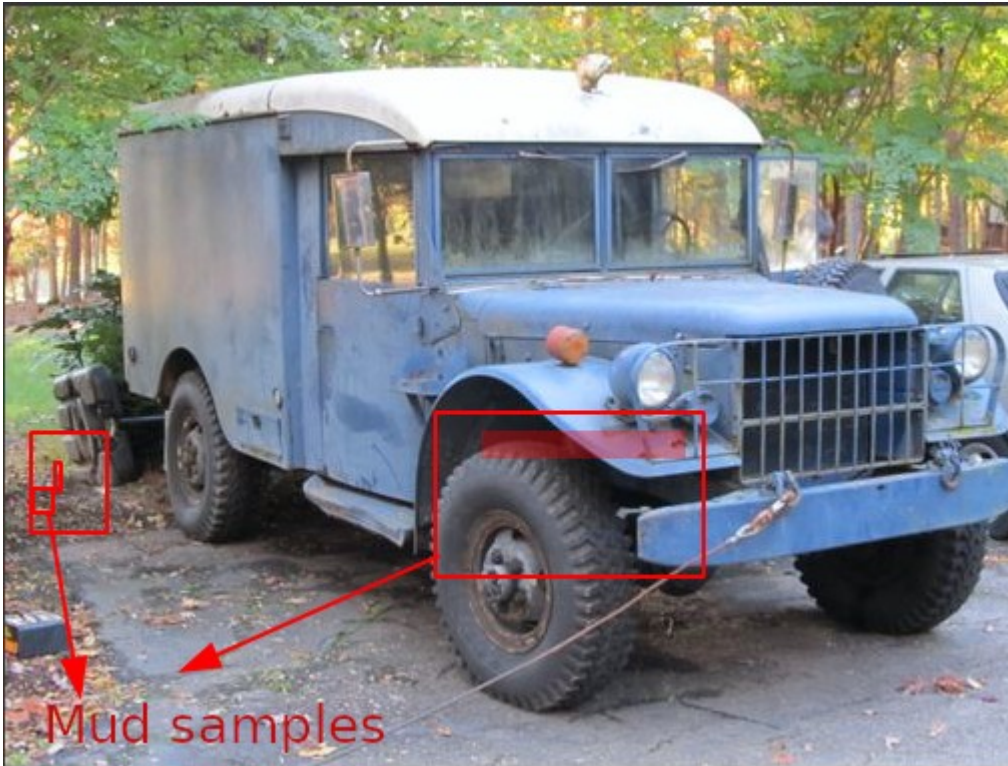


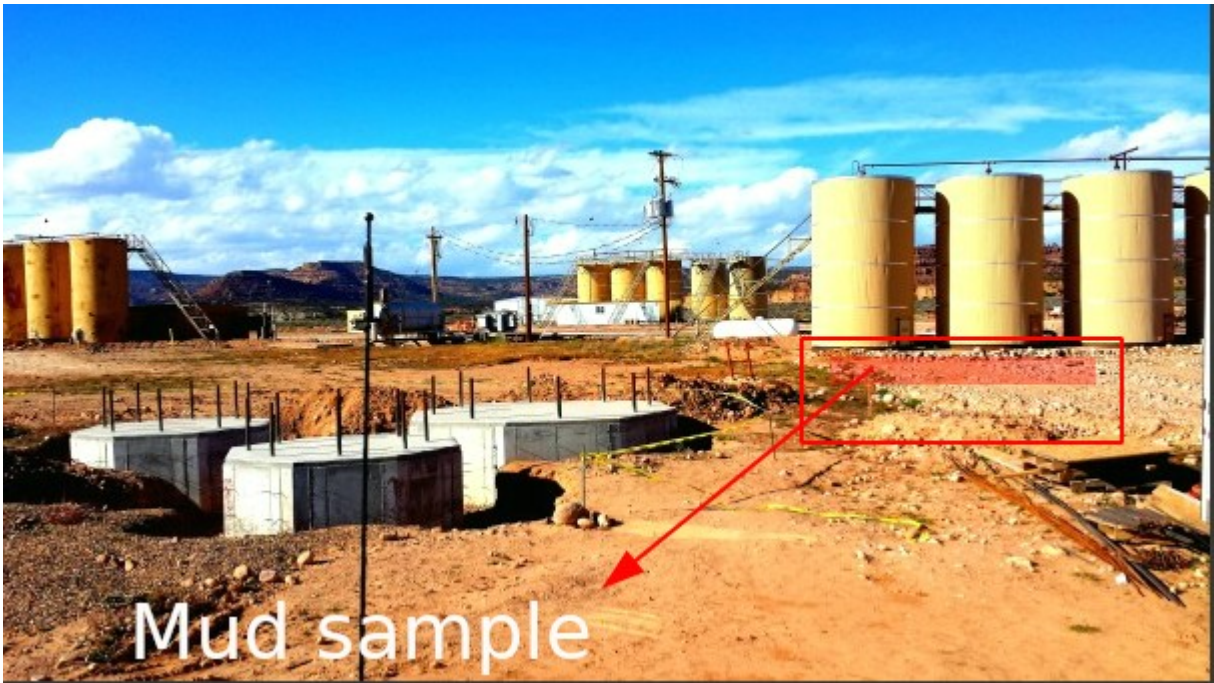
- **This is the investigative exercise we are proposing to you.**

