Module 1

Organizing the game

Requirements

List of materials/tools

- Safety boxes with combination locks
- Chests with key locks
- Stickers for indicating the paths (indoors version)
- Access to internet connection and GPS (outdoors version)

Procedure

STEP 1: Choose how many courses you want to set up, what device will be connected to each and how many steps (safety boxes) they will be comprised of.

Since only so many people can play a single course at any given time, it is a good idea to set up different, independent courses to have people play simultaneously (especially for large events with lots of players). All courses can have the same starting point (so that you can explain the rules to more groups at the same time before they start playing), but they cannot share clues and safety boxes.

Each course will be dedicated to a single device. For each device you should define an identifying symbol, and make a list of the elements it contains that you want to use for the game (one for each safety box along the course). The goal of the players is to find all the elements from that device throughout the course, and in the end go back to the starting point and open the chest containing the device itself (or a symbol/replica of it). It is also a good idea to color-code each course/device.

Three example devices with four elements in each will be given at the end of this Module.

STEP 2: Procure safety boxes and chests, and map the courses.

Each course of the game needs several safety boxes with combination locks (one for each “step” you want to be in the course) and a single chest with a padlock (that will be placed at the starting point of the course, where players need to get back once they have found the last safety box containing the key for the chest). Each box and chest should have a sticker or piece of paper attached with the symbol of the device/course it is connected to.

Explore the environment where you want to set up the game to find the best places to hide the safety boxes. You can use natural and artificial features for the environment, spray paint the boxes to make them blend more, and even set up simple systems of pulleys (that will be operated by/with the supervision of the organizers) to hide them above ground level.

CAUTION: Be mindful to not place boxes in locations that are potentially hazardous to reach, traverse or interact with. Even if each group of players will be tutored at all times during the game, accidents can always happen.

It's better to keep different courses somewhat separate from one another, and to not place subsequent boxes too far apart. Don't place boxes of different courses very near to one another; even if each is marked to its course, so there should be no chances of mistaking a box for another, people of one team finding the box of another's could still disrupt the game and distort the time results.

STEP 3: Prepare a list of questions about the elements present in each device.

For each box that you will place in a course (except the last one, which contains the key to the chest), you need to write two multiple choice questions related to that box's element. Answering one question will give the players directions for finding the next box, and answering the other will provide the combination to open it. This can be set up in several ways, but the simpler is to just assign to each possible answer a direction/combination, with the correct ones being assigned to the two correct answers.

Some example questions you can use will be available at the end of the Module.

Directions for indoors version: Map out in advance different courses in the environment using different colors and/or symbols. Answering correctly to the direction question will send the player on a course that ends near very near to where the next box is hidden. The other course(s) will lead nowhere; players should be made aware of that (for example, the course could end in front of a sign telling them they got the wrong answer), or they might waste an inordinate amount of time as the consequence of a single wrong answer.

Directions for outdoors version: You can use the free app "what3words", which uses a three-key-words system to assign to each 3-square-meters spot on the planet a unique identifier. Just check in which "geo-cell" the next box is located according to the map and write those words beside the

correct answer, then pick one or more empty cells in the vicinity and assign their words to the wrong answers. As for the indoors version, once players reach the wrong location they should be made aware of their mistake, either through something in the environment or directly by the organizer tutoring them.

STEP 4: Prepare an informational sheet for each device.

These sheets should contain a list of information about all the elements of the devices you want to use for the game. They should be given to each group when they start a course, and their purpose is to give the players additional information that they can use to find the correct answers to the questions.

For example sheets you can use, see **Students Card**.

STEP 5: Place the items and the starting desk.

Place the boxes in the designated spots, and set up a starting desk with all the final chests. All players should start the game at this desk, where the rules will be explained and the informational sheet for their course will be given to them. Make all groups start their courses at the same time if possible, in order to explain the rules to everybody at once.

There should be at least one organizer at the desk to explain the rules and look after the game materials, in addition to one person for each course, following the groups at all time during the game. The tutors following the players have the task of keeping track of the time taken to complete the course, inform the players if they end up in the wrong place, reposition the boxes after they have been used and be sure that nobody gets hurt/causes any damage (especially when children or teenagers are playing).

After a group completes the course, the tutor who is assigned to that course should go back and check that everything is in place for the next group to start playing. This means that, regardless of how long you plan your courses to be, you should always leave some extra time between groups for re-arranging the game.

To make the game more engaging, you can plan to give prizes to the fastest teams. If a competition for the game is set up, in order to keep things fair each course should have its own winner among all the groups who played it. Don't pit groups who played different courses against one another, because it's impossible to guarantee that different courses will be just as difficult/long. On the contrary, you may even go out of your way to set up courses of different intended difficulty levels/lengths to propose to players.

