

Nature's Magic Box

Walkthrough

The journey begins and our heroes wake up in the **Jerico dessert** without any food or water supplies. Suddenly, and after a couple of days searching for water and food, they find a wooden box in the middle of the dessert and while they open the box.....their adventure begins.

The **Magic Box hints**, in printable form (**see no. 3,8,11,16 and 17**), are meant to give the students the basic concepts and the steps to follow towards saving the world based on Biomimicry concepts. These hints will help them navigate around the room and understand where to start and how to move from one riddle to another until they find the magic key to unlock the door.

IMPORTANT NOTE: Keep in mind that the escape room's walkthrough is linear. This means that the students have to solve one riddle before they can move forward to solve the next riddle. ***All of the riddles go in a specific sequence.*** Moreover, it would be helpful that the students identify the first riddle quickly without spending time for searching the entire room/classroom, hence, guide them in the beginning towards finding the cat's eyes riddle (maybe with a hidden message that they find without unlocking any lock).

1. Cat's eyes (riddle number 1):

Backstory: Their first mission is to follow the right path as they walk to a cold, and empty road. Suddenly, a cat crosses the street with her eyes shining in the dark. The first riddle appears on the wall next to the door they entered the room. There is an Egyptian poster on the wall (A3 size – printable no.1) with some holes (3 of these holes are covered with the reflective tape and all the others are covered with aluminum foil).



Red circles: Reflective tape

Yellow circles: Aluminum foil



Invisible Ink Spy Pen with UV Black Light

Hint: Given that the first clue is “cat” and “night vision” (see printable no.3), the students must turn-off the lights in order to identify the correct spots on the poster (A3 size) on the wall, covered with the reflective tape.

Solution: The students must combine the Egyptian poster on the wall with the Egyptian papyrus on the table (or hidden in a box without lock). The Egyptian papyrus has 7 numbers and the students must link these numbers’ positions with the reflective tape positions on the Egyptian poster on the wall (by simply turning-off the lights). The hidden message (code “380”), written with glow in the dark ink, will be revealed using a blacklight upon the small Egyptian poster (A4 size – printable no.2). In this manner, they mimic the pavement markers inspired by the cat’s eyes.

2. Velcro box (riddle number 2):

Backstory: Their journey continues with something like an inception as they find another box placed in the table inside the room (next to the small Egyptian poster). Hence, clue “380” leads them to the Velcro Box. Using the 3-digits code, they unlock the box in which they find decomposed leaves, the Cryptex filled with coins (or small metal balls) and a Velcro tape where the cage key (see riddle no.3) is hidden inside.



Velcro box with a
combination lock (380)

Da Vinci Velcro with the
hidden key for the cage



Cryptex with metal coins
inside

Hints: A second optional hint may be revealed which will guide the students to use all objects inside the Velcro box in the correct order. In addition, the decomposed leaves inside the Velcro box will work as an indirect hint for the students in order to identify the correct page with the leaf on the Da Vinci’s Codex.

Solution: At first, the students must focus on the Velcro tape that is glued inside the box. When they unwrap the Velcro tape, they will find a small key that unlocks the wooden cage inside the room (it is easy to realize how to use the key as long as the cage has the only simple lock without numbers). Inside the cage there is the Da Vinci’s prototype, the Codex of the Flight of Birds and the marked transparent rice paper that will be used to find the hidden message in the Codex of the Flight of Birds.

IMPORTANT NOTE: In order to reveal the hidden message on the Codex, you have to work on a transparent rice paper based on page 34 of the Codex on the Flight of Birds (printable no. 4).

Place the transparent rice paper on top of the page, mark the letters W – I – N – G – S inside the text and drill these marks with a pen to create holes. Optionally, you may burn the edges of the transparent rice paper to make it look old!

3. Da Vinci's Codex on the Flight of Birds (riddle number 3):

Backstory: Our heroes arrive to the nearest village in order to find water, food supplies and a place to stay because it's really cold outside. The village seems to be uninhabited; all stores are closed and most of the houses seem to be locked and empty. Suddenly, they find a house with an unlocked door, our heroes enter inside the house where the first thing they see next to the door.....is a wooden cage.

