CENTRUM
NAUKI
KOPERNIK

Catalogue of exhibits

EXHIBITS

Every day thousands of visitors come to our exhibitions. We have observed them and gathered their opinions concerning all exhibitions, exhibits and learn how to design and build the best exhibits. This is our competitive advantage over any producer of interactive devices and educational materials.

The document presents 22 exhibits, which are the orginal selection of the Copernicus Science Centre.

Exhibits that we present in our offer not only give people a chance to discover new phenomena, but also to improve their skill of observation and be amazed with nature and capabilities of humans. They give opportunity to reflect on our limitations and the role of science in overcoming them.

Exhibits can be used by individual visitors, as well as engage a group of people. They can be easy to use and illustrate a simple phenomenon, as well as more sophisticated ones enable a deeper, multi-level exploration.

OUR EXHIBITS:

1. Precisely show authentic natural phenomena – a real experience and not just its model.
2. Are visually attractive and engaging and cause emotions.
3. Are characterised by minimalistic design, with uniform cases and colours, which make visitor focused on the very phenomenon and doesn't distract them with other factors.
4. Are safe, intuitive to use and durable.

We focus on key elements: precise presentation of the given phenomenon and making the visitor's experience as real as possible.

Each exhibit underwent numerous internal tests and was then repeatedly tested with visitors.

We have prepared exhibits with wide audience in mind, ranging from children, to teens, adults and seniors. This way you can reach different target groups and convince people of all ages that science is a fascinating adventure.

Drawing in the sand

Use rotational motion and make a sand masterpiece

With very simple tools or even their own hands, users create amazing patterns on the surface of sand-covered rotating plates. Rotation speed can be adjusted. The exhibit allows not only for great fun, but also for experimenting and creating various shapes, including the Archimedean spiral.

Keywords: frame of reference, relativity of motion, art

Drawing in the sand

Exhibit structure

The exhibit is an irregular hexagon-shaped table with a lot of fine sand on it. The table top's edge is raised to prevent the sand from falling off. On the table top there are three rotating plates propelled by electric engines placed under the table. Next to each plate there is a knob for controlling the rotation speed.

The exhibit allows up to three people to perform experiments simultaneously.

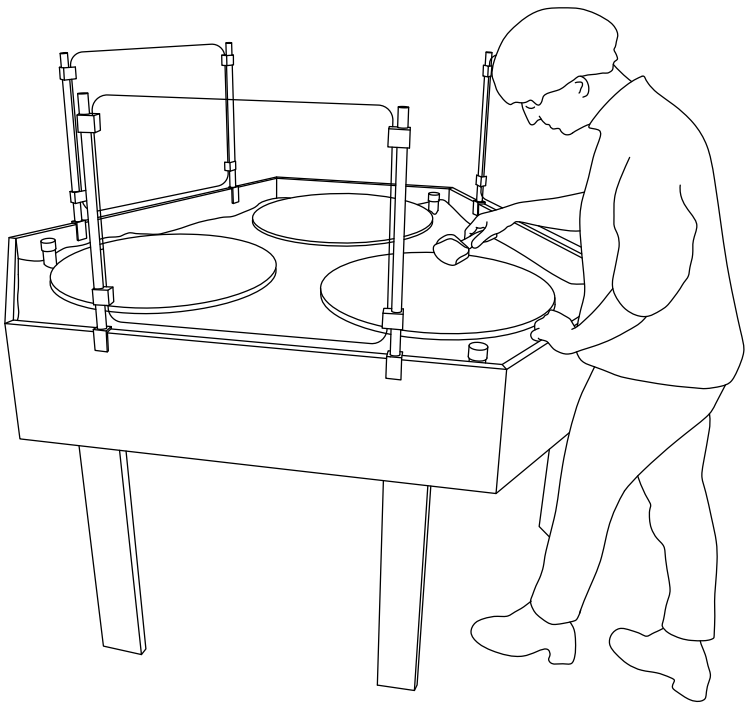
Technical details

Measurements: table: 150 × 150 cm; plate: ø 60 cm

Consumables: sand

Accessories: shovels, slats, and rods for the users to moving sand, gouging in it and performing other experiments

Power: 230V power supply



Mirror window

What happens when the brain receives contradictory information?

Due to the specific position of the mirror, what the experimentator sees is dissonant with what the muscles in their body feel. Very often human brain wrongly interprets images received by the sense of sight. It is so, because sight is the dominant sense.

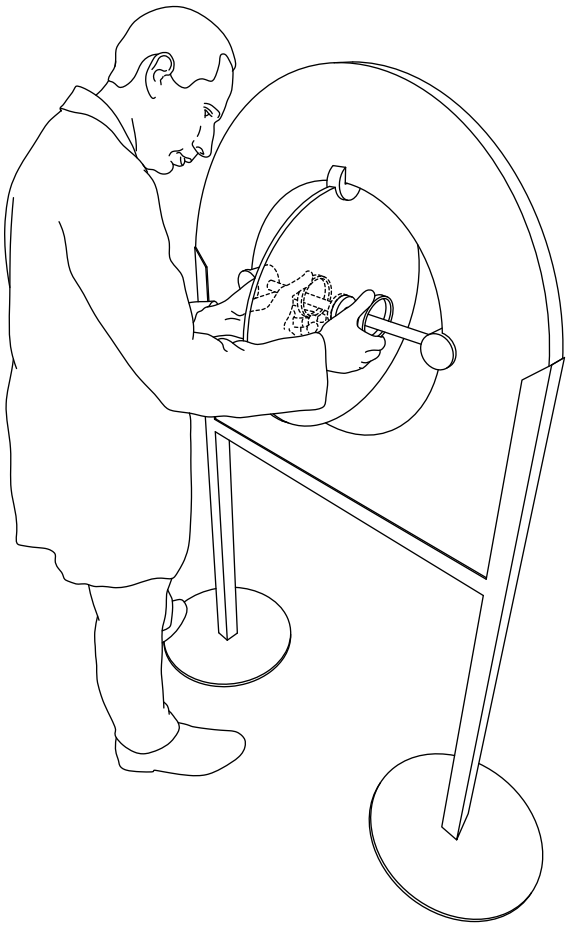
Keywords: mirrors, reflection, perception, optical illusions

Mirror window

Exhibit structure

The exhibit comprises of a vertically placed board with a round mirror installed across it, together with two brass rings that can be moved easily to the sides. The whole structure is joined with durable fittings that make the exhibit reliable and safe.

The exhibit can be used by one person simultaneously.



