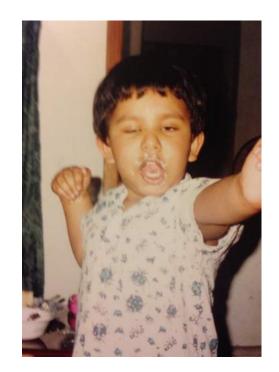# the team

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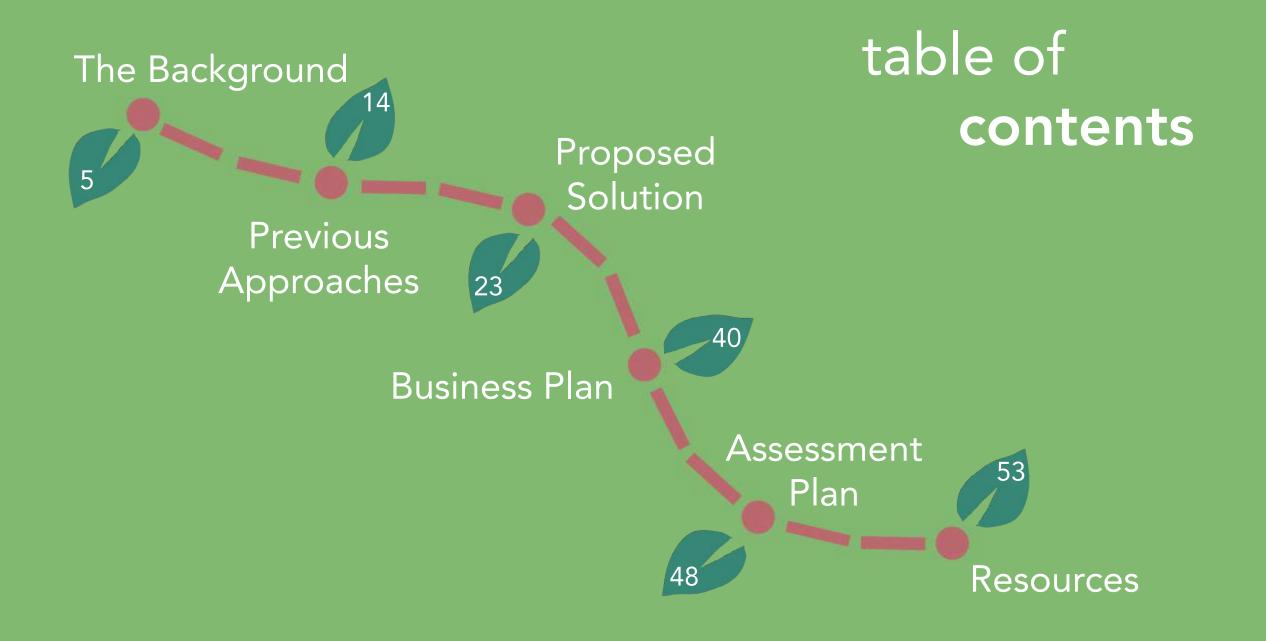
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executive summary

Ma DécouVerte is an interactive app-based excursion designed for children and families to discover nature and the biodiversity that exists in the city of Paris. The project aims to bridge the growing divide between nature and children, in order to maximize the potential health benefits of being in nature. The project also serves to contribute to the collection of scientific data by providing a means for individuals to easily submit photos of their observations to ecological databases. By mobilizing children to engage with the scientific process and environmental data collection, our project encourages children to develop an interest in preserving the nature in their city.

table of **contents**

the
background

the challenge

As cities across the world urbanize, children have a diminishing awareness and respect for the nature that surrounds them, which is detrimental to their health.

According to a 2015 report by the French Institute for Public Health Surveillance, in the greater metropolitan region, four in ten children, aged 3 to 10, don't play outside during the school week (ENNS, 2006-2007).

The results of this survey also show that only one out of two children spend outdoors in the week after school. In addition, only 64% of children go outside when school is not in session - Wednesday, Saturday, Sunday and school holidays.

