

## CONTENTS

1. **“Without Science, there is no culture”, by Manuel Toharia, director of the Science Museum Príncipe Felipe**
2. **Science Museum, Prohibited not to touch**
  - a) **Aims**
  - b) **Architecture**
  - c) **Outstanding data**
3. **Contents:**
  - a. **Calle Menor (Side Street):**
    - I. **Exhibitions**
    - II. **Experimental Classrooms**
      1. **Science on Stage**
  - b. **Calle Mayor (Main Street):**
    - I. **Exhibitions**
      1. **Artistic Representation of the DNA molecule**
      2. **Foucault’s Pendulum**
      3. **Flight**
      4. **Marvel Superheroes**
  - c. **First Floor: Science Showcase**
    - I. **Exhibitions**
      1. **CVIDA**
      2. **Exploratorium**
      3. **Electricity Theatre**
      4. **“A toda Vela” (“Top Sail”)**
    - II. **Attractions**
      1. **Space Cadet School**
    - III. **Experimental Classrooms**

#### **d. Second Floor: The Legacy of Science**

##### **I. Exhibitions**

- 1. JEAN DAUSSET**
- 2. RAMÓN Y CAJAL**
- 3. SEVERO OCHOA**

#### **e. Third Floor:**

##### **I. Exhibitions**

- 1. Chromosome Forest**
- 2. Space Adventure**
  - 2.1 Attractions. Space Academy**
- 3. Scientific Point of View of Drugs**
- 4. Climate Change**

#### **Without science there is no culture**

**by Manuel Toharia**

**Director of the Science Museum Príncipe Felipe**

On 13<sup>th</sup> November 2000 the Science Museum Príncipe Felipe opened its doors to the public. Two years previously, in the month of April, the first element of the City of Arts and Sciences was inaugurated, namely the Hemisfèric (IMAX and Full Dome). This was followed by the Umbracle (Promenade and Car Park), the Oceanogràfic (Aquarium), the Palau de las Arts Reina Sofia (Opera House) and recently, the Àgora. The whole set of art and science, avant-garde technology, futurist challenge at the service of the citizens of the Region of Valencia, of all Spanish people and all the inhabitants of the planet. Because of it Valencia is today the region that better represents the integral culture, the blending of the glories of the past and the realities of the most promising present, that is capable of hosting top-level events such as the America's Cup or the new urban Formula 1 circuit.

As far as the Museum is concerned, the chosen model follows the novel philosophy of full interactivity, which is amusingly symbolised by a key phrase that is as provocative as it is forceful, "forbidden not to touch, not to feel, and not to think"., which really means "forbidden not to learn"... In interactive

science institutions such as ours we offer a conceptual approach of what we hope to communicate, instead of the traditional objective approach deriving from the existence of collections of valuable pieces.

The type of visit that we provide means that the visitor may have more questions to ask on coming out than on going in. This is evidently a sure sign that knowledge is being achieved and that the level of scientific culture of the visitor is being improved; this scientific culture has horizontal objectives and is therefore suitable for everyone. We present science, technology, and the environment in a dispersed or specific manner, often directly related to current affairs, and with no distinction made between specialities. A motto that can be applied to interactive museums reads: "It is not nature's fault that man invented subjects".

All this makes it sound like a revolutionary museum, especially if we also take into account its open-plan style that makes visitors feel that they have become participants. Or its active and pleasant atmosphere (sometimes noisy and amusing, why not) and its predominantly popular character, neither elitist nor specialised. One further slogan should perhaps be added: "Science can be fun".

In an interactive museum, scientific culture is there to be enjoyed...

As well as visits to its exhibitions, the Museum offers all kinds of activities and initiatives related to education and scientific dissemination, with special attention being paid to the encouraging and developing of attitudes such as curiosity and a critical spirit, together with the teaching of knowledge and methods related to the sciences. Our Museum therefore embraces the philosophy of continuous education that is a feature of other interactive museums, inviting debate and reflection sometimes in a manner that is as indirect as it is efficient.

In short, this is a centre for scientific education in the widest sense of the term, which creates opportunities so that people can experience a divergent learning process without the result of their thoughts being anticipated in a rigid manner.

In addition, its contents find in the building that houses them one of the keys to develop an exhibition discourse with an identity of its own, which is what makes the museum unique. On the one hand the Santiago Calatrava building is truly impressive; it is of such value that museum proposals, among others, should avoid "fighting" against it and rather use it to the benefit of conceptual discourse. A formal competition between the contents and the recipient should never be proposed; the latter is architecturally impressive and the former must also be so, but from a strictly conceptual and educational viewpoint. The building is an architectural marvel that should also be contemplated from the inside, because there is no doubt that it is an excellent witness to the technological and aesthetic achievements that can be attained by humanity in the early 21st century.

