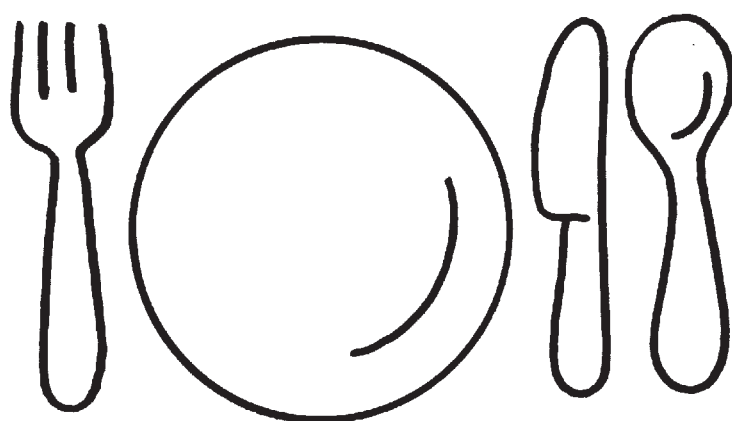




Appetizer before visiting The House of Experiments



(a complete selection of experiments and instructions for each experiment)

Ljubljana, July 2023

Dear Visitor – Dear Group leader

We are aware that 45 minutes (one school hour) is a very short time to become acquainted with the experiments, for reading instructions and performing experiments. The number of people who can visit the House of Experiments at the same time is restricted due to the limited size of our exhibition space and number of our experiments.

As we wish that your visit may be as rich in experience as possible, and that you will make the most use of time spent in the House of Experiments, we present an Appetizer. It is a collection of photos of experiments, accompanied by an explanation of what one is required to do in a certain experiment – a collection of recipes (without explanations and the science, which is concealed behind the experiments).

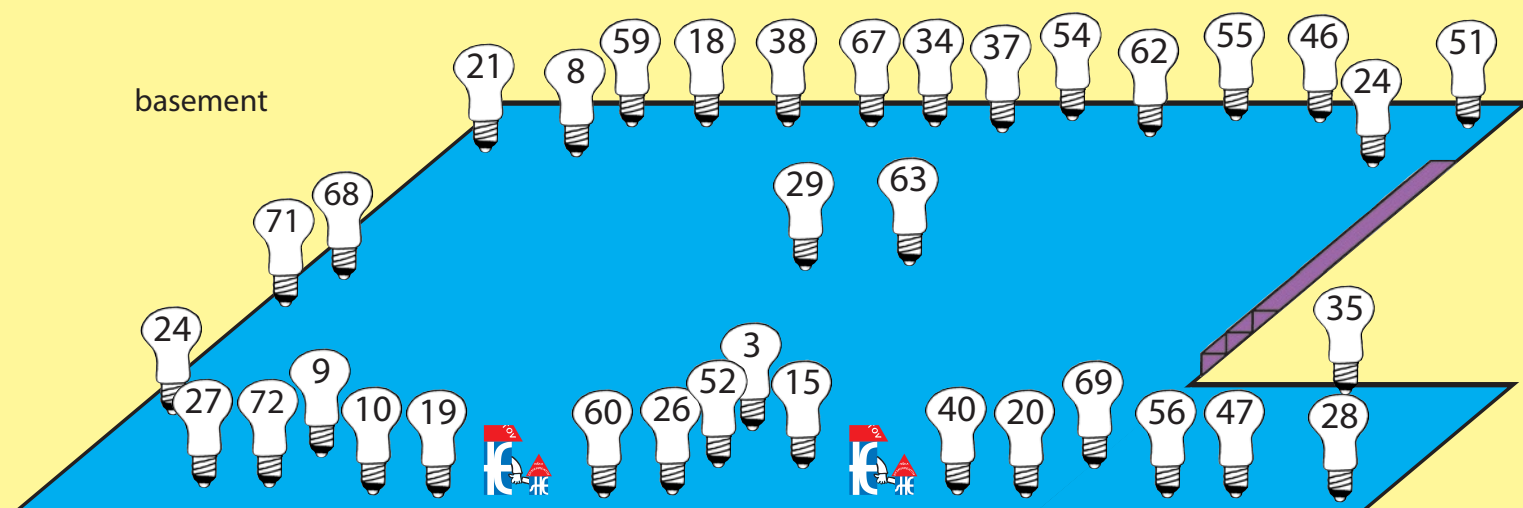
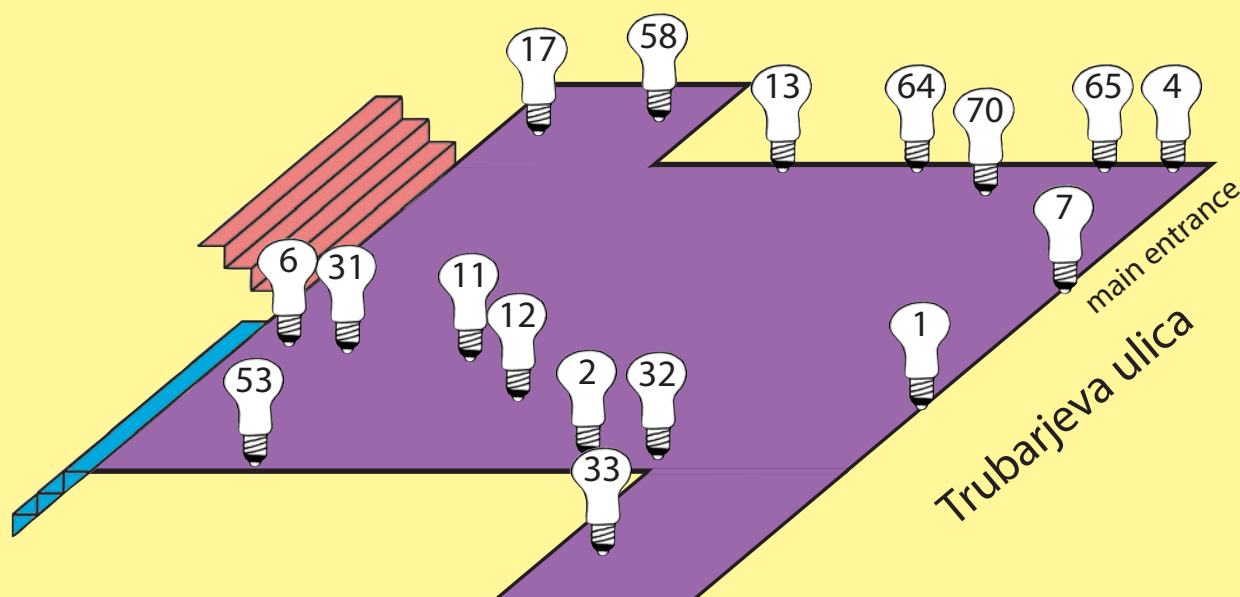
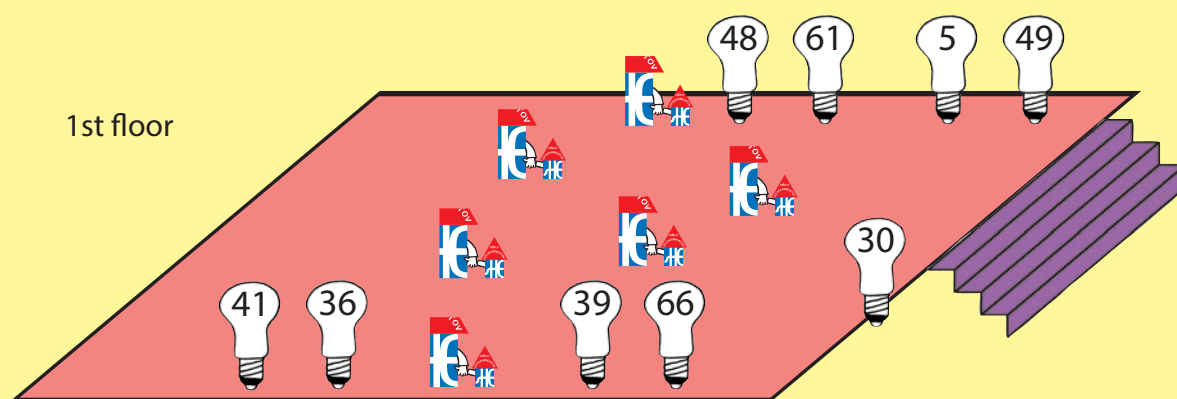
This is an Appetizer, made with extreme care, which will help to make the main course – experimentation, continuation of reading and deepening of knowledge in the House of Experiments – taste delicious.

