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BEES & TECHNOLOGY MEMORY GAME

PRINTING AND GAME GUIDE

PART OF
THE ENFORCE - HONEY EXPERIENCE
EDUCATIONAL TOOLKIT

1. ABOUT THE GAME

This playful memory game shows how many modern inventions were inspired by bees.

Your task is to match the green bee-themed cards with their corresponding blue technological invention cards.

The full deck includes:

- 8 pairs → 16 cards to be printed
- 1 Rules card
- 1 Solutions card (with every correct match)

The Rules and Solutions cards have a different background so they can be easily recognised.

2. PRINTING INSTRUCTIONS

Card size: 74 × 105 mm (A7 size)

Printing: Print two-sided

- Front: card illustration
- Back: the common card back design

Paper recommendation: 250–300 g/m² cardstock for best durability
Optional: laminate for long-term use (recommended for outdoor or apiary activities)

Cutting: Cut along the at the edge of the cards if printed all on one page. Or print each of the cards individually in the given size.

Use a paper cutter or craft knife + metal ruler for clean, even edges

Organizing the Deck

Set aside the Rules and Solutions cards
Shuffle the 16 game cards (8 pairs)
Lay them face down on the table in rows

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3. HOW TO PLAY

Goal: Find all matching pairs that show what inventors learned from bees.

Setup

1. Shuffle all cards.
2. Place them face down in a grid.
3.

Gameplay

1. The first player flips **two cards**.
2. If they form a correct pair:

- The player keeps the pair
- The player may continue flipping cards until they fail to match

3. If the cards do not match:

- Turn them back face down
- The next player takes their turn

Winning

The winner is the player with the most pairs at the end.

Helpful features

Helpful icons appear on cards to support matching
After the game, check correctness with the Solutions card

5. FOR EDUCATORS & BEEKEEPERS

Perfect for:

- experiential beekeeping visits
- school programs
- honey tasting events
- training sessions for beekeepers
- pollination and climate awareness activities
- interactive workshops

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BEES & TECHNOLOGY

RULES

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SOLUTIONS

BEE'S EYE - MICROCAMERA

BEE CELL - ARCHITECTURE

STINGER - INJECTION

BEE ANTENNAE - DRONE

BEESWAX - CANDLE

BUZZING, VIBRATION -
BIORESONANCE

MAGNETITE CRYSTAL
IN THE ABDOMEN - NAVIGATION

COLONY AND
SWARM INTELLIGENCE - AI

RULES

Match the bee (green) cards with the corresponding technical invention (blue) cards!

Find out what inventors learned from bees! The icons and SOLUTIONS cards will help you find the right pairs.

Shuffle the cards and place them face down on the table.

The first player turns over two cards. If they find a match, they can keep it and take another turn. They can continue doing this until they find a match. Once they fail to find a match, they turn the cards back over and the next player takes their turn.

The player with the most matches wins

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BEE COLONY

The colony creates collective intelligence and operates according to its rules. There is no "I," only "We." There is no central control, yet orderly behavior develops. Every bee—having evolved to do so—does what is necessary for the bee family and continues to do so.

THE BEE'S COMPOUND EYE

The interconnected hexagonal lenses are each focused on a different point. The images from each lens combine to form a mosaic image.
The compound eye of a bee consists of approximately 4,500 units and has a wide-angle view. It has a unique ability to detect movement, colors (except red), and ultraviolet and polarized light.

BEE CELL

Beehive cells are regular hexagons (6*120°), straight prisms. This is the most optimal shape because it provides maximum storage capacity with minimal use of material. This way, they can be built with the least amount of energy and store the most honey.

