SCIENTIFIC MECHANISM & DIGITAL APPLICATION CATALOG 2023

Usturlab is an organization that sees science as a building block of society, adopts the interactive language of culture, philosophy, art and technology, and aims to contribute to the social ecosystem of our country by bringing experts together in their fields in the right projects on the right platforms.

It provides a wide range of end-to-end services from workshops supporting formal education to the production of educational materials; from turnkey project productions such as educational spaces, science/art/technology centers, exhibition design to content consultancy.

Usturlab is a member of:

TAD 1954 TÜRK ASTRONOMİ DERNEĞİ TURKISH ASTRONOMICAL SOCIETY

ecsite

What do we do?

Education

We design and implement innovative education models for all age groups for public or private corporations.

Science Center

We offer science center design, implementation and consultancy services to bring science together with all individuals in society.

Exhibition Installation

We bring science, art, philosophy and history into the experienceable space, design digital/mechanical exhibition mechanisms, interactive games, educational platforms and reproductions.

Production

We plan and implement the processes of movie, animation and cartoon content in order to visualize scientific narrative for children and adults. We produce audiovisual materials for corporate projects.

Publishing

We publish books and design games to raise awareness in the fields of philosophy, art, science and ecology, and to increase curiosity in art and science.

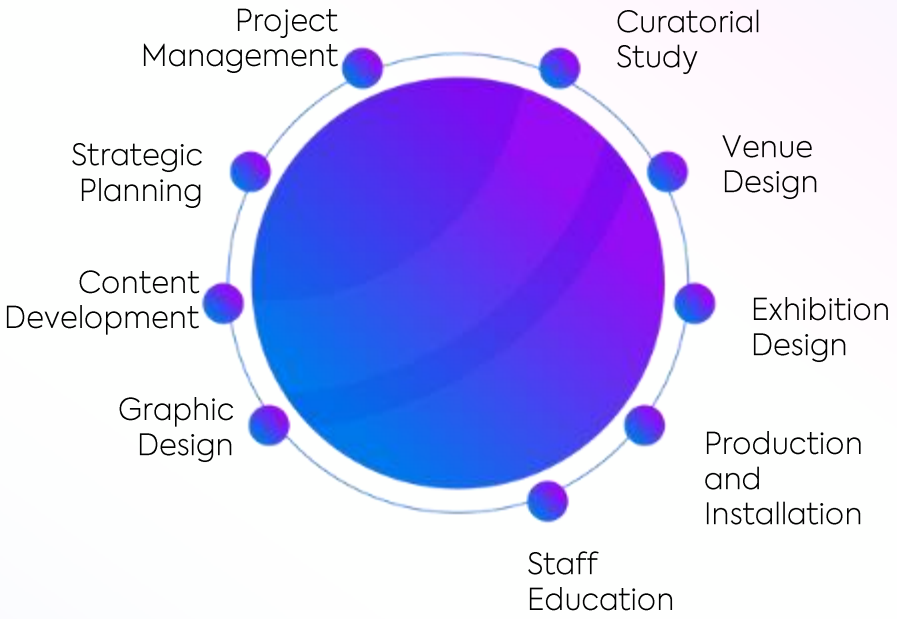
Game

We engage in the design and production of entertainment-oriented creations that not only serve recreational purposes but also uphold societal and individual benefits. Our endeavors prioritize cultural and scientific enrichment, offering eduvative games with meaningful insights.

What Can We Do For You?

In order for the outputs produced by the organization to increasingly continue, the most important investment for the future is to increase the interest of children and young people in this subject. To effectively reach individuals with this interest, the institution needs to transition its outputs from a macro level to a micro level, focusing on personalized engagement. The need for "Communication of Science" arises for this transfer.

Usturlab has the necessary equipment to provide communication of science for institutions with child-oriented, innovative teaching methods.



What Can We Do For You?

Scientific Mechanism Design and Production

Venue and Experience Area Design

Digital Application Content Design and Production

Organization Processes Management and Staff Support

Stand Management

Stand Installation

Corporate Identity and Product Portfolio Design

VIP and Promotional Gift Design

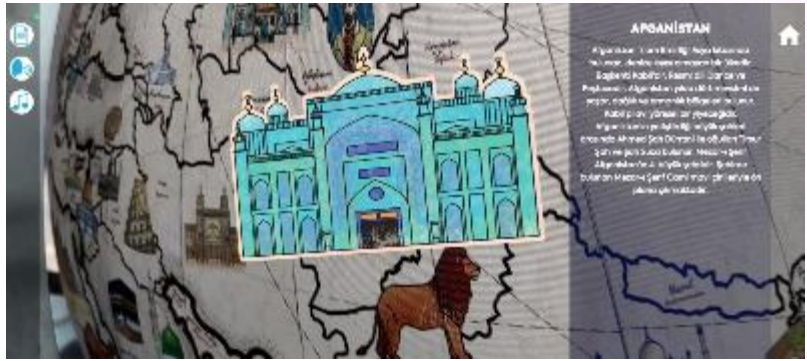
DIGITAL AND MECHANICAL MECHANISMS

GLOBARYUM AR APPLICATION

It is a digital interactive mobile application produced with AR technology. This application was prepared jointly for Es Sufi Sky Globe and Piri Reis Celestial Globe. The selection of the globe in the interface is made by the user. When the visitors point their cell phone camera at certain points on the sky globe or the celestial globe, they can examine the moving/still images of the countries and constellations in detail. During this process, one can acquire concise information both audibly and in written form.

AR Application

Click to watch the product introduction video.



AL-SUFI'S CELESTIAL GLOBE

Based on the shapes of the constellations as seen from outside the earth and based on Al-Sufi's drawings, a celestial globe map was designed to reflect the knowledge of the period. Visitors can examine the constellations and their positions on the celestial globe. At the same time, through a mobile application developed on augmented reality (AR) technology that can be downloaded to their mobile devices, they can establish a digital interaction with the celestial sphere.

Size: *R=100 cm*
Material: *Fiberglass, metal*

AR
Application

Click to watch the product introduction video.

PIRI REIS' TERRESTIAL GLOBE

Based on the drawings of Piri Reis, a world map design reflecting the information of the period was prepared. Visitors can examine the countries on the globe. At the same time, through a mobile application developed on augmented reality (AR) technology that can be downloaded to their mobile devices, they can establish a digital interaction with the celestial sphere.

This application is a common application for the celestial and the terrestial globe. The selection of the globe in the application is made by the user.

Size: *R=100 cm*
Material: *Fiberglass, metal*

AR Uygulama

Click to watch the product introduction video.

PIONEERS ON THE MOON

An original design, Pioneers on the Moon offers the opportunity to recognize the pioneering scientists who continue to live by naming the craters of the Moon.

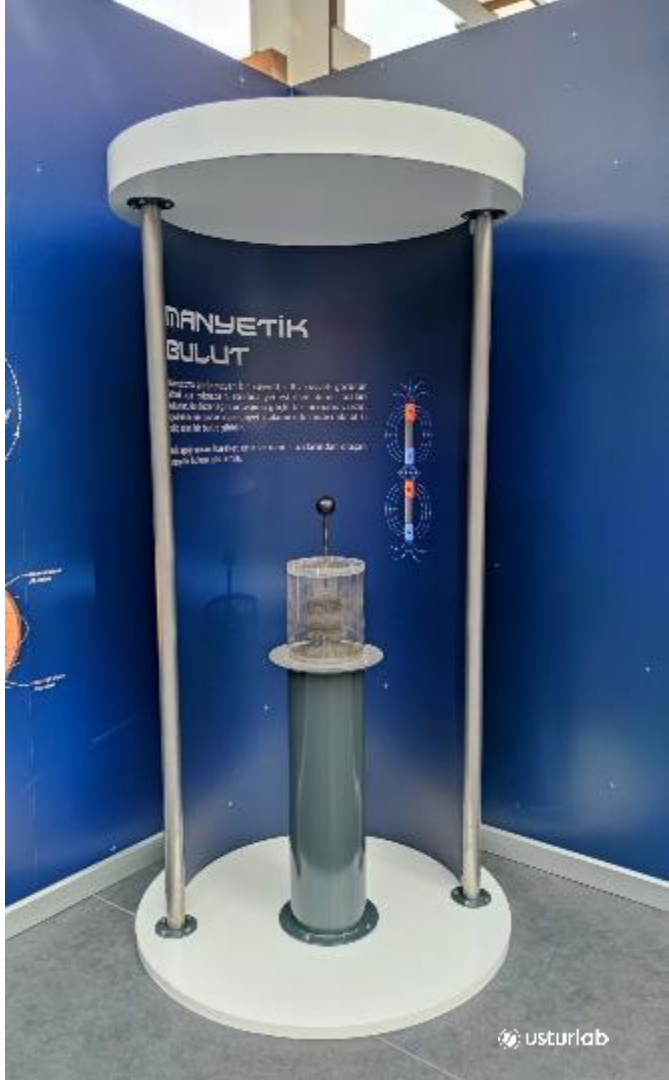
Size: *R=200 H:265 cm*
Material: *Glass, wood, 15.6 inch screen, plexiglass*
**Electricity is required.*

Click to watch the product introduction video.

MAGNETIC CLOUD

The visitor can observe the magnetic field lines by moving the powerful neodymium magnet in the center of the transparent case up and down in the mechanism filled with magnetic particles. Behind the magnetic cloud mechanism, there is a graphic surface with visuals and information about magnetic fields. Inside the case there is a strong magnet fixed on the base with a pedestal.