We advise you to take a look at each experiment in the Appetizer before your visit to the House of Experiments. You will then be able to fully dedicate your visit to experimenting and reading the rest of the instructions.

Welcome!

Miha Kos

Location of each experiment in The House:



Permanent exhibition

Interactive exhibit in The House of Experiments.



Temporary exhibition

Mobile interactive exhibits named "Little House of Experiments" - we visit primary schools, municipalities, companies,... and turn them into a science centre for one day. Here you can interact with several exhibits from this activity. We change these exhibits every month.



1. HIGHER WEIGHT - HIGHER PITCH

Do and observe!

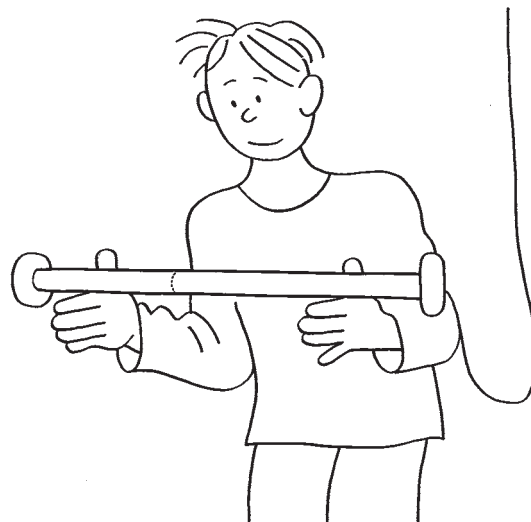
Step on the podium, wait for a moment for the device to settle down, and then pluck the string in front of you. Listen to the vibrating sound of the metal plate to which the string is attached. Try humming the tone so that you may remember it better. Take a note of the number on the display in front of you. Then make somebody else repeat the experiment. What do you notice?



2. THE "MAGIC" ROD

Do and observe!

Support the rod with one hand at each end, as shown in the picture. Move your hands slowly together. The rod will slide alternately on one hand and then the other. Your hands will always come together exactly at the midpoint mark on the rod.



3. THE ESCAPING MOUSE

Do and observe!

Cover your left eye with your hand and watch the cat chasing the mouse. You will be able to see the mouse from the corner of your eye. Step closer to the drawing, and then step back, watching the cat all the time. At a certain distance you will see the mouse vanish.



4. SHIFTING FACE

Do and observe!

Step about 2 metres (6 ft) back, close one eye, and look at the face on the wall. When you move left or right, the face will seem to be turning your way. After the experiment, step closer and take a close look at the face.



