

Kampala NOSES -schools programme-

Teacher manual

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Kampala NOSES

Odour pollution in Kampala, Uganda: identification with a participatory methodology and elaboration of a market strategy for its eradication



Kampala NOSES

Funded by [Àrea Metropolitana de Barcelona](#) and co-funded by [D-NOSES](#) project, Kampala NOSES is a pilot project that seeks to introduce novel ways with which to monitor and record odour issues across Kampala, with a longer-term vision of implementing new environmental reporting and governance mechanisms that are accessible to all, irrespective of literacy level, age or gender.

TIMEFRAME

November 2019 – August 2020

PARTNERS

Mapping for Communities (Uganda), [Mapping for Change](#) (UK), [Science for Change](#) (Spain)

COLLABORATORS

Kampala Capital City Authority (KCCA)

EXPECTED OUTPUTS

- **New educational materials and programmes** to promote (a) girls participation in STEM subjects; (b) environmental monitoring and stewardship (c) awareness raising that can be utilised by teachers and other education providers across the country
- **Awareness of odour pollution** and contributory factors in tandem with methods with which to monitor odour incidents
- **New data collection methods** to support duty bearers in identifying where odour pollution issues arise; in acting on odour observation reports in a more timely manner and thus support their incident Management Policies that outline how they can increase and enhance their capacity, in partnership with other lead agencies, to manage environmental incidents.
- **New data on odour pollution** with the potential to identify odour pollution 'hotspots' and sources
- **New ideas generated collaboratively** across stakeholders to explore ways in which odour pollution can be reduced in markets and across the city more broadly

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The teacher manual is part of the “Kampala NOSES schools pack” which provides all the material needed to teaching and is comprised of:

- 1 tablet
- 1 power bank
- 1 teacher manual
- 1 set of 5 smells pens
- 2 smell gradient poster
- A3 maps
- Sticky notes
- String
- Stick glue
- 24 exercise books
- 1 white tack
- Colour pencils
- Clipboards

INTRODUCTION TO KAMPALA NOSES SCHOOLS PROGRAMME

The Kampala NOSES school programme is one of the activities of the Kampala NOSES project. It is designed for primary year students (7 to 11) and is built around 6 separate interactive lessons.

This teacher manual is organised into identically structured sections containing, for each lesson: objectives, learning outcomes, duration, list of concepts, materials needed, a teaching guidance and practices. At the end of the manual, there is an Appendix section with supporting material.

OVERVIEW OF THE LESSONS

- Lesson 1 ‘Human Sense of Smell’
 - The human senses
 - The human sense of smell
 - Basic facts about our sense of smell
 - What is an odour?
 - How do we perceive an odour?
- Lesson 2 ‘Odour Pollution’
 - Types of pollution
 - What is Odour Pollution?
 - What can cause odour pollution
 - What are the health issues associated to odour pollution?
- Lesson 3 ‘Measuring Odours’
 - How can odours be measured?
 - What is odour nuisance?
 - What are the characteristics of odour nuisance, how can we characterize them?
- Lesson 4 ‘Perception Mapping’
 - Maps: Collecting, sharing and communicating information
 - Mapping reading skills
 - Place-based experience and views from the students
- Lesson 5 ‘Awareness Raising’
 - What is awareness raising?
 - What is a public campaign?
 - How can we share our message?
 - Steps to organise a public campaign
- Lesson 6
 - Your own project to raise awareness about odour pollution

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TIMELINE



Kampala NOSES

- Kampala NOSES project presentation for the teachers (**14th February 2020**)
- First workshop session with 10 schools: introduction to the project; the human sense of smell; odour pollution; measuring odours; co-design data collection; project activities (**19th February 2020**)
- Within school lessons 1-4 implementation (**24th February - 31st March 2020**)
- Data collection with smell diaries and mapping on Community Maps (**1st April - 29th June 2020**)
- Schools Ambassadors training peers within schools about odour pollution and data collection - they should use some of the activities undertaken during the different Lessons completed (**13th April - 24th April 2020**)
- Data collection with smell diaries and mapping on Community Maps (rotating mapping data activities between classes) with whole school (**27th April - 29th June 2020**)
- Within school lessons 5-6 implementation (**4th May - 25th May 2020**)
- School project to raise awareness about odour pollution for entry into the inter school competition (Lesson 6) (**June 2020**)
- Project team leaders visit schools to get feedback/presentations from students about their activities, learning and data collected and mapped (**July 2020**)
- School Ambassadors reconvene with all schools to share findings, present their entries for the competition and participate in capacity building for awareness raising events in markets (**July 2020**)
- Raising awareness actions of odour pollution implemented by the children of the participating schools in Kampala markets (**August 2020**)
- Collect perceptions on odour issues from women working in markets to involve them in a further phase of the project (**August 2020**)
- Students participating in the project record videos and interview one another to share their experience and learning (**September 2020**)
- Feedback event with city council and other actors. Presentations by children to share results/experience, and develop a proposal for next steps (**September to October 2020**)

LESSON 1

The human sense of smell

OBJECTIVES

- To get familiar with the human sense of smell
- To learn some facts about our sense of smell
- To learn what is an odour
- To learn what can we perceive from an odour

LEARNING OUTCOMES

- Knowledge acquired about the human sense of smell
- Knowledge acquired on basic facts about our sense of smell
- Knowledge acquired about what is an odour
- Knowledge acquired on what can we perceive from an odour

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LESSON 1: THE HUMAN SENSE OF SMELL

1HR

CONCEPTS

- Human senses
- The human sense of smell
- Odour perception

CONTENTS

1. The human senses
2. The human sense of smell
3. Basic facts about our sense of smell
4. What is an odour?
5. How do we perceive an odour?

MATERIALS REQUIRED

- Tablet
- Appendix 1-7
- Smell pens
- Smell gradient poster
- Sticky notes/paper

INTRODUCTION

The human sense of smell is the oldest sense that humans have. It is the first sense that we use when we are born and the most powerful one to protect us. In this lesson, we will tackle the human sense of smell, how does it work and some basic facts about it. We will also get familiar with what an odour is and what we can perceive from an odour.

START OF THE LESSON

Tell students (in their own language) what the objectives of the lesson are.

Start by questioning the students on the five senses and ask them:

- *Do you know which are the "five senses"?*
- *Can you name them?*

You can play on the tablet the 5 senses song and get them to learn it so they can sing it to others in the school:

<https://youtu.be/iA1uLc1uEbl?t=2>

During the introduction you should ask students if they know how the sense of smell works.

Show them on the tablet the 'How We Smell'

<https://youtu.be/snJn060piCs> video.

DISCUSSION ABOUT SMELLS

Do you know that our nose is a very strong "tool"?

Explain to the students that the human nose can distinguish very many smells! Ask them to name some.

Note the children's replies (or sketch them) on the board. In addition, you may have prepared in advance some characteristic photos or clip arts and pin them on the board as the pupils name them.

PRACTICAL 1: TESTING OUR NOSE

- Layout the smell pens on the desk -you have 5 to test-. Each of these pens has its own odour, which may trigger different reactions or feelings. You can display the 'wheel of odours/aroma wheel' (Appendix 3) to facilitate the odour identification.
- Ask the students to take one, remove the lids and take a smell.
- Ask them to write down what they feel about each odour on a sticky note/piece of paper and see if they can guess what it is (they should do this independently).
- Ask them take their sticky notes and stick them on the gradient poster (if using paper, lay the poster on the floor so they can put their papers on it).
- Ask them to compare how different their opinion is to others?

SENSE OF SMELL

Introduce the students to the information needed to determine an odour, and namely, to the odours' quality, intensity and hedonic tone using the worksheets provided in Appendix 7.

Explain that we use these factors in order to obtain as much information as we can about odours.

PRACTICAL 2: ODOUR DETERMINATION

- Ask the students to go back to the smell pens used in Practical 1.
- In small groups ask the students to score each odours' intensity and hedonic tone.
- These should then be added to the smell gradient poster

LESSON 2

Odour pollution

OBJECTIVES

- To acquire knowledge on the types of pollution
- To learn about what odour pollution is
- To learn about factors that contribute to odour pollution
- Potential health issues and odour pollution

LEARNING OUTCOMES

- Knowledge acquired on the types of pollution
- Knowledge acquired on what odour pollution is
- Knowledge acquired on what causes odour pollution
- To acquire knowledge on the health issues associated to odour pollution

Photo by Hermes Rivera on Unsplash



LESSON 2: ODOUR POLLUTION

1.5HRS

CONCEPTS

- Pollution
- Odour Pollution
- Odour emitting activities

CONTENTS

1. Types of pollution
2. What is odour pollution?
3. What can cause odour pollution
4. What are the health issues associated to odour pollution?

MATERIALS REQUIRED

- Tablet
- Worksheet (Appendix 7)
- Appendix 8-12

INTRODUCTION

Odour pollution is the second cause of environmental complaints after noise (France, 2015). Communities around the globe suffer from nuisance caused by odour from a variety of odour emitting activities. In this lesson, we will get familiar with the concept of odour pollution, what can cause it and its associated health consequences.

START OF THE LESSON

Repeat objectives of lesson 1. Tell students (in their own language) what the objectives of the lesson are.

Start by questioning the students -if they participated- what they can remember learning about pollution during the Science for My Health project.

Discuss with the students what might happen if an odour persists and is perceived by all (or almost all) students in the school or all (or almost all) people living in the community.

DISCUSSION ABOUT ODOUR POLLUTION

Continue with the presentation in Appendix 9-12 to discuss what kind of human activities cause odour pollution.

Ask questions like:

- *Do you recognize the activities causing odour pollution?*
- *Are there any of these activities taking place in your community or in the city?*
- *Does your community or other parts of the city face an odour pollution problem?*
- *Can odour pollution be caused by a coffee or chocolate factory? What do you think?*

Stress the fact that even the most pleasant odours (like the one released by a coffee or a chocolate industrial unit) can cause odour pollution if they repeatedly cause annoyance to the residents of the surrounding area.

PRACTICAL 3: MAPPING ODOURS AROUND SCHOOL

- Ask the students to work in small groups of 3-4 to identify the odours in the school using worksheet in Appendix 7. Apart from identifying them, ask them to report on the intensity and the hedonic tone of the odours (you have explained both factors in the previous unit).
- Each group looks around different places within the school: yard, classes, corridors, workshops, toilets, etc.
- When all groups complete the task, synthesize their findings in e.g. a powerpoint, on the board together with the students.
- Discuss what kind of habits or behaviours or activities are hidden behind the odours that they identified.
- Go a step further and discuss ideas on what the whole school could do to reduce these odours.



LESSON 3

Measuring odours

OBJECTIVES

- To acquire knowledge on how odours can be measured
- To acquire knowledge on what is odour nuisance
- To learn about the characteristics of odour nuisance

LEARNING OUTCOMES

- Knowledge acquired on how odours can be measured
- Knowledge acquired on what is odour nuisance
- Knowledge acquired on how to characterize odour nuisance

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LESSON 3: MEASURING ODOURS

1.5HRS

CONCEPTS

- Odour measurement
- Odour nuisance
- Characteristics of odour nuisance

CONTENTS

1. How can odours be measured?
2. What is odour nuisance?
3. What are the characteristics of odour nuisance, how can we characterize them?

MATERIALS NEEDED

- List of 'Mapping odours around schools' from Exercise 3
- String
- Appendix 13-17

INTRODUCTION

Odours are very difficult to measure as it is the most complex and subjective human sense. But there are several techniques to do so. In this lesson, we will learn the different possible ways to measure odours, the concept of odour nuisance and its characteristics, and why the human nose is the best one.

START OF LESSON

Repeat the objectives and what has been learned in Lessons 1 and 2 and tell students (in their own language) what the objectives of Lesson 3 are.

Start by questioning the students what they think might be used by scientists and professionals to measure odours.

Ask what they can remember using to measure air pollution during the Sciencre for My Health project -if they participated.

Introduce, with easy words, the different techniques to measure odours shown in Appendix 13-17.

PRACTICAL 4: MEASURING ODOUR AROUND SCHOOL

- Divide the students into groups of 5-6 and pick one odour source from the ones identified in exercise 3 (e.g. toilets, kitchen, flower garden within the school grounds).
- All the group walks together to the odour source and then walk away in different directions as far as 60 steps holding the string. They should all be connected by the string.
- On the count of 3, each student walks from the starting position two steps towards the source. Repeat the process. Whenever a student starts smelling the odour, he/she should stop and stay in that position holding the string. The rest continue taking steps towards the source until they also start smelling it.
- When all students stop, the string would represent the dispersion of that odour.
- Go back to the class and discuss how odours disperse in air.

FUN FACT

In the perfume industry, odour assessors are known as 'noses'. Becoming a professional perfume 'nose' takes seven years of training and qualifications in chemistry!

DISCUSSION ABOUT ODOUR NUISANCE

Ask the students to think about odours which they find annoying and the reasons why.

Do they all perceive the same smells as annoying?

Are there any differences among the students?

Introduce the concept of odour nuisance in their words.