Some investigators want to know where the soil found on the chassis of a car came from. So they took three soil samples:

- **Sample A:** From the parking lot of the vehicle.



- **Sample B:** from the owner's workplace.



- **Sample C:** from the owner's place of residence.



Then they sent these samples to a laboratory plus analyse yourself

Your job will be to analyze these soil samples to determine the source of the soil found at the "crime scene".

Here we describe a study of the mineral salt content of a soil in order to identify the source of sample "A:" at the location where the vehicle was parked. »

Protocol and investigation exercise

To identify the presence of ions in solution, tests involving a chemical reaction are performed. To do this, a small amount of appropriate reagent (see table below) is poured into the test tube containing the test solution. Then you observe what happens and record your observations.

You must have the following reagents with you:

- Sodium hydroxide (Na^+ ; HO^-);
- Sodium hydroxide (2Na^+ ; SO_4^{2-});
- Silver nitrate (Ag^+ ; NO_3^-) and
- Barium chloride (Ba^+ ; Cl^-).

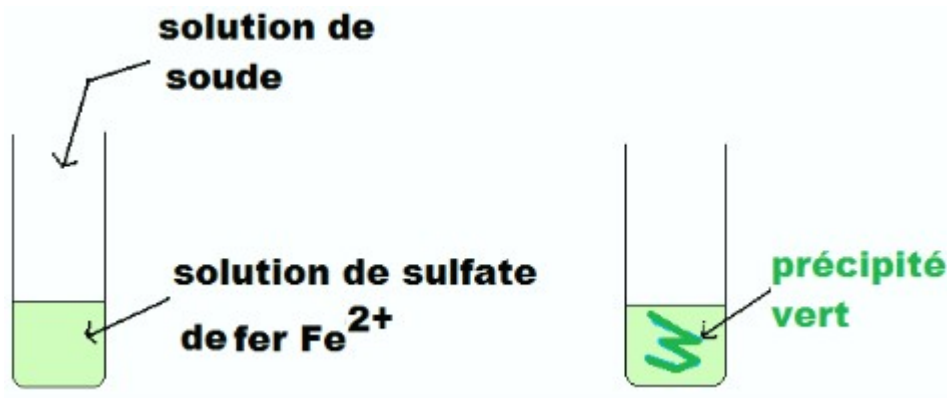
the local drugstore will be your friend to supply you or on the Internet to order

Summary table of characteristic tests for ion identification:

Ion to be identified	Reagents used	Observations
Fe^{2+}	Sodium(Na^+ ; HO^-)	
Fe^{3+}	Sodium(Na^+ ; HO^-)	
Ca^{2+}	Sodium(2Na^+ ; SO_4^{2-})	
Mg^{2+}	Sodium(Na^+ ; HO^-)	
Mn^{2+}	Sodium(Na^+ ; HO^-)	
Cl^-	Silver Nitrate(Ag^+ ; NO_3^-)	
SO_4^{2-}	Barium chloride (Ba^+ ; Cl^-)	

Pipette about 2 ml of the solution containing the ion to be characterized into a test tube (test tube).