Size: *R=100 cm H=200 cm*
Material: *Wood, plastic, magnet*



BLACK HOLE

In this exhibition, a mechanism inspired by the scientifically photographed structure of a black hole has been prepared. There is a well towards the pedestal to depict the singularity point of the black hole. At the top there is a hemispherical and illuminated surface representing the event horizon. Visitors can closely examine the structure of black holes on this model. The pedestal contains a mechanism where visitors can send small metal balls into the black hole. There are two different balls to study the motion of objects with different masses. These balls can be moved through the mechanism.

Size: *R=85 cm H=131 cm*
Material: *Plexi, led, sibu coating*
**Electricity is required.*

ASTRONAUT'S HANDS

Visitors put their hands inside a pair of astronaut gloves attached to a transparent closed glass cover and try to connect or disconnect simple parts such as bolts, nuts, etc. with the gloves in their hands. After putting on the glove, the visitor presses the button inside and the gloves inflate. With this outfit, it is aimed to experience the clothes worn and the operations performed in Space Walks.

Size: *100*43*120h cm, 100*43*100h cm*
Material: *Wood, glass, plastic*
**Electricity is required.*

Click to watch the product introduction video.

THE SUN, THE EARTH AND THE MOON

It is a device that interactively explains the periodic movements in the solar system. Visitors can examine the movement of the Earth and the Moon around the Sun by turning the device with the help of buttons. There are graphic visuals about seasons, days and months on the device.

Size: *152*132*75h cm*
Material: *Sibu coating, plexi*
**Electricity is required.*

Click to watch the product introduction video.

ATOMIC SPECTROMETER

Each element has a different light spectrum. When the elements in 5 spaces are electrified by pressing the button below them, a glow is created and the visitor looks at this glow with a lens. With this method, the spectrum of the light coming from space can be explained and the data on which celestial bodies contain which elements can be obtained.

Size: *80*60*80h cm*
Material: *Wood, plexi, lens*
**Elektricity is required.*

Click to watch the product introduction video.

TAQI AL-DIN'S SIX CYLINDER PUMP

With the rotation of the water wheel built on the stream, the eccentric shaft also starts to rotate. The eccentrics activate the pistons one by one. The circular motion turns into linear motion and the pistons move up and down. This movement creates a vacuum in the vacuum chamber and allows the water to move upwards. Similar piston systems are used in car engines today.

Size: *162*165*156 cm*
Material: *Metal, brass, water, wood*
**Elektricity is required.*

CLAMSHELL EXCAVATOR

In their book "Kitab al-Khiyel", Benî Mûsâ describes a mechanism for retrieving objects from water as the hundredth device. When the cylinder suspended downwards touches the water, it opens at the entry point. When the object to be grasped is caught, the cylinder is closed by pulling the rope in the middle and pulled up again. While this mechanism is used to collect ore from the sea or to pull objects that have fallen into the well/water, it is embodied in the exhibition with a playful approach.

Size: *104*142*150h cm*
Material: *Brass, metal, glass, water, wood*

BANU MÛSÂ'S MUSIC BOX

The oldest known device for creating musical sequences is the programmable musical automat developed by Benî Mûsâ. The original movement of this automat is provided by a stream of water and is therefore described as a self-powered automaton, the installation on display creates musical sequences with electric power.

Boyut: *82*82*150h cm*
Malzeme: *Ahşap, metal, ahşap*
**Elektrik ihtiyacı vardır.*

Click to watch the product introduction video.

EXHIBIT ON CONVERTING CIRCULAR MOTION INTO LINEAR MOTION

Three of these devices designed by Al-Jazari to direct large amounts of water upwards were powered by animal power, while the other two were self-powered. During these studies, Al-Jazari used the part we know today as the crankshaft for the first time. This part, which is included in many machines, converts circular motion into linear motion. This small part, which even triggered the Industrial Revolution with its effect, is considered one of the most important discoveries in history.

Size: *40*80*25 cm*
Material: *Wood, brass*

Click to watch the product introduction video.

TRIGONOMETRY

In the Middle Ages, the study of trigonometry was continued in Islamic mathematics by mathematicians such as al-Khwarizmī, Abū al-Wafā' al-Būzjānī and Nasīr al-Dīn al-Tūsī. In the Islamic world, where all six trigonometric functions were known, trigonometry became an independent discipline of mathematics. The phenomenon known as rose curves in trigonometry was turned into an interactive installation, emphasizing the transfer of knowledge between cultures.

Size: *134*4*80h cm*
Material: *Wood, metal*

CAMERA OBSCURA (THE DARK ROOM)

This is Ibn al-Haytham's experiment proving the linearity of light. When light from any object passes behind a pinhole, its image is inverted. The experiment, which is the most fundamental explanation of the working principle of the camera and the phenomenon of vision, has been designed interactively and turned into an experience.

Size: *40*91*40 cm*
Material: *Brass, wood*
**Electricity is required.*

THE THEORY OF RAINBOW

It is a device that shows the refraction of light in a spherical environment and the formation of rainbows. Water droplets also create spherical refraction points in the sky. White light hitting the spherical surface with a certain limiting angle is refracted and separated into its colors.

Size: *30*30*70h cm*
Material: *Brass, wood, glass*
**Electricity is required.*

THE MOONLIGHT OBSERVATION DEVICE

It is the experimental setup mentioned by Heysem in his epistel on moonlight. In his epistel, al-Haytham discussed in detail this mechanism, which he developed to explain the nature of moonlight, and how it was used. Briefly, observation is made by looking at the Moon with the naked eye through a small aliner.

Size: *50*50*70h cm*
Material: *Wood*

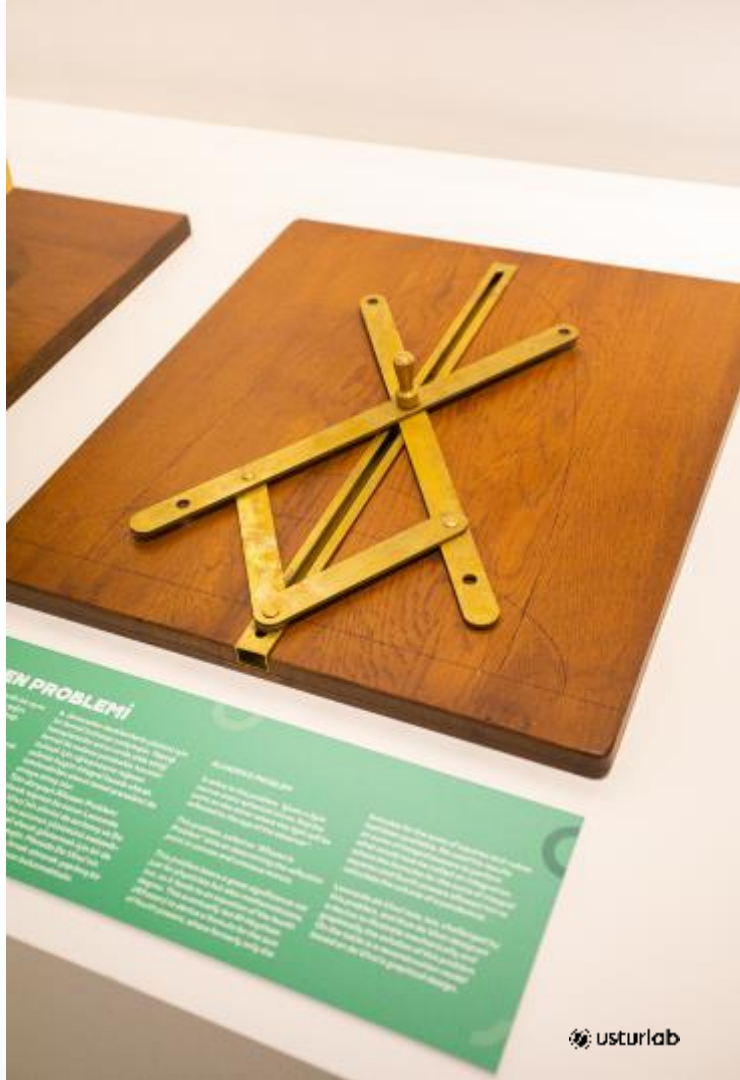
ALHAZEN'S PROBLEM

"Given a light source and a parabolic mirror, find the point on the mirror where the light will be reflected in the observer's eye."

This problem, which was carried all over the world as the Alhazen Problem, also challenged Leonardo da Vinci's mind, and Da Vinci created a device to show the solution of this problem in mechanical graphical form. On the table, there is a reconstruction based on Da Vinci's drawing.

Size: *40*45 cm*
Material: *Brass, wood*

Click to watch the product introduction video.



DO YOU WANT TO SMELL A THOUSAND YEAR OLD PERFUMES?

Most of our knowledge about the manufacture of fragrance in early Islamic civilization comes from Yakub al-Kindī's (803-870 CE) "Kitâb fî kimyâ'i'l-'idr wa't-tasîdât" (The Book of Perfume Chemistry and Distillation), book of fragrance recipes. It is the installation in which the fragrances described by al-Kindī are experienced.

Size: *170*8*34h cm*
Material: *Wood, brass, 5 different fragrance*

NOISE BARRIER

The effect of the noise barriers produced by TÜBİTAK MAM is conveyed in the mechanism made within the scope of composite material research. When the without barriers button is pressed, a loud traffic flow is heard. When the barriers are placed and the with barriers button is pressed, the effect of the barrier on the sound is seen. These sounds are supported by coloring through the screen placed in the device.

Size: *140*80*150h cm*
Material: *Wood, plexi, screen, filament*
**Electricity is required.*

Click to watch the product introduction video.

SCIENCE TO GO

With the "Science on Foot" table, visitors have the opportunity to examine the big world of small creatures and the states of matter. At the same time, they are provided with a Sample Investigation Protocol to take notes of the events they observe and learn reporting techniques like a scientist.

Size: *150*90*150h cm*
Material: *Wood*
**Electricity is required.*

Click to watch the product introduction video.