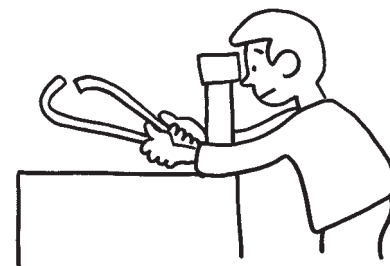
5. IS IT LEFT OR IS IT RIGHT?



Do and observe!

Look through the viewer, and move your right hand until it comes into view. You will see the hand approaching from the left.

Beside the viewer you will see two plastic rods. Hold them with arms outstretched and observe them through the viewer. Try to make the ends of both rods touch. Observe the red and blue vertical rods. Which one seems closer?



6. DISAPPEARING ACT

Do and observe!

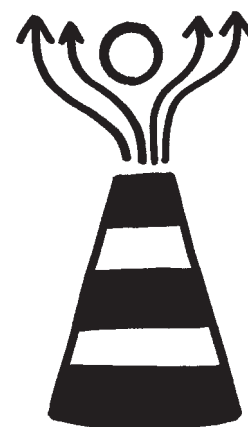
A lens and some glass rods are suspended in a large glass jar filled with liquid. Turning the knob lowers either the lens or the rods into the liquid. Contrary to expectations, the image seen through the lens is not magnified; in fact, the lens has no effect on the image at all. When the rods are dipped into the liquid some of them seem to disappear.



7. FLOATING BALL

Do and observe!

A ball rides on a stream of air blasting out of a strong blower. If you take hold of the ball and pull it sideways, you will feel a force drawing the ball back into the center of the stream. Letting go of the ball will make it wobble across the stream, but it will not fall down. Try tipping the blower slightly to see what happens.



8. SANDSCAPE

Do and observe!

Take the scoop and distribute the sand evenly in the upper three quarters of the sandpit. Create your own landscape, letting your imagination run free while forming hillocks and valleys. Make a water channel through one of the valleys, perhaps letting it run straight in the upper part of the sandpit and winding in the lower part. Tilt the pit and observe the consequences. After a while change the angle of the tilt and observe how the processes change depending on the degree of tilt.



9. BUBBLES UP

Do and observe!

Rotate the frame with the transparent tubes into a vertical position and observe the motion of the bubbles inside the tubes. The tubes are filled with different liquids, and there are approximately equally sized bubbles inside them. Repeat the experiment several times, also with different angles of the tubes.

10. FALLING MAGNETS

Do and observe!

Rotate the frame with two metal and two transparent tubes into a vertical position and observe the falling of bar magnets through the tubes. Repeat the experiment several times and try to figure out which magnet is the fastest and which the slowest.



11. GIANT BUBBLES

Do and observe!

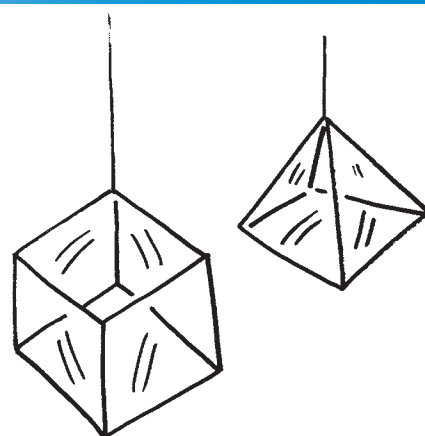
Dip the metal loop into the soap solution and pull it out again carefully so that a soap film is formed over the loop. Run for a few steps, dragging the loop through the air. Close the soap "pouch" with a swift movement, thus creating a giant soap bubble.



12. SOAP SOLUTION AND GEOMETRY

Do and observe!

Dip wire models of geometric shapes into a soap solution, and then gently pull the shapes out again. Observe the forms and surfaces that have been covered by the soap solution.

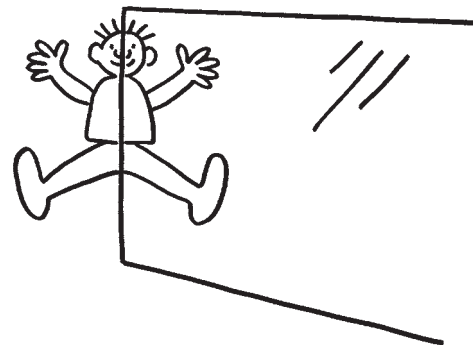




13. MAN IN THE AIR

Do and observe!

Stand next to the edge of a long flat mirror so that the mirror's plane goes vertically through your middle as precisely as possible. If you are standing correctly you should see your image in the narrow mirror on the opposite side. Take a hold of the handle behind the mirror with your left hand and lift your right leg without moving any other part of your body. Your image in the mirror on the opposite side will appear to be floating in the air. Observe what happens when you move other parts of your body. Stand by the narrow mirror and observe someone else performing the experiment.



14. SPARKLING FISH IN THE "BLACK SEA"

Do and observe!

Stand before the cabinet with your eyes level with the aquarium. If necessary, sit down on the stool. Turn the control wheel on the left side. The "Black Sea" is all around you on the left and on the right sides of the aquarium.

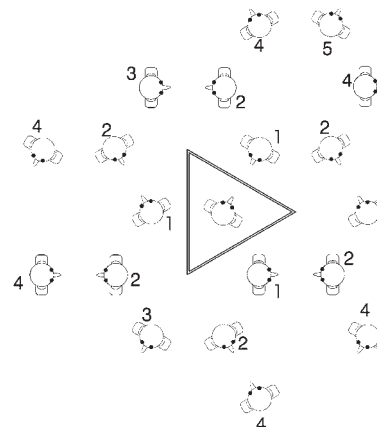
**NO SPACE,
NO EXPERIMENT**



15. MIRROR MULTIPLICATION

Do and observe!