Sodium solution



iron sulphate solution Fe²⁺

Sodium solution



iron sulphate solution Fe³⁺

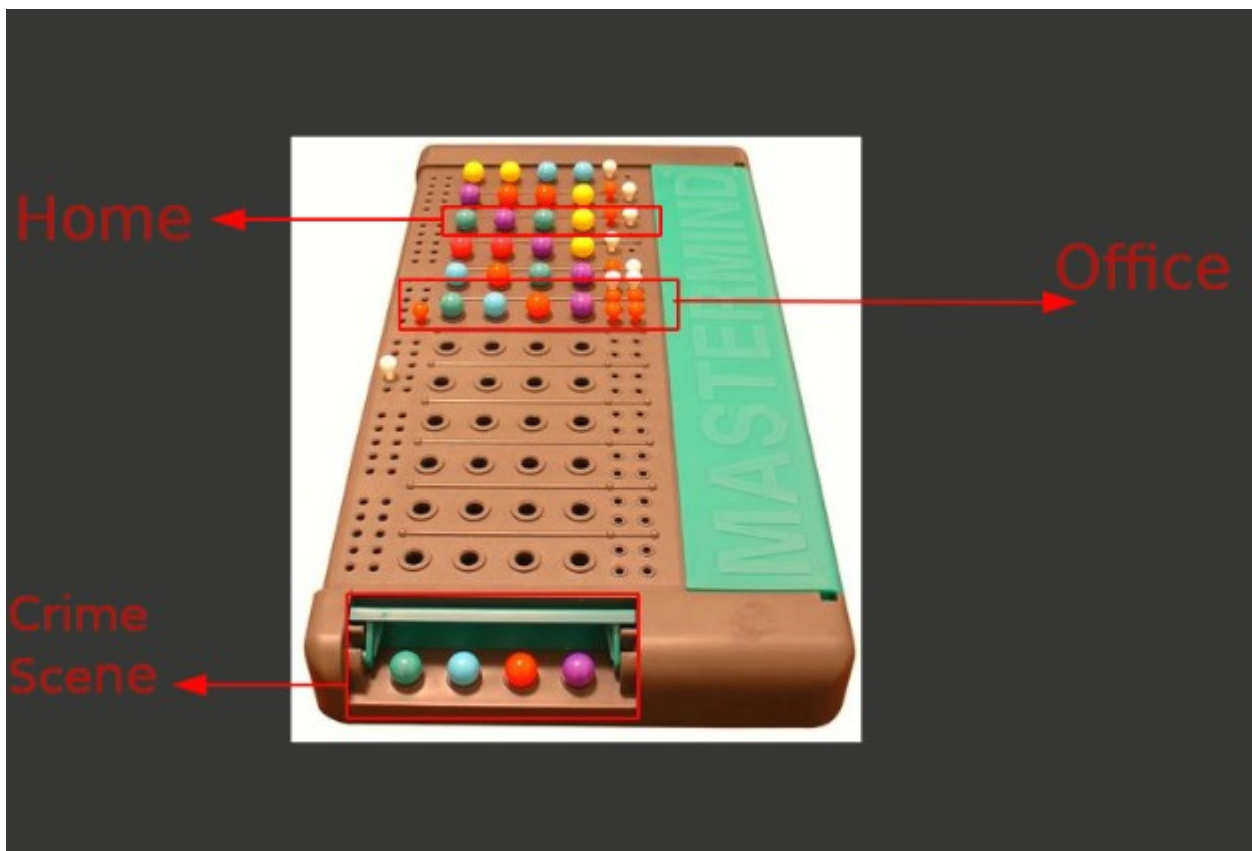
Then introduce a few drops of the reagent with a pipette.

Observe and record your observations in the table. You will see colour changes, with or without precipitates (the formation of a heterogeneous dispersed phase in your test tube).

These colours indicate a reaction that brings out a particular chemical compound present in your soil sample, which will ultimately give important clues to the overall composition of a sample you are trying to trace.



For example, 2 tubes with samples from 2 different sampling points with identical results and observations will give you a high probability indication of a vehicle having frequented both sampling locations.



Following Xavier's request I'm adding here an easy experiment I did at school ages ago :)

A silly experiment to discover if you are actually eating quality meat sausages or they are covertly vegan (or simply poor quality).

You may want to know if the meat sausages you are consuming are good (higher percentage of meat) or poor quality (full of starch) and that way to know if the percentage of meat versus other ingredients in your sausages is higher.

- Iodine (I).
- Cotton
- Different meat sausages (for comparison)

1. Cut sausages
2. Apply iodine with cotton.

Observe the colour of the sample. It will be darker when the amount of starch is higher.