FUEL CELL

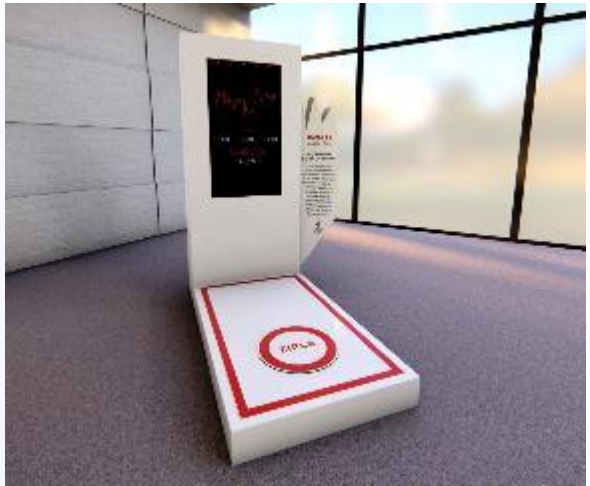
The Fuel Cell Table was designed to exhibit the experiments prepared by TÜBİTAK MAM in order to convey the studies carried out by TÜBİTAK MAM. At the same time, it was aimed for visitors to learn the concept of carbon footprint with the Carbon Footprint puzzle game. Brief information about the studies was given with the illuminated panel design.

Size: *150*90*150h cm*
Material: *Wood*
**Electricity is required.*

SEISMOMETER STAND

The Seismometer Mechanism is designed to experience the Seismometer device produced by TUBITAK MAM, which measures ground motions instantaneously.

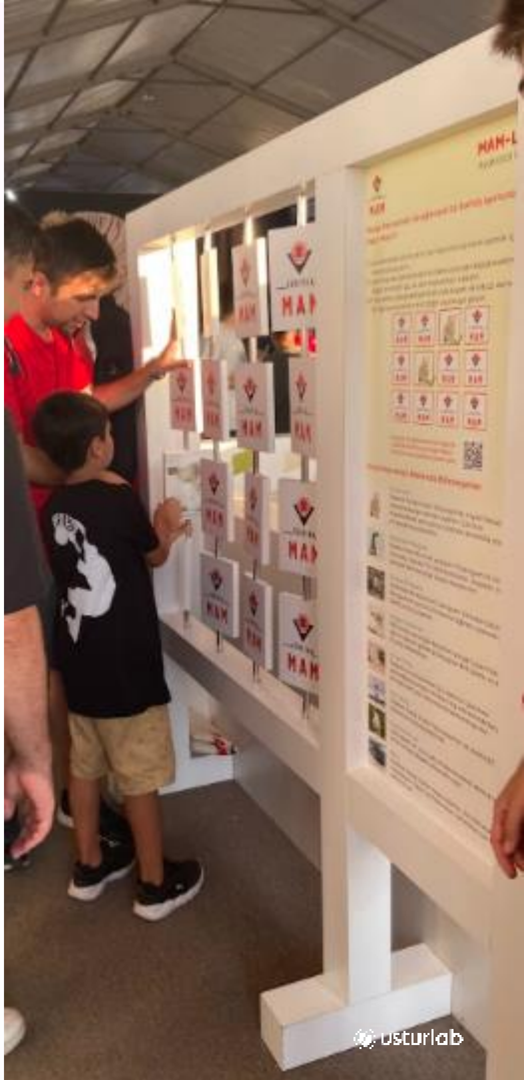
Size: *150*180*190h cm*
Material: *Wood*
**Electricity is required.*



POLAR ANIMALS MATCHING GAME

In the Polar Animals Matching Game, Polar Animals are introduced in the wooden game prepared to convey the studies carried out within the scope of TÜBİTAK MAM. It can be adapted to different concepts.

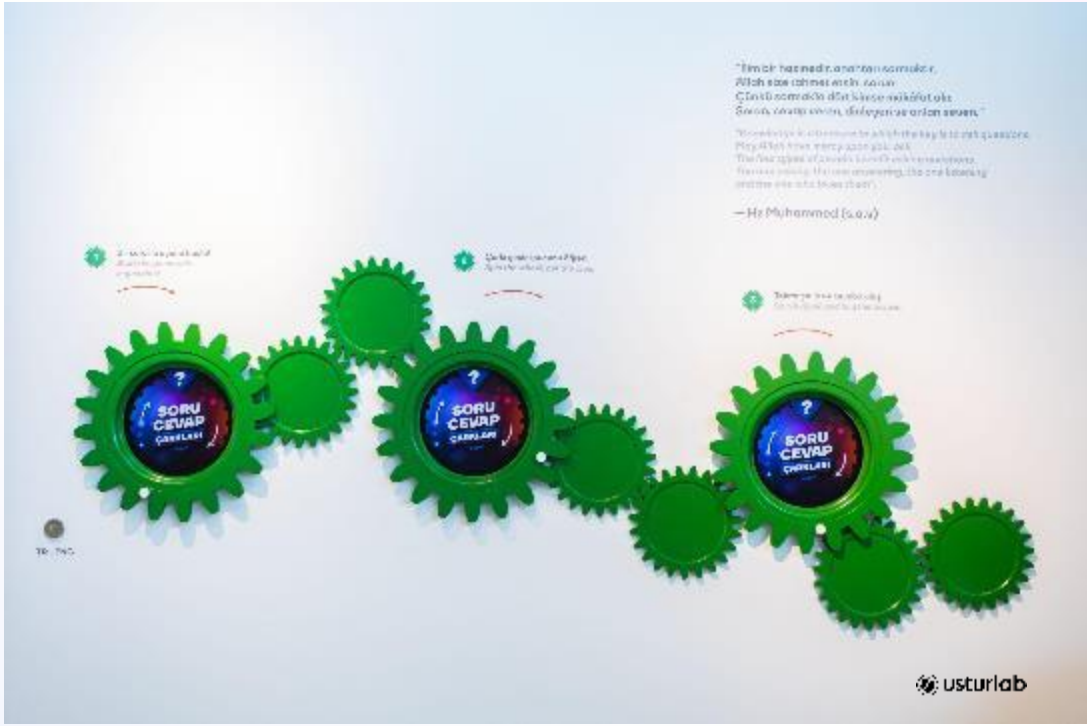
Size: *170*40*180h cm*
Material: *Wood*



Q&A GAME ON THE WALL

Fun questions about the history of science are included in the system where you get clues by spinning the wheels. It can be adapted to various themes.

Size: *300*270 cm*
Material: *Screen, wood*
**Electricity is required.*



EXPERIENCE AREAS

SEMICONDUCTOR TECHNOLOGY RESEARCH LABORATORY EXPERIENCE AREA

Based on the work and technology studies carried out within the scope of the Semiconductor Technologies Research Laboratory, an experience area compatible with the world of children has been designed. Participants enter the experience area and complete the stages in the laboratory environment. These stages include air shower, device use and observation with a microscope. Afterwards, a short movie showing where the chips produced are used is shown. Finally, a souvenir chip is presented to the participants and the experience is completed. Special clothes are removed at the exit.

Size: *950*360*240h cm*
**It can be produced in different sizes.*
Material: *Wood, plexi*
**Electricity is required.*

Click to watch the product introduction video.

CRIME SCENE INVESTIGATION

The Crime Scene Investigation Area is an experience area prepared to convey the intended use of fingerprint powders produced by TÜBİTAK MAM. With the special area designed for the experience share, investigator costumes and instructor service, children gain knowledge in the fields of both DNA and forensic medicine.

Size: *320*380*190h cm*
Material: *Wood*

IGLOO

The purpose of the mechanism is to exhibit polar research conducted by TÜBİTAK MAM. A room made of composite material in the form of a circle was built. Inside the room, there is a cold blowing device, lighting that gives aurora effect, polar photo exhibition. There is a screen layout and a seating area in the center of the area. On this screen, the introductory presentation created by Polar Research is demonstrated. There is an Eskimo stand outside the IGLOO where participants can take photos.

Size: *R=500 cm*
Material: *Solid polycarbonate, wood, screen*
**Electricity is required.*

Click to watch the product introduction video.

THE CUPOLA

The Cupola module on the International Space Station is a window through which astronauts can look out into space and Earth. It is a scaled-down model of this window. When visitors look through this window, they feel as if they are looking into outer space with depth perception.

Size: *175*45*150h cm*
Material: *UV printed plexi, led, wood*
**Electricity is required.*

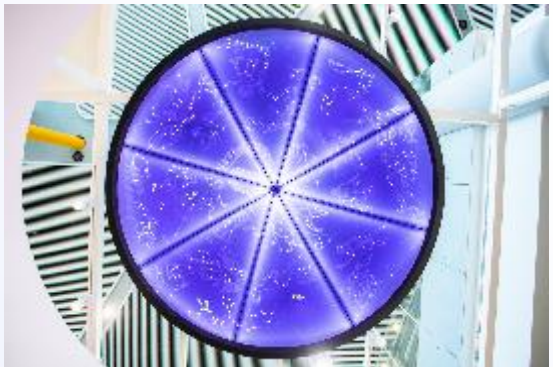
AL SUFI'S CONSTELLATIONS

The celestial globe is a gigantic, imaginary sphere surrounding the Earth on which the constellations are projected.

The celestial globe mechanism was inspired by the oldest known illustrated astronomical manuscript, al-Sufi's "Images of the Fixed Stars ".