Technical details

Measurements: 115 × 45 cm

Consumables: –

Accessories: –

Power: –

Walking spring

Take the spring... for a walk and learn that science doesn't have to be dead serious!

The experimentator's task is to make the spring "walk" on the conveyor belt. When one end of slinky falls on the belt, its parts stretch. Then the spring's elasticity makes its coils shrink, and then re-form itself. This makes the spring move in wave motion, flow and gain momentum. As a result, the other end of the spring lands further, makes another "step" and the process continues. The user can turn the knob to set the belt's speed at such pace that the spring will be "walking" without actually moving forward.

Keywords: kinetic energy, potential energy, elasticity, gravitational pull

Walking spring

Exhibit structure

The exhibit comprises an inclined plane with a conveyor belt. Its speed can be controlled and adjusted with a knob. At the top and bottom of the belt, there are shelves secured with raised edges. Users' safety is guaranteed by the optical barrier installed at the end of the conveyor belt.

The exhibit can be used by one person at a time.

Technical details

Measurements: 150 × 55 cm

Consumables: –

Accessories: Slinky spring

Power: 230V power supply

Bicycle twists

Add a rotating stool to the gyroscope, and let the fun begin!

This uncomplicated exhibit illustrates the gyroscopic effect phenomenon and the law of conservation of angular momentum. When the user tries to move the rotating wheel they are holding in their hands, they can feel the force impeding the change of position of the rotation axis (defined by wheel handles). The user and the rotating stool constitute a one single whole. Any attempt to change the axis of the rotating when impacts the rotating movement of the whole exhibit.

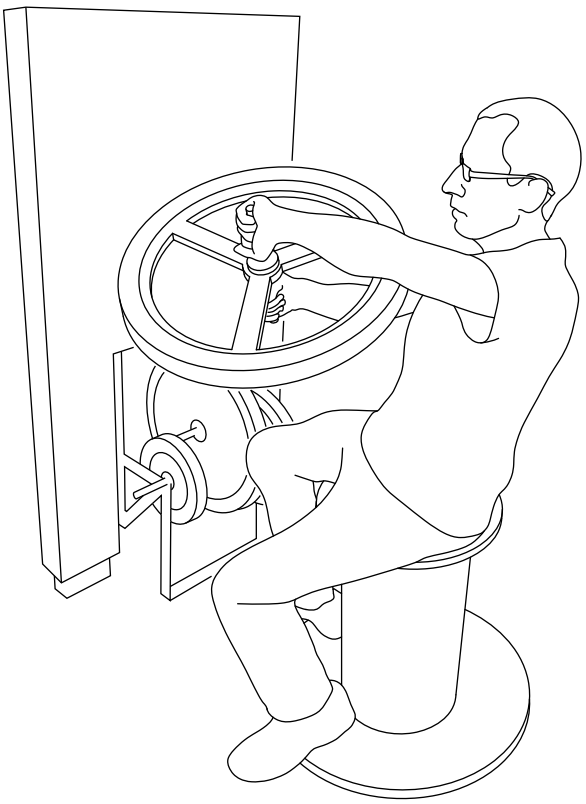
Keywords: dynamics, circular motion, moment of inertia, gyroscopic effect

Bicycle twists

Exhibit structure

There are two main parts of the exhibit: a rotating stool and a stand with wheel handles. Each user can choose one of three different-sized wheels (depending on the user's height and arm length). The wheels have suitable bearings and are weighted down on the perimeter. Supporting frames of the stool and the board are made from steel profiles.

The exhibit can be used by one person at a time.



Technical details

Measurements: boards: 90 × 50 cm; stool: ø 60 cm

Consumables: –

Accessories: –

Power: –

Air cannon

Fire an air bullet!

The experimentator directs the “cannon” towards wall made of mirror plates. By pulling and releasing the handle attached to the membrane, they release a large portion of air through a small hole. It’s an air bullet – invisible but noticeable. Structure of the drum and air jet make the released air shape into a torus, which looks like a small ring-shaped bun or a lifebelt. This shape can be seen on a board suspended from the ceiling a few metres from the cannon.

Keywords: aerodynamics

Air cannon

Exhibit structure

The exhibit is built of two elements: the first is a wooden cylinder with a membrane, fixed on a stand; the second is a board suspended from the ceiling. The board is made of hundreds of air blow-sensitive elements. Their mirror-like finish additionally creates an interesting visual effect.

The exhibit can be used by one person at a time.

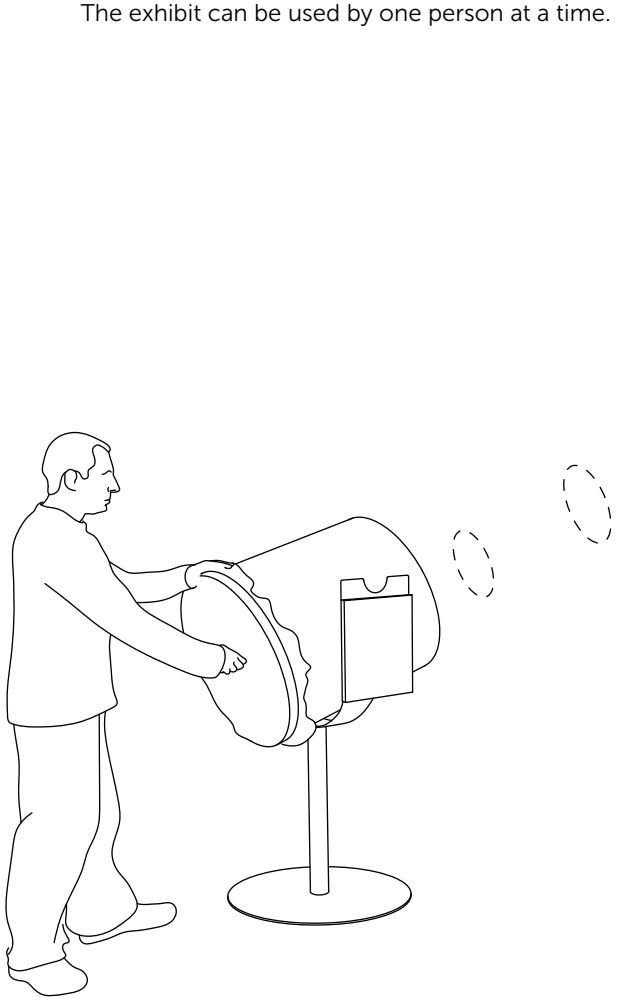
Technical details

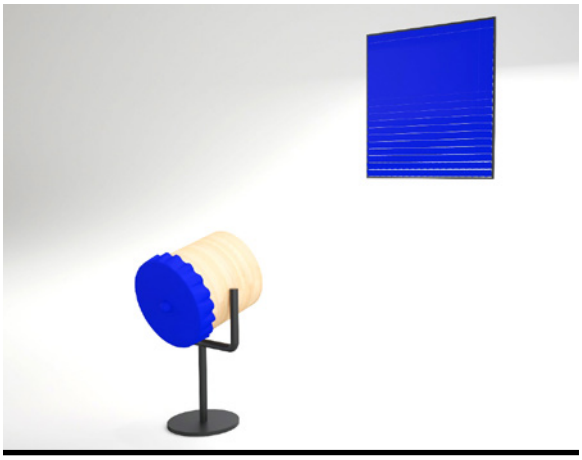
Measurements: 60 × 60 cm (cylinder);
150 × 150 cm (board); distance between the cylinder and the board: 5–6 meters