1. **Orange-brownish** 100% meat or closer should have the same colour than your skin when you apply Povidone-iodine
2. **Blueish** : Low meat content
3. **Blueish-Black**: Lower to none meat content. High content of starch.

Footnote: Vegetable cellulose doesn't react to the iodine test so I guess it serves the purpose of knowing if they are good vegetarian sausages or not.

ICC2020

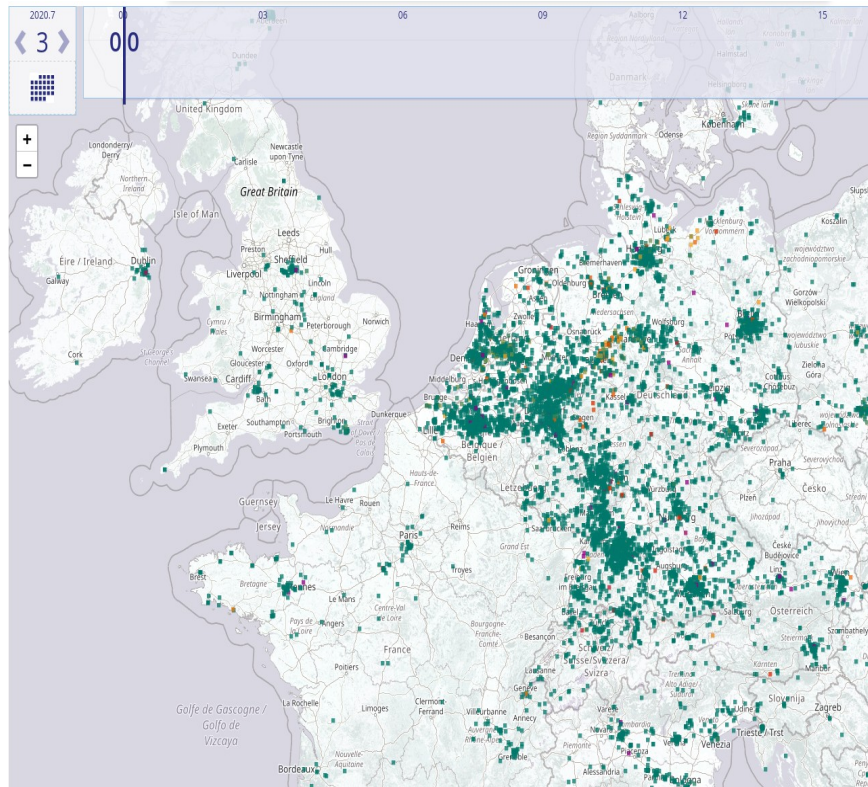
Exposing The Invisible Bioinvestigation



Environmental example

pro tip of the day

Air measurement and data and history – Europe



- You change the date on the picto at the top left. Then play (top right) or move the blue time bar from left to right:

https://sourisr.kapsi.fi/luftdaten/luftdate_vis/

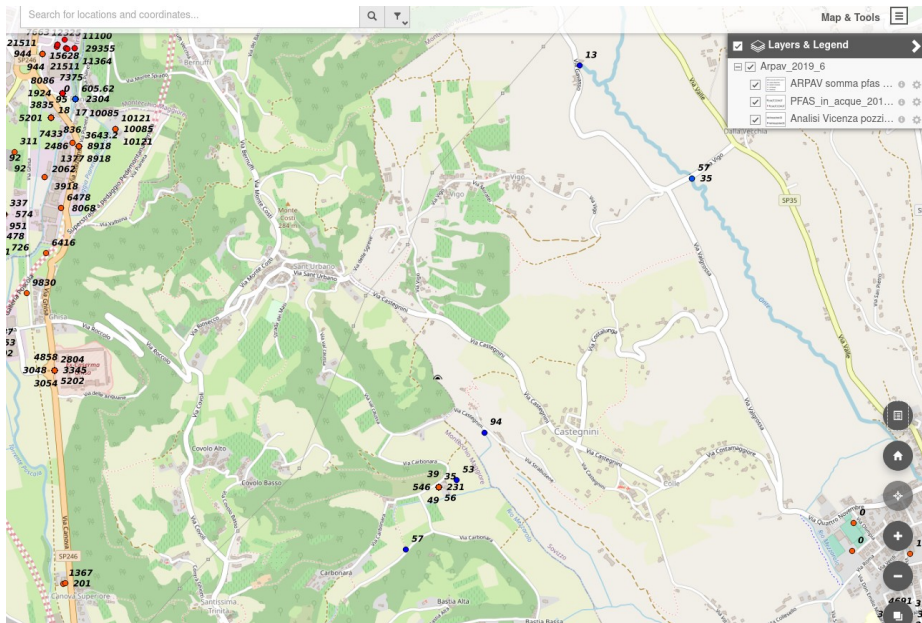
- For example, find an accident in Industry (fire) or police demonstration strike with cars, you can even use press release or archives to find the event.
- Then use the map and citizens data's sensors.