Size: *R=200 cm*
Material: *Barisol/ Stretch ceiling*
**Electricity is required.*

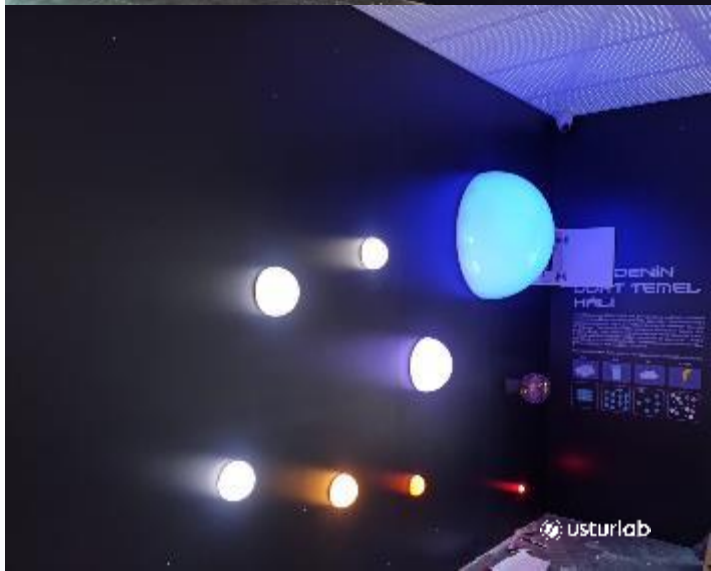
Click to watch the product introduction video.



TYPES OF STARS AND PLASMA SPHERES

The mechanism aims to explain the types of stars we know and visually show these types. The plasma structure of stars can also be examined in the exhibition area. Among these models are plasma globes (also known as Plasma Globe). Visitors can examine the electric arcs inside this globe and the plasma state of matter.

Size: *Diameters of the hemispheres:*
1 piece of 80 cm, 1 piece of 65 cm, 1 piece of 55 cm, 1 piece of 40 cm, 1 piece of 30 cm, 2 pieces of 20 cm, 6 pieces of 15 cm, 1 piece of 10 cm, 3 pieces of 5 cm
Material: *Plexi, led, glass*
**Electricity is required.*



ASTRONAUT MODEL

It is a three-dimensional, static astronaut model. The aim of the installation is to visualize a life-size astronaut suit. Visitors can get behind the model, pretend to be wearing an astronaut suit and take photos. Behind the model there is a staircase with a few steps so that children can reach it.

Size: *70*35*180h cm*
Material: *Fabric, plastic*

ROCKET MODEL

It is a three-dimensional, static rocket model designed as the entrance gate of the exhibition. The large-scale rocket model, which welcomes visitors in the entrance area, is designed as an iconic part of the exhibition both in photo shoots and in the transition gate section. It has an entrance exit measuring approximately 125*215h.

Size: *285*380h cm*
Material: *Fiberglass*

SOLAR SYSTEM MODEL

It is an mechanism with a model of our star, the Sun, and eight planets orbiting around it. This mechanism is located on the ceiling of the area. Just as visitors can observe the Sun and the planets while looking at the sky, here is a model of the Solar System that is approximately proportional to their actual size (only an approximate ratio in terms of size relative to each other).

Size in Image: *Diameters respectively:*
Sun_____80 cm
Mercury____20 cm
Venus_____35 cm
Earth_____35 cm
Mars_____30 cm
Jupiter____65 cm
Saturn____55 cm
Uranus____40 cm
Neptune____40 cm
Material: Paint over fiberglass
**Electricity is required.*
**It can be produced in different sizes.*

DIGITAL APPLICATIONS

ASTRONOMY EDUCATION PLATFORM

A computer-controlled astronomy education program-specific education platform that works integrated with projection, PC, sound system and scanner base has been developed. Astronomy trainings can be given through the platform, an ambient environment can be created, the desired movie or video can showed. Trainer training platform can choose the appropriate education for their age group.

Size: *1075*275h cm projection surface*
Material: *Projection, seating units, wooden kiosk*
**Electricity is required.*

Click to watch the product introduction video.

YOU ARE THE UNIVERSE

It is an interactive mapping application with a spaceport and moving space visuals projected on a large area. Users paint the characters of their choice such as astronauts, aliens, spaceships, planets, etc. as they wish, scan them into the system on the kiosk and transfer them into the application. These characters, which are painted and designed by the users themselves, come to life on the large-sized screen and are displayed moving in space. After a certain period of time, the characters disappear from the screen and new characters are uploaded to the system.

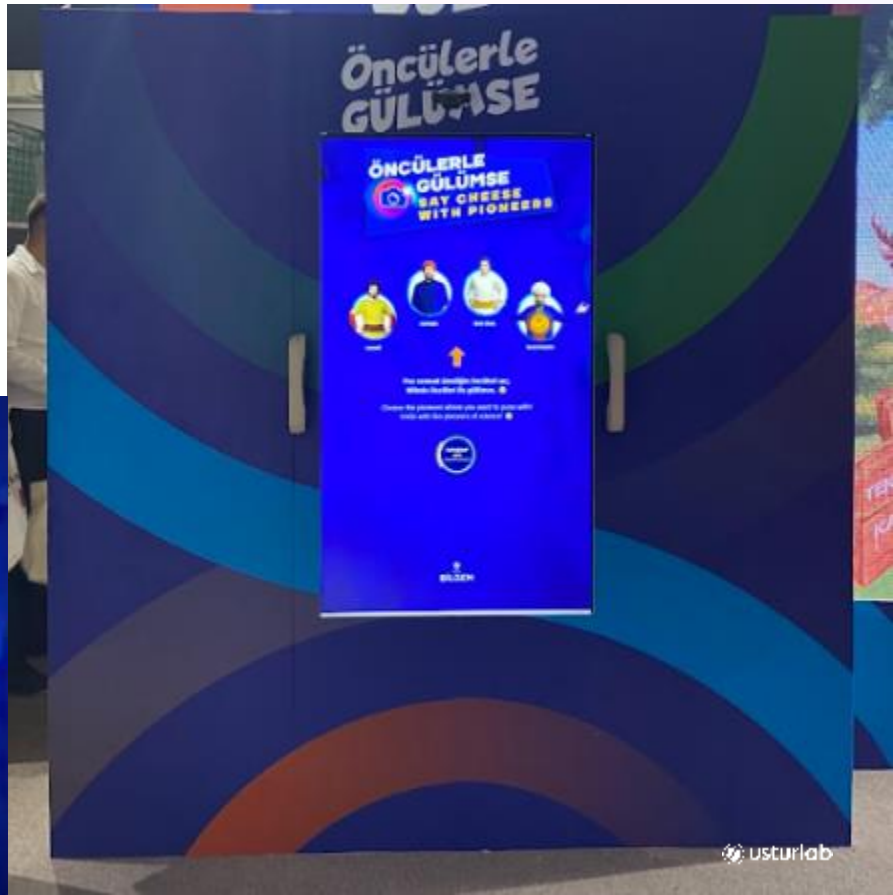
Size: *400*250h cm videowall*
Material: *Wooden kiosk, videowall*
**Electricity is required.*

Click to watch the product introduction video.

SAY CHEESE WITH PIONEERS

With this application, participants can take a photo with a specified concept, for example with scientists. Animated characters of scientists appear on the main screen, and participants who choose the scientist they want to take a photo with pose in front of the screen. The taken photo appears on the screen with a QR code. By scanning the QR code, participants can save the photo on their phone.

Size: *200*40*210h cm*
Material: *Wood, 55 inch Screen*
**Electricity is required.*



MISSION TO MOON

The visitors stand in front of a vertically positioned 55-inch screen integrated with kinekt technology and lower the activated shuttle to the Moon with body movements. Then they count where they are, walk on the Moon by taking steps, and plant the Turkish flag in their hand on the Moon. The user who performs the movements correctly receives the message "You have successfully completed the mission".

Size: *120*36*190h cm*
Material: *Wood, screen*
**Electricity is required.*

Kinect Application

Click to watch the product introduction video.

BUZZ PARK

In the game about the story of a honey bee, users manage the honey bee with their bodies to collect pollen from various types of flowers and try to be the winner of the game by making the bee collect these pollens in the hive. The game consists of 5 levels.

Size: *120*36*190h cm*
Material: *Wood, screen*
**Electricity is required.*

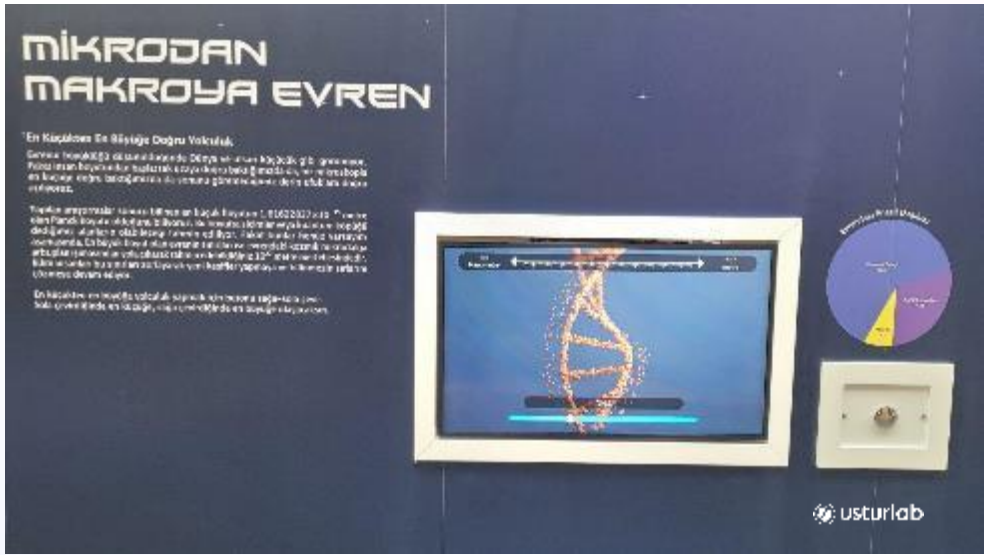
Kinect
Application

A JOURNEY FROM MICRO TO MACRO UNIVERSE

There is no scientifically proven data on what is the smallest and the largest in the universe. There are only examinations, observations and theories up to the most extreme points that can be reached with the possibilities of science and technology. In the light of these data, a digital content with visuals from the smallest to the largest has been prepared. This content is transferred to visitors through a screen. An interface and application that can be switched into the screen has been developed. Visitors can switch between the smallest and the largest by zooming in and out with the rotary button next to the screen. Planck's constant, subatomic particles, atom, DNA, cell, organism, human, Earth, Solar System, Milky Way Galaxy, neighboring galaxies, super galaxy cluster, cosmic web, cosmic background radiation are visualized.