PRACTICAL 5: RECORDING ODOURS WITH SMELL DIARIES

- Start reminding the students what they did in Practical 2: Odour Determination.
- Introduce the smell diaries (Exercise book with the smell diary template in Appendix 32) and the odour monitoring you will be doing for the next 3 months (April - June).
- Each student will work on the cover design of his/her own smell diary and leave it ready for the beginning of the monitoring.
- When the School Ambassadors train their peers in the schools about odour pollution and data collection, later in the programme (April) they should show them their own smell diaries and get the other students to design their own covers before starting data collection.



LESSON 4

Perception mapping

OBJECTIVES

- Students learn that maps are used to collect, share and communicate information
- Students develop mapping reading skills to navigate from A to B using a map
- Students learn to express their place-based experiences and views

LEARNING OUTCOMES

- This lesson aims to introduce students to the concept of mapping and involves child-centred mapping of the local area and develops the pupils' sense of place, enabling pupils to share how they see their area and community.
- Pupils explore what maps are for and the different kinds of maps that exist. What are the different uses of maps?

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LESSON 4: PERCEPTION MAPPING

3HRS

CONCEPTS

- Place and space
- Landmarks and navigation
- Quantitative and qualitative data

CONTENTS

1. Maps: collecting, sharing and communicating information
2. Map reading skills
3. Place-based experience and views from the students
4. Digitising information to make online maps

MATERIALS

Working in pairs, each pair should have:

- An A3 paper map of the area
- A clip board
- Colour pencils
- Perception mapping worksheet (Appendix 18)
- Appendix 19-22
- Tablets

INTRODUCTION

The lesson involves child-centred mapping of the local area and develops the pupils' sense of place, enabling pupils to share how they see their area and community.

START OF THE LESSON

Tell students (in their own language) what the objectives of Lesson 4 are.

Say to the class that “*we are now going to learn that everything we do, see, hear, feel, taste and smell, happens somewhere. How we describe the ‘where’ can be either very general or specific and that determines whether we are talking about a place or a location.*” Explain the significance of using landmarks (Appendix 19) to help people understand the locations and places being described.

DISCUSSION ABOUT THE MEANING OF THE TERMS LOCATION AND PLACE

Write the words location and place on the board.

1. Have students brainstorm descriptions of your school. As a class, brainstorm a list of descriptions about your school. Write students' ideas on the board. Make sure the descriptions include the following information:
 - a. the location of the school, such as what it is near and how far most kids travel to get to it
 - b. information about the school itself, such as what its name is and what it looks like
 - c. what key landmarks are around that would help someone locate the school
2. Categorize the descriptions by *location* and *place*.
3. Ask students if their responses are about the location of the school or the place. Place an “L” next to descriptions of the location. Place a “P” next to those that describe place.
4. Ask students to imagine that a new student will be coming to their school. They need to make the new student feel comfortable by sharing information about their school. As a class, develop a simple map or picture of the school. Have students take turns identifying where their class, own desks or specific learning areas are located within the school.
5. Now show them the physical map of your school and surrounding community to see if there are any similarities between their maps/pictures and the physical map.

CONTINUATION OF THE LESSON

Ask students if they can describe what a landmark is and the difference between location and place.

Remind them that everything we do, see, hear, feel, taste and smell, happens somewhere.

Explain that maps can be used to show people specific locations but also to share more general information about locations such as how many people live there (population maps), the quality of the environment etc.

**DISCUSSION ABOUT PERCEPTION MAPPING**

General perception mapping is a type of participatory mapping (collective mapping of ideas, experiences and/or views). See Appendix 21.

Perception maps tell a story about an area, provide a way to enable people to express their views and aspirations and perhaps to identify what is important to different cultural groups within a community.

The activity can be carried out both individually and in groups. Groups can also go out in the local community and get the opinions from passers-by in a public space or other events. It involves recording qualitative local knowledge that is not specifically about physical features in the area but aspects such as local history, memories, or feelings about locations/places.

You can carry out this activity by focusing on a specific topic, such as what are peoples' views on odour issues in the area? Or you can map what people like, don't like, their memories/stories about the place etc.

PRACTICAL 6: COMMUNITY PERCEPTION MAPPING

This activity involves taking the students out on a field trip in the local community to walk around mapping their perceptions. You can also get them to talk to members out in the community to ask their perceptions about smells in the area.

Before setting out, decide the route that you are going to take from the classroom and ask students to draw the route on their map from the starting point tracing along the roads back to the beginning. Tell them that they will be going out into the field and using the route they have drawn to navigate from start to finish.

Tell students that while they are walking along the route they should use the map to mark locations that they encounter where they like/dislike the odours they find and they should use the worksheet to say why or write any other comments they want to make about the location.

1. Take an A3 map of the area
2. Mark on the map, using an 'X' the location that you want to comment on.
3. Put a number next to the 'X'. Make sure your numbers go in a sequence so that there are no two numbers the same, in the same colour.
4. Use different colour pencils to mark locations with nice odours, bad odours, and use other colours for other categories, such as local environmental improvements to locations, for example.
5. On the perception mapping worksheet write your comments along with the relevant unique number marked on the map. You should do this as you go along so that you record as much information as possible.
6. If students talk to members of the public to ask them their views they should also record these on the map and record them on their worksheet. They should ensure that the people they talk to can identify/describe the location they are talking about so the students can map their comments

When you return to the classroom you can discuss with the children, whether they noticed things when they were out on the walk that they don't usually notice, as in were they more observant?

If they managed to speak to people out on the walk did they have similar views or perceptions to the students?

During another lesson all of the individual maps and perceptions can be collated and transferred to one large map and students can share their findings with other classes.

An A0 size poster map can be created by overlapping eight A3 maps.

DIGITISING DATA TO CREATE ONLINE MAPS

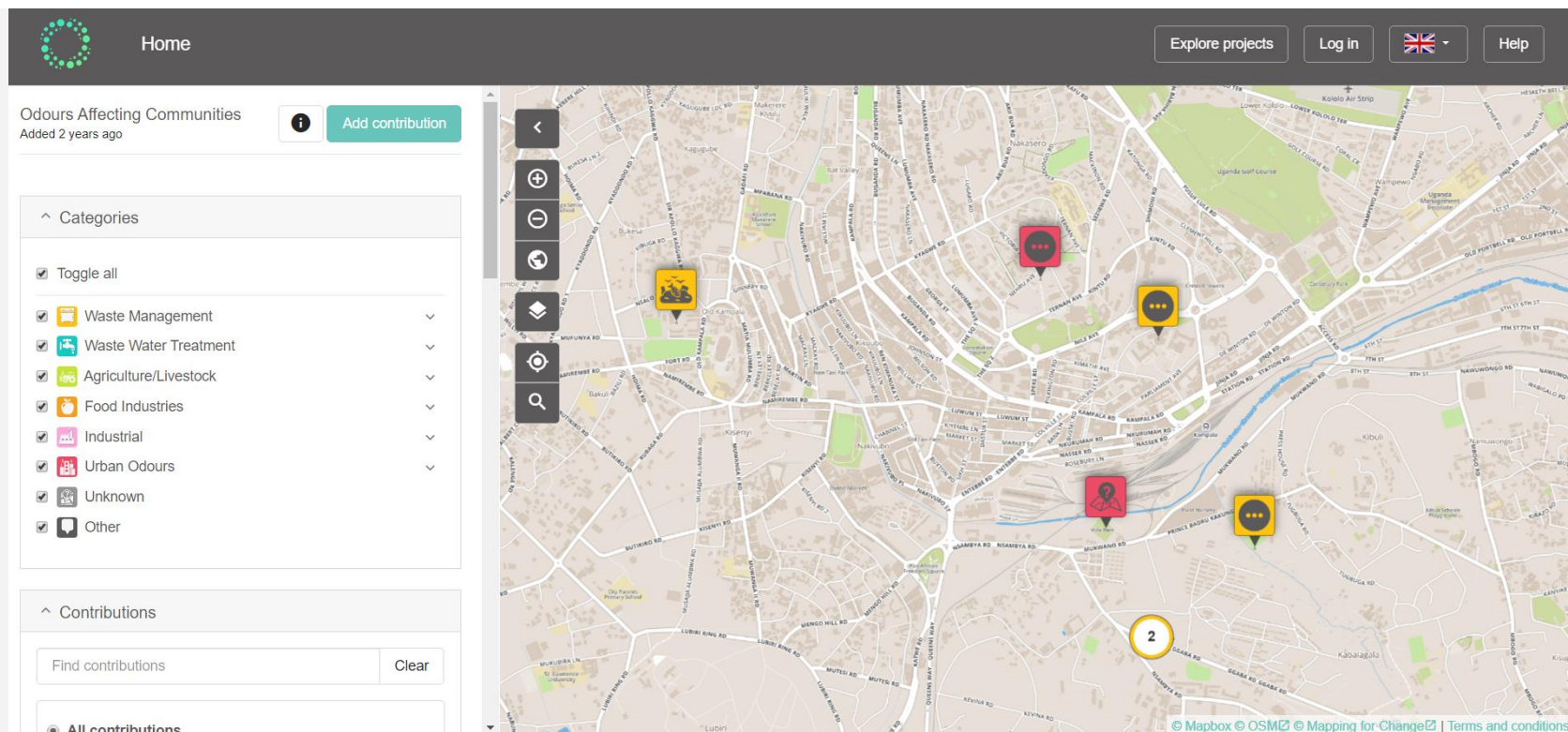
This Lesson has covered various aspects of geography and mapping. During the field trip students created their local perception maps and these were collated on a large paper map.

Any information collected using paper maps can be digitised using a variety of mapping platforms and systems, such as Google Maps and Google Earth. The most technical and sophisticated mapping systems are called Geographical Information Systems (GIS).

Throughout the programme students will have been collecting information about odours in their smell dairies.

This information needs to be mapped in the Community Maps platform so it is visible to all the schools and other stakeholders interested in the project.

A lesson should be dedicate to teaching the students how to transfer their dairies into the Community Map about local odours in Kampala.



Data collection with the smell dairies should commence after Lesson 4 (from 27th April - 29th June 2020). Students should make daily recordings from their commute, to and from school, the locations around their homes and weekend outings. The location is KEY! This information should be transferred to the Community Map on a weekly basis, with Ambassadors and other trained students in the school taking turns in groups to map the information using the tablet.



LESSON 5

Awareness raising

OBJECTIVES

- Students learn what is awareness raising and the concept of civic participation around environmental issues
- Students learn what a public campaign is
- Students learn the different ways and formats in which you can share a message
- Students learn the key steps to organise a campaign

LEARNING OUTCOMES

- This lesson aims to introduce students to what is awareness raising and the concept of civic participation.
- Within awareness raising, the lesson will focus on what a public campaign is and will show the key steps to be able to organise one.
- The students will be prepare to design and organise their own campaigns.

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LESSON 5: AWARENESS RAISING 2HRS

CONCEPTS

- Awareness Raising
- Public Campaign

CONTENTS

1. What is awareness raising?
2. What is a public campaign?
3. How can we share our message?
4. Steps to organise a public campaign

MATERIALS NEEDED

- Tablet
- A recent newspaper
- Appendix 29-31

INTRODUCTION

Awareness raising is when we teach people about a problem they might not know about, and this helps because when people know about a problem, they can do something to help. Students will be introduced to the concept of awareness raising and how to organize a public campaign.

“We are stronger together”/”civic participation” - introducing the importance of gathering with your community towards an issue affecting a group of people.

START OF THE LESSON

Tell students (in their own language) what the objectives of the lesson are.

Start by questioning the students where do they see football-related messages in their daily life (wall advertising, newspaper, radio, social media, t-shirts, etc.). Classify the list by imprint, video, audio media. Discuss about the information you see in each medium, asking questions like:

- *How much information can you share given the medium?*
- *Which medium offers more detailed information?*
- *Which medium displays less detailed information?*

PRACTICAL 7: ANALYSING MESSAGES ON THE MEDIA

Choose two topics (e.g. last game of the KCCA FC and a piece of news), divide the class into groups of 5.

Two groups will look for the information in the local newspaper (1 group/topic), two groups will look for that information in Youtube or the local media webpage and the last two groups will look at the information available in social media (such as Twitter or Facebook).

Each group will need to identify: the key information that each medium is showing, the length and level of detail of that information. They will write their findings on a piece of paper and share with the other groups.

DISCUSSION ABOUT AWARENESS RAISING AND PUBLIC CAMPAIGN

Continue with explaining the concepts of awareness raising and public campaigning (Appendix 30). Explain that a public awareness campaign is a marketing effort to build public recognition of a problem through media, messaging, and organised communication tactics. These target a large number of people over a specific period of time to try and generate specific outcomes or achieve predetermined goals.

Explain the steps needed for a public campaign using easy-to-understand language: choose a topic - choose a medium - think about your audience - create the message (Appendix 31).

PRACTICAL 8: CREATING A TEST CAMPAIGN

Each group of students is now going to create a test campaign for the different media they have looked at in the previous exercise. Using the template in Appendix 29, they will need to create a test campaign about a chosen topic and present it to the other students in the class.





Photo by Mapping for Change

**OBJECTIVES**

Students will be able to apply in a practical way the learning from units 1 to 6 in order to create their own awareness campaign to tackle odour pollution in their areas.