Four in ten children do not play outside during the week

In their paper, "Living in Cities, naturally," Terry Hartig and Peter Khan (2016) coin the term environmental generational amnesia. This phenomenon occurs when children lack exposure to nature, causing their attitude towards the environment to be indifferent. In turn, children are not motivated to preserve the current nature around them. As a result, the young generation assumes that the degrading environment is the norm and in the long term, will not care about continued environmental loss.

In the book Last Child in the Woods, Richard Louv (2005) explores other issues caused by the disconnect between children and nature. In the book, he uses the term "nature deficit disorder" (NDD) to describe a non-medical condition where children lack exposure to nature at an early age and conseq-uently, are susceptible to anxiety, depression, ADD, obesity, and other health issues.

benefits of exposure to nature

Nature-based education has a beneficial impact on children's development, improving physical, mental, social, and academic health ("Benefits of Connecting Children with Nature", 2017).
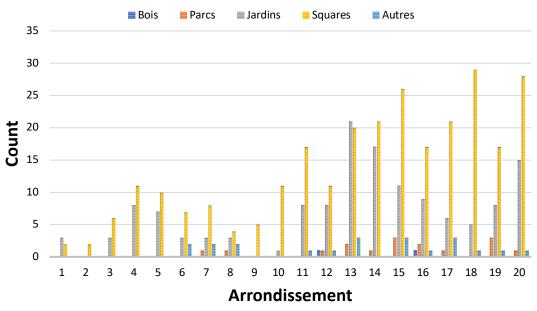
Better mental health and less stress

Improved academic performance

Improved vision and focus

Boosted creativity

More active lifestyle

where can kids find green?

This graph shows that some districts of Paris have very little green spaces available. But these are formal definitions for greenspaces which may not encapsulate small islands of green and biodiversity – for example, cemeteries prove to be locations with rich biodiversity but go unlisted here.
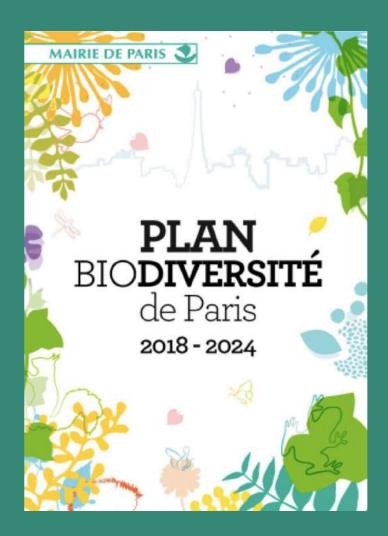
The purpose of our project is to show children that they can play outside no matter where they live, and get in contact with nature without necessarily going to the park and gardens.

NUMBER OF GREEN SPACES PER ARRONDISSEMENT

Adapted from "List of parks and public gardens in France"

city goals

The city has recognized the importance of educating and connecting children with the biodiversity that exists in the city. In fact, biodiversity was declared an honorary citizen of the city of Paris in September of 2016, ("Biodiversity," 2016). In the Biodiversity Plan of Paris 2018-2024, Action 11 states that one of the city's goals for protecting biodiversity is to teach citizens, especially children, about the "mechanisms and fragility" of the biodiversity that surrounds them in order to mobilize future generations to protect it.

what is **biodiversity?**

"Biodiversity is the living tissue of the planet. It is the variety of living creatures, including ourselves, and all relationships that are forged between them […], the presence of nature in the city improves the living environment and health of inhabitants, and contributes to reducing heat islands and pollution."

- Paris Biodiversity Plan 2018-2024

SDGs

United Nations Sustainable Development Goals

3 GOOD HEALTH AND WELL-BEING

3.4: "By 2030, reduce […] premature mortality rate from non-communicable diseases through prevention and treatment and promote mental health and well-being."

Exposure to green spaces is beneficial to children's physical and mental health.

