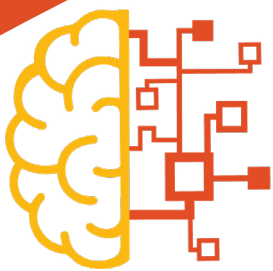


KIDS' SUMMER GAMES 2025

#1



CoBRAIN

**CoBRAIN brings summer vibes...
and fun through knowledge!**

Young explorers, get ready to learn through playing!



Funded by the European Union under GA no 101092211. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or HaDEA. Neither the European Union nor the granting authority can be held responsible for them.

Copyright ©  exelisis

CONTENTS



THE STORY OF THE PROJECT: WHAT'S COBRAIN _____ **4**

PUZZLE GAMES

1. CROSSWORDS _____ **6**

2. MATCH TIME _____ **8**

3. NUMBERING _____ **10**

4. SUDOKU _____ **12**

5. MAKE A CHOICE _____ **14**

6. COLOUR TIME _____ **16**

7. RIDDLE _____ **18**

MINI STORIES _____ **20**



WHAT'S CoBRAIN?

Imagine we could make metals even stronger and longer-lasting! In many industries—like cars, airplanes, and factories—metal parts wear out over time because of friction, heat, and rust. To protect them, scientists use thermal spraying, a special process that sprays tiny melted metal particles onto surfaces to create a protective coating.

But choosing the best materials for these coatings is tricky! Scientists usually test different coatings over and over, which takes a lot of time and effort. That's where CoBRAIN comes in!

CoBRAIN is a research project that combines experiments, computer models, and Artificial Intelligence (AI) to find better, stronger, and more eco-friendly coating materials faster than ever before. By using AI, CoBRAIN helps scientists discover new high-entropy hard metals that don't rely on rare or harmful elements. This means better protection for machines, less waste, and a cleaner planet!



Simple Explanations of Key Terms

Thermal Spray: Thermal spraying is a process where tiny melted metal drops are sprayed onto a surface, where they quickly cool down and stick. This creates a strong, protective layer that can be used in many industries like automotive, aerospace, and manufacturing.

Coating: A coating is like a superhero suit for metals! It helps protect against damage, wear, and corrosion, making the material last longer in different metallic surfaces.

Wear and Corrosion: Wear is when something slowly gets used up, like the soles of your shoes after running a lot. Corrosion happens when metals change due to exposure to things like water and air—for example, when a bike becomes rusty!

Artificial Intelligence (AI): AI is like a super-smart helper for scientists. It looks at lots of data and helps find the best solutions much faster than humans could by guessing!

High Entropy Hard Metals: Think of a smoothie made from lots of different fruits—it's a mix! High-entropy metals are a mix of different strong metals that create a super-coating!



1

Crossword is a cool game to train your brain. Check the difficulty level and give it a try! Can you solve them all?

Look for the words on these directions: ↗ → ↓ ↘

DIFFICULTY ★☆☆☆☆ DIFFICULTY ★★☆☆☆ DIFFICULTY ★★★☆☆

M	E	T	A	L
C	O	A	T	I
T	W	E	A	R
W	X	M	I	H
S	P	R	A	Y

Metal
Spray
AI
Coat
Wear

E	N	G	I	N	E	D	U
W	L	H	E	M	W	N	G
P	X	H	T	I	O	N	X
M	A	T	E	R	I	A	L
U	F	O	X	O	G	Z	Y
L	G	X	I	Y	Z	E	U
U	W	A	K	L	E	O	Z
Y	D	E	S	I	G	N	J

Oil
Material
Design
Engine
Gas

P	O	Z	G	U	F	C	Y
F	H	U	S	O	X	N	M
P	A	R	T	N	E	R	S
P	C	O	M	P	L	E	X
X	O	M	E	S	U	K	R
B	T	V	U	Z	E	T	D
P	H	Y	S	I	C	A	L
O	D	A	T	A	O	X	E

Data
Output
Physical
Complex
Partners

DIFFICULTY ★★☆☆☆ DIFFICULTY ★★★☆☆ DIFFICULTY ★★☆☆☆

M	A	C	H	I	N	E	I	M
Z	E	G	N	A	S	H	X	H
H	E	E	S	V	D	E	E	P
U	R	I	S	T	W	U	Z	B
M	P	R	O	J	E	C	T	B
X	O	N	L	Q	J	E	Z	J
A	I	D	G	O	Q	X	L	M
X	M	T	E	X	T	I	L	E
L	O	W	U	L	I	J	U	L