Hints: The Flying Machine prototype, inspired and designed by Leonardo Da Vinci, is the hint for the message that the students are searching for in the Codex.



The cage with the Da Vinci's prototype



The hidden transparent paper rice with the holes for decrypting the hidden message in the Codex



The Da Vinci's Codex for the Flight of Birds printed and hidden at the bottom of the cage

Solution: Our heroes have to carefully inspect the cage where they find the Codex of the Flight of Birds (on the bottom of the cage – printable no.4) and the transparent paper rice attached at the bottom side of the Da Vinci's wooden prototype (printable no.5 and no.6). After they get all clues from the cage, our heroes must sit on a table, read the Codex and find the correct page with the hidden message (the leaves inside the Velcro box will help them to find the correct page – page 34). When they place correctly the paper rice upon the Da Vinci's writings on page 34, the word '**wings**' appears inside the circles of the rice paper. The hidden word '**wings**' unlocks the Cryptex with the coins.

4. Bees' honeycomb (riddle number 4):

Backstory: After they find the coins inside the cryptex our heroes continue to search the house in order to find something to eat. The refrigerator and all kitchen lockers are empty, however, behind the door they find honey and a strange construction that looks like a Honeycomb made of paper with numbers inside each cell.

Hints: Next hint is revealed for helping students to understand how they will use the coins from the cryptex and the honeycomb (printable no.8).



The honeycomb (in 3D view) with different numbers.



Below digits 2, 5 and 5 three magnets are attached

Solution: The scope is to throw coins inside all hexagons of the Honeycomb (3 small magnets are attached on the back side of the construction at specific numbers, i.e. 255). When they shake the Honeycomb, they realize that all coins inside the cells are moving apart from 3 cells where the coin(s) are staying still (**255** is inspired by the world bee – b = 2, e = 5, each letter's position in English alphabet).

5. Eco-location animals and sonar (riddle number 5):

Backstory: Our heroes taste the honey which seem to be delicious. Everything is calm, they feel safe inside the house and they decide to get some rest when suddenly.....a swarm of bats breaks all windows entering the house!

Hints: Next hint appears revealing to our heroes the key to control the bats' swarm as also the way to solve this riddle (see printable no.11).

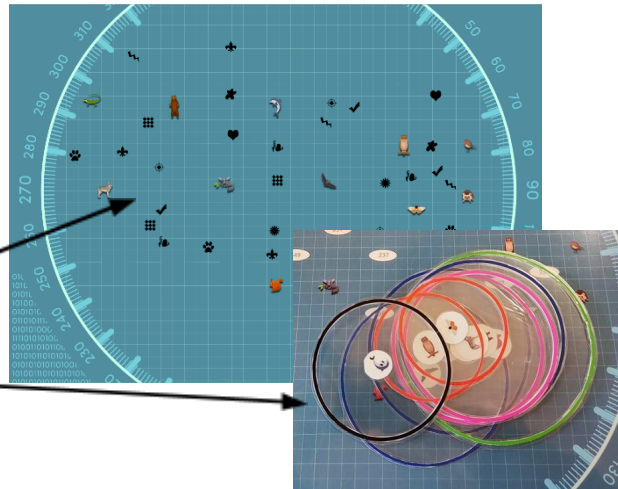
Solution: Code 255 from the previous riddle will be used in printable no.9 (see the image below). On the left side of printable no.9 there is a graph with numbers on the X axis and letters on the top of each bar. The students must select numbers 2 and 5 on the X axis that gives CO₂, using also the hints on the bottom right corner (blue rectangle). The sonar in the middle (yellow rectangle) includes different animals linked with different letters (i.e. C, O, H etc.). Having that the CO₂ is the answer, students have to select the correct animals/letters (i.e. C,O,O).