Crouch and climb into the triangular enclosure in front of you, taking care not to bump your head. Once inside the enclosure stand up and take a look around. You will see a never ending multitude of your own replicas filling the surrounding space.



16. THE MORE YOU DRINK, THE HARDER YOU CRASH

Do and observe!

The car starts driving by itself. You have to control it with your foot. The shift stick is used to change the direction of the car. Try to drive as carefully as possible and try not to crash. After a while, press one of the red buttons on the right side of the stick for a new number.

RENEWED!
new number: 50



17. COLORED FLAME

Do and observe!

By pushing down on the lever on the right side you will transfer some solution from the receptacles to the flame. Move the gas flame with the other lever. Different solutions will color the flame differently.



18. BALANCING ACT

Do and observe!

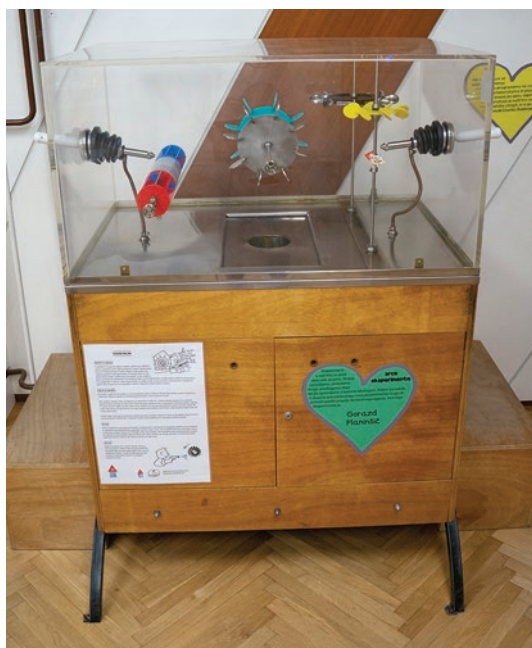
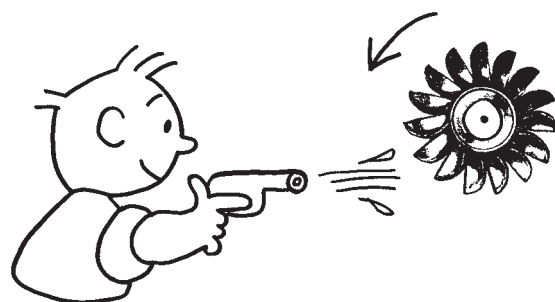
Step onto the wooden plank and grab the golden rod with both hands. Hold tight and try to stand in such a way that the seesaw doesn't tip over. Wait until only zeros can be seen on the display. Let go of the rod and try to keep steady as long as possible. When you let go, a stopwatch starts measuring the time. As soon the plank touches the ground or you touch the rod, the stopwatch will stop. The elapsed time will be displayed in the bottom line of numbers. The longer you manage to keep your balance, the greater the number. The upper line of numbers indicates the highest daily score. Does the seesaw always tilt to the same side? Is it easier to balance with your feet apart or close together? Is it easier to balance if you crouch?



19. WATER MILLS

Do and observe!

Press on the button to turn on the water pump, and then use the lever to aim the water onto the wheels inside the box. Observe the speed of rotation of the wheels and observe the way the water flows after splashing into the paddles. Compare the rotation of the red and blue wheels. Do you notice any difference beside the color? Also compare the rotation of the green wheel and the metal wheel of the same size that you drive with a steady stream of water. Observe the way the stream of water gets scattered when being directed into the sidewall or into the wall on the opposite side. What occurs when your stream and your





20. GLUTTONOUS BUBBLES

Do and observe!

Put your foot on the wooden step and push hard downwards. A bubble appears at the bottom of the cylinder filled with a dense liquid. Observe how bubbles of different size rise through the liquid. Try to form one or more small bubbles, and then a large one to follow.



21. BED OF NAILS

Do and observe!

Lie down on the bed. There is a panel full of nails beneath the bed, and the nails poke through tiny holes in the bed when you press the red button. When some time has passed after you press the button you will find yourself lying on a bed of nails. After a while the nails will withdraw and you are out of "danger".



22. FLOATING BUBBLES

Do and observe!

Approach the container with the soap solution. Press the lever and the bubble will rise from the bottom of the container. Observe the bubble also from the side.



23. UP THE SLOPE

Do and observe!

Pick up the wheel that is conically tapered at both ends, and place it at the start of the longer incline. Then let it go. The wheel starts moving up the slope. Watch the movement of the wheel. The wheel will move up the slope and stop at the top.



24. WHISPERING OVER LARGE DISTANCE

Do and observe!

Stand in such a way that you can speak into the ring at the center of the round mirror, and ask a friend to stand listening by the ring at the other mirror. Even though the mirrors are quite a distance apart, your friend will have no trouble discerning your words. You can thus have a conversation over a distance.

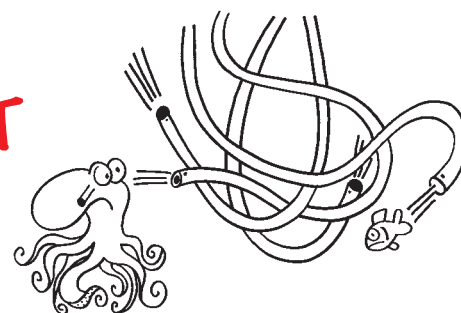


25. WATER SNAKES

Do and observe!

On the side of the sphere there are three small valves which control the flow of water. Observe what way changing the flow of water influences the motion of the pipes.