Consumables: –

Accessories: –

Power: –





Hanging balls

Ready for an arcade game? Steer the ball without touching it!

The experimentator places one ball at the exit of the tube and releases air flow by turning the knob. The ball stays within the air stream even when the tube is inclined from the vertical. The exhibit presents the Coandă effect, which is a physical phenomenon reflecting the tendency of a jet of fluid to stay attached to a convex surface.

Keywords: aerodynamics, Coandă effect

Hanging balls

Exhibit structure

The exhibit comprises of a table with highly raised edges, on which you will find two air jet tubes and two control knobs. The whole structure is finished off with a frame, on which a safety net has been placed in order to secure all elements from falling out.

The exhibit can be used by one person simultaneously.

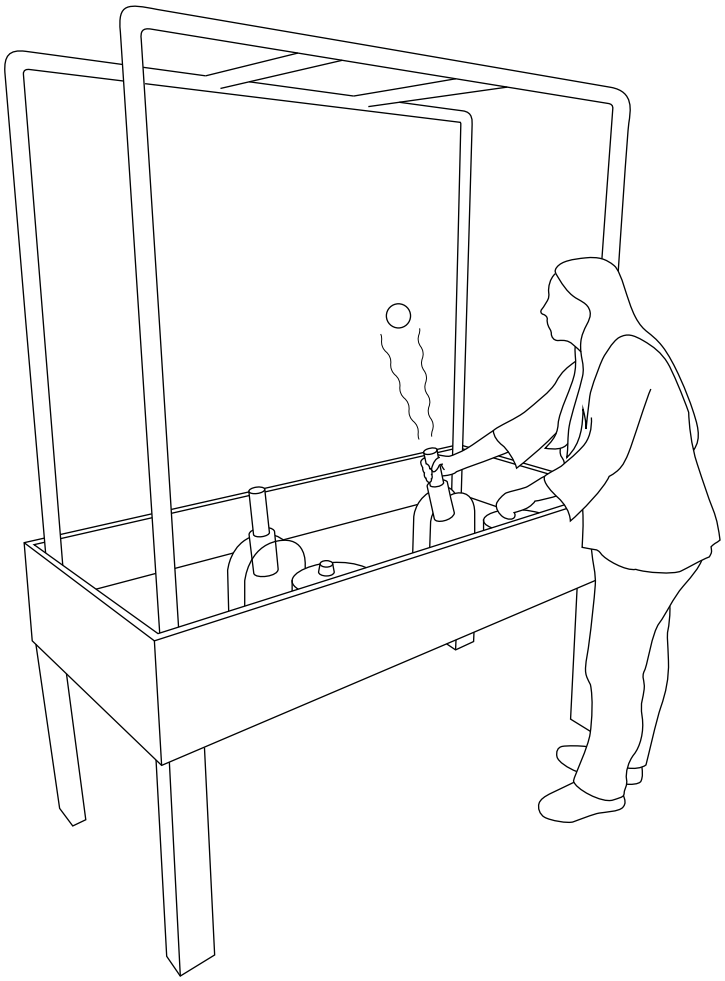
Technical details

Measurements: 170 × 60 cm, height: 220 cm

Consumables: –

Accessories: plastic balls and or marble balls

Power: 230V power supply



Colourful shadows

You think a shadow is always dark? It’s time to find out!

The exhibit allows the experimentator to observe the process of mixing of light colours in the RGB system. Above the table there are lamps giving red green and blue light. With lamps being installed slightly apart and the possibility of adjusting light intensity, the user can observe colourful shadows on the counter. Shadow is the area with less light received. Covering one colour with your hand makes less light of this colour reach the counter, which allows for other colours to mix together. This way the user can influence colour creation.

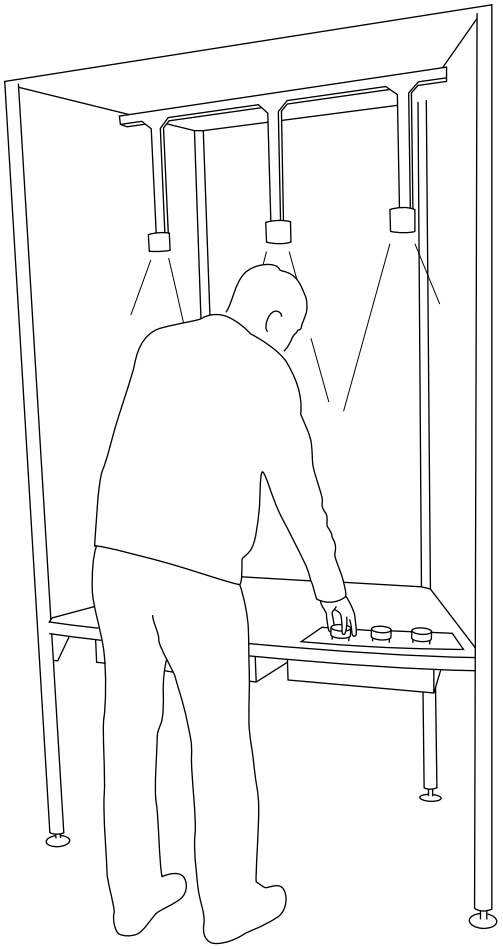
Keywords: light, mixing of colours, RGB, CMY

Colourful shadows

Exhibit structure

The exhibit is a darkroom-like cabin with a light counter on which you can look at various colourful shadows. The light comes from three powerful diodes in RGB colours. Desktop installed on the counter allows for adjusting light intensity separately for each colour.

The exhibit can be used by a couple of persons simultaneously.