LEARNING OUTCOMES

This mini project aims to introduce students to developing material to sensitise the public and generate awareness about environmental issues. Once the students understand more about the environment around them and consider the possibilities to improve it, they can initiate activities to engage others to achieve their purpose. Students will learn other skills such as project planning, working in groups, communication and evaluation. Through targeting a specific medium and audience they will learn what best serves as a creative and innovative way to communicate via the desired channel.

CONCEPTS

- Project planning
- Design
- Group working

INTRODUCTION

This Lesson should take place over several session as it requires the students to think back and reflect on what they have learned and apply this new knowledge to design and develop material that will be entered into the inter schools' competition. If they are the winners, their material will be professionally produced and used in the awareness raising event scheduled to take place in August and may also be used to share with the local radio stations, tv, radio, social media channels etc.

START OF THE LESSON

Tell students (in their own language) what the objectives of the project and competition are.

Start by asking the students to recall some of the factors contributing to bad odours in their communities that they've seen, recorded in their smell diaries, and mapped. Ask them to identify which is the most commonly recorded source of odour from their records and mapping. You can suggest that this should be the focus of their project in terms of raising awareness.

You should also remind them what they learned in Lesson 5 (Awareness Raising) and the way messages and communications are shared and displayed differently across different media (newspaper, radio, social media, t-shirts, etc.). Remind students that they have gained knowledge and awareness about odour pollution issues as a type of pollution which can affect communities. Ask them how they can spread the word amongst their communities to improve quality of life? Can they involve other people to support this cause and improve the situation?

PRACTICAL 9: CREATING A CAMPAIGN

Explain to the students that they will be attending a market in Kampala where they will be using the material from the winning schools to hold an awareness raising campaign to sensitize members of the public on the topic of odour pollution, some of the causes and factors contributing to it.

Divide the class into 5 groups. Each group should choose one of the following topics to work on for their campaign:

1. Poster/teardrop design to put up in markets during awareness raising event
2. Song to share on radio, social media & markets during awareness raising event
3. T-shirts design to be printed for students to wear during markets awareness raising event
4. Video to share on radio & social media & markets during awareness raising event
5. Banner to put up in markets during awareness raising event

Each group will need to identify: the key information that they want to convey for the medium select, the length and level of detail of that information. They will design, compose, record their messages, material, content for entry into the competition .

GLOSSARY OF TERMS

Absolute location: Specific location, using street names or landmarks, of a building or site.

Address: Specific location, using street names or landmarks, of a building or site.

Direction: The way in which somebody or something goes, points, or faces.

Epithelium: Is one of the four basic types of animal tissue, along with connective tissue, muscle tissue and nervous tissue. Epithelial tissues line the outer surfaces of organs and blood vessels throughout the body, as well as the inner surfaces of cavities in many internal organs.

Geography: Study of places and the relationships between people and their environments.

Government: System or order of a nation, state, or other political unit.

GPS: A Global Positioning System, or GPS, uses satellites orbiting the Earth to relate absolute location.

Latitude: Distance north or south of the Equator, measured in degrees.

Location: Position of a particular point on the surface of the Earth. A location is the place where a particular point or object exists. Location is an important term in geography, and is usually considered more precise than "place." A locality is a human settlement: city, town, village, or even archaeological site.

Longitude: Distance east or west of the prime meridian, measured in degrees.

Odour: A distinctive smell, especially an unpleasant one.

Olfactory: Of or relating to the sense of smell

Receptor cells: In biochemistry and pharmacology, receptors are chemical structures, composed of protein, that receive and transduce signals that may be integrated into biological systems. These signals are typically chemical messengers, which bind to a receptor, they cause some form of cellular/tissue response

Relative location: General spot where something is located; its place in relation to something else. Relative location is a description of how a place is related to other places. For example, the Independence monument in Kampala is 1.23km south of Nakasero Hospital

APPENDIX

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THE SCIENCE OF ODOUR

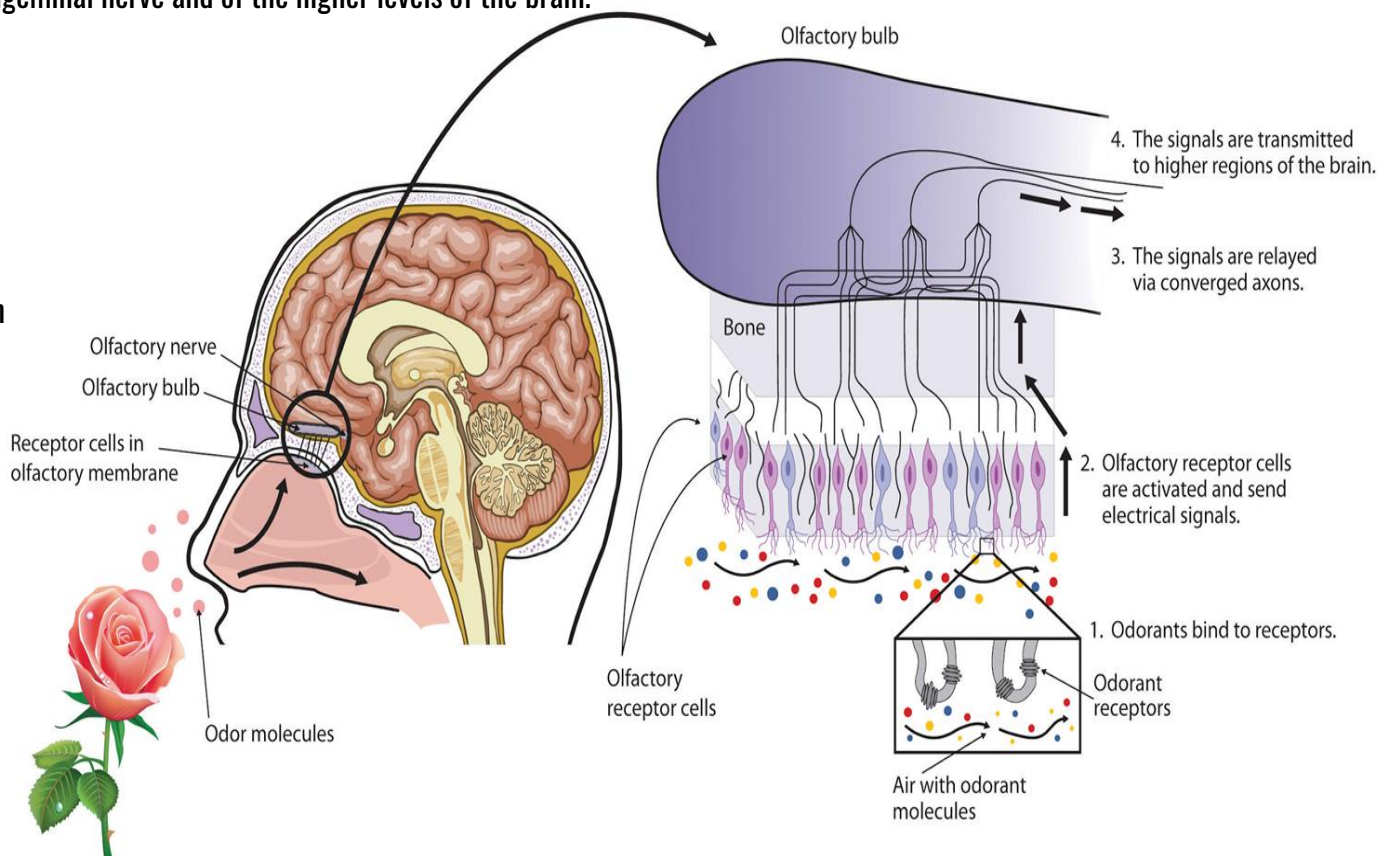
- The science of odour, including exactly what causes something to smell and how our noses interpret it, is an interesting study in both biology and chemistry.
- Odours themselves are chemical reactions, but through the nose, we access and understand the information via our olfactory system, the part of our bodies that processes and interprets smells.
- Our nose can recognize up to a billion different smells making it a very strong instrument to detect odours!

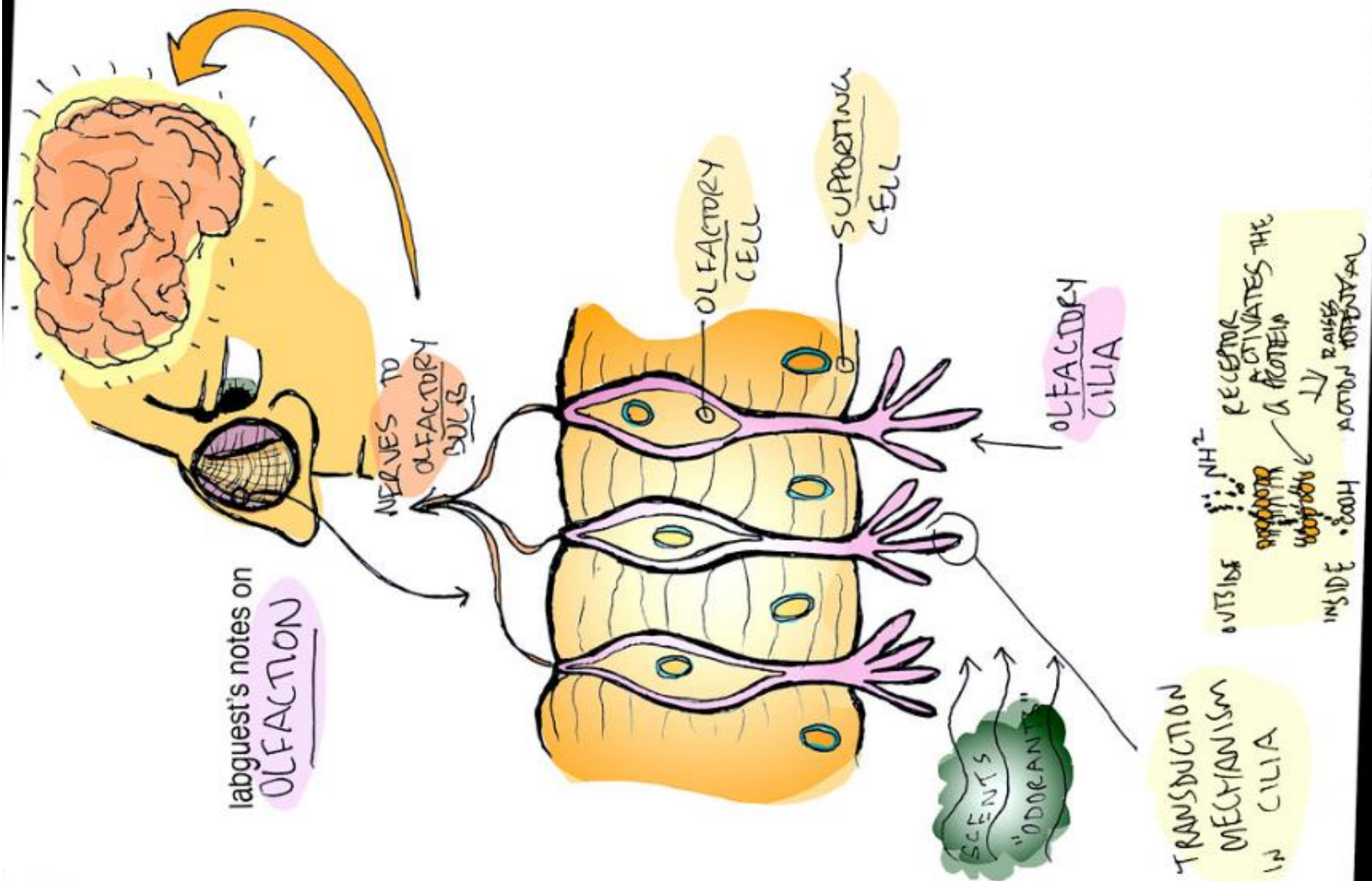
WHAT IS AN ODOUR?