**NO SPACE,
NO EXPERIMENT**

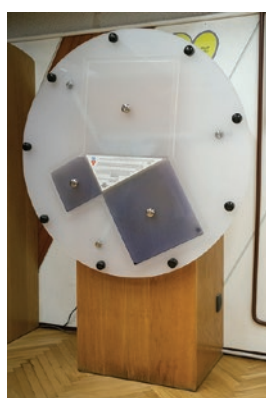


26. DANCING LIQUID

Do and observe!



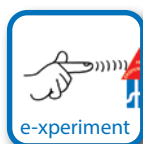
Press on one of the six buttons on the left side of the control panel. Wait for a few moments, and then listen to the music, at the same time observing the liquid under the translucent cover. Repeat the experiment with other pieces of music. Slide the microphone cover to the left side. Say something or sing a song into the microphone, holding down the red button beside the microphone. If you wish to use the microphone without the background music you should press the red button on the right side.



27. LIQUID PYTHAGORAS

Do and observe!

Slowly rotate the circular board and observe the flow of the liquid.

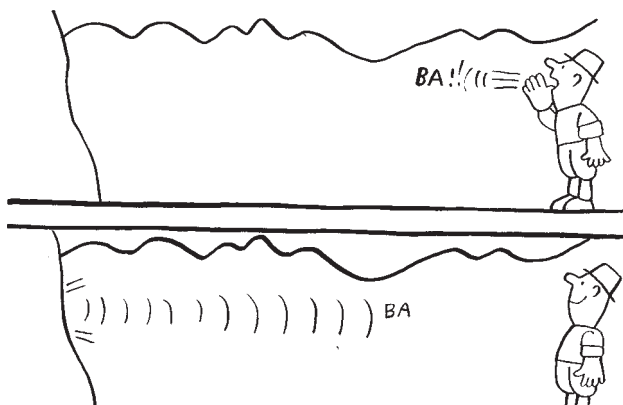




28. ECHO TALK

Do and observe!

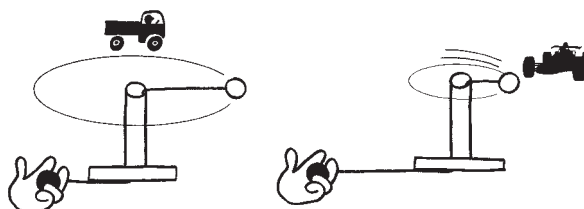
You can see four connected pipes in front of you. Speak into the lower one and listen to the sound in the upper pipe. What do you hear?



29. SPIN AND PULL

Do and observe!

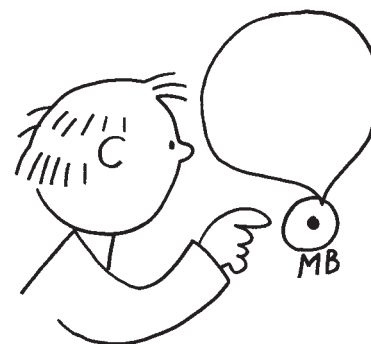
Take hold of the ball and make it spin in such a way that the string is always taut. Before the ball might come to a stop, pull on the little black sphere on the edge of the table. This sphere is connected to the larger ball. You can either pull on the little black sphere or feed the ball more line.



30. DO YOU UNDERSTAND?

Do and observe!

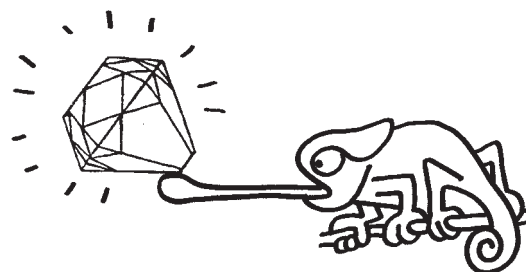
Step under the soundspeaker and touch one of the buttons on the map. You will hear the spoken word of the people living in the region shown on the map.



31. ANIMAL THIEVES - BUT WHAT ABOUT US?

Do and observe!

Take hold of the lever and pull it upwards, then return it to its original position. A precious object will appear on the pedestal before you. Try touching it with your FINGERS.

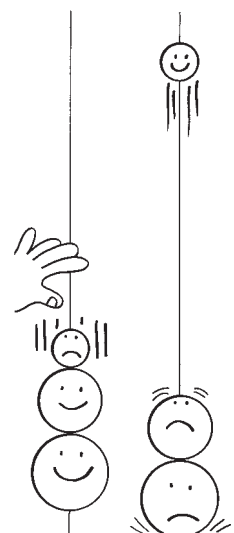




32. JUMPING HIGH

Do and observe!

Watch the balls of different sizes moving unhindered up and down the metal poles. Lift one, two or all of the balls and let them go. Observe how they bounce back from the ground and how they interact.



33. AIR GUN

Do and observe!

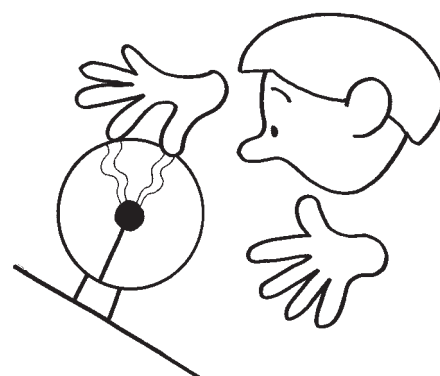
Tap the rubber membrane on the back side of the barrel with your palm. It is important that you tap the middle of the membrane with your palm flat. The tap should be quick, but not too strong. Observe how the plates in the frame on the wall react. If nothing happens tap the membrane some more, at the same time adjusting the direction of the gun and changing the intensity of the tap.



34. LIGHTNING IN A BALL

Do and observe!