Technical details

Measurements: 140 × 180 cm; height: 235 cm

Consumables: –

Accessories: shapes for creating shadows and colourful blocks

Power: 230V power supply

Mirror drawing

Copy a simple shape seen in the mirror. When you see both the shape and your hands only in the reflection, this simple task turns out to be really difficult!

The user's task is to outline the contour of a simple geometric shape with a felt-tip marker, looking only at its reflection in the mirror. However, there is one thing that makes this task difficult – the user can only see their hands in the mirror. When they move their hand forward, the mirror image of the hand moves backwards; when they move their hand backwards, the mirror image moves forward. This makes correctly moving the hand holding the marker a really complicated task.

Keywords: hand-eye coordination, mirror image

Mirror drawing

Construction of the exhibit

The exhibit consists of a long table with a cover concealing the user's hands and the drawing zone affixed to it. Drawings of geometric figures are placed on the table top under a glass pane, and thanks to LED lighting, they are perfectly visible in the mirror mounted above. The user draws them directly on the glass pane using a dry-erase felt-tip marker. The supply of markers and felt eraser pads are located within easy reach of the user. The stand also includes 3 stools, which can be easily moved to enable access for wheelchair users.

The exhibit allows three people to carry out the experiment simultaneously.

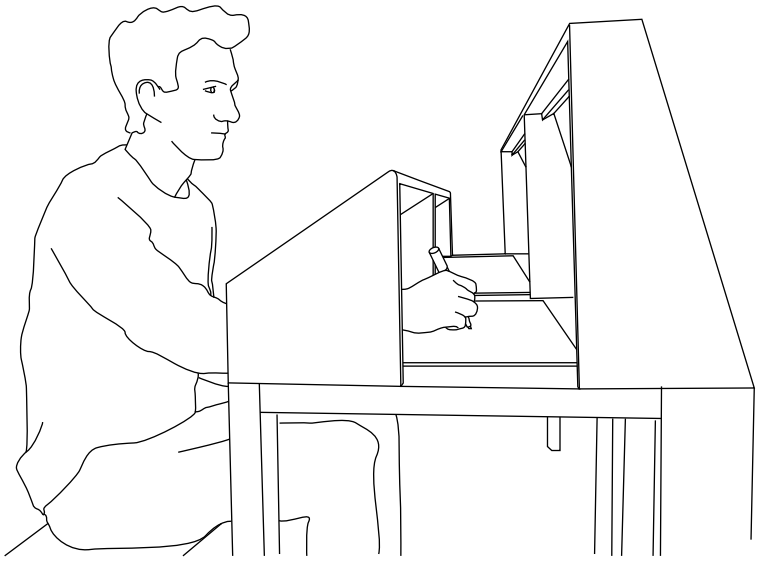
Technical information

Dimensions: width: 224 cm, depth: 60 cm, height: 117 cm

Consumable materials: felt-tip dry-erase markers and erasers for dry-erase boards

Accessories: three stools

Power supply: 230V mains



Two left sides

See what you would look like with a perfectly symmetrical face

The user sits down on the chair in front of a dashboard, that allows them to take a portrait photograph on the built-in screen. Then, as a result of electronic image processing, they can see the picture made up of two left or two right halves of their face. It turns out that while harmonious proportions result in the perception of a person as attractive, perfectly symmetrical faces usually look disturbing and unnatural.

Keywords: reflection symmetry, bitmap, electronic image processing

Two left sides

Construction of the exhibit

The exhibit is based on the table, with a control panel placed on the table top and a vertical board with a high-resolution screen and lighting for taking clear pictures of the user's face in the middle of the table. Above the screen, in a common housing, there is also a digital camera, which outputs its preview directly on the screen.

The exhibit can be used by one person at a time.

