OPERATION PRIORAT

ESCAPE ROOM, ORGANISER GUIDE

ACTIVITY 1 › ACTIVITY 2 › ACTIVITY 3 › BOX › ACTIVITY 4

LOCK COMBINATION

4 - 2 - 8

Activity 1 = 4 Activity 2 = 2 Activity 3 = 8

AGES	TEAMS	TIME	ORGANISERS	CARDS
14+ (younger with an adult)	2-7 players	Around 25 min	1 per table	In English

Players are the scientists who must design a soil bacterium to save a vineyard in the Priorat, dying of thirst after nine years of drought. Each of the first three activities gives one digit and the three digits open the box with the last activity inside.

1 MATERIALS

Per table:

- ☐ 1 box with a 3-digit combination lock
- ☐ 1 pencil and 1 team sheet per game
- ☐ 1 reddish/red envelope
- ☐ 1 white or gold Gold Medal envelope + badges
- ☐ Printed game materials
- ☐ 1 mustard-yellow envelope
- ☐ 1 turquoise/blue envelope
- ☐ Genetic code cards and decoding tables

If the Gold Medal envelope is white, add a gold sticker or decoration.

2 PRINTING AND ASSEMBLY

Print the complete game file in colour. Assemble each card with its corresponding back so the cards can be placed face down. Printing double-sided saves a lot of time because cutting is the slowest part and gluing fronts to backs doubles it.

- ☐ Activity 1 cards + backs
- ☐ Activity 2 cards + backs
- ☐ Activity 3 cards + backs
- ☐ Activity 4 cards + backs
- ☐ Six Memory cards
- ☐ Gold Medal cards and materials

3 TABLE AND BOX SETUP

Before each group starts, arrange the game exactly as follows.

ON THE TABLE	INSIDE THE LOCKED BOX
Intro cards (story and rules) - on top	**Activity 4**
Activity 1 - face down	Six Memory cards - face down
Activity 2 - face down	Mustard-yellow envelope
Activity 3 - face down	Red envelope
Genetic code cards	Blue envelope
Team sheet and pencil	Gold Medal envelope

Before players arrive: Set the combination lock to 4 - 2 - 8, lock the box and turn the wheels back to 0 - 0 - 0. If you do multiple session in the same day, between groups, put every card back in its pile, change the team sheet and lock the box again.

4 HOW TO RUN THE GAME

1	**Read the intro cards with the team.** The story and the rules.
2	**Start with Activity 1.** Players read the cards and choose the organism. The answer gives digit **4**.
3	**Move to Activity 2 only after Activity 1 is complete.** The decoding challenge gives digit **2**.
4	**Move to Activity 3 only after Activity 2 is complete.** The codon and complementary-strand challenge gives digit **8**.
5	**Open the box with 4 - 2 - 8.** Players continue with Activity 4, the Memory cards and the envelopes.
6	**Gold Medal (optional).** Teams that want to keep playing open the gold envelope and explain their idea to you.

MINUTE	WHAT IS HAPPENING
0:00	Intro cards and team sheet
1:00	Activity 1: choose the organism
5:00	Activity 2: decode the twelve numbers
10:00	Activity 3: choose the molecule, codons, complementary strand, count the G's (the longest one)
17:00	Lock, Memory and coloured envelope
20:00	Gold Medal, for teams who want to stay

Progressive reveal

Players should turn over cards only when the current instructions tell them to. Do not let them reveal all cards at once.

Recommended: before and after the game

If you have time, start with a 10-minute introduction to the ideas the game uses (DNA has two complementary strands, genes are instructions for proteins, different organisms write the same instruction with different "letters") and finish with a group debrief (section 9).

5 FACILITATOR NOTES: SOLUTIONS

ACTIVITY 1	Correct organism: **Bacillus subtilis**, card **4** - the only one that lives in the soil, forms spores to survive months without water and is safe. *E. coli* (1) lives in the gut and does not survive extreme conditions; *Saccharomyces* (3) is a fungus; *Pseudomonas* (6) can make plants sick. **First digit: 4.**
ACTIVITY 2	Numbers → symbols (table A) → letters (table B) = **ACC DEAMINASA**. Count of the letter C = 2. **Second digit: 2.** The next card explains the module: it breaks down ACC before it becomes ethylene, the hormone that stops root growth under drought.
ACTIVITY 3	Correct molecule: **γ-PGA** (not keratin, lipase or luciferin). With the *B. subtilis* code: strand 1 **AUG GAC GCU CUC UCU** (3 G), complementary strand **UAC CUG CGA GAG AGA** (5 G). Total G = 8. **Third digit: 8.**
ACTIVITY 4	After the box opens, players use the Memory cards to choose the pair of signals that only happens in drought. **Mustard-yellow envelope = high temperature + salinity (correct).** Turquoise = light + CO2 (always present, the bacterium would always be on). Red = water + infections (nothing to do with drought).
GOLD MEDAL	Optional extra challenge: players choose kill switch, auxotrophy or toxin–antitoxin and explain to you how they would keep the bacterium inside the vineyard. Any reasoned idea earns the badge; they do not need to know how the systems work.

6 WHERE TEAMS GET STUCK

WHAT HAPPENS	THE HINT THAT UNBLOCKS IT
Activity 3 eats the time: they do not know how to turn amino acids into codons. Walk past the tables just as they start translating.	"Each amino acid is replaced by its three letters - look at the card of your organism."
They write the same strand twice instead of the complementary one.	"A always goes with U, G always goes with C."

WHAT HAPPENS	THE HINT THAT UNBLOCKS IT
The lock does not open. Almost always they chose an organism that is not *B. subtilis* and counted the G's of different codons. This is on purpose.	"Go back to Activity 1 and check your organism against the three conditions." It shows them that the first decision affects the whole design.

Younger players

For players under 14, present the codon table simply as the code that opens the lock: they only need to read the table and follow the two rules. Understanding the genetic code is a bonus for older players, not a requirement to win.

7 ADAPTING THE GAME

IF...	THEN...
A team goes very fast	Give them the Gold Medal envelope before they finish and ask them to draw their biocontainment idea on the back of the team sheet.
A team goes very slow	Skip table A of Activity 2 and give them the symbol-to-letter table directly.
Children under 12 come	Make mixed teams with children, teenagers and adults, with one facilitator per table. At CosmoCaixa, adults and older players did the codon step and the younger ones decoded the message and played Memory.
Teams of 8 or more	Give everyone a role (reader, writer, decoder, translator) so nobody is just watching.
You have no lock box	Use a sealed envelope that you only hand over when the team says the right code.

8 ORGANISER RULES

DO	DO NOT
• Let players read and discuss. • Keep unused cards face down. • Allow the game to progress naturally. • Give hints only when needed. • Adapt your explanations to the age of the table.	• Do not reveal later cards. • Do not give the answers. • Do not open the box for them. • Do not give out envelopes early.

9 DEBRIEF AND FEEDBACK

When all teams have finished, ask three or four questions (always the first one):

- Which decision was the hardest, and why?
- If you had chosen a different organism at the start, what would have changed?
- Why should the bacterium only switch on in certain conditions?
- What could go wrong if the bacterium left the vineyard? How would you prevent it?
- Would you use this bacterium in a real field? What would you need to know first?

Then a quick feedback round, on paper or by a show of hands: how much they enjoyed it (1–5), how difficult it was, which activity was the hardest, one thing they learned, and their age range.

READY TO PLAY?