plan | Cell Diagram

Scale describes the size that real-life objects appear on a map. It is often written as a ratio, but can also be descriptive—like *one square equals a city block*.

Map Data

Map data is the information that your map includes, like points of interest, boundaries, physical features, and statistics.

What information will you include in your map?

_____

_____

## Stage 2. Hand-draw your map!

A. Keep your map simple!
B. Draw from 'birds eye view' perspective (looking down)
C. Label north using an arrow
D. Draw the outline of the major buildings, outdoor playing areas (yard, field/pitches), and nearby roads
E. Clearly label any car parks, drop off/pick up areas, traffic 'pinch points' where cars tend to idle (entrance gates, traffic lights)
F. Use a paper OSI topographic map or Google Maps to measure the distance between nearby roads and your school. Alternatively, you can 'pace' the distance on foot (do not forget to measure your stride length first!)
G. Mark where you wish to place the **3 diffusion tubes** on your map
H. Complete your legend

**OR**

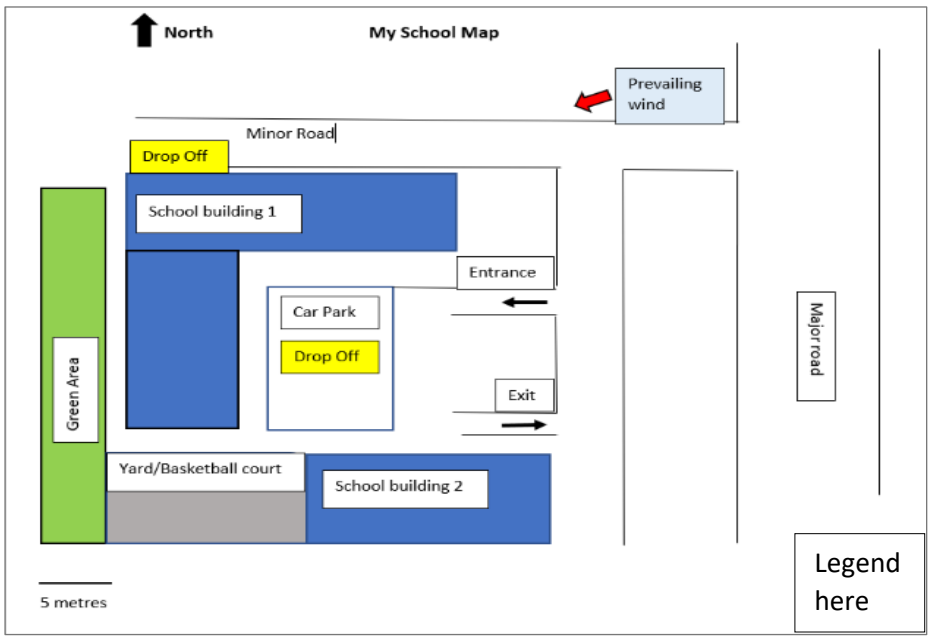
## Stage 2. Create a digital map!

A. You could Microsoft Word (or any software where you can draw/insert simple shapes)
B. Keep your map simple!
C. Draw from 'birds eye view' perspective
D. Label north using an arrow
E. Draw the outline of the major buildings, outdoor playing areas (yard, field/pitches), and nearby roads
F. Clearly label any car parks, drop off/pick up areas, traffic 'pinch points' where cars tend to idle (entrance gates, traffic lights)
G. Use a paper OSI topographic map or Google Maps to measure the distance between nearby roads and your school. Alternatively, you can 'pace' the distance on foot (do not forget to measure your stride length first!)
H. Mark where you wish to place the **3 diffusion tubes** on your map
I. Complete your legend

## Stage 3. Now you have created a map, what next?

Once you have drawn your map, you can try to predict areas where nitrogen dioxide ($NO_2$) gas is likely to be higher, such as, close to a busy road or drop off point (idling cars), and conversely where nitrogen dioxide is likely to be lower.

For example, look at the sketch map (not to scale) below. Where you would place your diffusion tubes at this school?



**What kind of information are you looking for?**

We suggest choosing a location where $NO_2$ is likely to be high, for instance close to a main road, a place where $NO_2$ is likely to be moderate, for instance at a drop-off point or school car park, and a place where $NO_2$ is likely to be low, for instance in an area away from traffic.

Every school is different! We can make predictions but sometimes we are wrong – this is why we are testing our hypothesis by monitoring $NO_2$ over a period of time.

If you have taken part in the AQ campaign before, perhaps you wish to place a tube in the same location to compare your results from year to year, or perhaps you wish to test a new area?

**What else will affect my results?**

- The prevailing **wind direction** will influence the movement of nitrogen dioxide! $NO_2$ levels are highly variable and can decrease just 10s of meters away from their source.
- Is the air flow pattern moving nitrogen dioxide from a nearby road towards your school? You can look up historical wind direction to identify your local prevailing wind direction when choosing locations.
- It is also a good idea to record the daily weather during the measurement period too.

## Student Presentations

Ask students to present their final map to the class. The objective is to reach a class decision on where to locate the monitoring tubes. Students could include supporting information, such as prevailing wind direction, likely traffic pinch-points, school commute routes, to decide where the tubes should be mounted.