Size: *43 inch screen*
Material: *Screen*
**Electricity is required.*

Click to watch the product introduction video.



THE SOUNDS OF THE PLANETS

Radio waves from stars or planets in space can be recorded and converted into sound. The planetary sounds obtained with these data are presented to visitors with this mechanism. The sounds of the Sun, Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus and Neptune can be listened to separately. There is an interface on the screen where these sounds can be selected and listened to.

Size: *2 10.9 inch IOS tablet*
Material: *Tablet, headphones*
**Electricity is required.*

Click to watch the product introduction video.

DIGITAL CRYPTOGRAPHY GAME

Kindî deciphered the cipher code developed by Julius Caesar, known as the Caesar cipher, with the method known today as frequency analysis. The development of this method revolutionized the field of cryptology and led to the development of new encryption methods. In the touch game, which starts with an encrypted message, the Caesar cipher must be solved to save the country.

Size: *104*40*130h cm*
Material: *43 inch screen, wood*
**Electricity is required.*

Click to watch the product introduction video.

SPACE PUZZLE

This is a space-themed digital puzzle game. There are 5 different puzzle images with different difficulty levels. Visitors can make 12, 20 or 30 piece puzzles by selecting the image they want. Turkish - English language option is available.

Size: *80*45*100h cm*
Material: *27 inch screen, wood*
**Electricity is required.*

PLANET BOOM

The kiosk with astronomy-themed digital games is designed for 43" touch screen. It can be prepared in different screen sizes upon request.
It includes 3 different categories of games:

1. Planet Crush is a 5 level game where planets are destroyed by merging them.
2. The Memory Game is a game where face down cards themed on space images are opened and their partners are found.
3. Puzzle is a game where 5 different space-themed drawings are played as puzzles.

Size: *121*66*110h cm*
Material: *Wood, screen*
**Electricity is required.*

Click to watch the product introduction video.

FLOWER BLAST

It includes digital games with a nature theme. The following games are available in the app:

1. Flower Blast
2. Memory Game
3. Puzzle

Size: *121*66*110h cm*
Material: *Wood, screen*
**Electricity is required.*

Click to watch the product introduction video.

WEIGHT IN SPACE

It is a digital interactive scale application. When visitors stand on the scale, they can see their own mass, the gravitational force of the planets and they can see their weight on planets and different celestial bodies.

Size: *113*117*138h cm*
Material: *Wood, screen*
**Electricity is required.*

HOW MUCH WOULD YOU WEIGH IN THE 16TH CENTURY?

It is a digital scale mechanism that shows the visitor's information according to 16th century weight units on the screen.

Size: *78*103*118h cm*
Material: *43 inch screen, digital scale, wood*
**Electricity is required.*

Click to watch the product introduction video.

THERAPEUTIC MUSIC MODES

There are many works by Muslim scholars on the effect of music on human psychology. Some of these healing maqams for the soul and body can be listened to with the digital application or mobile application on display.

Size: *2 13 inch screen*
Material: *Ipad, headphones*
**Electricity is required.*

Click to watch the product introduction video.

DIGITAL MANUSCRIPT

In the 8th century, scholars of Islamic civilization translated various works from Greek, Syriac, Sanskrit and Persian. The Digital Book features the works of the great thinkers and scientists who lived during the Ancient Greek period that shaped history.

Size: *70*36*118h cm*
Material: *Ahşap ve 24 inch touch screen*
**Electricity is required.*

The Manuscripts:

- *Elementler-Kitâbü'l-Usûl- Kitâbü'l-Erkân- Kitâbü'l-Ustukussât*
- *EL-MECİSTÎ (Sintaksis / Almagest)*
- *RİSALE fi'n-NEFS*
- *RİSALE fi'l-MÜSÜLİ'l-AKLİYYETİ'l EFLATUNİYYE*
- *TERCÜME MİN KİTABİ CALİNUS fi't-TEŞRİH*
- *KİTABÜ'l-HAŞAİŞ - De Materia Medica- Peri Hyles Iatrikes*

Click to watch the product introduction video.

THE ZIJ OF ULUGH BEG

The Zij-i Ulugh Beg can also be produced as a digital book.

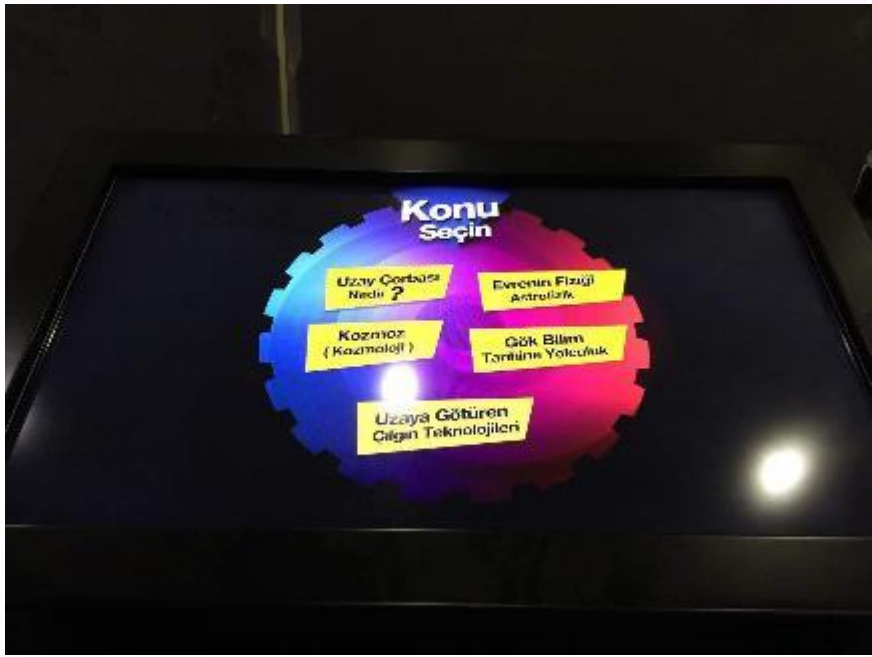
Size: *70*36*118h cm*
Material: *Wood and 24 inch touch screen*
**Electricity is required.*

Q&A KIOSK

Questions prepared in the astronomy category are integrated into the 43-inch touch screen. The visitor tries to answer the questions by selecting the question title in the desired category.
Category Headings:

- What is Space Soup?
- Physics of the Universe: Astrophysics
- Universe
- Journey to the History of Astronomy
- Crazy Technologies Taking Us to Space

Size: *121*66*110h cm*
Material: *Wood, screen*
**Electricity is required.*



BILGEM Q&A

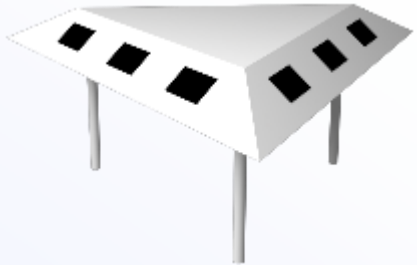
Questions about Tübitak Bilgem's working areas are integrated into the 43-inch touch screen. Visitors try to answer the questions by selecting the question title in the category they want.

Size: *121*66*110h cm*
Material: *Wood, screen*
**Electricity is required.*

PUZZLE TABLE

It includes a puzzle workshop to be held in the area where the ship model belonging to TÜBİTAK MAM is exhibited. The puzzle can be adapted to different visuals.

Size: *220*191*85h cm*
Material: *Wood, 9 10.4 inch tablet*
**Electricity is required.*



PRODUCTIONS

THE ONES THINKING BEYOND TIME

The movie Thinking Ahead of Its Time tells the story of human history's adventure in science.

Video: *10 dk. mp4*
Language: *TR\ENG\AR-IQ*
**It can be translated into any language.*

Size Option 1: *Videowall (3x2)*
Size Option 2: *86 inch Screen*
**Electricity is required.*

Click to watch the video.

EARTH-CENTERED UNIVERSE MODEL

The description of the Earth-Centered Universe Model adopted by Ptolemy in Islamic civilization is digitized and exhibited as a video.

Origin: *Museum of Turkish and Islamic Arts*
Size: *R=150 cm*
Video: *5 min (recurrent)*
**Electricity is required.*

Click to watch the video.

Miniature in the photo: The description of the Earth-centered universe model adopted by Ptolemy in Islamic civilization, Museum of Turkish ve Islamic Arts

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A DAY IN THE LIFE OF AN ASTRONAUT

The screen shows a short film about how astronauts take care of their basic needs on the space station, narrated by Chris Hadfield, a longtime crew member of the International Space Station. Visitors can watch a real astronaut's experience on the space station.

Video: *12.17 min*
Size: *50 inch screen*
**Electricity is required.*

ALHAZEN MOVIE

It is about the life of Ibn Alhazen, who is considered the first scientist.

Video: *2D & 2 min*
Size: *32 inch screen*
**Eelectricity is required.*

Click to watch the video.