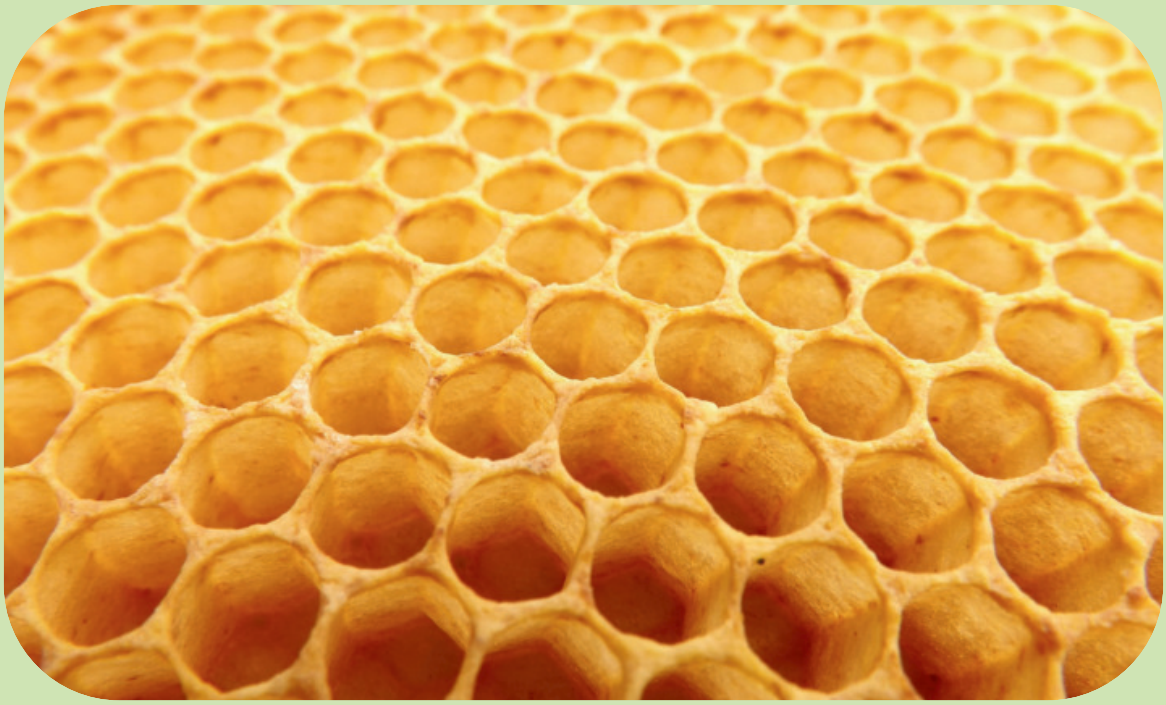
STINGER

The stinger is located at the end of the female bee's abdomen. The honeybee dies after stinging. The injected bee venom enters the subcutaneous tissue and the bloodstream.

THE ANTENNAE OF THE BEE

Receptors on two antennae on the bees' heads are capable of detecting tiny vibrations, scents, wind direction, temperature changes, spatial positions, pressure waves, and vibrations.

BEESWAX



Beeswax is a transparent secretion from the wax glands of worker bees, but it turns white when the bees chew it to make it malleable. Bees use beeswax to make honeycombs for honey and offspring. Beeswax is very flexible and has excellent water-repellent properties.

BUZZING AND WING VIBRATION

The sound produced by the vibration of the wings resembles a buzzing noise. The vibration waves (frequency) produced by the movement of the wings can reach 230-250 Hz during flight, while at rest they can be around 180-200 Hz.