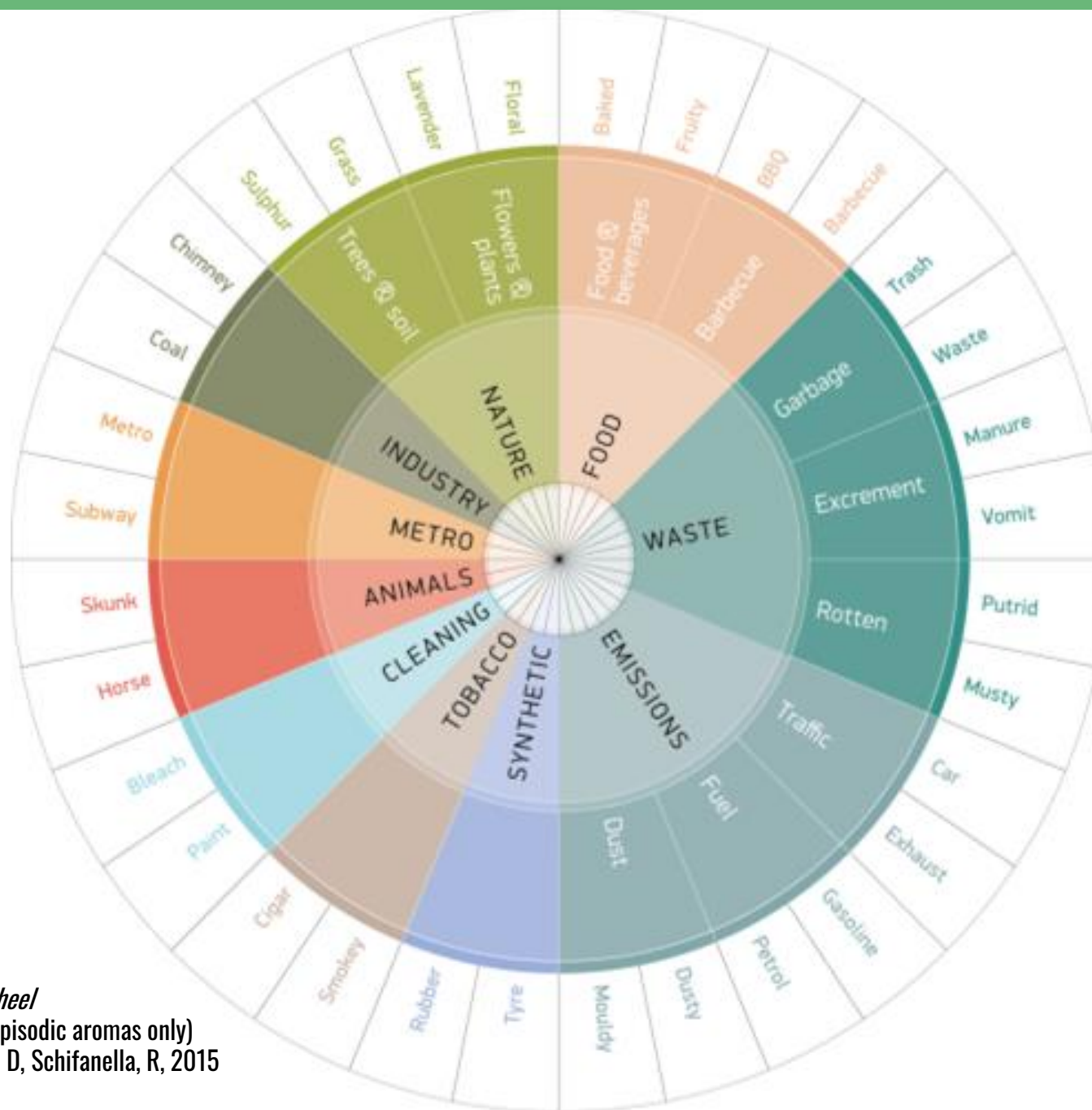
- Odour is a property of a mixture of substances capable of stimulating the olfaction sense sufficiently to trigger a sensation of odour.
- Odour perception starts in the nasal cavity and ends up with the transmission of a stimulus to the brain, where it may cause pleasant or unpleasant sensations, or even originate physical reactions, due to the involvement of the trigeminal nerve and of the higher levels of the brain.

WHAT DO WE NEED TO KNOW ABOUT A SMELL/ODOUR?

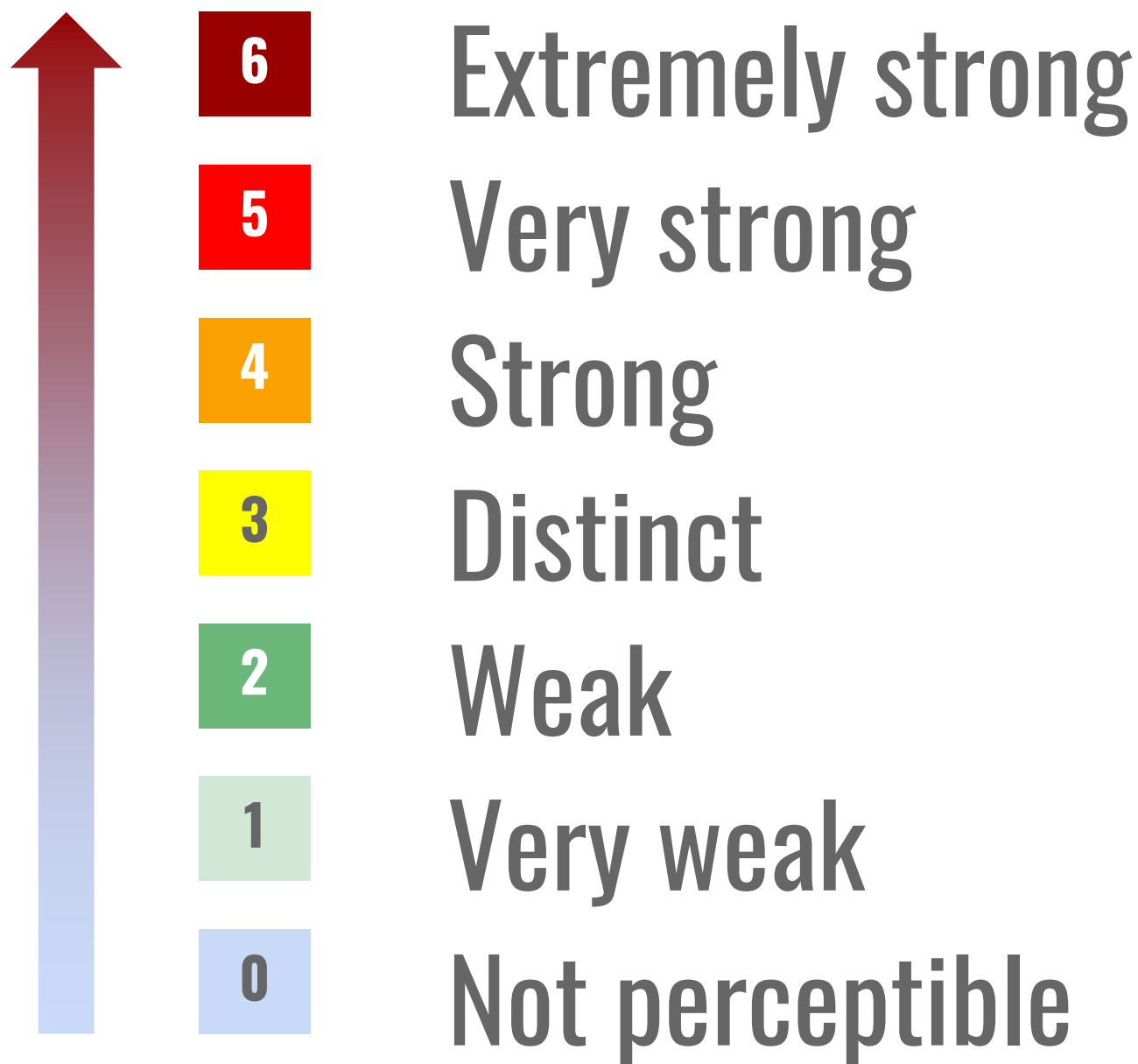
- Quality of smell: What the smell is.
 - Aroma/odour wheels. They are a simple method of classification of the odour character (i.e. quality, note, type, group or category) and intensity of each characteristic. They can be used to facilitate odour classification. The “wheel of odours/aromas” you can see is a graphic that classifies the most commonly found odours in an urban and peri-urban area.
- Odour intensity: How strong is it.
 - We score it starting from 0 for odours that we cannot perceive/smell to 6 for the extremely strong odours.
- Hedonic tone: How pleasant or unpleasant the odour is.
 - We score this from -4 for the extremely unpleasant odours to +4 for the extremely pleasant ones.
- Odour Concentration
 - We can determine the concentration of an odour using various techniques and in most of which we need the participation of people!