ANIMATION ABOUT AVICENNA, BIRUNI, FARABI

Avicenna lived in the same era as other great scientists such as al-Biruni and al-Farabi. The lives of these three great scientists were spent traveling, especially in pursuit of science. The important recorded events of their travels are listed in this animation.

Video: *4.39 min*
Size: *32 inch screen*
**Electricity is required.*

Click to watch the video.

AL-KHWARIZMI AND ALGEBRA

The evolution of the number system we use today in history is visualized and presented to visitors.

The number "0" first appears in Indian manuscripts. However, it took centuries for it to be mathematically accepted and included in the process. The number zero, which previously carried philosophical meanings such as emptiness and absence rather than mathematical expressions, was included in mathematical operations by Al-Khwarizmi. The numbers in the video show the translation of the text into binary coding.

Video: *2.38 min*
Boyut: *43 inch screen*
**Electricity is required.*

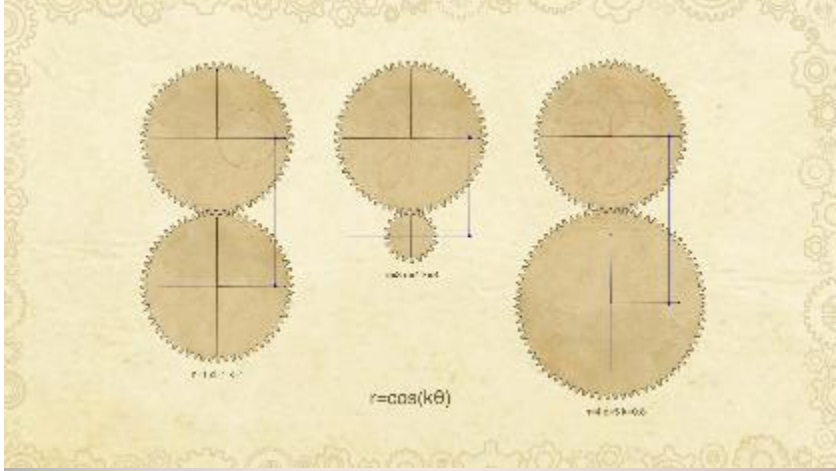
Click to watch the video.

TRIGONOMETRY

Designed in combination with a trigonometry overlay, this video shows a sinusoid plotted in the polar coordinate system. These curves are encountered in everyday life in optical problems, satellite and engine design.

Video: *1.36 min*
Size: *24 inch screen*
**Electricity is required*

Click to watch the video.



ISLAMIC ARCHITECTURE

Many of the aesthetic, structural or spatial innovations we observe in the major architectural centers of the Islamic world have largely stemmed from the active involvement of mathematicians in the design process. This video narrates these works that continue to inspire admiration today.

Video: *3.13 min*
Size: *43 inch screen*
**Electricity is required.*

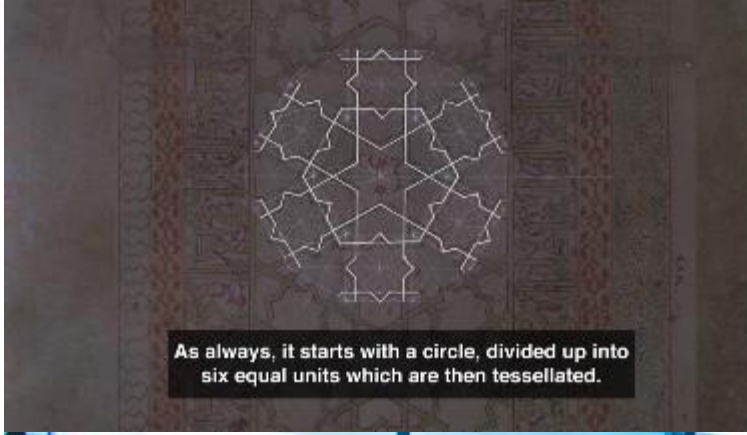
Click to watch the video.

GEOMETRY IN ISLAMIC TRADITION

This video is an introduction to two main research disciplines on the use of geometry in the Islamic tradition. The visuals in the video were drawn by architect and artist Zeynep Iqbal Kayani using compasses, pencil and paper.

Video: *6.34 min*
Size: *43 inch sreen*
**Electricity is required.*

Click to watch the video.



THE GREATEST EXPLORER OF ALL TIMES

This is an animation showing the routes of the world's greatest travelers.

Video: *1 min*
Size: *43 inch screen*
**Electricity is required.*

Click to watch the video.

REPRODUCTIONS

WOODEN ASTROLABE

The wooden astrolabe on display is made according to the latitude of Istanbul and consists of three layers, one fixed and two movable. It can be produced for any city in the world at any latitude.

Size: *R=150 cm*
**It can be produced in different sizes.*
Material: *Wood*

Click to watch the product introduction video.

AL ZAHRAWI AND THE BAG OF A SURGEON IN 16TH CENTURY

In support of the Hippocratic theory that "everything should be in order and easily accessible", famous Muslim physicians such as al-Râzî, Zehrâwî and Avicenna all produced their own personal medical bags with metal ornaments to carry their necessary supplies. Inspired by the 16th century physician's bag, this installation features the medicinal plants, prescriptions and surgical instruments used at the time.

Size: *25*15*20h cm*
Material: *Brass*

AL JAZARI'S FOUR BOLT LOCK

Al-Jazari gives a description of a door lock with four bolts in his work "al-Jâmi bayna al-ilmi wa'l-amal an-nâfi fî sınâati al-hiyel". These latches are designed to the right, left, down and up in a way that does not allow the thief to open the door from any direction. The lock can only be unlocked with a key. Door bolts locked with a key cannot be opened by moving them by hand. This lock system, which has never been encountered anywhere before, is a mechanism unique to Al-Jazari.

Size: *115*200*25 cm*
Material: *Wood, brass*

Click to watch the product introduction video.

OMAR KHAYYAM AND THE DANCE OF VENUS

The work on display is inspired by the north dome of the Isfahan Mosque, mathematically modeled by Omar Khayyam. The pattern inside the dome shows the path of the planet Venus when observed from Earth.

Size: *R=200 cm*
Material: *Wood*

ROTATING ASTROLABE

The astrolabe on display is a reproduction of the astrolabe produced by Muhammad Salih Tatavi in 1666, designed according to the geographical coordinates of Istanbul.

Original Astrolabe: *Museum of Turkish and Islamic Arts*
Size: *R=16 cm*
**It can be produced in different sizes.*
Material: *Brass, wood*
**Electricity is required.*

HOURGLASS

It is a kind of primitive chronometer that has been used for centuries for different purposes. Hourglasses do not show time. They are used to measure time intervals. Ottoman astronomers also made use of hourglasses during their observations. The hourglass in the model is designed to measure a time interval of five minutes.

Size: *10*10*20h cm*
Material: *Brass, glass*

CALIPER

It is a tool used for drawing circles. It was designed according to the model in the miniature describing Ottoman astronomers.

Size: *10*10*20h cm*
Material: *Brass*

TRIPOD

It is a type of measuring instrument used by Ottoman astronomers and described in miniatures. It has movable legs and a weight in the center.

Size: *30*30*20h cm*
Material: *Brass, wood*

LONG RULER

It is a type of ruler used by Ottoman astronomers and described in miniatures. In addition to being a measuring tool, it also serves as a kind of compass used for drawing large circles.

Size: *10*60 cm*
Material: *Brass*

DIAL/QUADRANT

Since the astrolabe was first folded in half and then in half again, it evolved into the rubu board, which means one-fourth, or the quadrant. The face of this board, which is the mukantarat side of the standard rubu board, and the drawings on the other side were inspired by the rubu board drawings in Gazi Ahmed Muhtar Pasha's Riyâzü'l-Muhtâr Mir'âtü'l-mîkât ve'l-edvâr.

Size: *16*16*1,5 cm*
Material: *It can be produced in brass or wood.*

GONIOMETER

It is a tool used by Ottoman astronomers and is among the instruments of observation and measurement described in miniatures. It is thought that this instrument was used for measuring angles and drawing by obtaining the desired angle with its movable arm.

Size: *70*70 cm*
Material: *Brass*

ASTROLABE

The astrolabe in the image was probably manufactured in 1680 for Sultan b. Azam b. Beyazid, a descendant of the Ottoman Sultan Bayezid II.

Size: *R=19 cm*
**It can be produced in different sizes.*
Material: *Brass*

MURAL QUADRANT

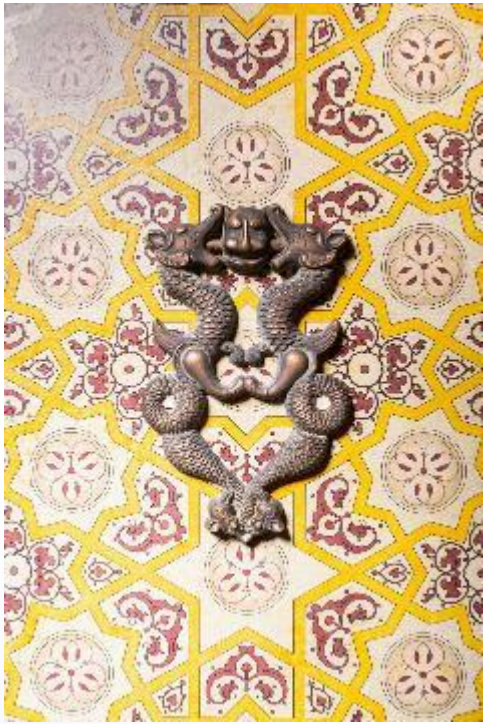
The mural quadrant on display is a scaled-down model of the original 2.5 meter diameter dial from the Merâga Observatory. In the center of the dial is a movable angle ruler. This fixed wall dial is used to determine the altitude of the sun, the inclination of the ecliptic and the latitude of the observation site.