4.7: "By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development […]"

By learning about biodiversity and its importance to society, children will be inspired to join the effort against environmental degradation.
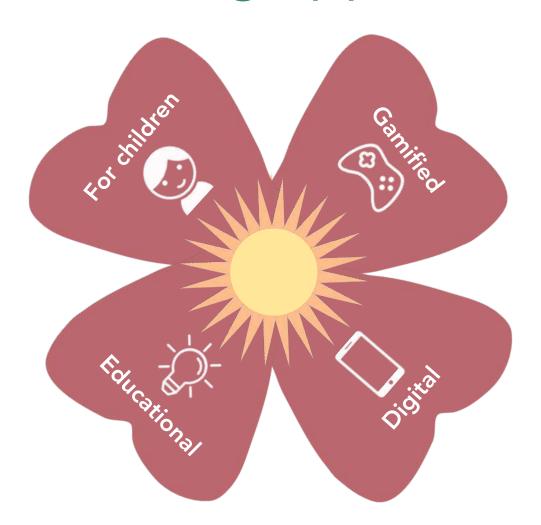

15.9: "By 2020, integrate ecosystem and biodiversity values into national and local planning […]"

Our proposal integrates bio-diversity values into a solution for the nature-child disconnect.

previous
approaches

assessing approaches

For children

Gamified

Educational

Digital

In order to tackle the disconnect between nature and children while also educating children about Parisian biodiversity, we selected four key components to integrate into our solution. Although the following previous approaches each lack different key components, they remain important precedents from which we drew influence. Many of their strengths are incorporated into our proposed solution, assuring that Ma Découverte includes each key component: designed for children, uses digital tools, has an interactive game aspect, and provides educational content.

Balades Paris Durable

Balades Paris Durables allows users to choose from several themed walking routes around the city, each lasting approximately 2 hours. These walking tours take users to different nature locations throughout the city and provide information about the local flora and fauna found in those locations (Balades Paris Durables, n.d.). However, the use of dense text and the application's lack of interactivity makes it less engaging, especially for younger users.

Strengths:
- Provides users with information about urban nature
- Outlines routes for users to explore the city

Sauvages de Ma Rue

Strengths:
- Helps users identify species
- Promote education through observation
- Citizen science component

Sauvages de Ma Rue is a phone application for Parisian children that helps them identify plant species in their neighborhood (Sauvages de Ma Rue, n.d.). The app also allows children to send their collected data to researchers. However, this app is limited to plant species and has a limited amount of gamification.

Pedagogical Parks in Paris

An example of a pedagogical park is Parc Floral de Paris, which is located in Bois de Vincennes (Le Parc Floral de Paris, n.d.). The park has several themed areas such as the botanical garden, bonsai garden and butterfly garden. There are also informational panels located throughout the park. However, Parc Floral is far from the city center. Therefore, it is not easily accessible for all the children of Paris.

Strengths:
- Entertaining for children and families
- Promotes observation through education
- Access to a lot of documentation at the library of La Maison Paris Natural

participatory science in Paris

Insectes & Ciel étoilé

Observatoire de la Biodiversité des Jardins

SPIPOLL
Suivi Photographique des Insectes Pollinisateurs

Oiseaux des jardins

These programs teach people how to recognize different species of animals. Then they collect citizen observations and photos about this species around their home and living area. The data collected is accessible to scientists conducting research.

Strengths:
- Promotes education through observation
- Citizen science component

Nature Cat's Great Outdoors

Nature Cat's Great Outdoors is an application created in the United States. The app encourages children to go outside and record their nature observations through drawings, images, video or audio. The app assigns daily missions and rewards user participation with badges (Nature Cat's Great Outdoors, n.d.).