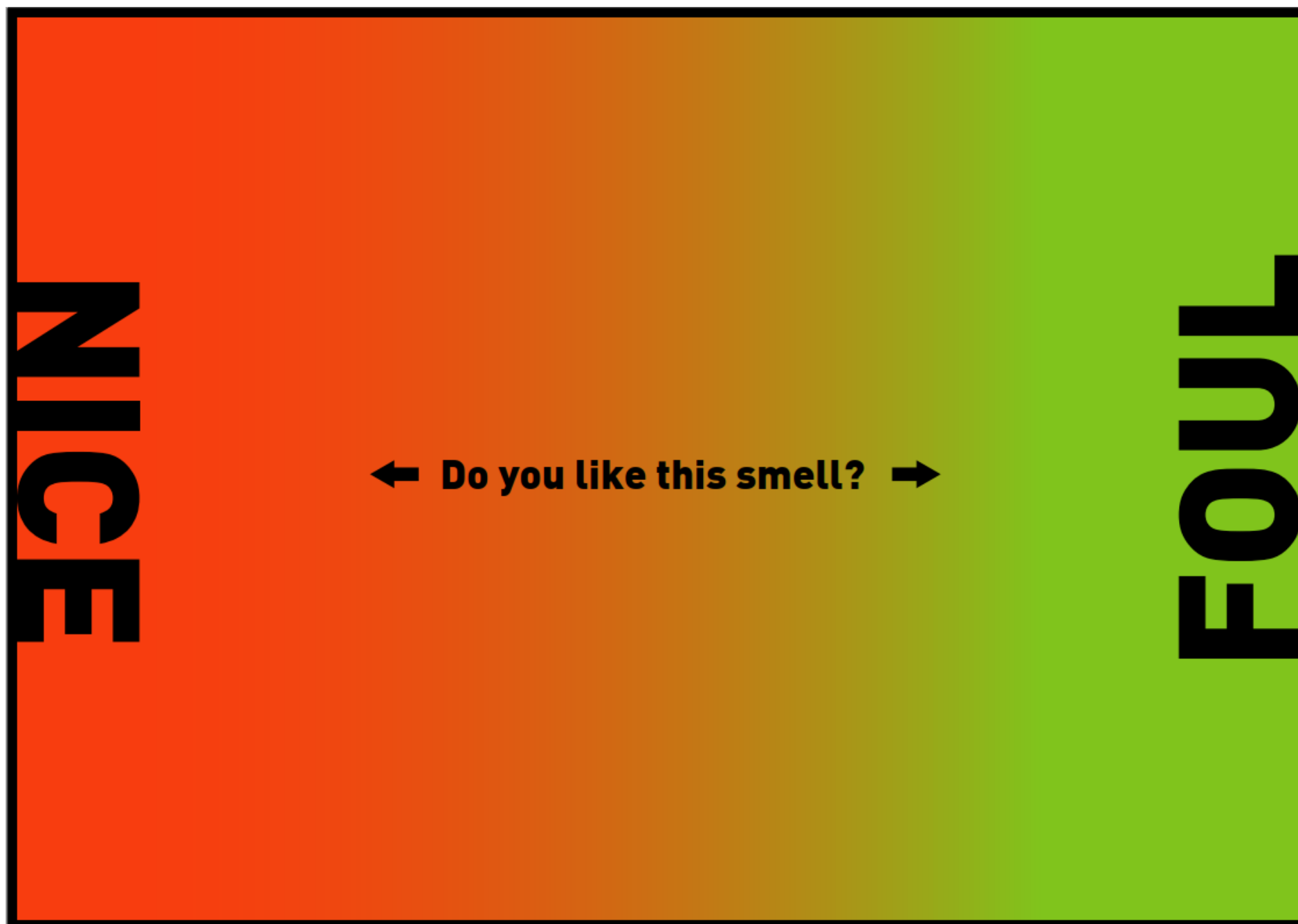


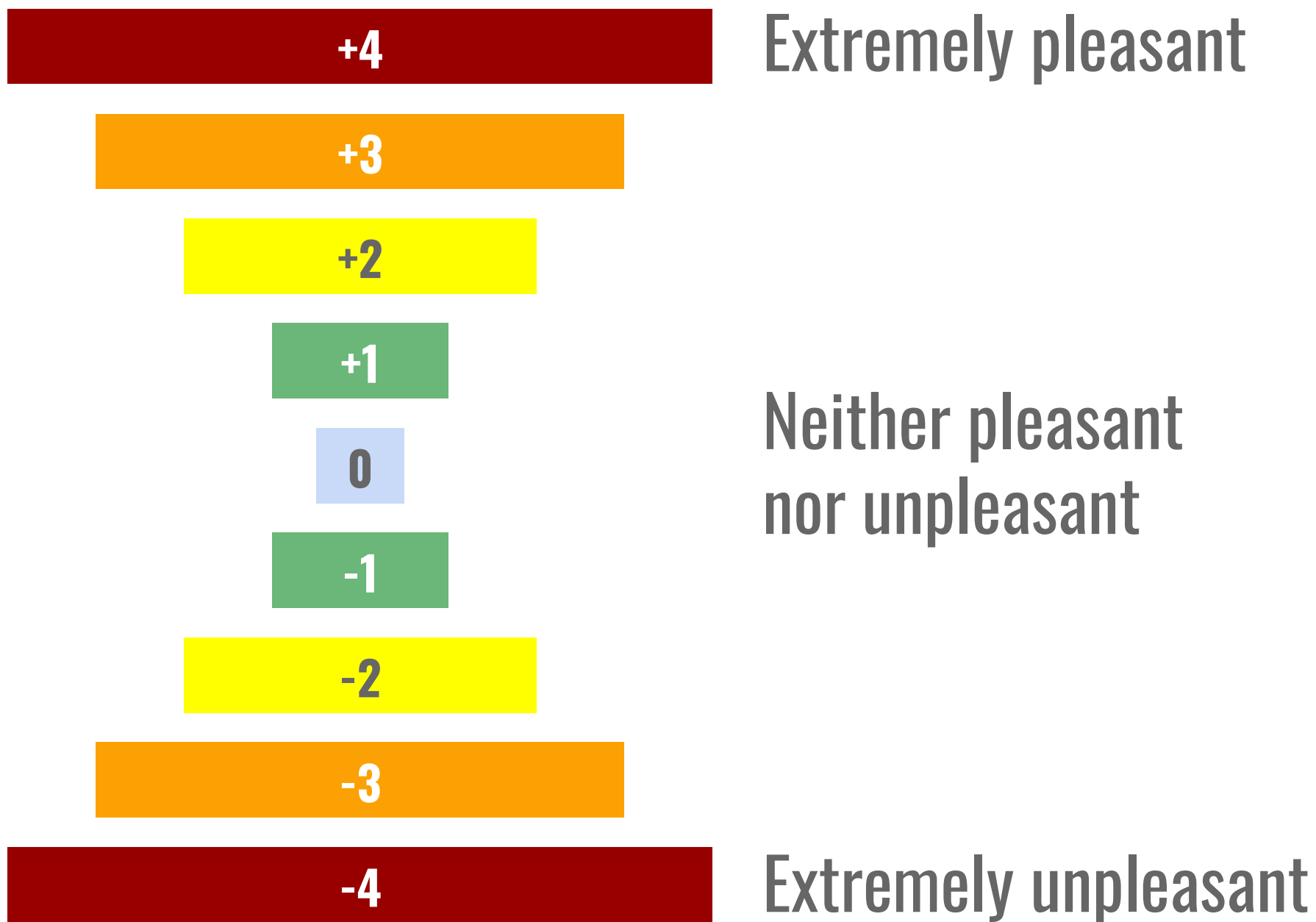




Urban Smellscape Aroma Wheel
(depicting background and episodic aromas only)
Aiello, L, McLean, K, Quercia, D, Schifanella, R, 2015









SMELL 1	It smells like ...																
Intensity	0	1	2	3	4	5	6	Hedonic tone	-4	-3	-2	-1	0	1	2	3	4
SMELL 2	It smells like ...																
Intensity	0	1	2	3	4	5	6	Hedonic tone	-4	-3	-2	-1	0	1	2	3	4
SMELL 3	It smells like ...																
Intensity	0	1	2	3	4	5	6	Hedonic tone	-4	-3	-2	-1	0	1	2	3	4
SMELL 4	It smells like ...																
Intensity	0	1	2	3	4	5	6	Hedonic tone	-4	-3	-2	-1	0	1	2	3	4
SMELL 5	It smells like ...																
Intensity	0	1	2	3	4	5	6	Hedonic tone	-4	-3	-2	-1	0	1	2	3	4

SMELL 1	It smells like ...																
Intensity	0	1	2	3	4	5	6	Hedonic tone	-4	-3	-2	-1	0	1	2	3	4
SMELL 2	It smells like ...																
Intensity	0	1	2	3	4	5	6	Hedonic tone	-4	-3	-2	-1	0	1	2	3	4
SMELL 3	It smells like ...																
Intensity	0	1	2	3	4	5	6	Hedonic tone	-4	-3	-2	-1	0	1	2	3	4
SMELL 4	It smells like ...																
Intensity	0	1	2	3	4	5	6	Hedonic tone	-4	-3	-2	-1	0	1	2	3	4
SMELL 5	It smells like ...																
Intensity	0	1	2	3	4	5	6	Hedonic tone	-4	-3	-2	-1	0	1	2	3	4

ODOUR NUISANCE

Odour nuisance is caused by an odour which is so offensive and prolonged in time that it significantly interferes with the everyday life of communities and eventually annoys people.

ODOUR POLLUTION

- Is a type of air pollution
- It is measured in Odour Units (o.u.E/m³)
- Is a sign of alert
- It is the continued exposure to environmental odours in our place of residence or work, that causes discomfort for the people.
- It is one the second cause of environmental complaints (France, 2015)!
- It can cause discomfort, headache, stress, anxiety, lack of concentration, lack of sleep, even respiratory problems.

WHAT CAN CAUSE ODOUR POLLUTION?

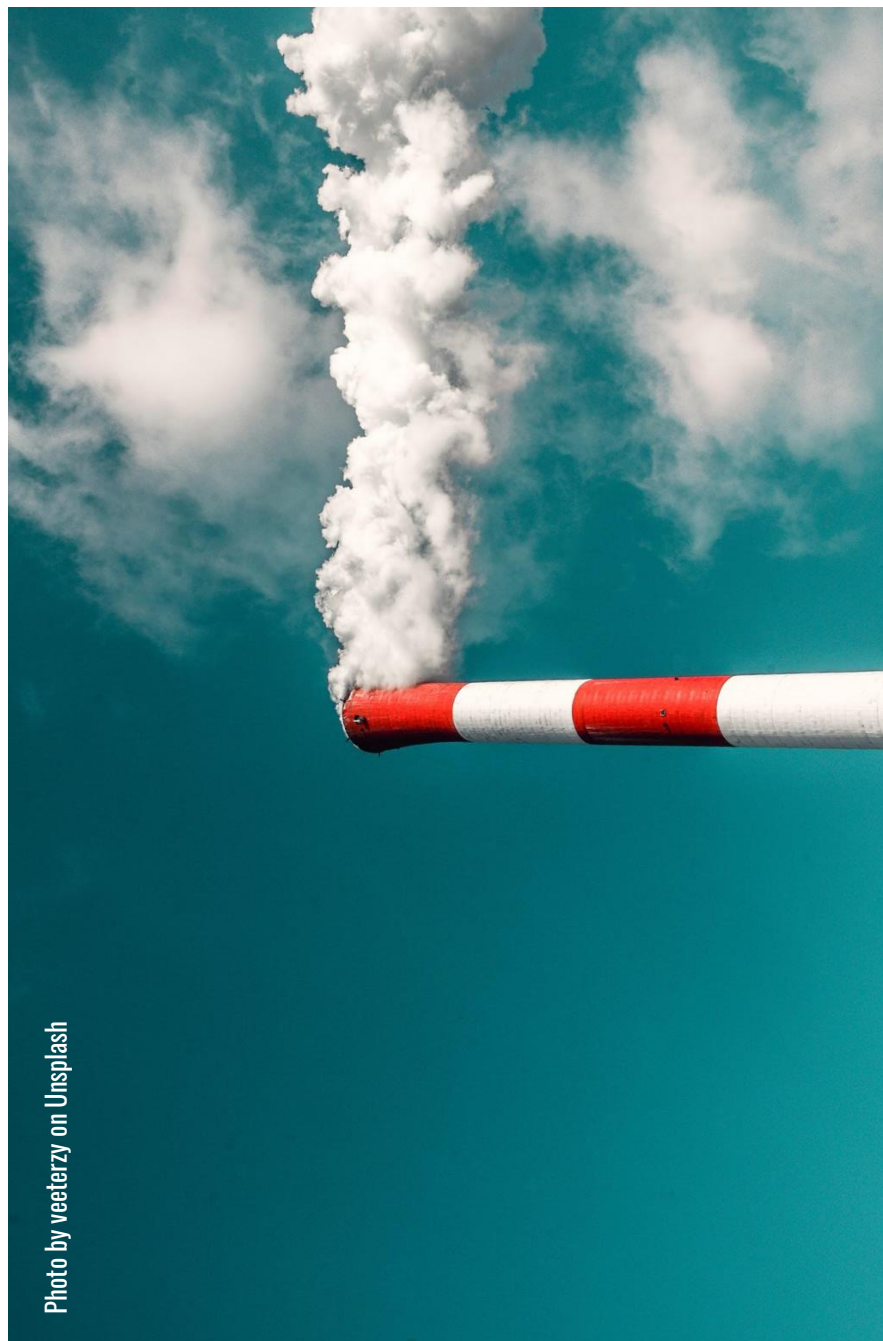
There are many activities in our cities which can cause odour pollution, like waste management, a waste water treatment plant (WWTP), sewage, traffic, etc. In rural areas, we can find other activities like farming or fertilising, which can also be a source of odour pollution.

However, all types of odours, regardless their origin (type) and hedonic tone (good or bad smell), depending on their frequency and intensity may cause discomfort.





Photo by Chimpreports











DYNAMIC OLFACTOMETRY

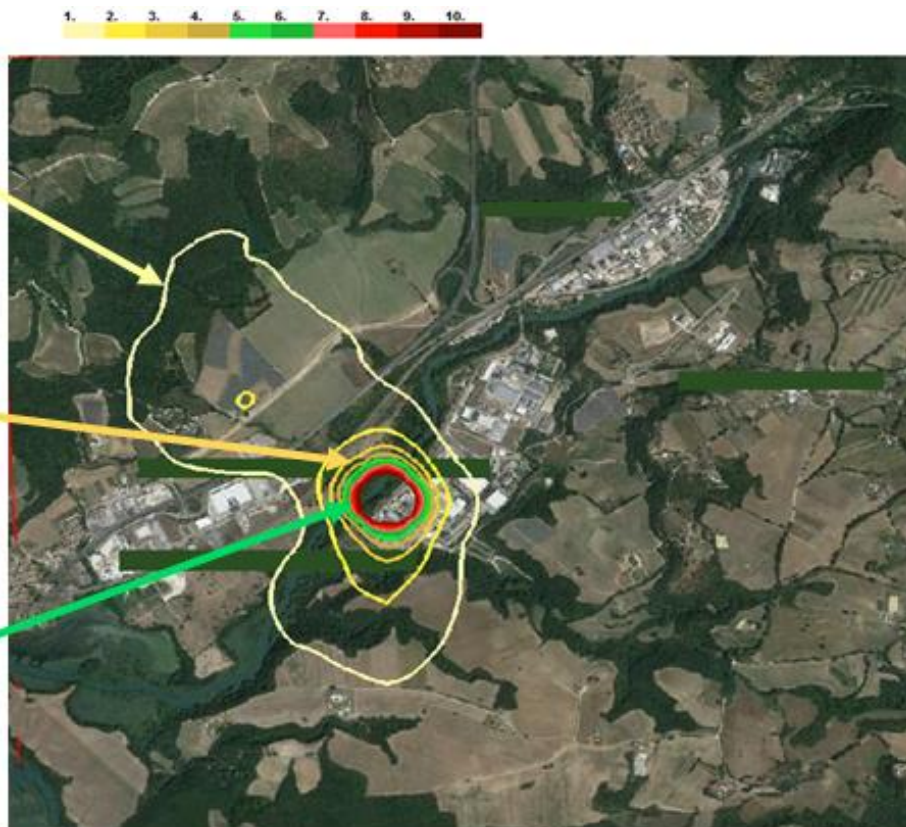
In dynamic olfactometry, the odours are sampled in specific bags from the potential sources of the odours.

The sampling bag is connected to a machine called an "olfactometer" and the air sample is diluted with clean air.

Then, the panelists (odour assessors) sniff the diluted odour. Each time the dilution changes the panelists try to perceive an odour. When someone perceives an odour he/she presses a button, signalling that the perception threshold for the odour has been reached.

The odour concentration is determined from the dilution factor at that precise moment. For example, if an odorous air sample is diluted 620 times to be detected, then the odour concentration is 620 ou/m³ (odour units per cubic metre).