Well Done, you've just stepped in environmental investigation.

Environmental example

Perfluoroalkyl chemicals (PFAS)



<https://frama.link/cpfas>

PS+
FLA
AND

PFAS.land

«Più che un movimento, siamo in movimento». Organo di informazione del Movimento NO PFAS del Veneto promosso dal Comitato di Redazione Interdisciplinare LET'S STOP THEM > informazione e azione contro i CRIMINI AMBIENTALI, per la GIUSTIZIA CLIMATICA attraverso la soluzione delle questioni territoriali. A partire dai PFAS, l'inquinante perfetto.

Articoli recenti

COMITATO DI REDAZIONE
INTERDISCIPLINARE

L'ARCIPELAGO NO PFAS |

21 giugno 2020 | SALE L'INTERESSE INTERNAZIONALE PER I PFAS. I DUE IMPORTANTI ARTICOLI DI SCIENZE.

<https://pfas.land/>

What's Bioinvestigation



Away From Your Screen, Out in the Field

by Mario Rautner

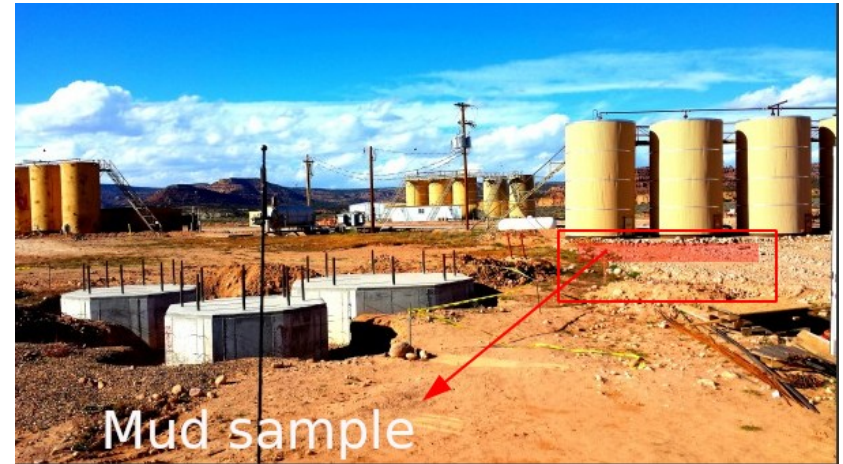
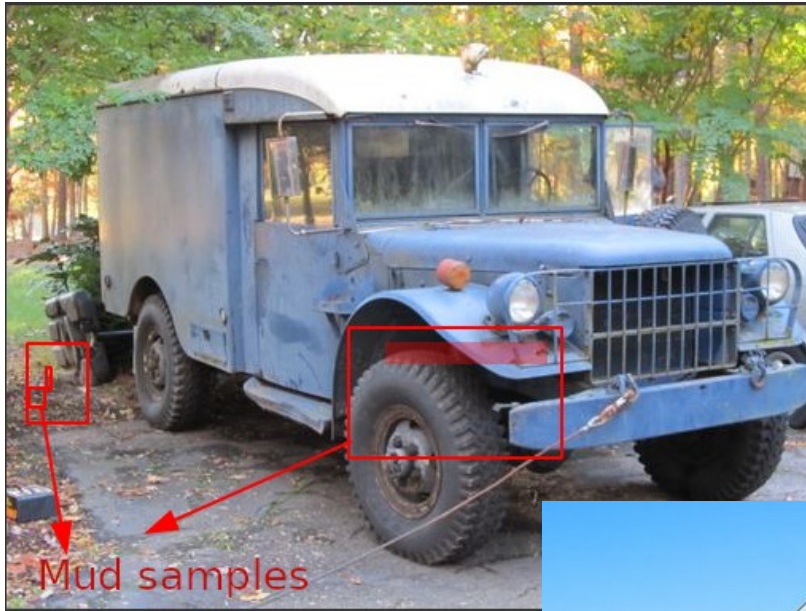
Safety first !