Model
Project
Machine
Textile
Steel

1 HIDDEN WORD
(3 LETTERS)



E	X	P	E	R	I	M	E	N	T
P	R	O	D	U	C	T	I	O	N
A	L	W	A	F	H	M	U	O	-
P	N	D	I	U	F	U	Y	K	H
O	O	E	R	N	I	W	C	I	B
E	N	R	-	C	J	H	X	E	H
I	N	-	F	T	N	H	Q	L	P
O	T	V	U	I	C	V	Z	I	O
J	Y	X	E	O	-	B	X	Q	A
E	Y	N	L	N	-	L	D	H	J

Production
Function
Air-Fuel
Experiment
Powder

C	H	R	O	M	I	U	M	P	Z
O	I	E	X	C	U	S	Z	H	V
B	D	N	C	H	S	R	L	B	I
A	J	D	B	E	E	A	C	C	R
L	S	F	C	M	Z	Y	W	S	T
T	R	O	C	I	E	I	S	W	U
T	R	C	I	C	E	D	W	C	A
P	C	K	A	A	S	T	Z	M	L
J	I	A	C	L	B	O	S	U	D
B	I	N	D	U	S	T	R	Y	Z

Chemical
SDSS
Virtual
Chromium
Process

1 HIDDEN WORD
(CHEMICAL WITH 6 LETTERS)



DIFFICULTY ★★★★★

EXPERT

S	U	B	S	T	A	N	C	E	S	P	O	N
K	H	O	R	I	Z	O	N	L	X	E	P	N
G	A	N	G	Z	E	C	E	C	V	E	O	H
E	X	P	E	U	M	U	T	I	N	I	I	U
N	O	N	W	I	F	U	T	L	S	K	E	L
D	Y	I	Z	-	P	O	N	O	E	-	T	U
-	A	S	Y	U	M	N	R	I	G	T	-	-
U	-	X	I	O	I	R	G	Y	M	A	L	E
S	O	S	T	A	O	X	E	U	R	O	P	E
E	N	U	R	C	X	H	J	-	V	E	R	F
R	A	B	R	E	S	I	S	T	A	N	C	E
C	O	M	P	U	T	A	T	I	O	N	A	L
C	T	E	C	H	N	O	L	O	G	I	E	S

Substance
Unimore
Automotive
End-User
Computational
Corrosion
Resistance
Oxy-Fuel
Technologies
Horizon

2 HIDDEN WORDS
(7 LETTERS) (6 LETTERS)



BRAINER

Found the given words but not all.

You know how to search and find solutions. Keep training your skills to get your best-self.

BRAINIOUS

Found all the given words easily.

You can find everything and you're capable to solve even strange tasks. Keep expanding your skills.

BRAINIAC

Found all the words & at least 1 hidden.

You're an expert in solving problems and a great explorer! You're one step away to master CoBRAIN's function.

2 Match the following objects with their coating options, and the words with the meaning that it has more sense.

OBJECT	COATING OPTIONS
CAR	NON-STICK
SHIP	SCRATCH-RESISTANT
KNIFE	RUST-PROOF
FACTORY MACHINE	HARD PROTECTIVE LAYER

HELP

Objects:

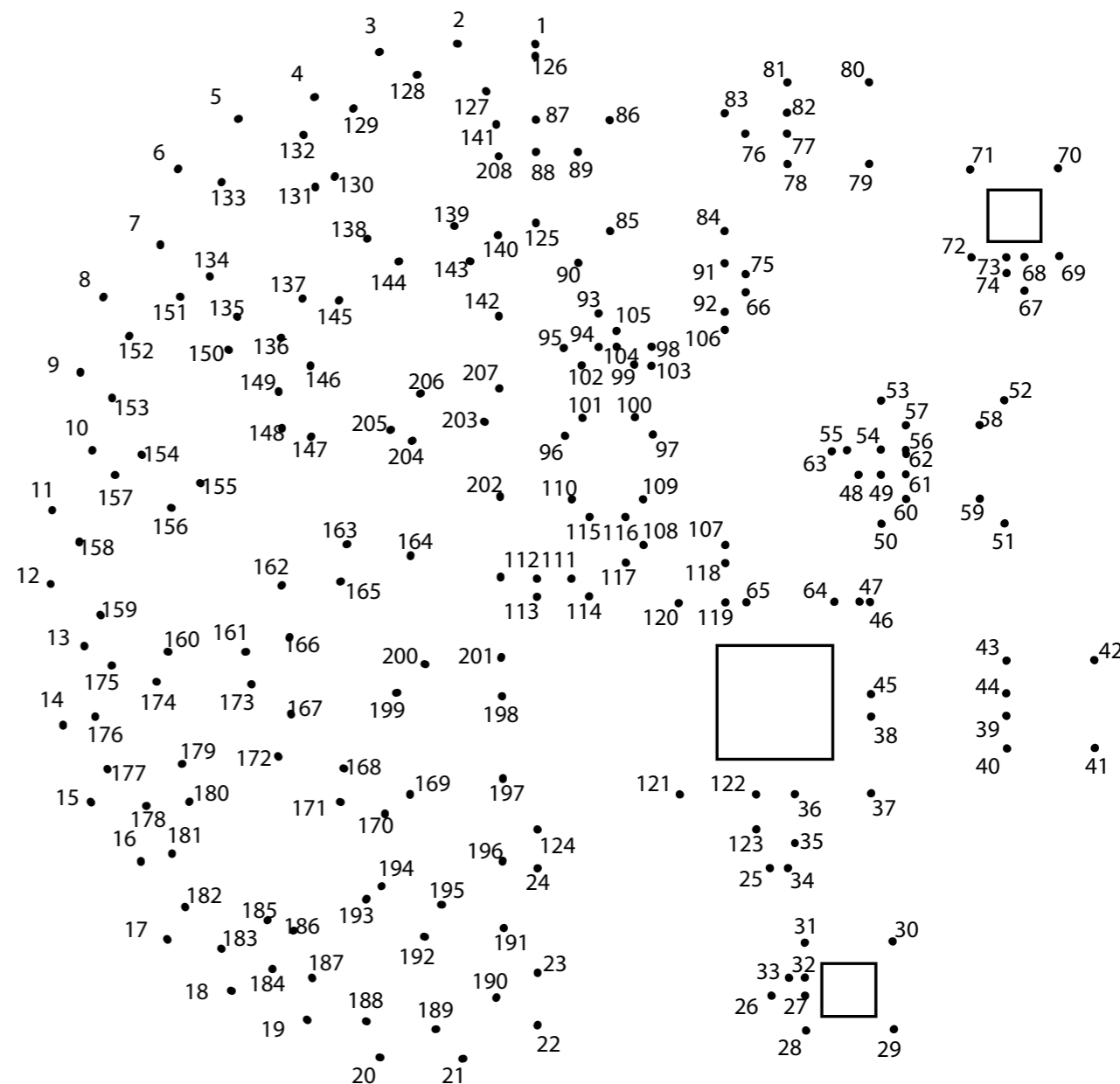
- A car's metal body
- A ship sailing in the ocean
- A kitchen knife
- A machine part in a factory

WORD	MEANING
THERMAL SPRAY	A metal made by mixing many strong metals together.
COATING	Tiny melted particles sprayed on surfaces to make them stronger.
WEAR	Smart computer programs that help scientists solve problems.
CORROSION	A strong layer that protects machines from damage.
ARTIFICIAL INTELLIGENCE (AI)	When metal gets damaged by air or water (like rust).
HIGH-ENTROPY METAL	When something slowly breaks down from use.

CONNECT THE DOTS – REVEAL THE MYSTERY!

Are you ready to uncover a secret picture hidden in the dots? Follow the numbers in order — 1, 2, 3, 4... all the way to the end — and connect the dots with your pencil. As you go, a surprise image will start to appear. Can you guess what it is before you finish?

HINT: It's something cool from the world of CoBRAIN and science! Once you're done, try colouring it in and give it your own creative twist!



3

Decode the secret words using the letter-number key

(A=1, B=2, C=3, D=4, E=5, F=6, G=7, H=8, I=9, J=10, K=11, L=12, M=13, N=14, O=15, P=16, Q=17, R=18, S=19, T=20, U=21, V=22, W=23, X=24, Y=25, Z=26).