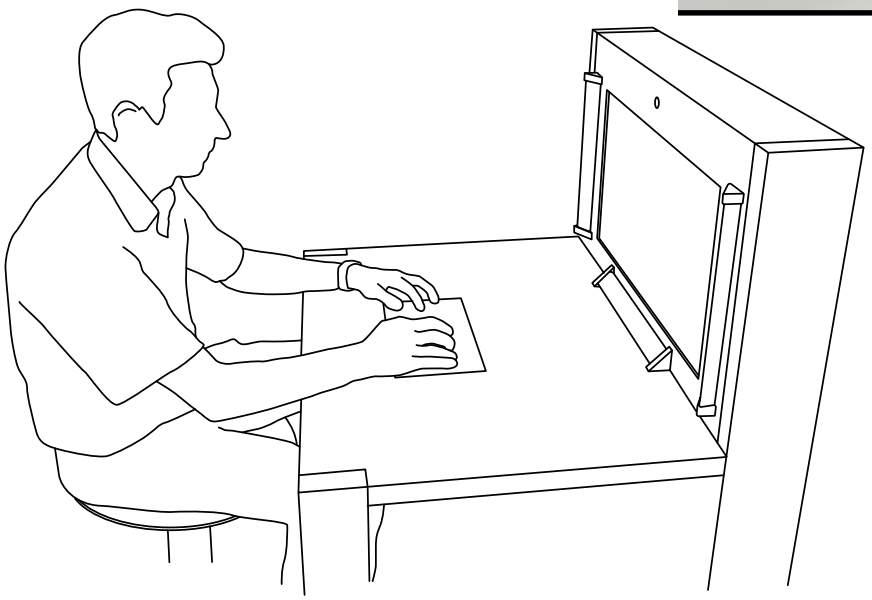
Technical information

Dimensions: width: 90 cm, depth: 80 cm, height: 125 cm

Consumable materials: none

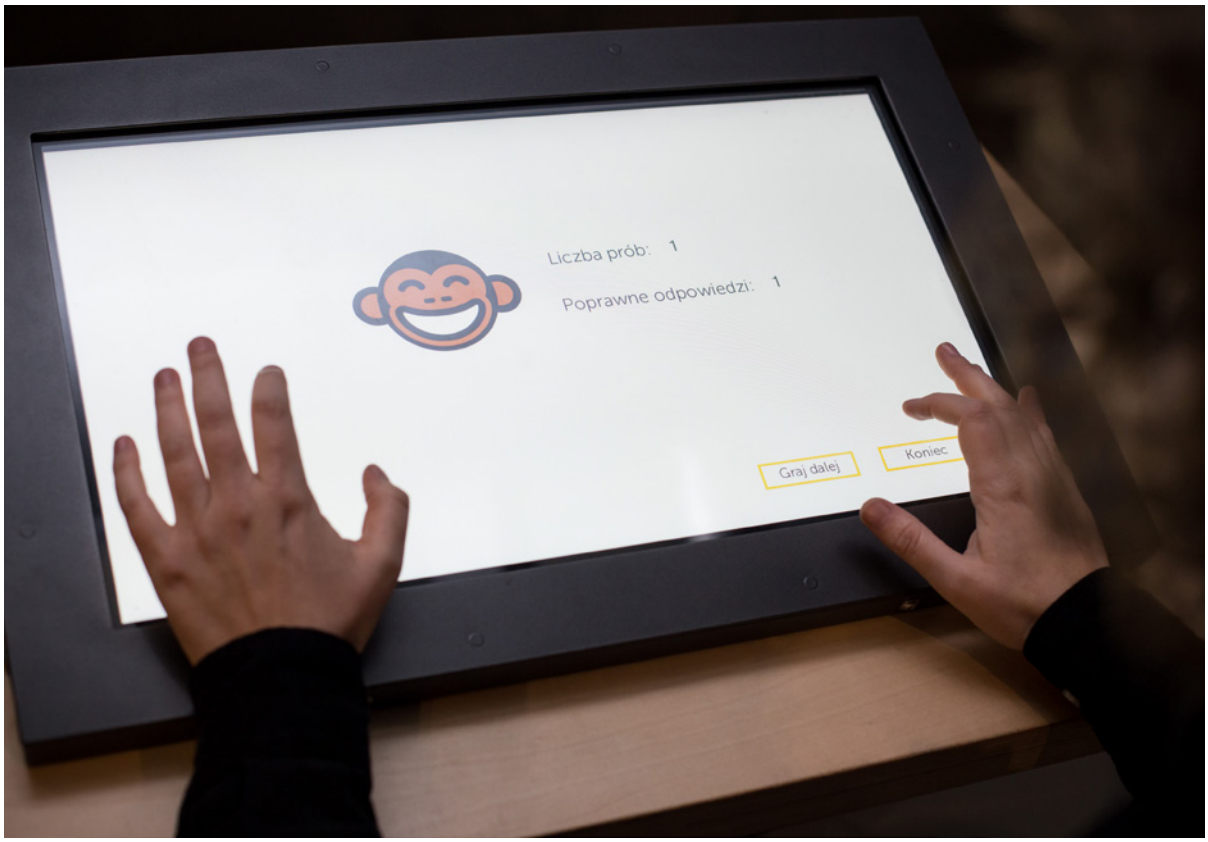
Accessories: stool

Power supply: 230V mains



Masters of instant memorisation

When you need to remember something right away, chimpanzees do better than people!



The exhibit recreates an authentic scientific experiment that studied ultra-short-term memory. The user can briefly see digits scattered around in random places on the screen. After a moment, the digits turn into rectangles. The task is to identify the rectangles, in the order corresponding to the ascending order of numbers. The experiment has proven that when it comes to remembering something right away, chimpanzees do better than people! This exhibit allows you to experience this for yourself.

Keywords: types of memory, ultra-short-term memory, experiment, cognitive psychology

Masters of instant memorisation

Construction of the exhibit

The stand is a simple table with an inclined desktop, equipped with a 21-inch touch screen. The touch screen is a uniform interface for communication with the user.

The exhibit can be used by one person at a time.

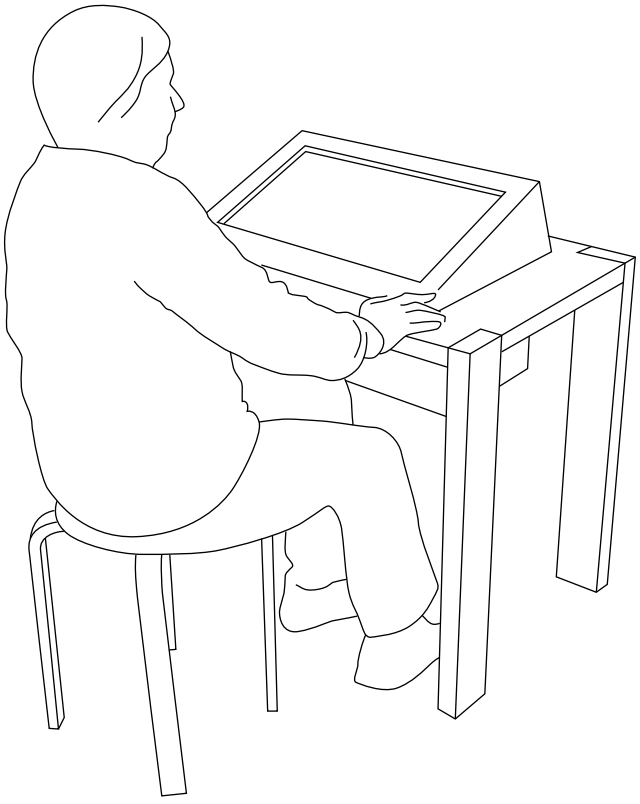
Technical information

Dimensions: width: 85 cm, depth: 56 cm, height: 76 cm

Consumable materials: none

Accessories: stool

Power supply: 230V mains



Rotating Table

What if we turned the classical mechanics up a notch...?

The task in the experiment is to arrange the balls, rings and discs in such a way that they maintain balance and roll on a constantly rotating plate. The path of a rolling object depends on its position and angle after starting. Users look for original configurations of objects and spend a lot of time playing with this exhibit.

Keywords: classical mechanics, friction, momentum, gravity, balance

Rotating Table

Construction of the exhibit

The exhibit has the form of a large table under which a mechanism driving a circular flat plate was installed. The disc rotates at a steady rate of about 75 revolutions per minute. On the table top, there is a number of objects used to perform experiments (rings, discs, balls). Maintenance access to the drive is available underneath the table top.

The exhibit allows anywhere from several up to approximately a dozen people to experiment simultaneously.