Size: *180*4*180h cm*
Material: *Brass, wood*

AL JAZARI'S GATE OF ARTUKLU PALACE

The Artuqid Palace gate, which has survived to the present day with its own hand drawing in Cezerî's famous manuscript, is covered with the famous geometric decorations of Islamic art. The gate is about 4.5 meters high and has two wings. "The property belongs to Allah, the One and Only, the Almighty" is written in kufic writing style in relief on the top.

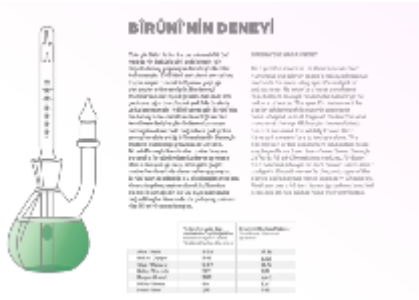
Origin: *Topkapi Palace Museum Library Ahmet III Collection*
Tazhib: *Zeynep Iqbal Kayani*
Calligraphy: *Kenan Yüksel*
Geometric Pattern: *Ayten Tiryaki*
Coloring : *Hasan Aktaş*
Size: *115*200*25 cm*



BÎRÛNÎ'S EXPERIMENT PICNOMETER

Al-Bîrûnî, a versatile scientist, conducted many experiments and used different methods to determine the mass of matter. Al-Bîrûnî obtained the most consistent results from his experiment by measuring the volume of overflowing water. The water overflow container he produced while designing this experiment is presented to the visitor as a showcase installation. In addition, visuals and information are available as graphic prints.

Size: *60*100*50h cm*
Material: *Glass, semi-precious stones, metals, brass scale, metal weights, wood*



AR RAZI'S ALEMBIC

Al-Râzî describes an advanced alembic. The beaked alembic and distillation vessel are suitable for the distillation of water. This is the earliest known description of a distillation mechanism in which the vapor condenses inside the still. The model of the described alembic is on display, with images and information.

Size: *30*25*65h cm*
Material: *Glass, copper, clay, metal*

JABİR B. HAYYAN AND JEWELRY KILN

The earliest known recipe for the production of nitric acid belongs to al-Hayyan. Jabir bin Hayyan also explains various formulas for producing steel and purifying other metals. An example of a kiln used for the production of jewelry is presented to the visitor.

Size: *30*25*65h cm*
Material: *Clay*

WORKS FROM IBN SINA (AVICENNA)

"El-Kânûn Fi't-Tıbb and Kitabü'ş-Şifa" are among the most important works written in the field of medicine and philosophy. These comprehensive works are still being translated today and their influence continues. The books on display emphasize the influence and importance of Avicenna's manuscripts.

Size: *80*25*35h cm*
Material: *Paper, leather*

RUZNAME

Ruzname is a type of calendar unique to the Ottomans. The exhibited ruzname was prepared by Nâ'ili Mehmed and covers the years 1804–1888.

Origin: *Ruznâme, Nâ'ili Mehmed, Kandilli Observatory Museum*
Calligraphy&Tazhib: *Sümeyra Dursun*
Size: *30*100h cm*
Material: *Framed Reproduction*

DIPLOMA

The first diploma in the Islamic world emerged as a permission to transfer the hadiths heard or written by one person to others during the transmission of hadiths, and later began to be used instead of a diploma in madrasas. The exhibited diploma was given by Kirmasti Zade Ahmed b. Muhammed Efendi to his student Murad Molla.

Origin: *Murad Molla's Diploma, 1869*
Suleymaniye Manuscript Library
Calligraphy: *Kenan Yüksel*
Tazhib: *Zeynep Yüksel*
Size: *57*109h cm*

ISS MODEL

The International Space Station is the place in space where astronauts live and conduct space exploration. It is permanently in orbit around the Earth and is the most costly structure ever built on Earth. This is a model of the habitat in a closed showcase. Visitors can examine parts, etc. on a realistic model of the ISS made of Legos. The model is displayed in a closed niche glass showcase.

Size: *61*40*51h cm (showcase), 38,2*7*26,2h cm (model)*
Material: *Wood, glass, plastic legos*

SPACE CRAFTS

This installation is designed to explore spacecraft and their functions. Lego models of space vehicles are placed in a closed showcase. Visitors examine the vehicle models and learn about their functions according to the information next to them. There are 3 showcases. Each showcase contains lego models of a spacecraft and its instruments.
Spacecrafts with lego models:

- Space Shuttle
- Spacecraft and space exploration vehicles
- Lunar research base

Size: *61*37*51,5h cm (showcase sizes)*
Material: *Wood, glass, plastic legos*

LIFE IN SPACE

Replica models of items such as food packages, beverage packages, etc. used by astronauts working on the International Space Station in daily life are exhibited in a closed showcase.
Materials on display:

- First space food vegetable applesauce replica
- Water package replica
- Food replicas in heatable collapsible aluminum cans
- Various vacuum-sealed food replicas
- Water gun (used to re-wet dried food) replica

In this area, visitors can take a closer look at the astronauts living in space and the objects they use. 2 niches are placed in the showcase.

Size: *91,5*30*34,5h cm (showcase), 51,5*30*41,5h cm (showcase)*
Material: *Wood, glass, plastic legos*

SPACE TECHNOLOGIES

Some of the technologies first developed for space technology and the needs of astronauts have become indispensable today. There are several examples of these technologies and graphic surfaces explaining their relationship with space exploration. The products themselves and/or replicas of these products produced with space technology and used today are exhibited in closed niche showcases. In this area, visitors closely examine how the technologies developed for the needs in space are reflected in our daily lives.

Products on display:

- Memory foam
- Hand vacuum cleaner
- Sunglasses
- Wireless headphones
- Infrared Thermometer
- Hook-and-loop fasteners
- Computer Mouse

Size: *41,5*30*51h cm, 41*30*33,5h cm, 51*30*41h cm, 41*30*34,5h cm (Showcase sizes)*
Material: *Wood, glass*

WALL INSTALLATIONS
LIGHT PANELS

BAYT AL HIKMAH

The miniature in the image depicts a Baghdad school in al-Hariri's al-Maqamat, likewise a reflection of the Bayt al-Hikmah established in Baghdad.

Minyatür: *Depiction of a Baghdad School, Harîrî "el-Makâmât", National Library of France*
Size: *250*40*280h cm*
Material: *Print on water contrast*

OBSERVATORIES OF THE ISLAMIC CIVILIZATION

The miniature in the image describes Takıyyüddin al-Râsıd working with other astronomers at the Istanbul Observatory.

Origin: *Sultan III. Murad Şehinşahnâmesi, Istanbul University Library*
Size: *130*8*200h cm*
Material: *Illuminated panel*
**Electricity is required.*

IBN AL-NAFIS AND PULMONARY CIRCULATION

Ibn al-Nafis was the first scientist in the history of medicine to fully and accurately explain the small blood circulation system. The small circulatory system is presented to the visitor with an illuminated installation of moving lights.

Size: *70*8*160h cm*
Material: *Illuminated panel*
**Electricity is required.*

THE GOLDEN RATIO

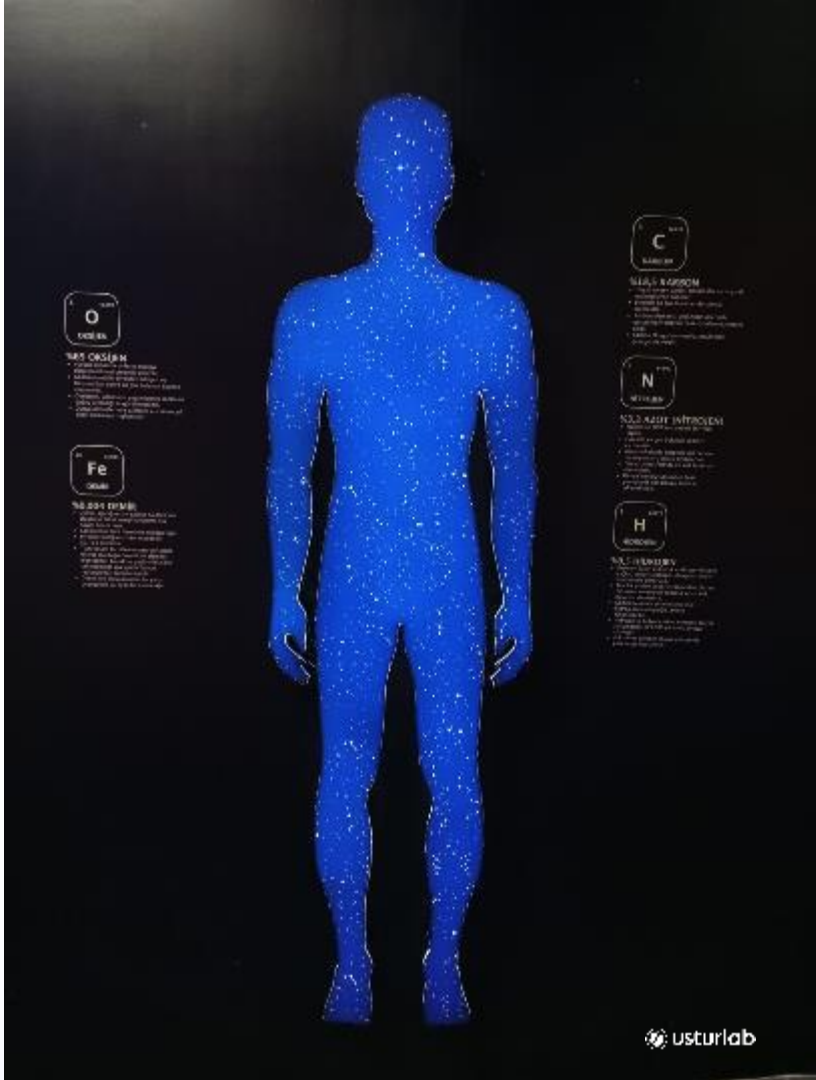
The golden ratio is a numerical value observed in mathematics and art between the parts of a whole, which is thought to give the most aesthetic ratio in terms of harmony. Through Fibonacci, the process of Indo-Arabic numerals' introduction with Europe is included.