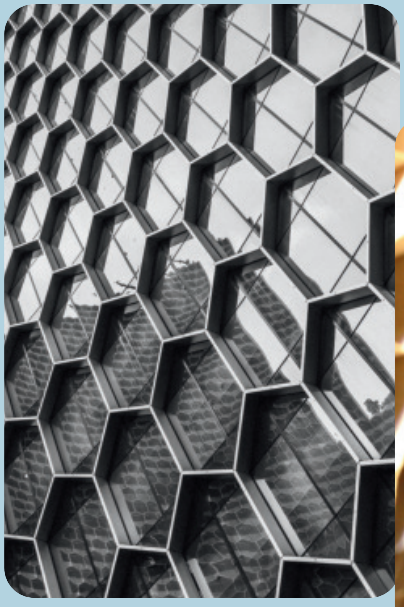
MAGNETITE CRYSTAL IN THE ABDOMEN

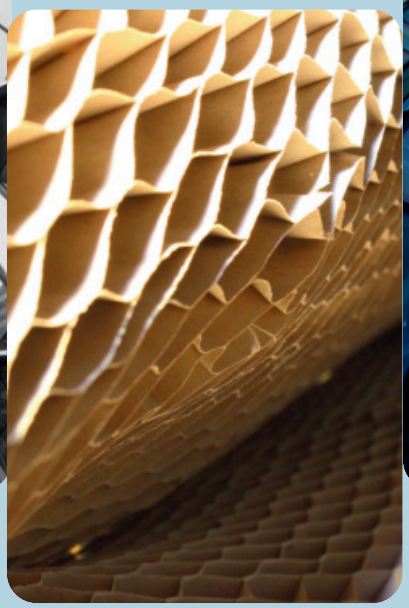
The cells containing iron-rich (magnetite) crystal particles found in the abdomen of bees are connected to the bees' nervous system. This is why bees can sense magnetic fields.

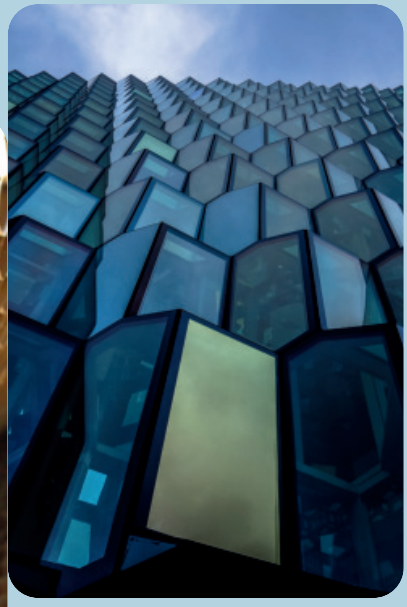
MICRO CAMERA

The Mikorokamera captures images with a wide viewing angle and sharp focus. It is well suited for internal medical examinations, military, telecommunications, and robotics developments.

ARCHITECTURE







With minimal use of materials and energy, it is possible to create high-strength, lightweight building walls, effective insulation, and large storage capacity for tanks. This structure can also be used effectively in vehicle and aircraft bodies and packaging materials.

INJECTION

The injection needle is a thin tube with a sharp tip that pierces the skin, and a syringe is used to inject liquid, such as medicine, into the body, under the skin, into a muscle, or into a vein.

DRONE

Sensors built into drones greatly help them fly safely, navigate precisely, and land accurately. Such drones can be used effectively in remote sensing, reconnaissance, communications, and agricultural work.

CANDLE

Beeswax candles purify the air by emitting negative ions during combustion, which are capable of binding pollutants, allergens, dust, and smoke in the air. They do not produce soot during combustion, have a longer burning time, and have a slight honey scent.

VIBRATION THERAPY, BIORESONANCE

Humans, alpha brain waves, the normal vibration level of the earth is 7.83 Hz.