However, oxygen appears 3 times. In order to eliminate 1 oxygen molecule, students must read the hint on the top right corner (yellow box with the bear). The message pinpoints that "*Not all animals use the eco-location system, for instance a brown bear*" and as result, the students have to select the correct circles that are marked with a dolphin (C), a bat (O) and an aye-aye (O) (see Figures below). Putting the correct circles (printable no.12, no.13 and no.14) centered on top of each animal in printable no.10 and based on the Trilateration method, a symbol that looks like a leaf/heart appears inside the circles' intersection area. The final goal is to link this sign with printable no. 15 and the numbers of the animals' symbols. Using the animals that use the echolocation system on the Y axis and the correct column on X axis (where the leaf symbol is placed), a code appears (**237**). This is the code that unlocks the lock of the final riddle!



The sonar in the middle and all hints needed to find the correct circles

The sonar map including numerous codes, the list of animals that is included in the image above and the printed circles that are linked to these animals (with different colors)



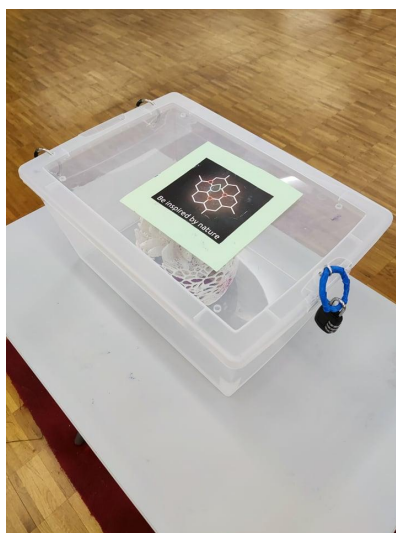
IMPORTANT NOTE: Both sonar and sonar grid files (printable no.9 and no.10) must be printed in A3 size. Alternatively, you can print these files in multiple A4 size pages and make a collage. The circles must be printed in A4 size (i.e. printable no.11 - 13)

6. **Corals and CO₂ absorption (riddle number 6):**

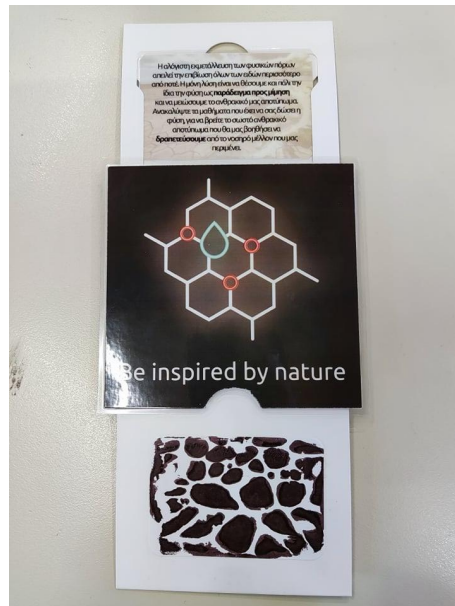
Backstory: Our heroes are safe from bats, however, all doors in the house seem to be locked. They are trapped! They are trying to unlock every door in the house when suddenly, in the basement door they see printable no.18 and a table on top of a red carpet leading to the door and a 3D printed coral formation inside a box. Our heroes have to keep in mind the use of coral mechanisms as inspiration for making cement that stores carbon instead of releasing it into the atmosphere.

Hints: The final hints appear (see printable no.15 and no.16). You may hide these hints inside the coral that is locked in the box.

Solution: For the final riddle, our heroes have to unlock the box using code **237** from the sonar riddle in order to remove the coral structure. The 3D printed coral keeps 2 hidden clues. The ultimate goal of this riddle is to use the plasticine for creating the correct pattern (key) using the 3D printed coral surface. Using the plasticine pattern and dark ink (see hints in printable no.16 and no.17), our heroes approach the door where the unlocking pattern is glued (hidden inside or on the backside of printable no.18).



However, the pattern is not revealed until they pull the paper made construction (see the Figure below). On the top side of the paper made construction there is a hidden message on how to use the key. On the bottom there is the correct pattern that unlocks the door. They have to attach their plasticine made pattern upon the pattern on the door. If the pattern (metaphorically the carbon footprint) is correct, **THEY ARE FREE TO EXIT THE HOUSE, THE MAGIC BOX AND LITTERALLY SPEAKING.....THEIR CLASSROOM!**



THE END!