Strengths:
- Engages children to go into nature
- Encourages children to record their observations
- Use of incentive badges

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iNaturalist

iNaturalist.org

How It Works

Record your observations — Share with fellow naturalists — Discuss your findings

Strengths:
- Engages the public with nature
- Citizen science
- Provides knowledge about how to recognize species

iNaturalist is a global online community of citizens and scientists (iNaturalist, n.d.). The website and application allow users to connect with experts to help identify species they observe. The platform also allows users to host BioBlitz events and contribute to scientific data.
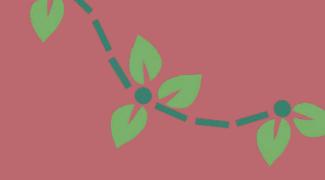
Geocaching

Strengths:
- Encourages people to go outside and explore
- Scavenger hunt makes it entertaining for users

Geocaching is a global scavenger hunt, accessible to anyone with a GPS device. The game provides users with the GPS coordinates of hidden geocaches - small containers holding objects and logbooks. Users then search for the geocache and record their visit in the geocache's logbook. The platform also provides resources for users wanting to create and place their own geocaches (Geocaching, n.d.).
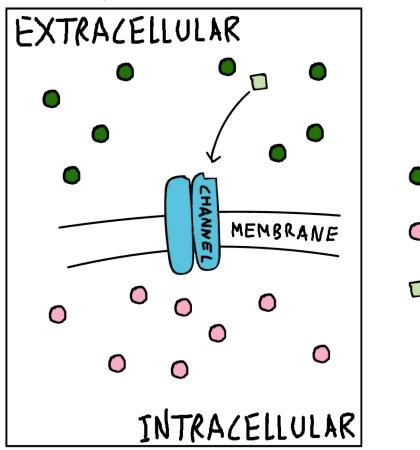
proposed
solution

the idea

Ma DécouVerte is an **interactive excursion** designed for primary school-aged children (6 through 12) to use with their parents or guardians. The free application will **guide users to green spaces and biodiverse locations** throughout the city. At these locations, users will have the opportunity to collect points by **exploring, observing, and reporting**.
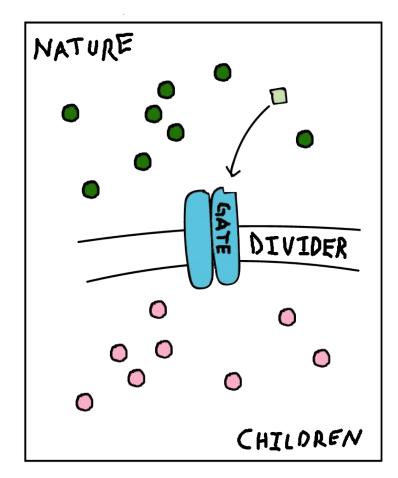
biological inspiration: **protein channels**

Channels, which are groups of proteins that line our cell membranes, control the imports and exports of the cell. These cellular gates are opened by the presence of a stimulus such as a chemical compound known as a ligand. When the ligand attaches to the channel, the channel opens to allow the diffusion of specific molecules (KhanAcademy, 2015). Without ligand binding, the channel cannot open, transportation will not be facilitated, and ultimately the cell will not be successful.
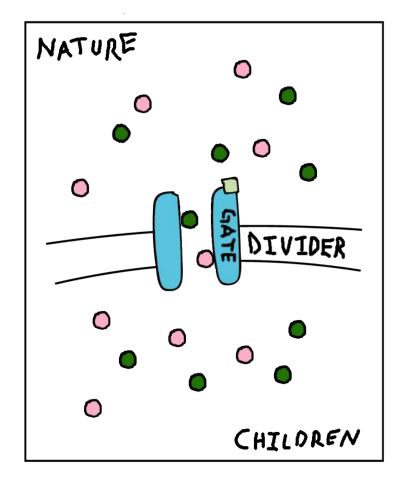

Molecule 1

Molecule 2

Ligand

We envision a closed gate to exist in the divide between Parisian children and the urban nature surrounding them. As a result, the balance between nature and children is at a disequilibrium, putting the youth population at a greater risk of heart disease, stress, and mental disorders. On the other end of this imbalance, the growing population cares less about nature and in turn, is likely to care less about continued environmental degradation.