A. 8-9-7-8 5-14-20-18-15-16-25

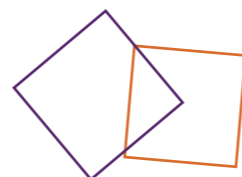
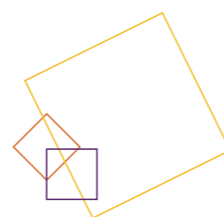
B. 20-8-5-18-13-1-12 19-16-18-1-25

C. 3-15-13-16-21-20-5-18
13-15-4-5-12-19

D. 3-15-18-18-15-19-9-15-14

E. 3-15-1-20-9-14-7

F. 3-8-18-15-13-9-21-13



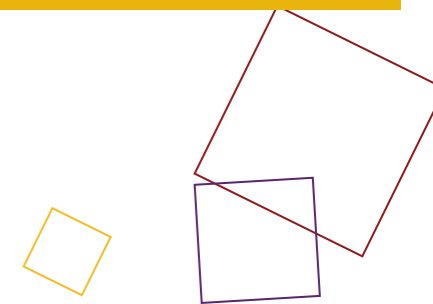
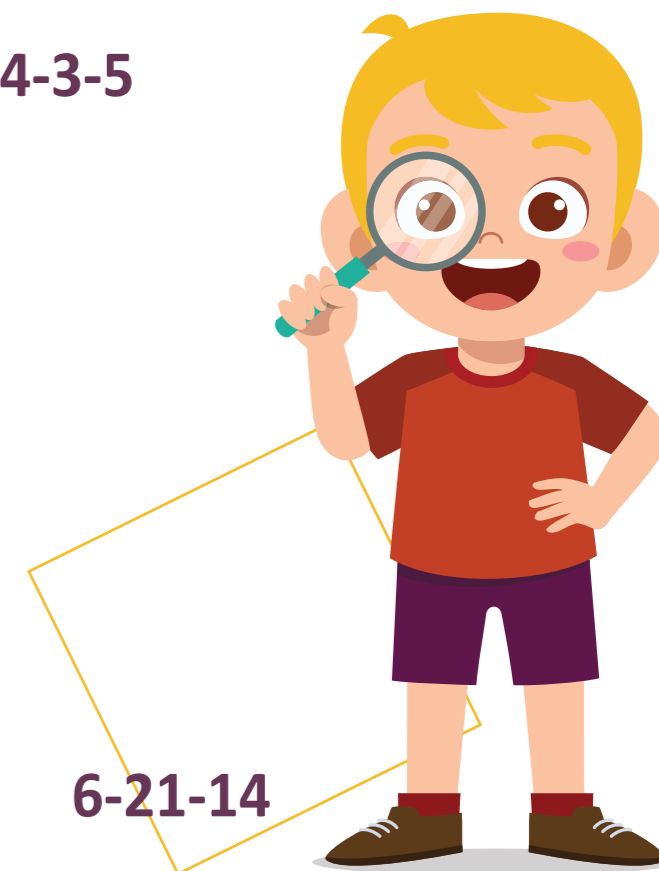
G. 5-24-16-5-18-9-13-5-14-20-19

H. 1-18-20-9-6-9-3-9-1-12
9-14-20-5-12-12-9-7-5-14-3-5

I. 3-15-2-18-1-9-14

J. 3-8-5-13-9-3-1-12

K. 3-15-1-20-9-14-7 9-19 6-21-14



DID YOU KNOW?

“High Entropy Hard Metals” are like super-powered alloys made from many different elements mixed together! They’re very strong and can protect things from wearing out. CoBRAIN scientists use them to make coatings that help machines last longer.

FUN FACT

Rust can make a toy car stop working, but if you put a special coating on it, the rust can’t form. That’s why coatings are so important to keep things in good shape!

4

Sudoku is a fun puzzle game where you use your brain like a little detective!

- 1) Look the grid and try to fill the empty boxes with numbers (1-9).
- 2) Each row, column and box must have all numbers once.
- 3) No double numbers in box, column or row.

	1	2		3		7		
	8		5	2				3
	9				4	8	1	
1		8						3
	4	3	2		8	5	7	
	5					6		4
	3	9	4					2
6				8	7			4
		4		1		9	6	

		4	7		5	3		
			6					
3		9				6		8
	5	8	3		6		4	
6								2
	2		1		9		3	
7		6			1	9		5
8		3	5		4	7		

		9	4			2		5
	6		1			3		
7	4		9		2			
		4			8			3
	8							6
2			5			1		
			6		7		5	2
5		1					9	
		8			9			1

	1		7		2			5
	8							9
		3		4		2		
1				6				7
		8	1		4	3		
3				7				6
		2		1		9		
	5							6
	3		9		7			1

MISSION TIME

Here's a brainy challenge for young puzzle solvers!

You see 4 finished Icon Sudoku puzzles — but only one is completely correct!

- 1) Look at each puzzle carefully.
- 2) In a correct Sudoku: Every row, column and box has all 9 different icons.
- 3) Only one puzzle follows all the rules.