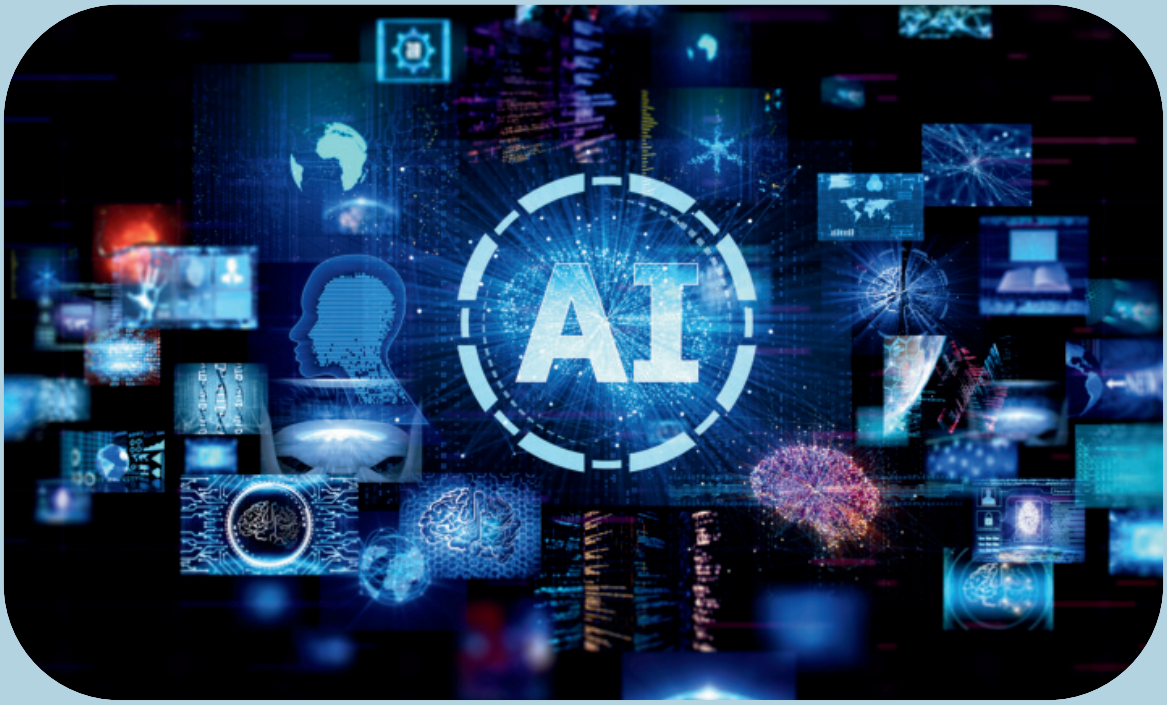
Various electromagnetic frequencies are used in vibration therapies, e.g.:

0.5–15 Hz – relaxation, stress relief;

30–100 Hz – immune system activation, inflammation reduction;

200–600 Hz – cellular processes, chronic problems.

ARTIFICIAL INTELLIGENCE



The field of artificial intelligence (AI) and algorithms based on the collective behavior of bee colonies is called "swarm intelligence." Examples: Scout bees / Heuristic search, ABC algorithm. Nectar source information / Decentralized peer-to-peer data sharing algorithm. Role sharing / Specialization, task optimization.

NAVIGATION WITHOUT GPS

Humans have long used compasses to navigate based on the Earth's magnetic field (its poles, strength, and electromagnetic field characteristics). Today, developers of self-driving systems powered by artificial intelligence are also studying "bee navigation."

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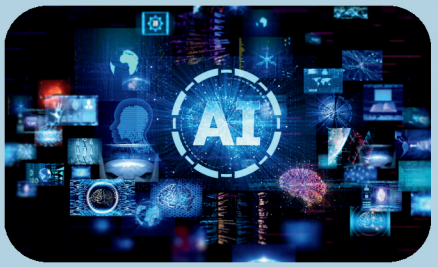

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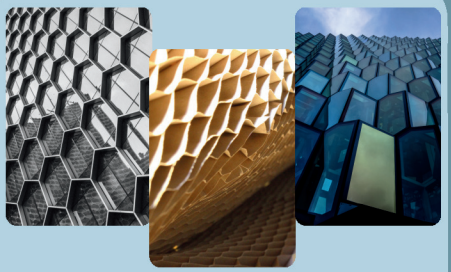

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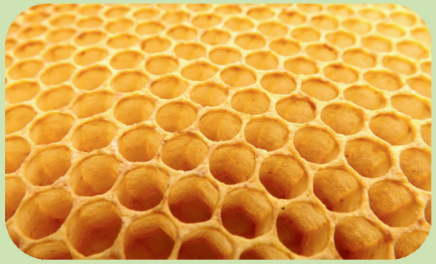

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