NATURE

GATE

DIVIDER

CHILDREN

- Awareness & Health Benefits
- Care & Scientific Interest
- Our App

Our application proposes to activate this channel.

With our app, the knowledge of urban nature is able to reach children and in turn, children are able to contribute to preservation and understanding of their environment by collecting information for scientists. Nature and children can reach equilibrium.
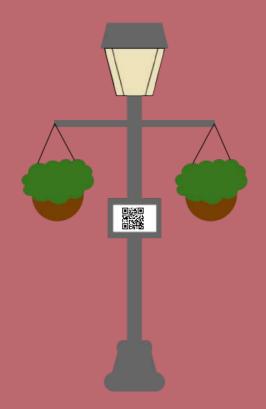
the components

interactive phone application
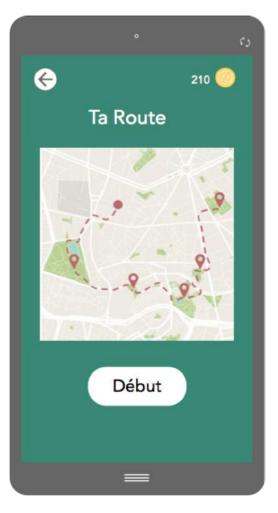
physical location indicators

how it works

The application will allow users to input
- the amount of locations they would like to visit OR
- the time they would want to dedicate to their excursion.

Using this input and the user's current location, the application will generate a route for the user to follow. This way, the user can always expect a new adventure.

features

Point collection will serve to keep users engaged and motivated to explore more

A live map will outline the route and stops along the route

Users can take photos of animals and plants that they see, save the photos to their device and submit for research

Users scan QR codes in order to earn points and unlock activities

Users can draw their observations and save to their device

Users can record sounds they hear and save to their device

210

30

activities

Upon arrival to a designated location, the user can scan the location's unique QR codes to activate the corresponding missions. Completed missions earn the user more points and badges.

Potential missions/tasks could include:

- **searching for species** of plants and animals
- **counting** and recording animals seen
- **drawing**, taking **photos** and recording **audio**
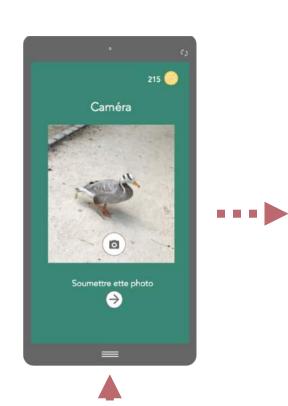- **completing quizzes** using available information panels

citizen science

After taking a picture of a plant or animal, the user will have the option to submit the photo and accompanying information to the databases of the Muséum National d'Histoire Naturelle. The photo will be processed through an image recognition software that will classify the species in the picture. This information and metadata associated with the photo – date, time, location, and weather - will be sent. In return, the child will receive information about the species they photographed. This process will be more efficient as the technology advances.

VIGIE**NATURE**

Image Recognition Software

Location: Parc Montsouris
Date: 23/07/2018
Time: 17h32
Temperature: 29 ℃

Species: Black Barred Goose
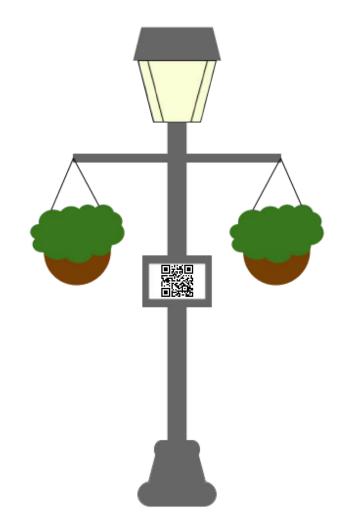**Location:** Parc Montsouris
Date: 23/07/2018
Time: 17h32
Temperature: 29 ℃

Species: Black Barred Goose

locations

To mark participating locations, signs with the Ma DécouVerte logo and a QR code for downloading the application will be placed on defining and easy-to-spot infrastructure such as light posts, poles, and entrance gates.