Push the red button and wait until you notice bright green beams spurting out of the center point of the glass ball. Touch the glass lightly with your hand, and you will notice that most of the beams shift towards your hand. Let a friend touch the ball at the same time, and observe the reaction of the beams.



35. CATCHING SOUND IN A SPIRAL

Do and observe!

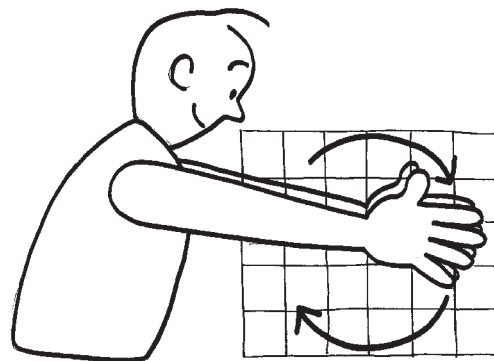
Have you ever listened to the sounds inside a large marine shell when you hold it close to your ear? Now try the tubes you see attached to the wall. Bring your ear close to the opening on the far left and listen. Then try the same with the longer tubes. Do you notice any difference? Press your head tightly to the opening of the tube and move away again. Do you notice any change?



36. FLUFFY HANDS

Do and observe!

With your palm rub the mesh and observe what sensation you feel. Now rub the other side of the mesh with your other palm. The sensation is the same on both sides. Next rub the mesh with both hands at the same time so that the palms touch each other and are separated only by the mesh.



37. FINGER THERMOMETER

Do and observe!

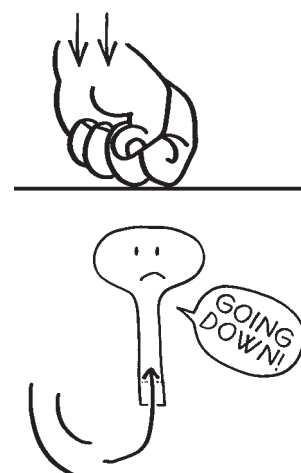
Try to arrange the cylinders by temperature, beginning with the warmest cylinder. Keep score of the temperature with the number of indicator lights: the warmest cylinder gets all six lights, the next cooler cylinder five, and so on. The coolest cylinder gets one light. Having thus scored the cylinders press the green button. Lights in the upper row will tell you how successful you were as a thermometer. The green and red lights indicate correct guesses and mistakes, respectively, but not where the mistakes were made. Pressing the red button you can start over again.



38. BUSY DIVERS

Do and observe!

Step on the pedal with your foot and watch what happens to the floats in the transparent cylinder. Release the pedal and step on it again. Observe also what is happening to the liquid inside the transparent floats.



39. LAUNCH PAD

Do and observe!

Step on the footprint outline and try to jump as high as possible. After the jump you will see the height you reached displayed on the screen.



40. EYES LEAD US BY THE NOSE

Do and observe!

Benham's wheel - from black and white apparent colours appear.

Press the button and observe the coloured stripes which appear on the spinning wheel. Remember the order of the colours from the rim of the wheel towards the centre. Wait until the wheel stops spinning, then press the other button. The wheel begins to spin in the opposite direction. But is the order of the colours the same as before?

Observe the pupil of your eye

Press your eye towards the opening and find a position in which the image of your eye is sharp (if you are wearing glasses, try to do it without them). Wait until your eye has adjusted to the faint light. Then press the button and carefully observe the black opening at the centre of your eye.

The Spiral - a distorted world

Press the button and gaze without moving at the centre of the circle until the wheel stops turning by itself. Then look closely at the palm of your hand and watch what happens.

You can read the instructions for the other experiments on this exhibit just by going to Hiša eksperimentov.



41. FEEL THE PRESSURE

Do and observe!

With your strongest finger, raise to the height of fully one centimetre each of the little rods on which different weights are placed. Feel the difference of pressure on your finger while doing this.



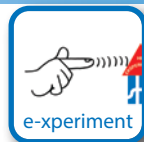
42. LITTLE SUN GLOWS, LITTLE RAIN GOES

Do and observe!

By using the world in miniature, you can observe at the bottom of the cylinder the "sea", the light source inside are the "sun", and the metal dish on top of the cylinder is a "cloud". Watch what happens in this little world.

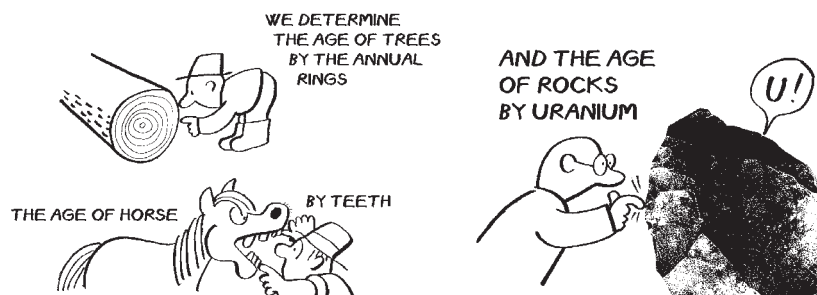


46. THE DICE IS CAST



Do and observe!

Choose an atom (uranium ^{235}U , carbon ^{14}C , iodine ^{131}I) and follow the storyline of the radioactive decay by throwing dice.



47. HAVE YOU EATEN YOUR SPINACH TODAY?

Do and observe!

Sit down by the table and with one hand grasp the handle-bar at the edge of the table. Rest the elbow of your other arm on the pad in front of you and take hold of the upper or lower handle on the bar.

On the handle, first a red light will appear, then an orange one, and after that a green light. When the green light is showing, begin to push the handle-bar as strongly as you can in the direction towards your other arm (towards the handle).