Example Material

What follows is a set of example devices, materials and questions you can use for your game setup (informational sheets to go along with this sample material are also available, in the **Students Card** document). If you wish to use different devices, elements and/or questions of your choosing for the game, feel free to take inspiration from the following as an example on how to create your own.

SMARTPHONE

Elements it contains: **Gold – Magnesium – Copper – Indium**

FIRST STEP – ELEMENT GOLD

First question:

From 100 Smartphones it is possible to extract as much gold as from:

1) An apple (correct answer)
2) A cherry

Second question:

Where can you find gold inside a Smartphone?

1) Battery
2) Electrical components (correct answer)
3) Display

SECOND STEP – ELEMENT MAGNESIUM

First question:

Which food contains the higher quantity of Magnesium?

1) Beans (correct answer)
2) Cheese

Second question:

In contact with Oxygen, Magnesium becomes:

1) White
2) Transparent
3) Opaque (correct answer)

THIRD STEP – ELEMENT COPPER

First question:

Why is Copper used in the construction of beer plants?

1) Because it has good heat transfer (correct answer)
2) Because it is cheap
3) Because it is resistant

Second question:

Which country is the world leader in Copper production?

1) Russia
2) Bolivia
3) Chile (correct answer)

FOURTH STEP – ELEMENT INDIUM

First question:

What happens when an Indium bar is bent?

1) It breaks
2) It heats up
3) It produces a shrill squeak (correct answer)

Second question:

What is the main source of Indium?

1) Zinc production (correct answer)
2) Platinum production
3) Mercury production

SPEAKER

Elements it contains: **Copper – Neodymium – Gold – Ytterbium**

FIRST STEP – ELEMENT COPPER

First question:

Why is Copper used in the construction of beer plants?

1) Because it has good heat transfer (correct answer)
2) Because it is resistant

Second question:

Which country is the world leader in Copper production?

1) Russia
2) Bolivia
3) Chile (correct answer)

SECOND STEP – ELEMENT NEODYMIUM

First question:

Neodymium is used in the production of speakers because it guarantees:

1) Durability
2) Sound clarity (correct answer)

Second question:

Neodymium can be released in the environment during the disposal of:

1) Organic waste
2) Home appliances (correct answer)
3) Pruning waste

THIRD STEP – ELEMENT GOLD

First question:

From 100 Smartphones it is possible to extract as much gold as from:

1) An apple (correct answer)
2) A cherry
3) A watermelon

Second question:

Where can you find gold inside a Smartphone?

1) Battery
2) Electrical components (correct answer)
3) Display

FOURTH STEP – ELEMENT YTTERBIUM

First question:

You can also find Ytterbium inside a:

1) Saucepan

2) Smartphone (correct answer)
3) Sheet of paper

Second question:

Does Ytterbium belong to the rare-earth elements?

1) Yes (correct answer)
2) No
3) Partially

ELECTRIC CAR

Elements it contains: **Nickel – Neodymium – Lithium – Lanthanum**

FIRST STEP – ELEMENT NICKEL

First question:

Nickel is mainly used for the production of:

1) Stainless steel (correct answer)
2) Rechargeable batteries

Second question:

In a dark chocolate bar (0.1 kilograms) how much Nickel can be found?

1) 260 grams
2) 0.26 micrograms
3) 0.00026 grams (correct answer)

SECOND STEP – ELEMENT NEODYMIUM

First question:

Neodymium is used in the production of speakers because it guarantees:

1) Durability
2) Sound clarity (correct answer)

Second question:

Neodymium can be released in the environment during the disposal of:

1) Organic waste
2) Home appliances (correct answer)
3) Pruning waste

THIRD STEP – ELEMENT LITHIUM

First question:

Consuming it at our current pace, it is estimated that the world's Lithium reserves will be depleted in:

1) 50 years
2) 525 years
3) 175 years (correct answer)

Second question:

When were the scientists Goodenough, Whittingham and Yoshino awarded the Nobel Prize for Chemistry for the development of lithium-ion batteries?

1) 2019 (correct answer)
2) 2017
3) 2007

FOURTH STEP – ELEMENT LANTHANUM

First question:

At home, you can find Lanthanum inside:

1) A TV (correct answer)
2) Floor tiles
3) A kitchen burner

Second question:

If Lanthanum is inhaled, it can cause the development of cancer in which organ?

1) Liver
2) Kidneys
3) Lungs (correct answer)