<https://kit.exposingtheinvisible.org/en/how/field-research.html>

Let's take a practical example



Bioinvestigation

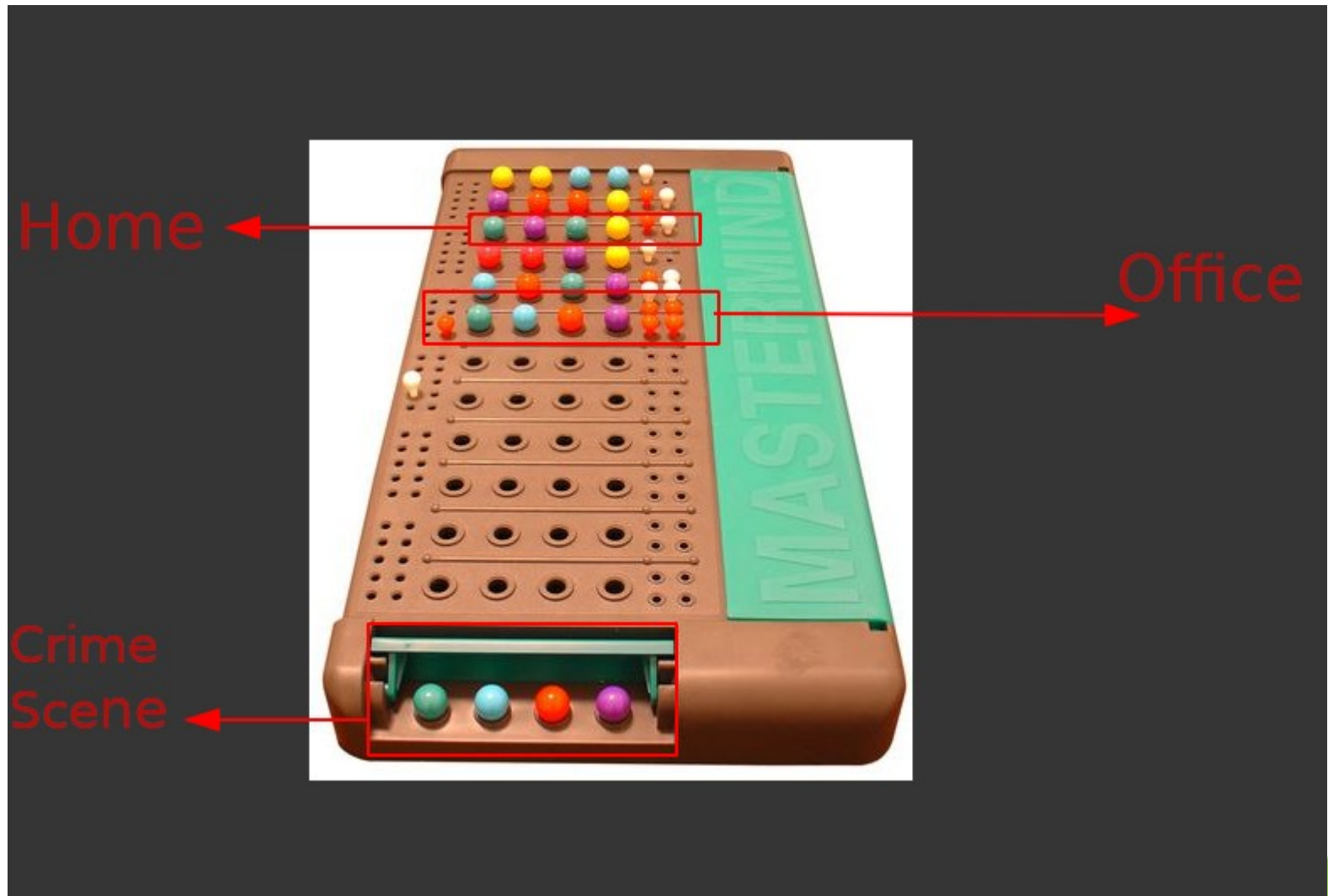


Bioinvestigation

- 2 tubes series with samples from 2 different sampling points with identical results and observations will give you a high probability indication of a vehicle having frequented both sampling locations.