Apart from serving as indications of the locations' association with Ma Décou-Verte, the signs will also serve as self-advertisement. For passersby unfamiliar with the application, the signs may be intriguing and prompt them to scan the code or research our app's name.

Information panels are a critical component of our project, encouraging users to . They allow users to learn about the location and the species commonly found there. This information will allow users to answer our quiz questions and identify species they see. For this reason, we plan to use existing panels and install new ones. The Ma DécouVerte logo and QR codes will be placed on both existing and new panels.
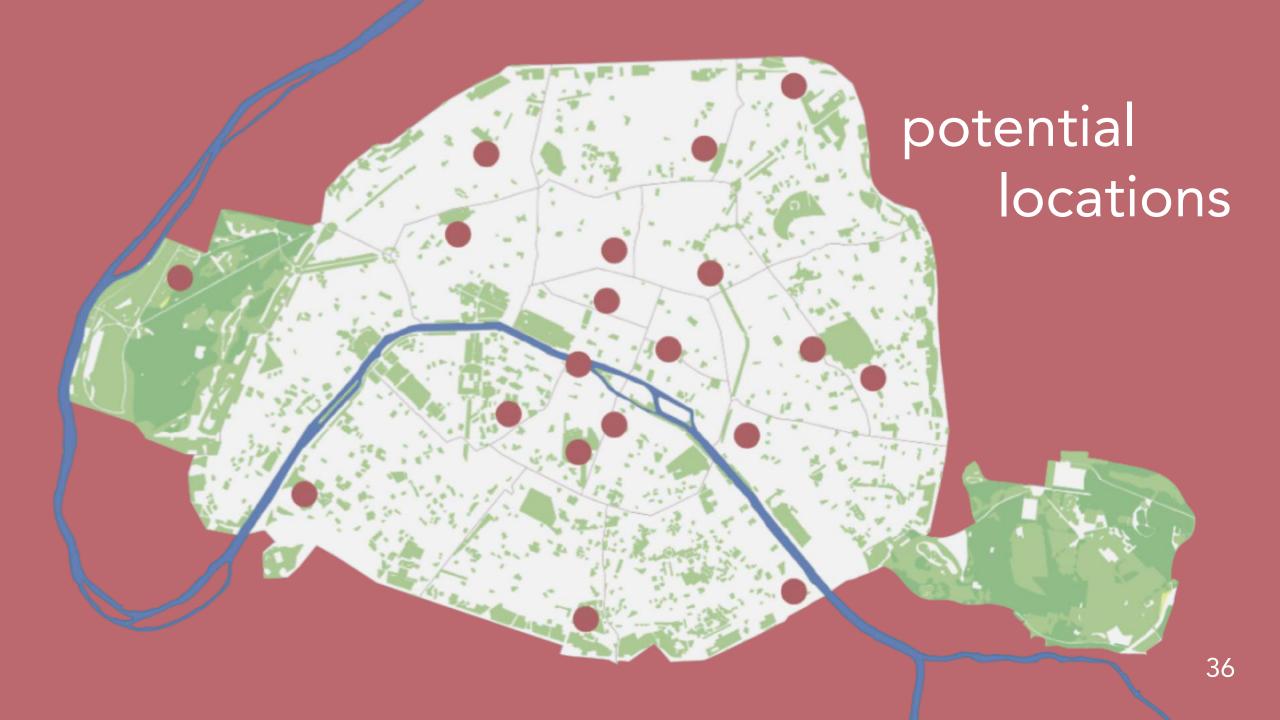

Papillon

Les papillons sont des insectes de l'ordre des lépidoptères, qui comprennent également des mites. Les papillons adultes ont de grandes ailes, souvent aux couleurs vives, et un vol remarquable. Le groupe comprend la grande superfamille Papilionoidea, qui contient au moins un premier groupe, les capitaines et les analyses les plus récentes suggèrent qu'il contient également les papillons nocturnes.