Another characteristic that makes the Science Museum Príncipe Felipe unique is its location within the spectacular complex of the City of Arts and Sciences of

Valencia. In recent years a synergic effect has been strongly felt jointly with the Hemisfèric and the Oceanogràfico, and this has reached its height with the opening of the extraordinary Palau de les Arts Reina Sofía, the opera theatre that will represent a milestone of this century and now with the Agora, a very versatile multifunctional space of a new architecture model, which will be able to complete the cultural and entertainment contents offered by the City of Arts and Sciences.

In its first seven years of life, the Museum has been visited by over 24 million people. Moreover, our visitors have been shown over 150 different exhibitions with some 2,500 exhibition modules. We have collaborated directly with museums from over thirty countries and with practically all the Spanish science museums, to generate over a thousand activities of scientific dissemination, encouraging millions of observations of the moon, the sun, Mars, Saturn...

We have sent over 100,000 crew members to the International Space Station by means of our simulator, we have made our visitors give thousands of mechanical sneezes in the Chromosome Wood around Chromosome 5, one of the almost 200 interactive models of this section of the macro-exhibition LIFE AND GENOME.

This is not to mention the many millions of smiles and manifestations of applause, exclamations and surprised faces, even with the odd little start, which have arisen in each and every one of the sessions of Science on Scene, in the multiple revitalisations and workshops of all kinds that we have held during this period, in the most surprising modules, in the scientific theatre plays for children...

The Museum is a member of the Board of the ECSITE, the world organisation of science museums, which is made up of 400 institutions of this kind in 32 countries. It is also the headquarters of the Spanish Association of Scientific Communication, which is chaired by the director Manuel Toharia.

With the modesty of those who realise that there are always things that can be improved and that still remain to be done, we cannot help being proud of what we have achieved with the support of the Valencia Regional Government and the members of the public who have visited us. The overwhelming majority of the latter have declared their intention of making a repeat visit (90% of visitors according to surveys). At the same time however, we are conscious of the great responsibility that we bear for the coming years, not only in order to maintain current standards but also to improve all those aspects that are not up to standard.

## **SCIENCE MUSEUM PRÍNCIPE FELIPE HANDS ON, MINDS ON, HEARTS ON**

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Already captivating from the outside, the museum is a building of grand proportions and organic forms that houses a multitude of activities and initiatives related to the evolution of life and scientific and technological dissemination.

Visitors have large free access areas and almost 30,000 square metres of exhibition space. Interactivity distinguishes the Science Museum Príncipe Felipe, presented under the motto “Prohibited not to touch, not to feel, not to think”. In this way the museum presents a real tool for educating and reactivating the critical capacity of the population.

Together with the extensive exhibitory material, the museum also promotes the diffusion of activities and publications related with science and education, transforming itself into a transmitter of knowledge between the scientific-educational world and society as a whole.

Its value, as a complement and support to the educational activity of educational centres and for companies and institutions, makes it a living museum that maintains a constant dialogue with the society surrounding it.

### **AIMS**

1. To present scientific activity in the wide sense and biology and genetics in particular.
2. To disseminate concepts, techniques, processes and attitudes that are derived from our knowledge of science in general.
3. To contribute to the scientific education of the public allowing them to take part in the work of the scientists.
4. To draw society's attention to modernity, advances in knowledge and the scientific-technical world, so making science more accessible to the general public.
5. To support the diffusion of this knowledge and culture in different social media, especially to teachers at all educational levels and to professionals in the media.
6. To generate travelling exhibitions and to organise educational activities that help to make Valencia an international reference point in the field of genetics and scientific dissemination.

7. To serve as a platform for exhibiting industrial innovations that are created in the Comunidad Valenciana, first and foremost, and then in the rest of Spain and the world.

As early as November 2002 it was nominated a member of the board of directors of ECSITE (the European Collaborative for Science, Industry and Technology Exhibitions), which is an European organisation for the dissemination of science and technology including some 300 museums and interactive institutions that are visited every year by over 35 million people. In 2004 the Museum was again nominated for its contents and the number of visitors it receives.

The museum collaborates with different museums around the world on the forming, developing, granting, hiring and purchasing of exhibitions. Similarly, the Science Museum Príncipe Felipe takes part in jointly producing exhibitory and didactic material as well as in programming the activities of the most important museums, both national and international science museums, such as:

- Exploratorium of San Francisco (U.S.A.)
- La Cité des Sciences et de l'Industrie -La Villette- in Paris (France)
- the National Science Museum of London
- Pacific Science Centre of Seattle (U.S.A.)
- La Casa de las Ciencias of La Coruña.
- El Parque de las Ciencias of Granada.