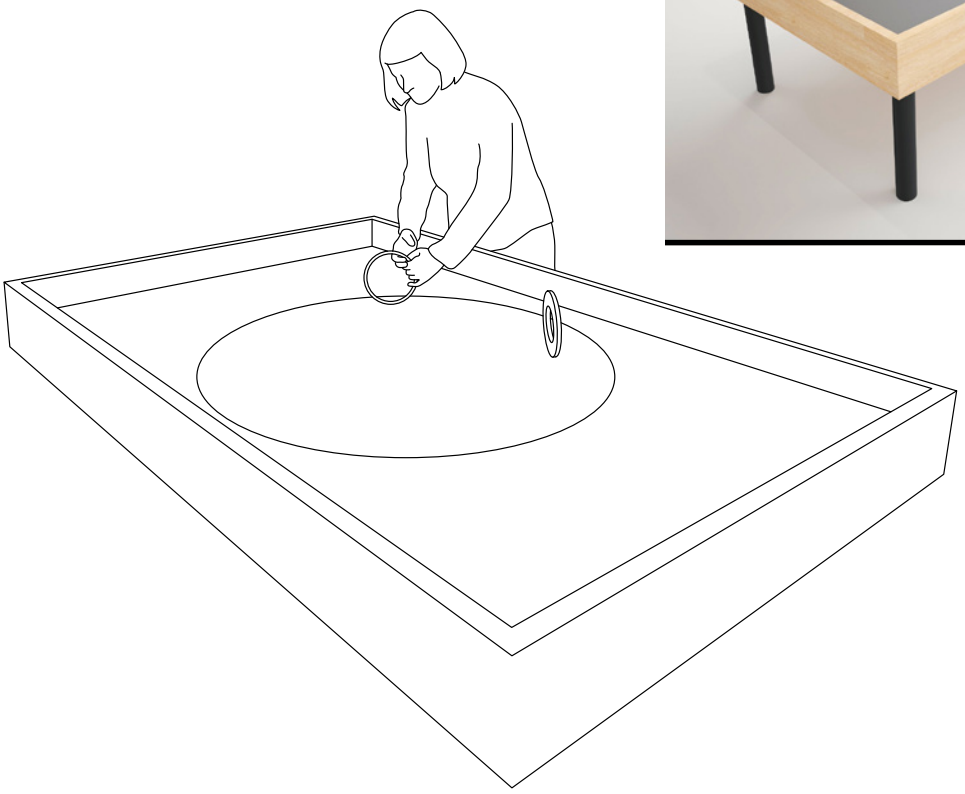
Technical information

Dimensions: table: 205 × 130 cm; plate: ø 100 cm

Consumable materials: –

Accessories: rings, discs, balls; optional: platform for persons of lower height

Power supply: 230V mains



Fan

Design of the set: The set consists of two components. The first is the blower itself – a transparent tube mounted on a wooden structure above a fan. The gap between the fan and the bottom of the tube allows free access to the inside. The second element of the set is a box with various small items for experimenting and building flying structures.

Activity of the visitor: The visitor's task is to build flying structures from the elements they find in the box (paper, straws, sticks, etc.). Depending on the experimenter's objective, the structures can float in the tube, fall or move in a certain way. The set can be used by several people at the same time.

Topics: The constructions built by the visitor from available materials behave differently in the air flow inside the tube. Some fall immediately on the fan, others float in one place, others fly out of the tube. The behaviour of the structures depends on various factors, mainly their weight and surface area. An object that is too heavy will not be able to rise, while a very light one will immediately fly out of the blower. A spread-out umbrella-like structure will float more easily in the air than an elongated, rocket-shaped one.

Keywords: falling, gliding, flying, gravity

Consumables: ping-pong balls, skewer sticks, rubber bands, A4 sheets of paper, ice cream sticks, straws

Reusable materials: scissors

Man puzzle

Design of the exhibit: The exhibit consists of two elements. The first is a table holding a human mannequin with models of the major organs: lungs, heart, liver, pancreas, stomach, intestines, kidneys, bladder, brain, eye, etc. The organ models can be removed to then be placed back in their proper place inside the mannequin. The second element of the exhibit is a touchscreen table with diagrams of the human internal systems with descriptions of the functions of each organ.

Activity at the exhibit: The user's task is to place the organ models inside the mannequin in such a way that they all fit. This gives the opportunity to look at them closely, see how they are positioned in relation to one another and compare their size. As the organs are closely packed, there is only one correct way to arrange them.
The exhibit allows several people to experiment at the same time.

Topics: The internal organs are of a specific size and have a specific place intended just for them, and they are also tightly packed. This is why we feel every change in this orderly system. The organs function in systems whose action – coordinated by the nervous system – is what makes us alive. The lungs allow gas exchange and the liver, among other things, is responsible for digesting fats and proteins, regulating glucose levels and many other vital substances in the blood, storing vitamins and minerals, cleansing the blood of harmful substances, neutralising toxins, supporting the immune system and blood clotting. The pancreas produces digestive enzymes and hormones. The stomach and small intestine are responsible for digestion of food and absorption of nutrients. The large intestine is responsible for the absorption of water and vitamins. The organs of the urinary system – the kidneys and bladder – enable the removal of unnecessary and harmful substances from the body. And, finally, the heart – it sets the blood in motion so that it reaches every corner of our body, supplying it with the necessary and removing unnecessary substances from cells, organs and tissues.

Keywords: human, model, internal organs, digestive system, respiratory system, genitourinary system, cardiovascular system, nervous system, brain

Velvet hands

Drag your hands along the metal mesh and feel the illusion of pleasant smoothness.

The user's task is to drag their closed hands along metal meshes. In this experiment, the user feels the illusion of 'velvety hands', while touching one of the meshes, making them believe that they are touching a very soft and smooth fabric. We don't know exactly why this tactile illusion happens. Since we are all different, some users may perceive stimuli differently. Some people don't feel anything special at first. Others need to close their eyes in order to feel the effect.

Keywords: sense of touch, perception, illusions

Velvet hands

Exhibit structure

The exhibit has the form of a stand. It comprises three metal meshes stretched over wooden rims.

The exhibit allows three people to experiment simultaneously.