Les papillons sont des insectes de l'ordre des lépidoptères, qui comprennent également des mites. Les papillons adultes ont de grandes ailes, souvent aux couleurs vives, et un vol remarquable.

35

potential
locations

36

Park / Green space	Arrondissement	Activities
Seine's bank	1	Observe Seine biodiversity
Oasis d'Aboukir	2	Discover vertical garden
Jardin Anne-Frank	3	Observe insect hotel
Jardin Médiéval de Cluny	5	Discover how the plants in the garden were used during the Middle Ages
Parc du Luxembourg	6	Observe beehives
Jardin Catherine Labouré	7	Visit the pedagogical garden
Parc Monceau	8	Observe plants and beehives

Park / Green space	Arrondissement	Activities
Canal Saint-Martin	10	Observe freshwater mussels, eels, sun poles, cormorants and muller sponges
Jardin des jeunes pousses	11	Search butterflies and others insects
Coulée verte	12	Search for which plants are wild and which have been grown by humans
Jardin Abbé-Pierre Grands-Moulins	13	Learn about different environments
Parc Montsouris	14	Search for bird species
La Petite Ceinture	15	Observe flowers and animals such as foxes and hedgehogs

Park / Green space	Arrondissement	Activities
Parc de Bagatelle	16	Observe peacocks, nutria and carps
Martin Luther King's Parc	17	Observe aqueous plants and typical bank trees
Jardin Rosa Luxembourg	18	Observe water plants and fruit trees
Forêt Linéaire	19	Learn about differences between the different environments (wooded meadow, forest and dense canopy)
Jardin Naturel	20	Observe frogs and tritons in the lake.

Information gathered from "Jardins de Paris insolites ou méconnus," "Les espaces verts au cœur du Grand Paris," and *A Portrait of Biodiversity in Paris*

business
plan

value proposition

We provide an entertaining experience in nature to school-aged children. Unlike previous approaches, we offer an experience that integrates digital tools, games, and citizen science at no cost to users.

timeline

**Acquire
Funding**

**Development +
Build
Infrastructure**

Launch

**Update +
Expand**

Reach out to key
funders and
sponsors with our
idea

until January 2019

Create the app
and set up posts
and QR codes at
locations.

January 2020

Advertise through
our channels and
launch app

April 2020

Improve app to fix
bugs, reflect new
data/discoveries,
and have new
features.

*June 2019
and onwards*

funding

city hall

Because our project assists city hall in carrying out their Biodiversity Plan, we can provide the city with basic application usage information in exchange for funding.

Muséum National D'Histoire Naturelle

In exchange for sponsorship, we are providing the museum's citizen science program with data.

green NGOs

In our application, we plan to sell advertising space for green NGOs, such as Fondation Nature Homme and Fondation Goodplanet, with whom our vision aligns.

key partners

In order to provide current and reliable ecological data in our application, we plan to partner with the Agence Régionale de la Biodiversité. In addition to the data available on their website, we will require more detailed data, which we can receive from different organizations within their network.

We plan to join the citizen science network VigieNature, which is run by the Muséum National d'Histoire Naturelle (MNHN, n.d.). As a participating organization, the data collected by our app can be used for scientific research.

advertising channels

La Maison Paris Nature is a nature resource center located in the Parc Floral de Paris. Because this center serves children and families, posters of our application can be placed inside the center and tutorials can be also be held there.

Paris Mômes is a free bimonthly magazine for Parisian parents that provides activity ideas for families and information about local events (Paris Mômes, n.d.) We plan to advertise our app as a family activity in this public-ation.

key resources

The Google Maps API will provide the navigation, routing, and geolocating capabilities necessary for our application.

The iNaturalist API and deep learning engine will provide us with the image processing capabilities for species identification.

costs

App Team

We will need a team of at least 2 developers to create and maintain the app. We will also need an information curator to manage the biodiversity information that is on the app.