Size: *100*65h cm*
Material: *Plexi, led*

WE ARE ALL STARDUST

It is an infographic design that gives information about how and when the compounds and elements in the human body were formed in space and a lighted panel installation in the shape of the human body.

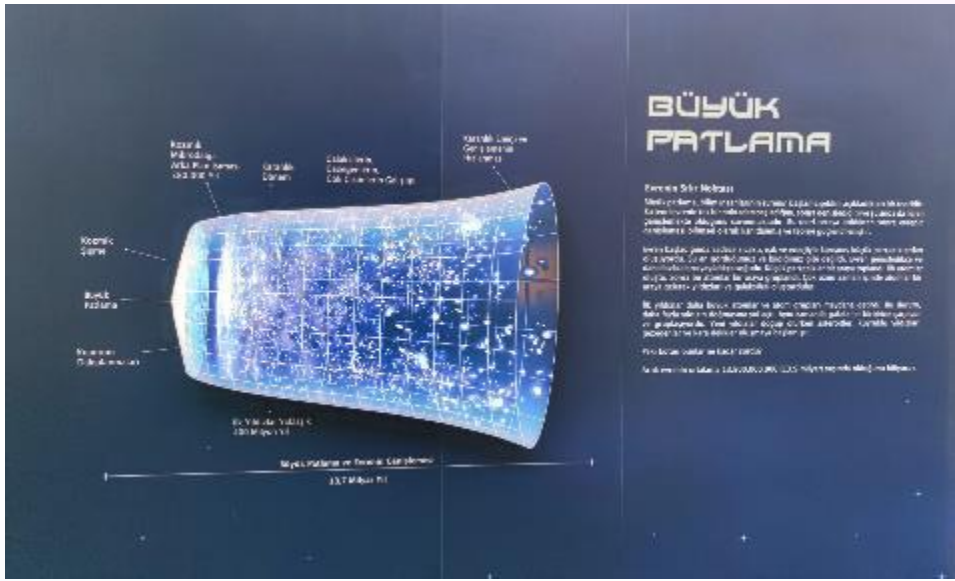
Size: *51*180h cm*
Material: *Illuminated panel*



THE BIG BANG

It is an illuminated panel installation with an infographic and interactive explanation of the big bang theory. The visitor examines the stages of the big bang on the board. There is a design work around the panel showing the stages of the big bang and short explanations.

Size: *60*40h cm*
Material: *Illuminated panel*



COZMIC LIGHTS

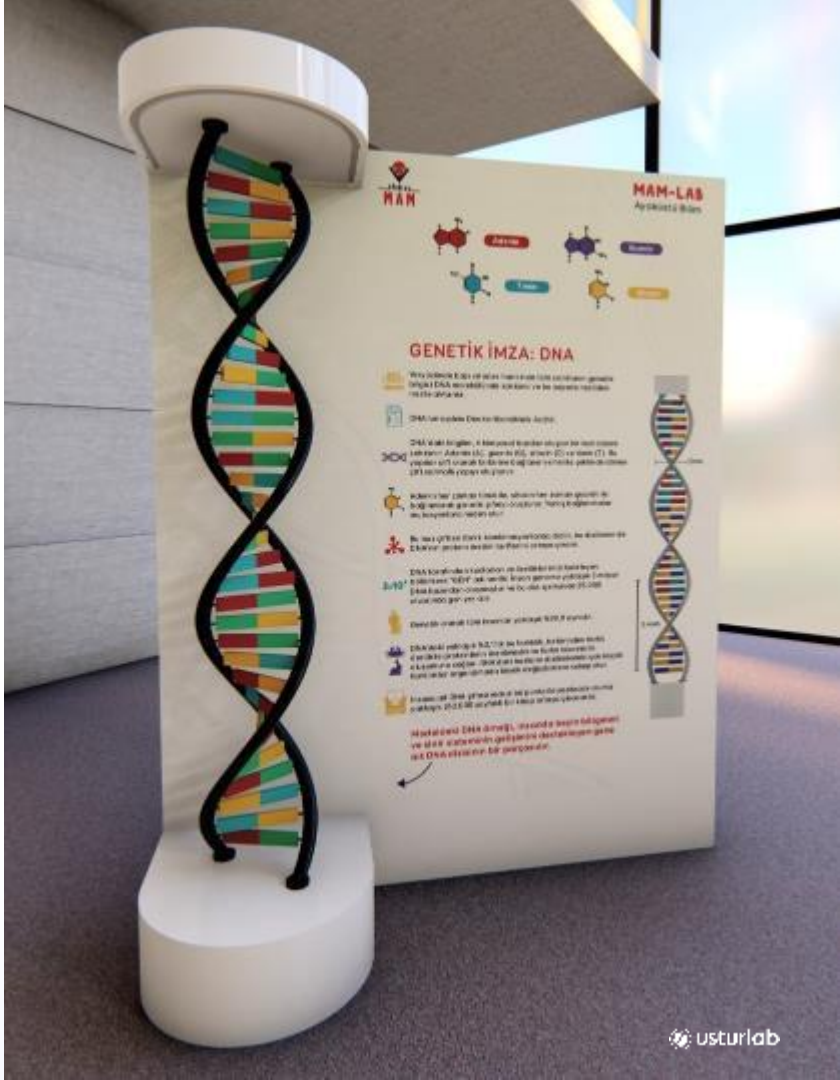
It is an illuminated panel installation that explains the meaning of the light coming from the stars and provides spot information on this subject. The visitor examines the infographic information and visualization given on the illuminated panel.

Size: *110*135h cm*
Material: *Illuminated panel*

DNA STAND

With the 3D DNA model, visitors have the opportunity to examine our DNA, our genetic signature, in 3D. It was aimed to reinforce the information presented visually with the illuminated panel design explaining the DNA structure with examples.

Size: *150*85*190h cm*
Material: *Wood, plexi, metal*



TWO DIRHAMS ONE SEED
JUST MEASUREMENT IN ISLAM

Carob bean is the only seed in nature whose weight does not change. 4 carob seeds are worth one dirham. This is why it was used as a measure of weight by the Arabs, Seljuks and Ottomans. This example of appellation explains the development of a folk etymology.

Size: *180*95h cm*
Material: *Graphic printing, carob bean, plexi*

THE ZIJ OF ULUGH BEG

The chart in Zij of Ulugh Beg includes many tables such as the table of Determination of the Positions of Fixed Stars in Latitude and Longitude, the table of fixed stars, the charts of the planets, the longitude and latitude charts of cities.

Origin: *Zîc-i Uluğ Bey, Uluğ Bey, 1438*
Topkapi Palace Museum Manuscript Library
Revan Collection
Size: *68*116h cm*
Material: *Graphic print*

EVOLUTION OF NUMBERS

Numbers have been used since prehistoric times. As a result of a transformation of approximately 22 thousand years, the number system we use today has emerged. The evolution of numbers in history is visualized and presented to the visitor.

Material: *Graphic print*
Size: 463*280h cm

THE MAP OF OBSERVATORIES IN ISLAMIC WORLD

The first modern observatories, where scientific observations and measurements were made, were established in Islamic geography. The map includes information on official and private observatories.

Size: *351*280 cm*
Material: *Graphic print*

THE MAP OF HOSPITALS IN THE ISLAMIC WORLD

Institutionalization in the field of medicine reached its peak in Islamic Civilization. Muslims attached great importance to both medical education and patient care and established many health centers in their geographies where patients could be treated. Some important hospices of Islamic civilization are highlighted with this map.

Size: *351*280h*
Material: *Graphic print*

ALHAMBRA AND INSPIRATION FROM THE EAST

The Alhambra, one of the most important works of Islamic architecture, continues to inspire its visitors as a World Cultural Heritage. The Islamic patterns, Japanese paintings and Eastern miniatures found in the Alhambra have influenced Western painters and have been cited as a source of inspiration. Henri Matisse's painting "The Dessert: Harmony in Red" is used as an example.

Size: *301*280h cm*
Matedrial: *Graphic print*

JIHANNUMA THE VIEW OF THE WORLD

"Jihannuma", which means "a view of the world", is an atlas that is considered to be one of the turning points in the history of geography, as it was the first time that Ottoman, European atlases and other sources were used. It provides information on the attempts to describe the earth on a two-dimensional plane, starting with the Babylonians and ancient Egyptians.

Origin: *Cihannümâ, Kâtip Çelebi, 1648*
Süleymaniye Manuscript Library, Nuruosmaniye Collection
Size: *180-95 cm*
Material: *Graphic design*

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THE MAP OF INTERACTION

Many of the objects we use every day, which have become indispensable in every aspect of our lives, are the work of hundreds of years of history, dozens of civilizations and more people than we can count. It is a visual design that provides information about these objects that have come to the present day by transcending civilizations and time, and the places where they were born.

Size: *498*280h cm*
Material: *Graphic design*

THE MAP OF ISLAMIC CITIES

It is a visual installation describing the elements of urban space in Mecca, Medina, Istanbul, Baghdad and many other Islamic cities.

Size: *463*280h cm*
Material: *Graphic design*

Murat Reis Mah. Yeni Ocak Sok.
No:33 Üsküdar / İstanbul

+90 542 206 10 09
+90 543 206 10 99

bilgi@usturlab.com.tr