Bioinvestigation



Bioinvestigation

Now

- You have a crime scene
- A suspect
- Home of the suspect
- His office

Dorking :

> `site:his-office.tld inurl:".bak"`

Or

> `inurl:".tar" his-office.tld`

Etc.

<https://kit.exposingtheinvisible.org/en/how/google-dorking.html>



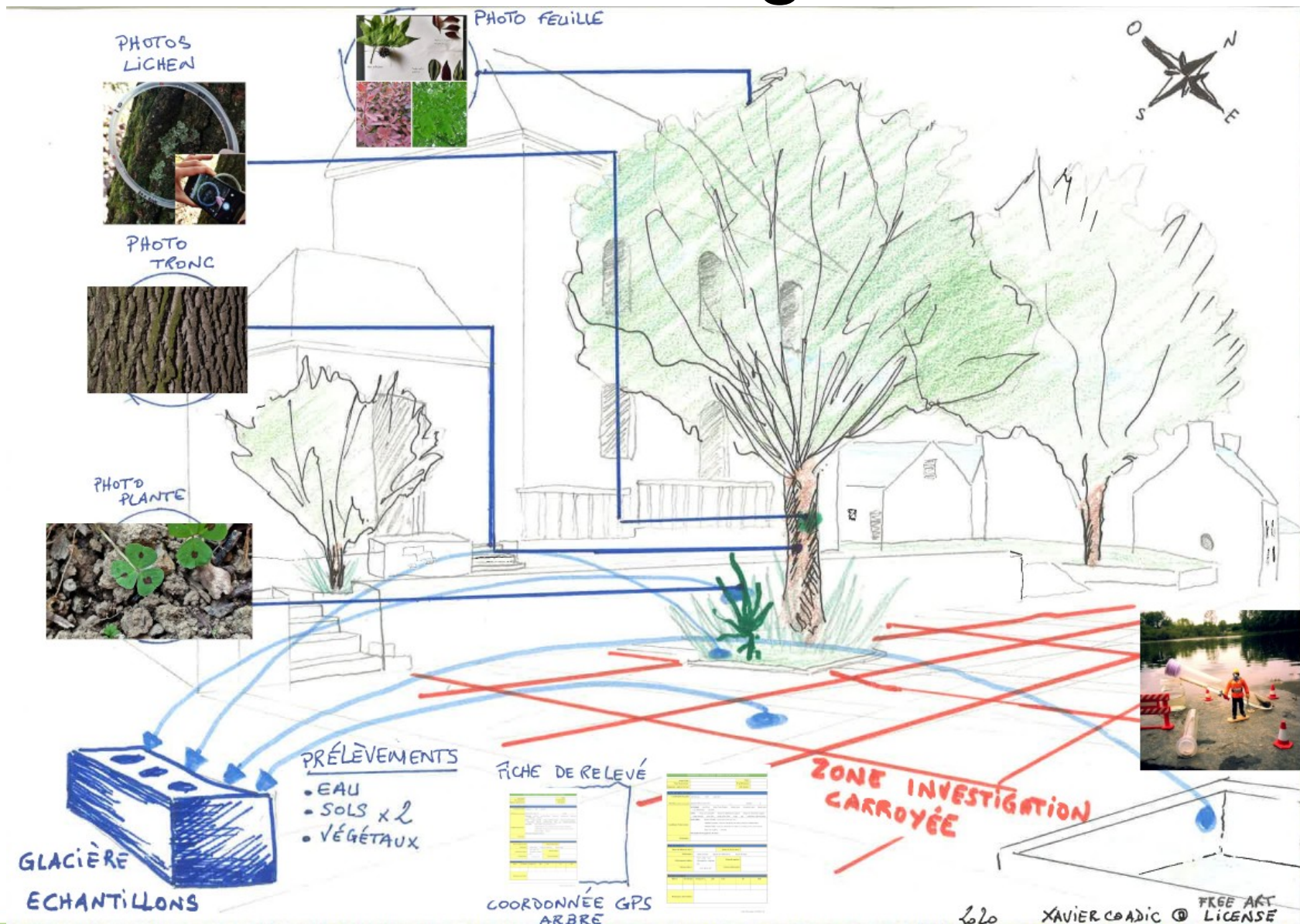
Bioinvestigation

Now Do It Yourself at home

- Tell us if you encountered problem
- You can do it
- Similar protocols with
 - Plants
 - Water
 - Food
 - Etc.