Advertisement

To attract new users, we will need to advertise our app to parents through channels such as Paris Mômes and La Maison Paris Nature.

Physical Markers

We will need to create signs, QR code and logo stickers for existing and new information panels.

Software

We will need to pay to use the Google Maps API and the image processing software.

assessment
plan

app metrics

Metrics	Information provided
Downloads, Growth Rate, Daily Active Users, Stickiness, etc.	These generic app usage statistics will tell us information about how often our app is being used, how many people are using it, and how we can expect it to spread.
Number of QR code scans	Number of visits to each location allows us to determine which are the most popular locations.
Number of drawings made, audio recorded, and photos taken	Can help us determine which features are the most used.
User surveys	Can help us determine if app functions properly, is easy to use, and is enjoyable to users.
Quiz scores	Can help us determine usefulness of information panels.

knowledge + social indicators

Indicator	Information provided
Trend in quiz scores	Different trends in the quiz scores within a user and across the user populations lets us know if the app is successfully educating users.
Number of QR code scans	Number of visits to each location allows us to determine which are the most popular locations.
Number of photos submitted for science	Can help us determine how engaged users are with citizen science component.
Parent surveys	Ask parents about their child's interest in nature and whether the app has.
Trends in app usage	By leveraging these trends against contextual information such as app updates, we can see what is working well in the app.

health indicators

Indicator	Information provided
Total time spent on route	Will determine how much time user has spent outside using the app.
Sum of all route lengths	Will determine how many kilometers user has walked using the app.
Parent surveys	Ask parents if their child is more eager to be outside and be active.

conclusion

Through Ma DécouVerte, we hope to open the gate between urban nature and children in order for both to benefit. Ideally, children will be increasingly motivated to care for the environment after interacting with it. In doing so, children will receive numerous health benefits and the scientific community will receive collected data for furthering environmental research. Ma DécouVerte aims to not only teach; it seeks to expose children to everything nature has to offer.

resources

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images

Title: Butterfly from pixabay.com, modified by team with map from www.commons.wikimedia.org/wiki/File: Green_spaces_in_Paris,_2012.svg
2: Flowers produced by team
5, 14, 23, 40, 48, 53: Title photos taken by team
6: Icons from pixabay.com
8: Icons from flaticon.com, child by pixabay.com
9: Graph produced by team, information from fr.wikipedia.org/wiki/Liste_de_parcs_et_jardins_publics_de_France
10: www.paris.fr/biodiversite
12,13: www.un.org/sustainabledevelopment /sustainable-development-goals/
15-22: Flowers produced by team, icons from flaticon.com
16: www.baladesparisdurable.fr
17: www.sauvagesdemarue.mnhn.fr

18: www.parcfloraldeparis.com/fr
19: Spipoll logo from www.spipoll.org/, Insectes et ciel étoilé logo from vigienature.mnhn.fr/ insectes-et-ciel-etoile
20: www.pbskids.org/apps/nature-cats-great-outdoors.html
21: www.inaturalist.org/
22: www.geocaching.com
25-27: Diagrams produced by team, inspired by Khan Academy video "Ligands and Receptors"
28-33: App designed by team using MockPlus, map from snazzymaps.com
28, 34: Light post produced by team
32: Animal icons from flaticon.com
33: Goose photograph taken by team, *VigieNature* logo from www.mnhn.fr

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35: Information panel produced by team, butterfly from www.paris.fr/biodiversite

36: map from www.commons.wikimedia.org/wiki/ File: Green_spaces_in_Paris,_2012.svg

44: *Agence* logo from www.arb-idf.fr/, *VigieNature* logo from www.vigienature.mnhn.fr/

45: La Maison Paris Nature Logo from https://www.facebook.com/MaisonParisNature/, Paris Mome logo from www.parismomes.fr/

46: Google Maps API from www.intelligencepartner.com/wpcontent/uploads/2 016/10/logo_lockup_maps_apis_color-copy.png, iNaturalist logo from static.inaturalist.org/sites/1-logo_square.png?1514411332