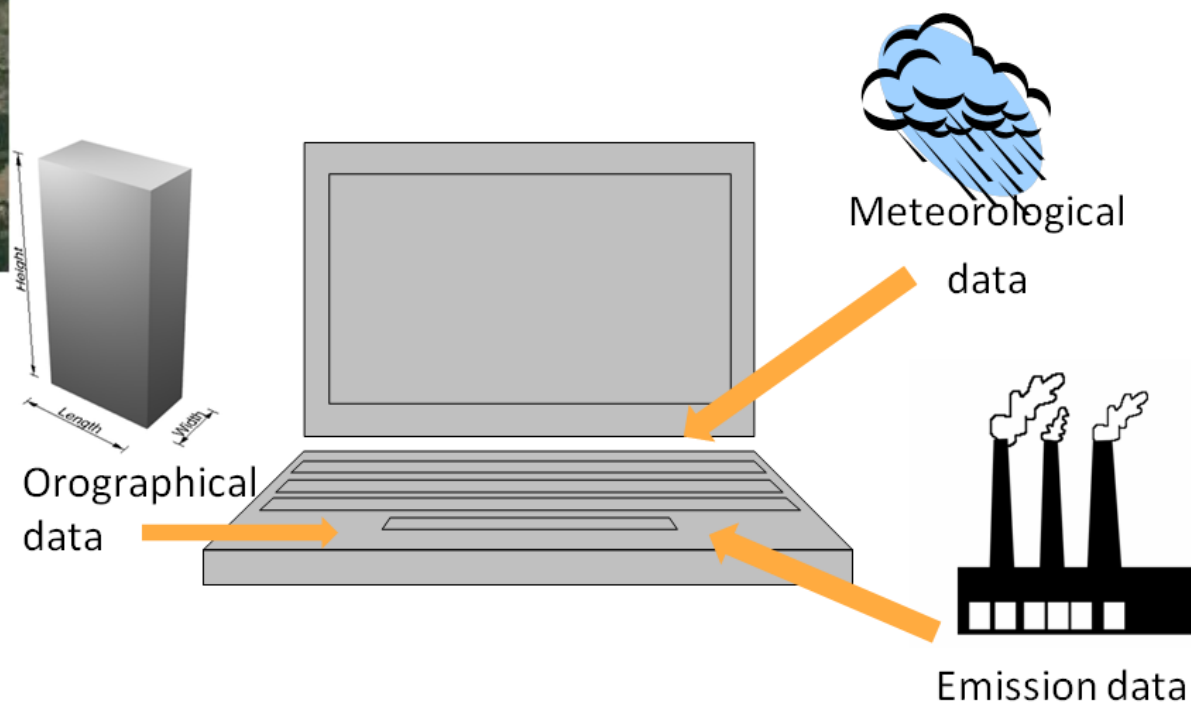
Odour assessors are carefully selected by their exposure and sensitivity to n-Butanol, a chemical that is widely used as the industry standard for odour measurement. The assessors are screened as a panel to ensure accuracy in testing of the odour that needs to be measured, and each assessor must be screened at least 10 times to ensure consistency in their sensitivity results.



DISPERSION MODELLING

The dispersion modelling measures how the odour is spread from the source to the people who smell them. This is currently the preferred way in most countries to evaluate odour impacts caused by different odour emitting activities on the surrounding communities.

As we can tell from its name, it is a method using a mathematical model to combine data from dynamic olfactometry together with geographical and meteorological (weather) data.





ARTIFICIAL OLFACTION

It is a sensor, also known as ‘electronic nose’. Sensors do not respond to odours, but to gas/volatile compounds. An electronic nose on its own cannot identify all 500.000 volatile organic compounds that cause smell! As any other sensor, it has to be trained and loaded with the right information so the device can detect specific chemical components.

Even if it could mimic human sense of smell, it will say nothing about real nuisance.

Some of the limitations of this method is the low sensitivity, stability problems and sensitivity to humidity. Also, the replicability of the measures is limited and the data obtained are not robust.



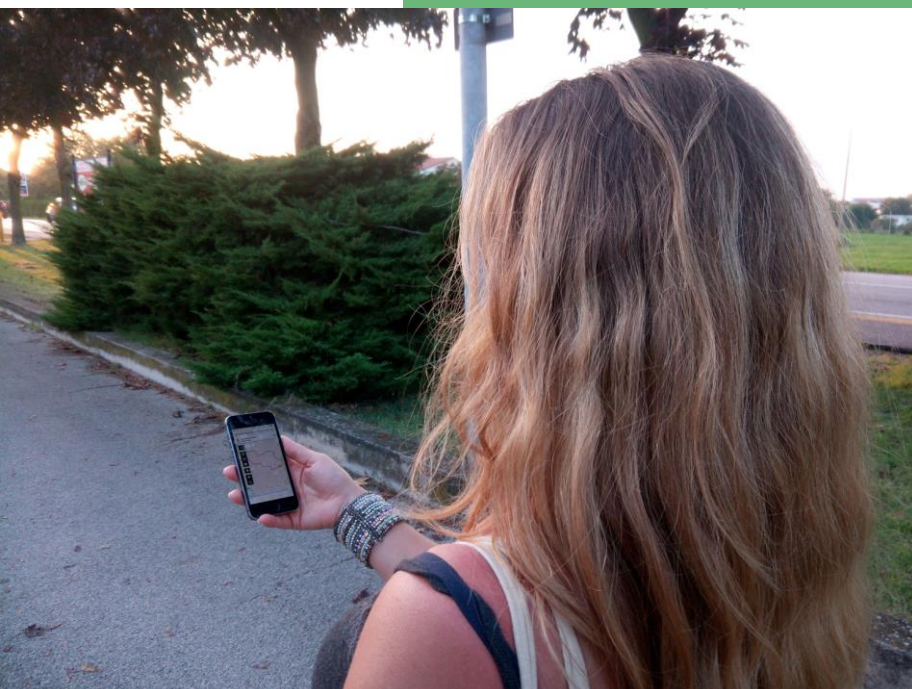
Students during a field inspection (Laura Capelli, POLIMI)

FIELD INSPECTION

In field inspections people participate and smell in the field and not in the laboratory, as in the dynamic olfactometry.

People have been trained to carry out field inspections and may (or not) come from the local area. The process of field inspections is applied using the grid or the plume method. Let's start with the "grid" method.

The main idea of field inspections is to estimate the degree of annoyance in a determined problematic area by means of the olfactory capacities of a group of people (panel) specially trained and "calibrated" for this purpose.



CITIZEN SCIENCE

Citizen Science is for everyone, even those who have no previous experience or scientific background. It is a flexible, simple, cost effective and reliable way of gathering evidence to answer a specific question or to generate new knowledge. Using the power of the public, observations, monitoring and local knowledge can be collected en masse in a way that would be unfeasible or unaffordable using professional scientists.

The Citizen Science approach to monitoring odour brings together the power of many, using one of the most effective odour sensors - the human nose.

People can record the frequency, intensity and type of odour that they experience and combine the individual observations of many to build a clear picture of the issue. As more people are involved in sharing their findings, or data, the level of subjectivity is reduced.

To collect comparable data, each one needs to record:

- Date
- Time
- Location
- Type of Odour (to choose from):
 - Waste
 - Waste water
 - Agriculture
 - Industrial
 - Food industry
 - Urban
 - Nice odour

Additionally, other aspects such as Intensity, frequency, hedonic tone or comments.

Smell Diary Keep a note of what you can smell, and when...



About the situation			About the odour				Comments
On what date did you notice the odour?	At what time did you notice the odour?	Where did you notice the odour?	What type of odour was it? (see list below)	How strong was the odour? 1 (mild) - 5 (very strong)	Where was the odour coming from?	How long did the odour last on this occasion?	
10/10/19	14:34	Junction of Penny Lane and Strawberry Fields, Liverpool	Urban	5 (very strong)	Unknown	20 minutes	This is a busy road but today the diesel smell was stronger than usual

**Pupil sheet**

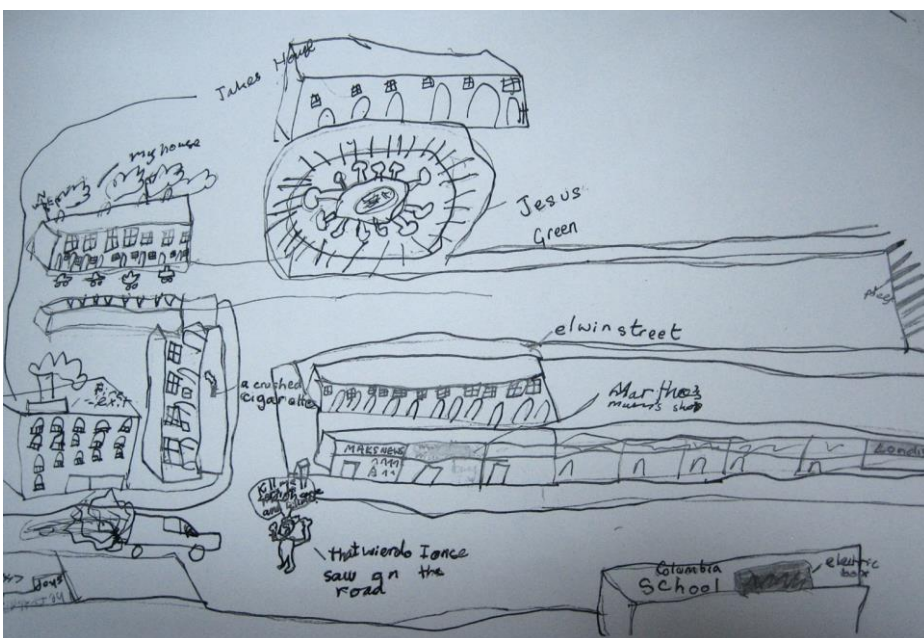
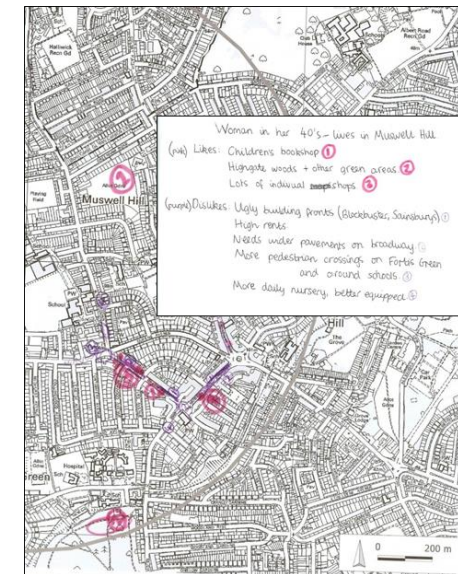
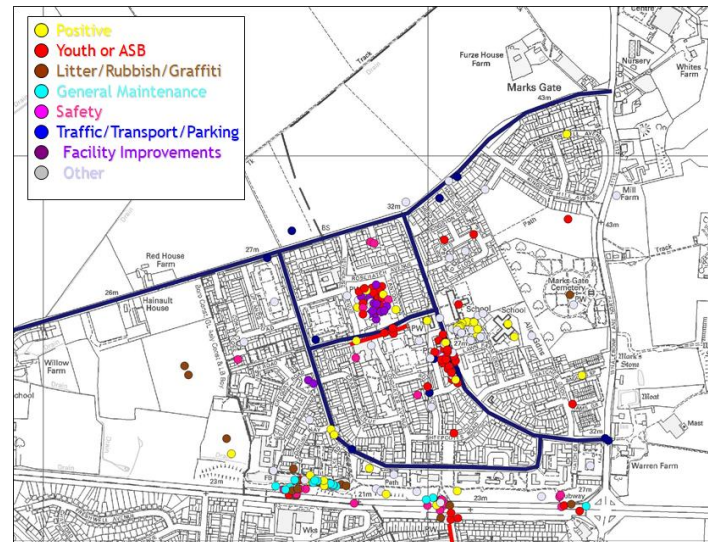
Student Name:

Think about the landmarks/locations on your route. Make a list of things you have added to your map

Class:

		Landmark name/Location description	What would you tell people about this place?
A place I like the smell of	1		
	2		
	3		
	4		
A place I don't like the smell	1		
	2		
	3		
	4		
The odour here reminds me of...	1		
	2		
	3		
	4		





My Hackney Wick - Mapping Field Day

Name Danika - Aremu-Fadela

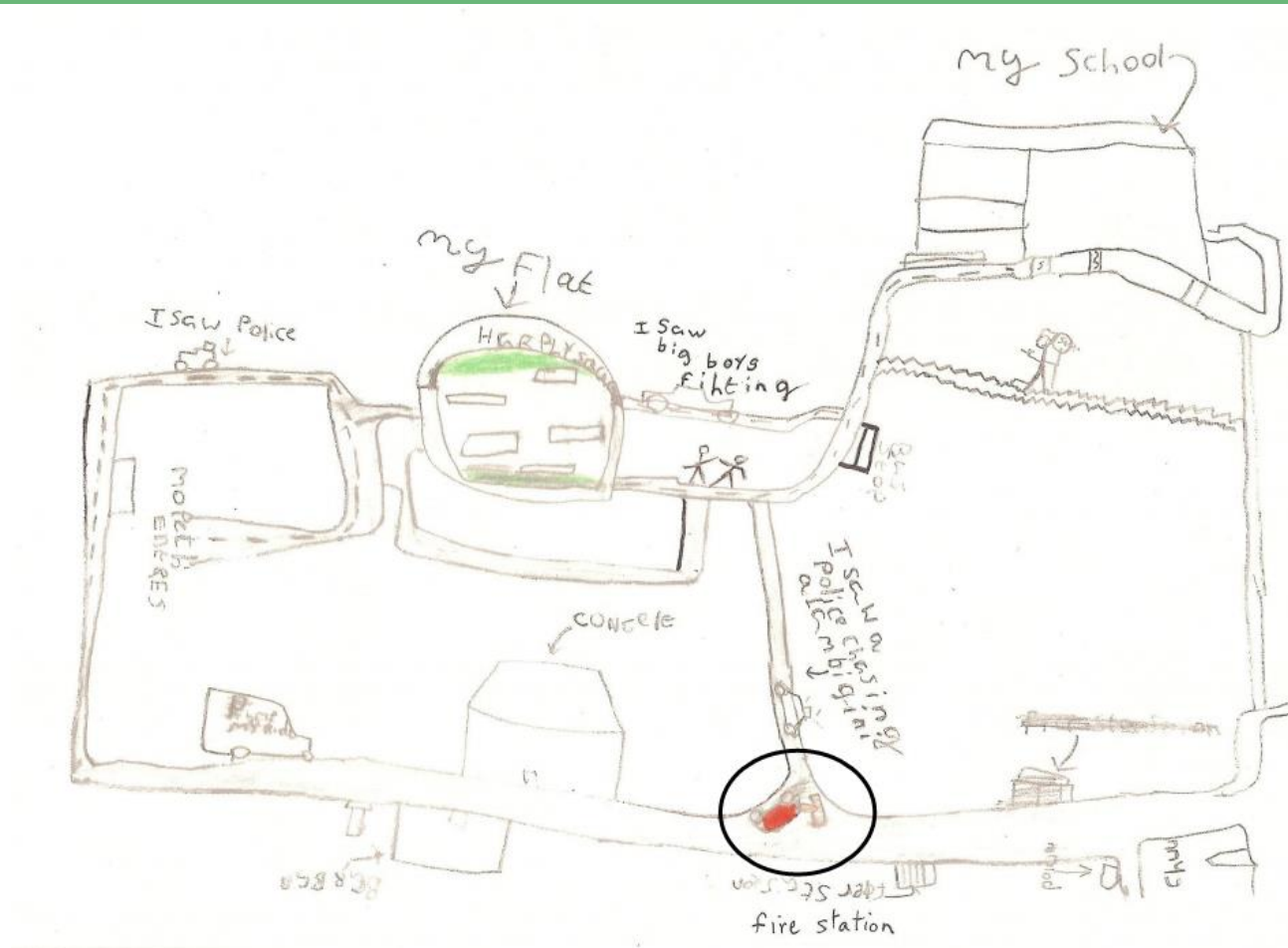
1. Landmark The Wick Cafe
 What would you tell people about this place?
The cafe is so nice and cosy and they will give you some delicious food and nice coco