A

B

C

D

5 Time to make a choice! Can you answer the following questions? Choose the right answer for them!

- 1) **What happens if you spray melted metal on a wall?**
 - A. You get a new superhero costume
 - B. You get metal-flavored popcorn
 - C. The wall starts dancing
 - D. You make a strong, protective coating
- 2) **Why do metallic parts need coatings?**
 - A. To stay warm in winter
 - B. Because they want to look shiny in selfies
 - C. To protect them from scratches, rust, and damage
 - D. To hide from robots
- 3) **What is Artificial Intelligence (AI)?**
 - A. A robot that does your homework
 - B. A smart helper that finds patterns in data
 - C. A talking potato
 - D. A type of spaghetti
- 4) **What does “wear” mean in science?**
 - A. What scientists wear in the lab
 - B. When something gets tired and takes a nap
 - C. When a surface gets damaged slowly over time
 - D. When shoes run away
- 5) **What do High-Entropy Hard Metals remind us of?**
 - A. Something like a smoothie made of many strong ingredients
 - B. A magical metal that sings
 - C. A metal that loves puzzles
 - D. A cat that can type reports
- 6) **What is “corrosion”?**
 - A. When a metal gets sleepy
 - B. When metal gets damaged by water or air (like rust!)
 - C. When robots sing too loud
 - D. When you forget your lunchbox at school

- 7) **What do scientists do when they use trial-and-error?**
 - A. Try random buttons until something explodes
 - B. Guess, test, and see what works
 - C. Jump on a trampoline until they find answers
 - D. Ask their pets for advice
- 8) **What kind of surfaces do thermal spray coatings protect?**
 - A. Birthday cakes
 - B. Walls made of jelly
 - C. Alien spaceships made of cheese
 - D. Metallic parts in cars, airplanes, and machines
- 9) **What makes High-Entropy Hard Metals so cool?**
 - A. They mix many strong metals to make an extra-tough material
 - B. They glow in the dark (just kidding!)
 - C. They’re made from one super boring metal
 - D. They can do backflips
- 10) **Why is AI helpful in science?**
 - A. Because it tells great jokes
 - B. Because it helps scientists find smart solutions faster
 - C. Because it always brings cookies
 - D. Because it likes to draw



6 Hello! My name is 'Cobrainico' and I am here to make things more fun! You can paint me any way you like and in any style you wish, just be creative!



7 Read the riddles and try to solve them. Can you guess them? If you can't, try to solve the mixed letters or decode the numbers (similar to game 3 page 10) and get the correct answers!

Let's see the riddle of June

"I'm a mix of metals, but I'm not a jewelry piece. I can resist wear and tear, keeping things in peace. What am I?"

THE ANSWER IS...

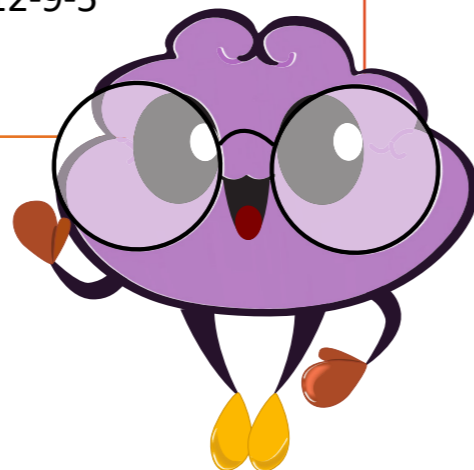
A DHRA TELMA TONACGI

What about the riddle of July?

"You can't see me, but I hold data tight, helping machines think day and night. What am I?"

THE ANSWER IS...

20-6-12-9-1-9-9-3-1-18 5-3-12-20-9-7-5-14-14-12-9-5



UNIMORE
UNIVERSITÀ DEGLI STUDI DI
MODENA E REGGIO EMILIA



ALMA MATER STUDIORUM
UNIVERSITÀ DI BOLOGNA



info@cobrain-project.eu

www.cobrain-project.eu

FOLLOW US!



MINI STORIES

THE COATING DETECTIVES

Once upon a time, in a world full of machines, there was a young scientist named Sam. Sam had a robot friend named Code, and together they traveled around the world, testing new materials to help machines last longer. One day, they found a special coating that could protect against rust and scratches. But there was a problem! They had to figure out how to make the coating faster without wasting time or money. Sam and Code used their special tool that could predict which coating would work best—without doing hundreds of tests!

MORAL: By using smart tools and understanding materials, scientists can find the best solutions faster, just like Sam and Code did!

FOLLOW US!



Had fun?

Check more games in our website.

ANSWERS