48. LET'S HOLD OUT HANDS

Do and observe!

Place yourself just less than a metre in front of the experiment. Select the framed mirror which is approximately at the level of your eyes, and look into it. Slowly stretch out your hand towards the centre of the mirror, as if you were going to shake hands. You will notice a hand reaching out from the mirror towards you. Now stand in front of one of the spoons which are fixed beside the mirrors, and repeat the test as described (you need to stand closer to the spoon than to the mirror). You will notice that something similar happens.



49. SWEET-O-BIKE

Do and observe!

Mount the bike and start cycling. While cycling, the food that is ready for you to eat, comes towards you. You have type 1 diabetes and have no insulin of your own. Therefore you must inject insulin before eating.

By pressing the LEFT brake, you take the food item to eat. Insulin is injected by pressing the RIGHT brake. You have to hold it until you are satisfied with the amount of insulin you want to inject. When you let the brake go, the insulin is injected into your body. The aim of the experiment is to stay on the road as long as possible, which means that your blood sugar level is well-regulated. HINT: during biking on a steep road and/or for healthy food, your insulin need is minimal.



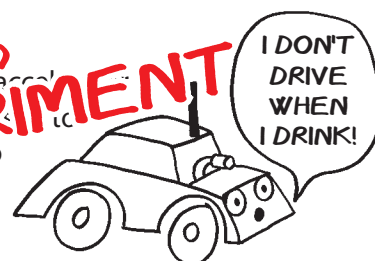


50. THE MORE YOU DRINK, THE HARDER YOU CRASH

Do and observe!

The car starts by pressing the accelerator with your foot. The shift lever allows you to choose the direction of the car. Try to drive as carefully as possible and try not to crash. After a ride press on one of the red buttons on the right side of

**NO SPACE,
NO EXPERIMENT**



the stick for another ride.



51. THE TURNTABLE

Do and observe!

Step onto the revolving base. Set the heavy wheel (the flywheel) into upright position and turn it round. Meanwhile, hold onto the steering-wheel with your other hand. Keep on grasping the steering-wheel with your other hand, and with it gradually turn the flywheel into horizontal position. You will now begin revolving. Are you turning in the same direction as the flywheel? Keep turning the steering-wheel slowly onwards. When the flywheel is back again in vertical position, you will stop revolving.



52. LESS IS MORE

Do and observe!

With your hand, slowly raise and lower the upper weight. Then with the same hand, take hold of the lower, larger weight, and raise both weights simultaneously.



53. A BIT OF WATER

Do and observe!

In this experiment we have seven cylindrical and two larger rectangular containers. In the next step you will try to take the amount of water stated on the screen out of the bottom into the top container.

You will experimentally measure the water that was taken out – if you had poured out as much water as would fill the upper container, it would exactly fill all the seven cylindrical containers.

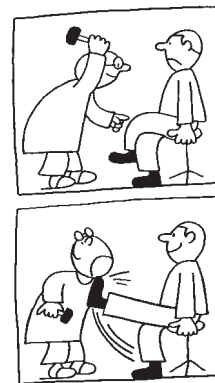




54. REFLEX-O-METER

Do and observe!

Nerve centers in our brain are stimulated by the data from our surroundings, and they produce a sensation (seeing, hearing (sound), touch) leading to voluntary or involuntary responses. Measure your response time.



55. WALKING ON SUNSHINE

Do and observe!

If the bugs are not lively choose one of them and shine some light on it with the lamp included in the experiment. The lamp can be turned on and shifted by the two buttons – one on the left and one on the right of the text. If the light beam doesn't reach the chosen bug, you can steer the creature into the beam by turning the wheel on the front panel of the experiment.



56. IMAGE UPON IMAGE

Do and observe!

Using the items in the experiment (you may also use some of your own) make an animated movie. Arrange the initial setting and photograph it by pressing the button with the camera symbol. Move an object a little bit and make another photograph. Continue in this way. You can see the animated movie you made by pressing the 'movie button'. To start afresh, press on the snake symbol biting its own tail.



57. WOMEN IN SCIENCE AND TECHNOLOGY

Do and observe!

Listen to the life stories of female scientists from seven countries. Start by touching a picture of the scientists.

**NO SPACE,
NO EXPERIMENT**



58. TWIRLING COLORS

Do and observe!

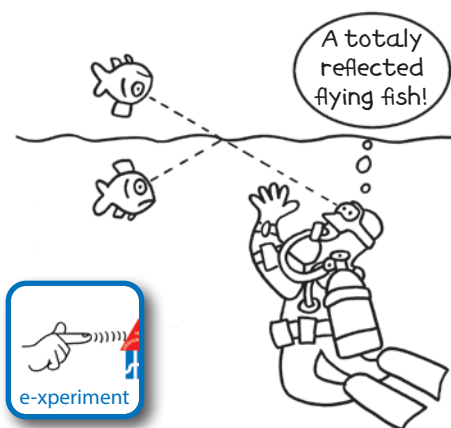
Touch one of the buttons on the glass panel. The pinwheel starts to turn, and at the same time the red light begins to flash. The flashes grow faster and faster, and eventually the red pinwheel blades seem to stop. When the green light starts flashing, you can begin with your experiment. The frequency of the flashes can be regulated by the red and green buttons. Touching the (♪ ♪) symbol decreases the frequency of the flashes, while touching (♪ ♪ ♪ ♪) increases it. Vary the frequency of the flashes and observe the patterns on the pinwheel. Observe the color of the pinwheel at the point where the red and green blades seem to overlap.



59. TOTALY REFLECTED

Do and observe!