2. Landmark The Train Station
 What would you tell people about this place? The train station is a really good way to get some where quicker

3. Landmark Victoria park
 What would you tell people about this place? It's a big place and nice and we can go on the slide and run things

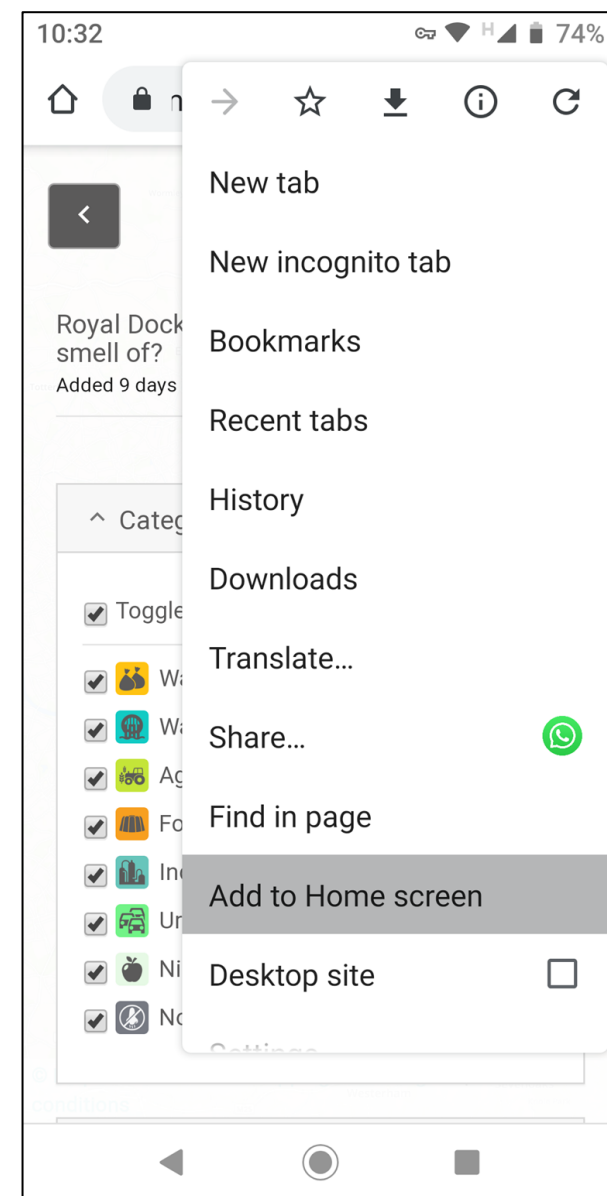
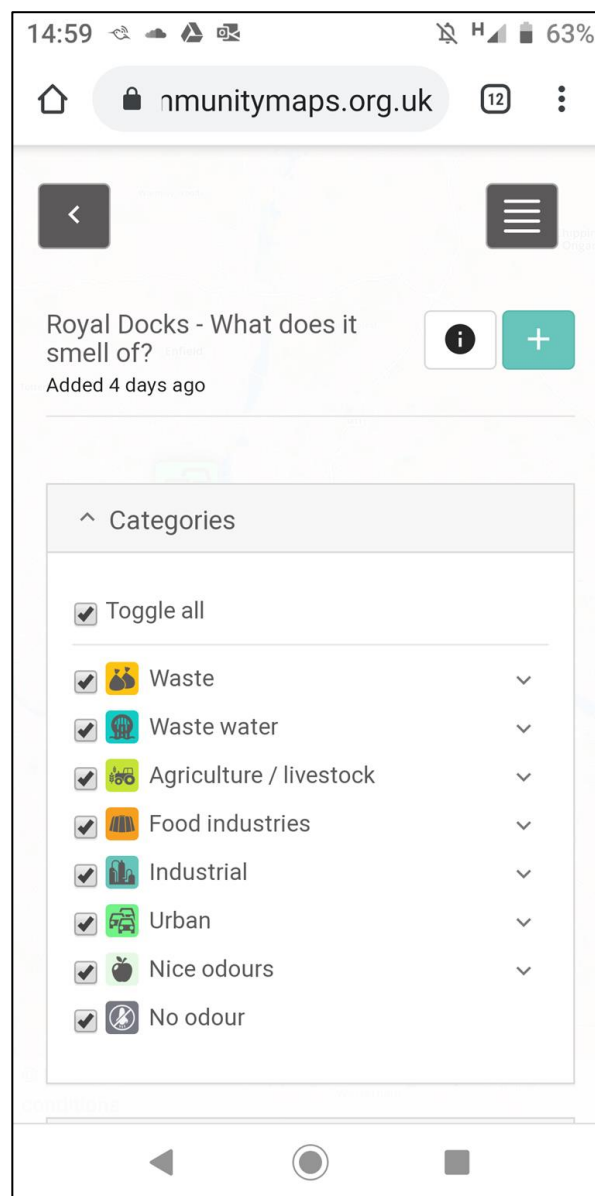
4. Landmark Cook Cutter
 What would you tell people about this place? It's a amazing shop where you can buy stuff

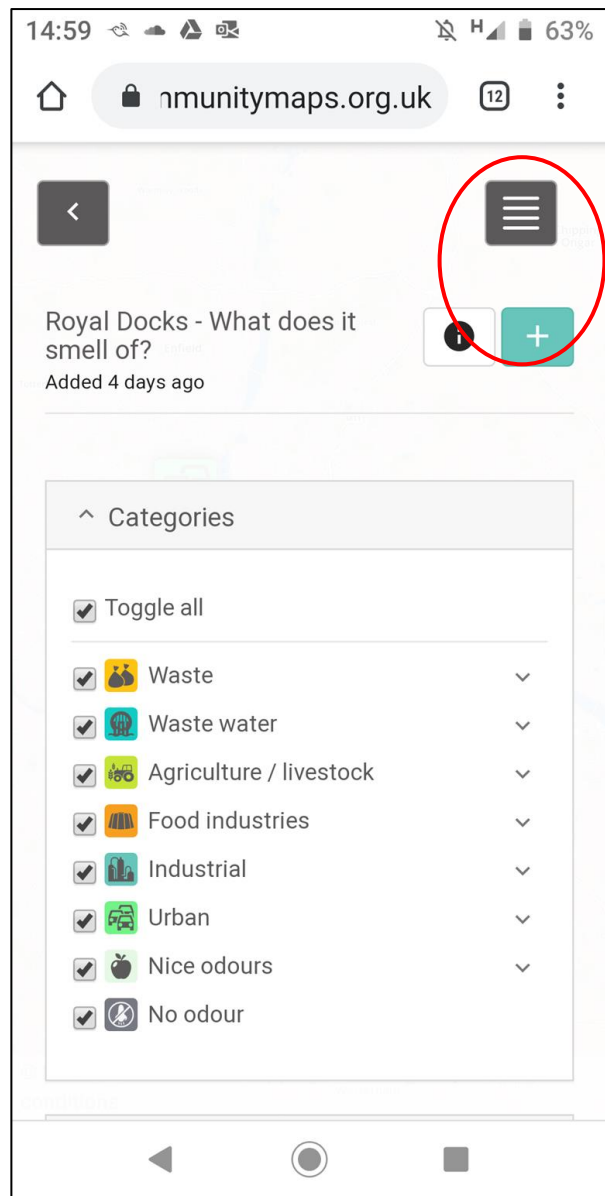
5. Landmark 9 Park
 What would you tell people about this place? It's so fun and good



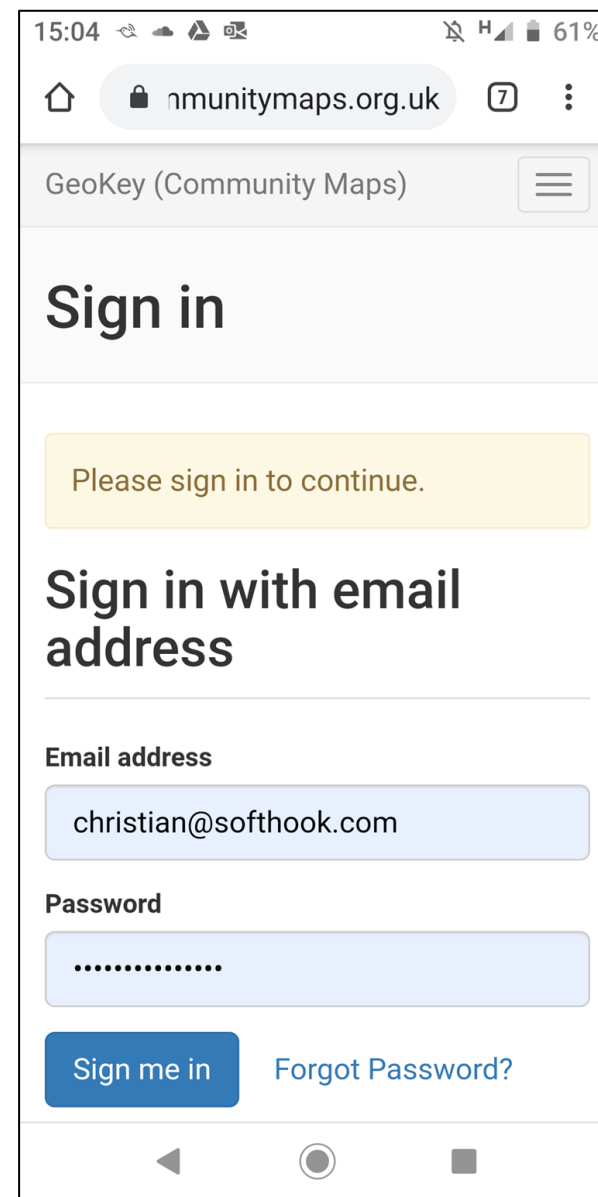


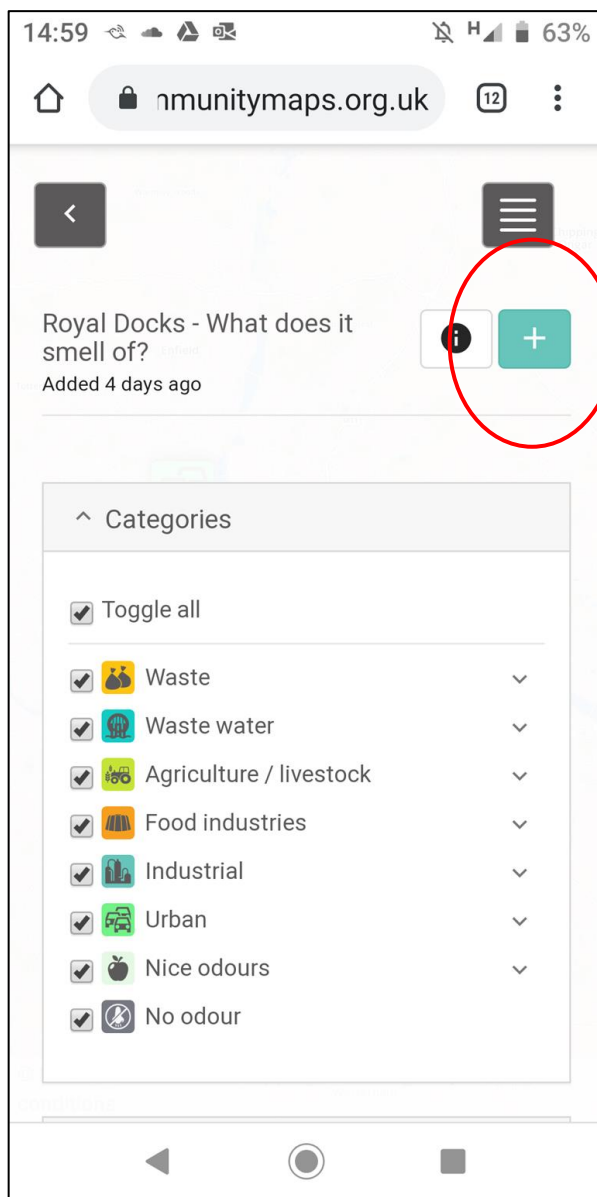
Community Maps is the free web app for reporting your odour observations and creating collaborative odour maps.