Bioinvestigation



Collaborative notes for ICC2020

bioinvestigation sharing skills

session

Skill-share session by Xavier Coadic (contact available here:

<https://xavcc.frama.io/>)

Today we will talk about bioinvestigation, probably a new concept for most of us. You probably may have encountered examples of investigation related to environmental issue. Pollution, industrial disaster, natural disaster, loss of biodiversity, etc?

For illustration in environmental issue, I recently shared in the wire chat a short "How to" specific air data that could be used in environmental investigation

□ pro tip of the day

Air measurement and data and history

Europe

You change the date on the picto at the top left. Then play (top right) or move the blue time bar from left to right:

http://sourisr.kapsi.fi/luftdaten/luftdate_vis/

For example, find an accident in Industry (fire) or police demonstration strike with cars, you can even use press release or archives to find the event.

Then use the map and citizens data's sensors.

Well Done, you've just stepped in environmental investigation.

You can also plan something similar with water issue and data and map.

Well ,

an environmental or ecological problem is already a big subject in itself

Focus

Bioinvestigation, or trace biosaerch, is a set of technics and methods that are both more specific of the investigation and at some time broader in scope than classical investigation

It could be use, for example, in a case of armed conflict to expose some clue or trace (weapon use and pounder, chemical weapons, blood in the field...). Or as a complement to the investigation on a company

<https://kit.exposingtheinvisible.org/en/what/companies.html>

And certainly more according to your needs

What's the case?

A pickup truck comes to a river where you see or suspect problem

Pollution or something else to hide whatever

It's a crime scene

We want to find out where that pickup come from and it belongs to.

You can use a picture of this pickup with its license plate number on it in Yandex web browser and Optical Character Recognition (OCR

https://en.wikipedia.org/wiki/Optical_character_recognition + <https://cloud.yandex.com/docs/vision/concepts/ocr/> + https://yandex.com/images/search?text=pickup_license_plate)

To find out more information with image recognition. You can also use this trick to identify insects from one of your photos

Then

We will take mud samples from

- The parking place soil and the pickup
- From the place where the owner works
- From the soil where the owner lives

We will put each type of soil / mud in 7 tests tubes (or glass if you don't have any test tube)

→ 7 tests tubes for each soil samples

Each tube is half-filled with demineralized water

Then a specific reagent is introduced into each tube, such as silver nitrate in tube 1 for our 3 sets of tests tubes for example

- 1 reagent for 1 tube
- 7 tubes for 1 sample of mud

Then, after short few minutes we obtain 7-color code for each sampled location

In our case

If the pickup truck wear mud from the river and mud from the industry office where the owner works

- River Mud 7colors code = pickup 7colors code
- Industry Mud 7 colors code = pickup 7colors code

So we have a high probability clue that the problem and the owner come form this industry

→ It's a MASTER MIND GAME

What if now we use dorking <https://kit.exposingtheinvisible.org/en/how/google-dorking.html> to find files from this industry in order to build stronger clue. For example, looking for chemical buying orders hides in backup or in compress [archive](#)

industry.tld inurl:".bak" <or> industry.tld inurl:".tar" <etc>

Mud tests example

Case of investigating different mud samples from a car tyre to find out where the car was: https://cloud.tacticaltech.org/apps/onlyoffice/1027140?filePath=%2FSHARED_IIC2020%2Fskills-share-bioinvest-practice.docx

You do 3 tests - one from the tyre, one from the work location, one from river to verify where the car tyre mud comes from - needs 7 test tubes for each sample + several reagents (see file in link above for examples) = 21 test tubes in total.

This method can be used in crime forensics for instance to find out where a crime victim was last (based on analysis of mud/dust from their shoes/car/other items)

You can try this protocol (seven test tubes with reagents) to analyse plants, water and other items from your area to check levels of pollution.

Safety in bio-investigations:

- has to be applied to specific threat models in each situation
- conduct risk assessment before going on field

Resources:

Open WetWare

For open collaboration on bio-investigations:

https://openwetware.org/wiki/Main_Page

Water

Sensors without a “measuring cell” device thanks to the wetware (biochemical material) to measure contaminants in water.

Important resources are available in English:

Publication:

<https://www.biorxiv.org/content/10.1101/619296v2>

Video:

<https://invidio.us/watch?v=OAQCnDHzaE>

Blog/history :

<https://bioengineeringcommunity.nature>