Pick a light bulb that isn't submerged in water and observe it closely. Then rotate the wheel a little, so that the bulb is completely under water. Does the bulb seem any different than before being submerged? Repeat the procedure with the other bulbs. Do you notice the same change in all of them?



60. CYLINDRICAL MIRROR

Do and observe!

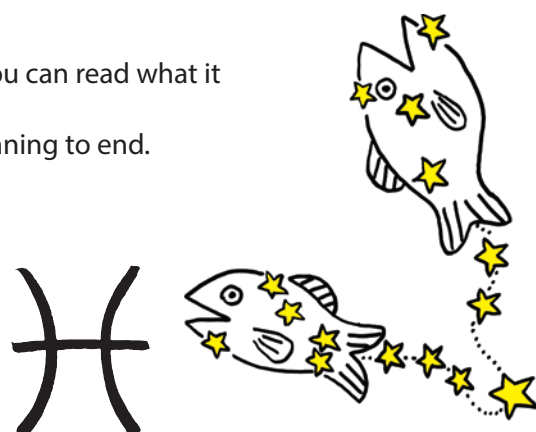
In front of you are several "deformed" images. Pick one and observe its reflected image in the cylindrical mirror. Draw your own image while looking at the reflected image.



61. HOROSCOPE

Do and observe!

Spin the horoscope so that you can read what it says about the zodiacal sign. Read everything – from beginning to end.

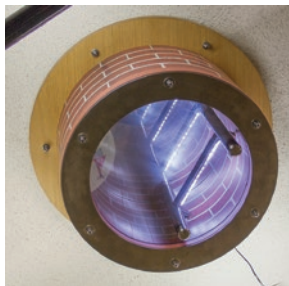
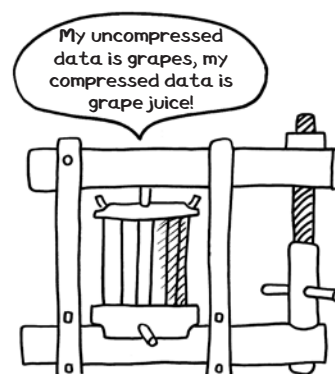




62. VIEWER

Do and observe!

Bring your eye close to the eyepiece of the viewer and look through. Turn, raise and lower the viewer. The image in the viewer can be drawn closer or moved away by turning the darker ring on the viewer.



63. SKY IS THE LIMIT

Do and observe!

Look up and observe the inside of the chimney. Can you tell how tall the chimney is?



64. INVISIBILITY REVEALED

Do and observe!

Look at the screen. No, this experiment is not faulty. There is nothing wrong with the screen, although you can see only white. Below the screen there are four paddles. Take a yellow paddle and look through it at the screen. Watch the screen carefully while turning the paddle as shown in the illustration. You will now notice colors on the screen. When you turn the paddle, the colors change hue. Carefully observe the image of the screen reflected in the side "windows" of the experiment. The image there is also colored. Repeat the procedure with the other paddles. Some of the paddles don't transmit light. You can use these to observe the reflected light.



65. DIVIDE AND CONQUER

Do and observe!

Select the appropriate waste disposal bin for a variety of objects.

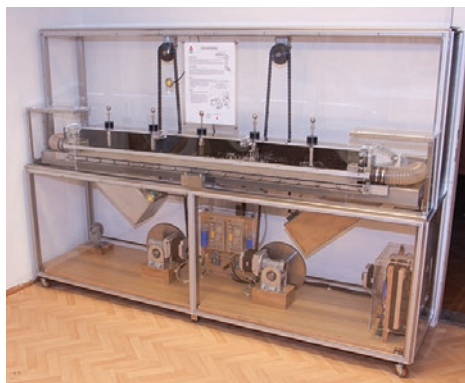


66. A WHOLE LOT

Do and observe!

Create a black and white figure/drawing in the grid on the lower touch screen. You can use the "FILL WHITE" and "FILL BLACK" buttons on your right. To confirm press the "SEND" button, and check when the drawing was or will be displayed on the upper screen. To see more options click the appropriate tags. To create a new figure, press the "START OVER" button.





67. STILL WATER RUNS DEEP!

Do and observe!

Dip one or two paddles into the flowing "river" which makes an obstruction in the flow, corresponding to something like a bridge pier in an actual river.



68. DRAW ME!

Do and observe!

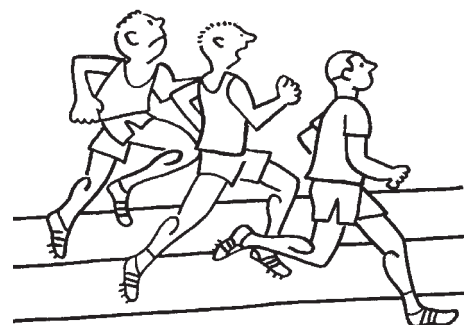
You have most certainly already drawn a cat, a monkey or an elephant... "Draw me!" will teach you, how to draw several animals in the style of Božo Kos.



69. PHOTO FINISH

Do and observe!

You can see four cameras in front of you. The selected camera will start to capture an image of your face and its surroundings. The camera captures images in two different modes, and two different images will appear on the display.



70. »HOT« SMARTPHONE

Do and observe!

Take a look at the dark oblong panel above the door leading into the rest of the rooms in the House of Experiments. Do you notice anything special about it? Look at the screen which shows the image of the panel through the camera pointed at the panel. If you have a smartphone, turn on your camera and observe the image.



70. CONNECT THE DOTS

Do and observe!

Step a few metres away from the dominoes and observe them from afar. Can you see the portrait of a scientist?



71. OOPS

Do and observe!

Arcade game - breaking taboos. Find out the rules of the game by yourself!

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