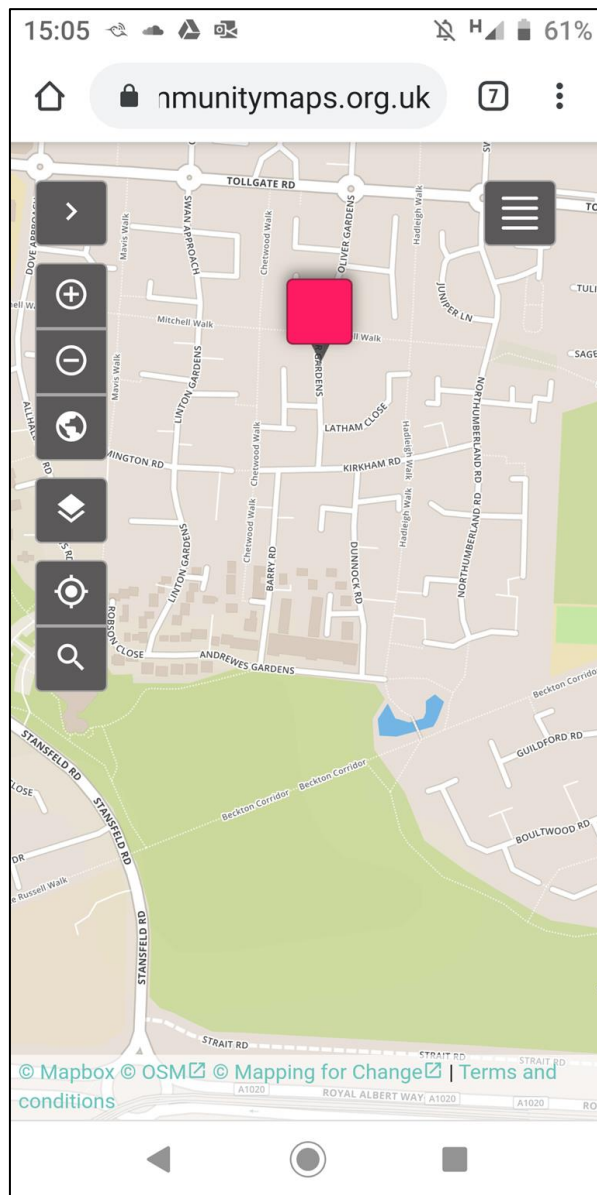
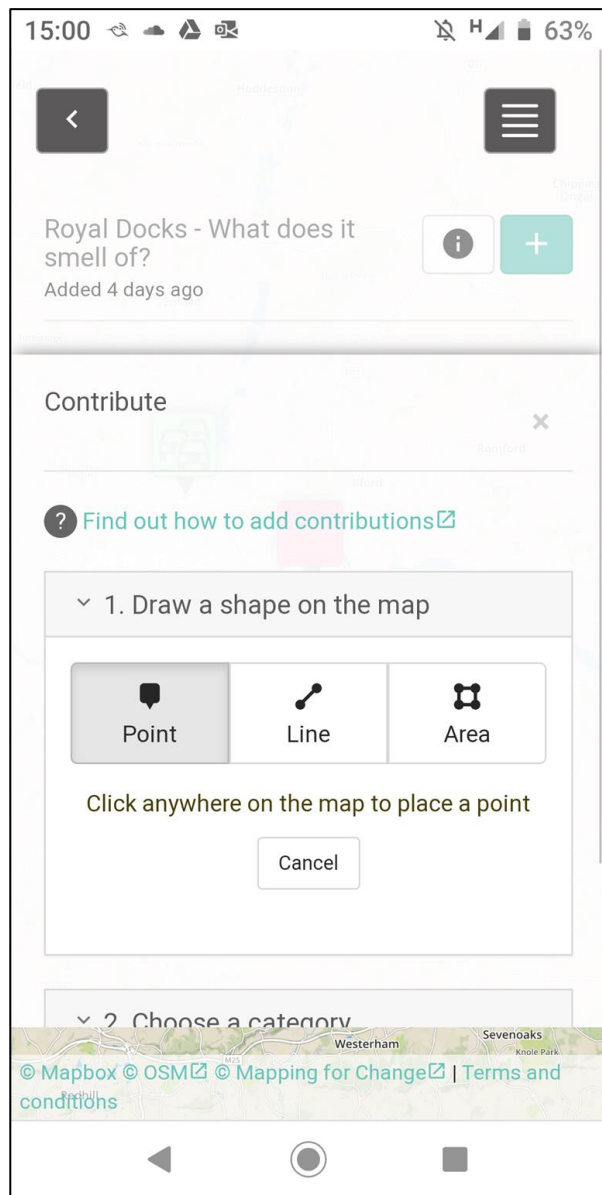


Register for an account
using email





Create an Observation



Move the marker to where you smelled the odour

15:05 61%

communitymaps.org.uk

1. Draw a shape on the map

2. Choose a category

- ☐ **Waste**
Added 4 days ago Fields 7
- ☐ **Waste water**
Added 4 days ago Fields 7
- ☐ **Agriculture / livestock**
Added 4 days ago Fields 7
- ☐ **Food industries**
Added 4 days ago Fields 7
- ☐ **Industrial**
Added 4 days ago Fields 7

15:06 60%

communitymaps.org.uk

1. Draw a shape on the map ✓

2. Choose a category ✓

3. Add data to your new contribution ✓

Type of odour (required)

Oil / petrochemical

Odour intensity (required)

How strong is the odour?

5 - very strong (clearly annoying)

Odour tone (required)

Is the odour nice or foul?

-2 unpleasant

Time of odour (required)

Categorise the odour using the required fields



15:07 60%

communitymaps.org.uk

< Your tone (required)

Is the odour nice or foul?

-2 unpleasant

Time of odour (required)

When did you experience this odour?

31/01/2020 15:13

For example 31/01/2020 15:04

Odour duration (required)

How long did the odour last?

It was punctual

Source of odour

If you know where the odour is coming from, please tell us.

The time/date is important

16:28 48%

communitymaps.org.uk

<

Comments

Please give us any more details you wish to share about the odour

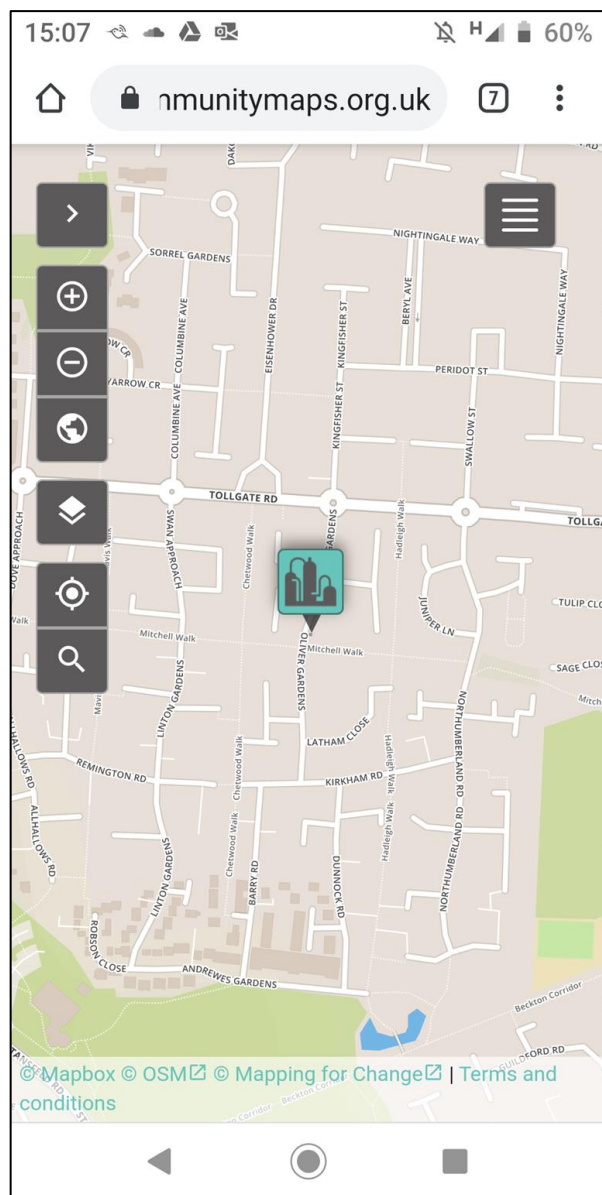
MEDIA FILES

Select files manually

* Please be aware videos will be uploaded to our private YouTube account

Save draft Add contribution

Don't forget to submit



Your finished recording your odour observation!



GROUP	Which topic would you like to communicate about?	Where would you like to share your message, is it face-to-face, digital, social media?	Who would you like to communicate your message to? List the groups of people you would like to receive your message.	Write the message you would like to share here:	Add here any supporting material, such as images, audio, etc.
1					
2					
3					
4					
5					

WHAT IS A PUBLIC CAMPAIGN?

A public awareness campaign is a marketing effort to build public recognition of a problem through media, messaging, and an organized set of communication tactics. These campaigns target a large number of people over a specific period of time to try and generate specific outcomes or achieve predetermined goals.

A few examples of what a public campaign can be:

- A public speech
- Writing media news
- Posting on social media
- A public event in your community

WHY ARE PUBLIC CAMPAIGNS IMPORTANT?

Because they can be used to contribute to policy change by putting pressure on policy-makers and encouraging the community to take action. These campaigns can inform the community about a current problem by highlighting and drawing attention to it in such a way that the information and education provided can solicit action to make changes.



1. WHAT & WHY: Determine your topic and goals of the campaign

- Are you concerned with a particular issue in your community? Why is this important?
- What is the topic/issue you want to raise awareness of?
- What do you want to achieve with the campaign? Set your goals!

Example: I want to organize a campaign to prevent people from dumping rubbish in the streets and keep Kampala more clean.

2. WHO: Decide your target audience, identify supporters & existing networks

- Who is your target audience?
- Which people do you need to involve to reach your target audience?
- Are there already people supporting or organising similar campaigns?

Example: Identify the members of the community who can support and the ones who you think need to be involved within the campaign.

3. HOW: Which communication strategies will you use to communicate your campaign?

- How will you spread the message? What resources and which channels will you use?
- Which communication strategies will be more effective for the target audience you have chosen?

Example: I want to involve the youth in my community and we will need to share posts in popular social media channels as well as build signs for preventing rubbish dumping.

4. DEEPENING THE WHO: Engaging community leaders and develop champions

- Community leaders can share your message with specific audiences that other supporters may not be able to reach.
- Community champions can be developed to spread the word and involve more participants
- Learn about the needs and concerns of this specific community

Example: To engage community leaders and develop champions we will need meetings with them to decide the best strategies to involve the community.

5. DEEPENING THE HOW: Create a communication strategy

- What types of media do you need to engage your community?
- Will you contact your local newspaper or radio? Will you use social media channels? Will you organize meetings with communities?
- How often will you share your message?

Example: We think the best way would be to contact the local radio and spread the message as well as organising community gatherings.

6. DEEPENING THE WHEN: Develop a plan

- Responsibilities, locations & time
- What resources do we need to follow the steps?

Example: Meet with your group and share who will be in charge of what.



**Smell Diary** Keep a note of what you can smell, and when...

Odour types:

Waste

Waste water

Agriculture

Industrial

Food industry

Urban

Nice odour

About the situation**About the odour****On what date did you notice the odour?****At what time did you notice the odour?****Where did you notice the odour?****What type of odour was it? (see list below)****How strong was the odour?**
1 (mild) - 5 (very strong)**Where was the odour coming from?****How long did the odour last on this occasion?****Comments**

10/10/19

14:34

Junction of Penny Lane
and Strawberry Fields,
Liverpool

Urban

5 (very strong)

Unknown

20 minutes

This is a busy road
but today the diesel
smell was stronger
than usual

Odour types:
Waste
Waste water
Agriculture
Industrial
Food industry
Urban
Nice odour
About the situation
About the odour
On what date did you notice the odour?
At what time did you notice the odour?
Where did you notice the odour?
What type of odour was it? (see list)
How strong was the odour?
1 (mild) - 5 (very strong)

Where was the odour coming from?
How long did the odour last on this occasion?
Comments



Kampala NOSES

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