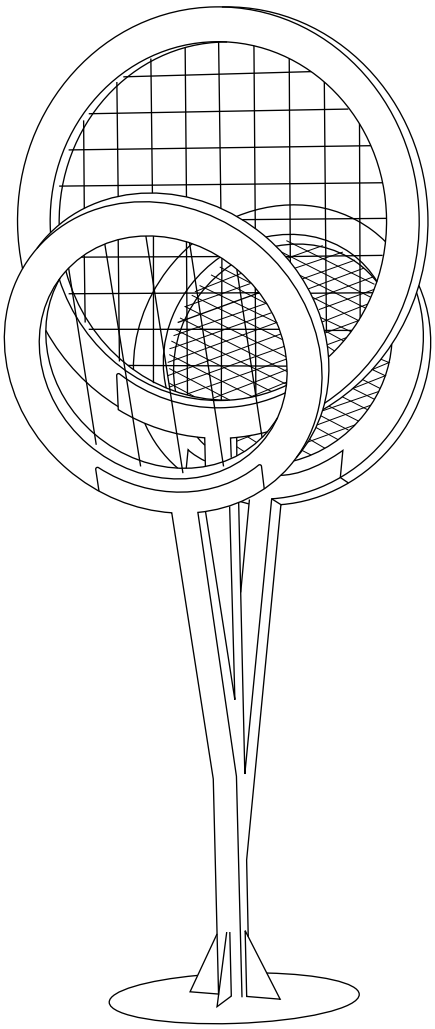
Technical details

Measurements: 70 × 60 × 140 cm

Consumables: –

Accessories: –

Power: –



Roller racing

Design of the exhibit: The exhibit consists of two identical inclined planes arranged in parallel next to each other and two rollers that can be placed at different points on the planes and then released freely. The rollers are made of the same material, have the same diameter and the same mass. In the case of one roller, this mass is distributed evenly around the circumference, while in the other roller most of the mass is concentrated close to the axis. Consequently, the seemingly identical rollers differ in their moment of inertia, which affects the rate at which they gain rotational speed as they roll down the plain.

Activity at the exhibit: The user places two rollers in the same place on the track and lets them go at the same time. Although at first glance the rollers are identical and both roll without slipping, they pick up rotational speed at different rates, which translates into different speeds of translational motion.
The exhibit can be used by one person at a time.

Topics: A roller with a higher moment of inertia rolls more slowly than a roller with a lower moment of inertia. This is because a higher moment of inertia means that it is more difficult to give the object rotational speed.
In the process of rolling, potential energy is converted into kinetic energy, which is the sum of the kinetic energy of rotational motion and the kinetic energy of translational motion. The kinetic energy of the two rollers at the end of the path is the same and results from the available potential energy, which is equal for both rollers (the start and end points are the same). What differs between the two rollers at the end of the path is the division of the total kinetic energy between the translational and rotational parts. The one with more kinetic energy of translational motion has less kinetic energy of rotational motion. Conclusion: a roller that rolls faster has less energy stored in rotational motion (even though it is spinning faster!).

Keywords: moment of inertia, kinetic energy of translational motion, kinetic energy of rotational motion, potential energy

Mathematical puzzles

Design of the exhibit: The exhibit consists of a table with eight stations for solving different puzzles. What they have in common is that, in addition to mental work, it is necessary to perform manual actions on a physical object (flat puzzles, three-dimensional puzzles, tangrams, pieces that have to be separated, joined or put in the right order, etc.).

Activity at the exhibit: The user sits down at a stand and has unlimited time to solve the puzzle. After solving the problem, they can change the stand and take up the challenge at another puzzle.
The exhibit allows several people to experiment at the same time (one person per stand).

Topics: Some of the proposed puzzles are jigsaw puzzles, some involve disconnecting pieces. Solving some requires perceptiveness or spatial imagination (e.g. a fragmented cube), others require finding an algorithm and repeating it until it works (e.g. the Tower of Hanoi).

Keywords: puzzle, algorithm, jigsaw

Accessories: puzzle elements

Rotating mirrors

Some mirrors can put the world on its head!

The exhibit consists of six sets of mirrors. Each set consists of a pair of mirrors forming a certain angle. When rotating a set of mirrors, the user notices that the image in the mirror is turned upside down, while in other cases it remains natural. Depending on whether an even or odd number of reflections occurred, the image will be reversed or not.

Keywords: geometric optics, directional reflection, multiple reflections

Rotating mirrors

Exhibit structure

The exhibit is built on the basis of a triangle. The plywood construction is set on metal legs. Two sets of mirrors with different opening angles between the panes are attached to each of the three sides. Each set is mounted on a rotating base with handles.

The exhibit can be used by six people at a time.

Technical details

Measurements: 170 × 150 × 120 cm

Consumables: –

Accessories: –

Power: –

Vanishing Cat

Design of the exhibit: The exhibit consists of a screen and a control panel with three sliders to adjust the intensity of red, green and blue light displayed in three overlapping circles on the screen. The exhibit has a housing made of plywood with plastic inserts in the form of intensity slider markings. An screen is mounted in the rear.

Activity at the exhibit: The user activates the exhibit by touching the start button. On the screen, at the point where the circles illuminated by red, green and blue light intersect, a cat appears in a randomly set colour. (The user can choose whether they want to see only a uniform background with the produced colour or coloured circles showing the intensity of the individual component colours).
The experimenter has to adjust the intensity of the green, red and blue light so that the colour of the background on which the cat appears blends in with the colour of the cat. In other words, the cat blends into the background and disappears from sight (hence the name of the exhibit – vanishing cat). The light is controlled by sliders on the control panel. The intensity of the individual light colours is also visualised as coloured bars on the screen. When the user is convinced that the colour has been adjusted correctly, they can use the "check" button. Markers then appear on the coloured bars on the screen to indicate the correct intensity of the individual light colours. The exhibit can be used by one person at a time, but additional people are allowed to participate in the discussion.

Topics: Mixing coloured light is governed by different principles than mixing coloured paints, so it can seem very difficult at first. When you add more paint, the colour darkens because the paint absorbs the light it receives. But as we add more coloured light, the background colour will become lighter. When you add all the colours of light together, you get white light – and a completely white background. When the colour of the background changes, the colour of the cat placed on that background does not change. But this is hard to believe! It often seems different because of the contrast between the background and the cat. The cat will look darker on a light background and will appear lighter when we change the background to a darker one.
The exhibit demonstrates the principles of mixing the colours of light in the RGB (red, green, blue) primary colour palette. By varying the intensity of individual screen subpixels, it is possible to create the impression of any colour.
The RGB palette is used in displays and takes advantage of the natural perception properties of the human eye, in which the cone cells (operating in good light) are sensitive to colour perception, with their sensitivity peaking at red (564 nm), green (534 nm) and blue (420 nm). In the RGB space, we are dealing with additive synthesis – the combination of colours will create the impression of white light.

Keywords: colours, colour mixing, RGB, lighting intensity

Bone hearing

Topics: We hear sounds because the vibrating air causes the eardrum in the ear to vibrate, which in turn triggers other parts of the middle and inner ear, which finally vibrate the fluid in the cochlear duct. The vibrations of the fluid stimulate the ciliated cells lining the inside of the duct, which, when stimulated, send nerve impulses to the hearing centre in the brain.
Bone conduction is a way of hearing bypassing the eardrum. Sound travels directly to the inner ear by vibrating the fluid inside the cochlear duct.

Keywords: sound, mechanical vibration of the medium, amplitude, frequency, sense of hearing, structure of the ear

Design of the exhibit: The exhibit consists of a table on the top of which are two small circular fields. These fields are mechanically coupled to vibration exciters, which convert an electrical signal into vibrations. The exciters are connected to a source of music. In this way, the circular fields produce vibrations of small amplitudes and different frequencies, playing music (similar to the membrane of a loudspeaker, but in this case the vibrating surface is hard and rigid and the amplitude of the vibrations is so small that no sound propagates through the air).

Activity at the exhibit: The user sits on a stool and rests their elbows on the circular fields. When they press their index fingers to their ears, they hear music. The experimenter can try pressing their wrists or open palms to their ears and see with which hand position they will hear the music best. The exhibit can be used by one person at a time.

Shapes of light

Design of the exhibit: The exhibit consists of a luminous surface near which there is a rotating disc with holes in different shapes (first aperture). At some distance from the disc there is a stand on which discs with holes cut in different shapes can be placed (second aperture). At the end of the optical path there is a white surface (screen). The light coming from the source after passing through both apertures produces a luminous image on the screen.

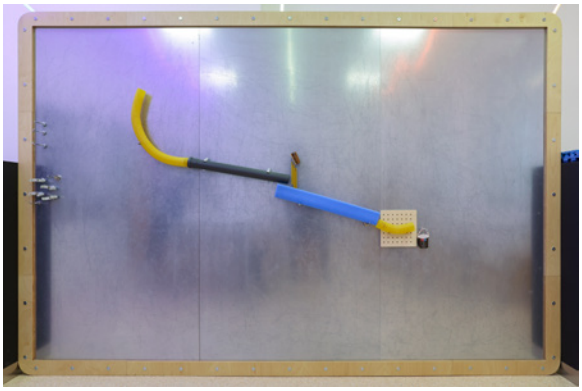
Activity at the exhibit: Using the disc, the user selects the first aperture, thus determining the shape of the light source. Then, by placing the selected disc on the stand (second aperture), they determine the shape through which the light coming out of the source passes. Finally, the user observes the resulting image on the screen.
The exhibit can be used by one person at a time.

Topics: The exhibit shows how the shapes of the openings through which light passes affect the image produced on the screen. The first aperture determines the shape of the light source. Let us assume that the user has chosen an aperture with an F-shaped opening. If the second aperture consists of one small opening, an image of an inverted F will be produced on the screen. We can therefore adopt the principle that light passing through a small opening produces an image of the inverted source on the screen.
If the shape of the second aperture is more complicated, we can imagine that it is made up of closely spaced small openings. Each will generate an image in the form of the inverted source. So if the second aperture is shaped like, say, a star and the first aperture is shaped like the letter F, the resulting image will look as if the star was drawn with a marker whose tip is shaped like an inverted letter F.
At first glance, it is difficult to see in such an image that it has been created by multiplying the image of the inverted source, because the individual letters overlap, merging into one whole. However, the F-shape can be seen at the edges of the resulting image (where there are no images in the vicinity to merge with).

Keywords: geometrical optics, aperture, real image, light rays

Accessories: aperture disks

Great machine



Activity of the visitor: The Great machine set is inspired by the idea of the Rube Goldberg Machine. The visitor is tasked with creating the most interesting, diversified route for a small wooden ball in the space of a large metal board. There is no single correct solution here, but the more unusual the ideas, the better. For younger children, building a track that can keep the ball is just enough of a challenge, while older children, teenagers and adults can focus on finding out-of-the-box solutions. The set can be used by several people at the same time, this is even advisable due to its size.

Topics: The set encourages the creative use of available materials and the search for unconventional solutions. The task is formulated in a rather perverse way – usually what you would be trying to do is to find a solution as simple as possible, as quickly as possible, and here the aim is quite the opposite. This allows you to see the world from a slightly different perspective and to implement ideas that would otherwise have to be rejected.

Keywords: Imagination, creativity, gravity, dependencies, domino effect

Reusable materials: wooden ball, plastic tubes, foam profiles, rubber bands with hooks, magnets, tube holders, set of bolts and hooks.

Thermal imaging camera

Design of the exhibit: The exhibit consists of a large screen in a wooden framework. A thermal camera is placed just above the screen. The image recorded by this camera is displayed on the screen. Additionally, there is a metal stand with two panels a few meters in front of the screen. One is transparent, constructed of plexiglass, the other is a hanging construction film that can be moved.

Topics: The exhibit enables the user to view the "light" emitted by his or her body. Even though we cannot see it, all things emit electromagnetic waves. Just as a piece of metal heated to a high temperature emits red light, the human body also emits infrared "light". The difference in the type of light emitted comes from the fact that the heated metal has a temperature of about 900 degrees C, while the human body has a temperature of about 36 degrees C. With the naked eye, you cannot see infrared "light". However, the fact that you cannot see a thing does not mean that it is not there. In general, all objects around us "glow", and the colour and amount of this glow depends on the temperature of the object. Such "light" is called thermal radiation. By recording thermal radiation, one can infer the temperature of the object that emits this radiation. The image is obtained with a camera sensitive to electromagnetic waves in the thermal infrared spectrum. The colours visible on the screen are not natural. From red – for the warmest areas, to yellow, green and dark blue – for the coldest areas.
The user can make parts of their body warmer (e.g. by rubbing them) or cooler (by touching cold objects) and view the areas so altered under infrared light. They can also observe the cooling or heating process. It is also interesting to explore the effect of clothing on the observed image. The resulting image represents a relative temperature measurement, i.e. it does not have a numerical temperature scale but is based on differences in the heat of the objects that are recorded.

Keywords: thermal radiation, thermography, heating, cooling, homeothermic nature of the human body

Maintenance: The exhibit is connected to an electrical supply. It is switched on and off with a button on the bottom left of the framework.

Visual concept – Example of an arrangement of the proposed exhibits in space

Air Cannon
Walking spring
Fan
Man Puzzle
Masters od Instant Memorisation
Velvet Hands
Rotating Mirrors

Visual concept –
Example of an arrangement of the proposed exhibits in space

Fan
Mirror Window
Rotating table
Great Machine

Visual concept – Example of an arrangement of the proposed exhibits in space

Masters od Instant Memorisation
Colourful Shadows
Two Left Sides
Thermal Imaging Camera

Visual concept –
Example of an arrangement of the proposed exhibits in space

Copernicus Science Centre
20 Wybrzeże Kościuszkowskie
00-390 Warsaw

Contact
Dagmara Łukasiewicz
Mobile: +48 508 624 114
Email: dagmara.lukasiewicz@kopernik.org.pl