Through these years, the Science Museum Príncipe Felipe has also become into an important forum for the celebration of scientific congresses and internationally recognised centre for holding events such the 5th Euro-Mediterranean Conference of Ministers for Foreign Affairs, Astronomy Congress "100 years of Supernova", Desertification in the Mediterranean Region Meeting, 57<sup>th</sup> International Astronautical Congress, or the IPCC (the group of UN experts on climate change).

## **ARCHITECTURE**

The Science Museum Príncipe Felipe, the work of the Valencian architect Santiago Calatrava, is unique in the world for the geometry of the building, its structure, the materials employed and the constant presence of nature within it.

In the Museum building, architecture, engineering and art have a close relationship, both with the world of science and technology and with several basic principles: simplicity of approach and elegance of architectural forms. Hence, in the Museum building, the contents and the container achieve an overall coherence.

The Museum has a personality of its own, in the modern architectural style that turns the containers of museums into parts of the collection or contents of the same. The huge size of the museum allows it to house various types of activities at the same time, as opposed to smaller museums that have a function limited to a particular field of science or nature.

It is a predominantly interactive Museum, with an open and participative style, in which the visitor has the freedom to touch and to plan their own route in an entertaining, popular and non-elitist atmosphere. The Museum also has areas of free access that allow the visitor to enter certain areas free of charge, where temporary exhibitions and all types of activities are held.

### **OUTSTANDING DATA**

- Opened on 13th November 2000
- More than 24 million visitors since it was opened to the public in 2000.
- Foucault's pendulum weighs 170 kilograms and it is 34 meters long, one of the longest in the world.
- 20,000 m<sup>2</sup> of glazed surface area with more than 4,000 panes of glass
- 42,000 m<sup>2</sup> of constructed surface area, of which, 26,000 m<sup>2</sup> are exhibitory spaces. It is the largest in Spain in total surface area.
- It is 220 metres long, 80 metres wide and 55 metres high.
- 58,000 m<sup>3</sup> of concrete and 6 tonnes of steel were used in its construction.
- 13,500 m<sup>2</sup> of pools.

## EXHIBITIONS

### **CALLE MENOR (SIDE STREET) (free access)**

#### **I. Exhibitions**

Located in the ground floor, this free access place has an area with temporary exhibitions.

The silhouettes of 55 of the best scientists of all times, with their names, their dates of birth and death and a sentence that identifies them to us, reminds us that scientific knowledge is the work of many people.

#### **II. Experimental Classrooms**

##### **1. Science on Stage**

The classrooms making up the “Science on Stage” space house various displays that put a group of experiments on stage. Following a script, and through a series of surprising results, the more entertaining aspects of science are made more accessible to the public in the hall. A story is made up by means of a sequence of spectacular experiments where the assistance of one or various members of the public is required.

##### **Chemical magic**

Chemical reactions continuously take place around us, some naturally and others provoked. They start with one or various substances, so as to obtain other completely new ones. Often the reactions are accompanied by changes of colour, giving off heat and light, producing electricity and explosions

##### **Cold, cold**

The gas most abundant in air, nitrogen, is in a liquid state at  $-196^{\circ}\text{C}$ . Much less abundant, carbon dioxide is solid at  $-76^{\circ}\text{C}$ . Bodies in contact with them experience interesting and surprising changes.

##### **Horror of the void**

Experiments where the concepts of pressure, force, vacuum... enter into play and reveal themselves, as all objects fall at the same speed in a vacuum, water boils at room temperature on reducing atmospheric pressure...

##### **Sounds: music and nature**

A place where the characteristics of sound are experienced: timbre, resonance, the musical scale. In this demonstration it is possible to hear what the sound of the human heart is like and to observe how sound alone can break glasses.

### **Micrarium: looking at the invisible**

An experimental workshop which aims to teach how a microscope works and the new visual world that these instruments provide us with.

### **Robots**

The aim of this workshop is for pupils to discover, through the direct handling, the importance to robotics to our lives. The idea is to develop programming skills, promote teamwork, familiarise ourselves with new technologies and artificial intelligence, among others.

### **Television studio workshop**

An interactive workshop in which those attending get to know how a television studio operates through a short duration programme. The participants explore all the mechanisms that are involved in the recording of a programme from the TV set point of view and that of the control room. The workshop concludes with the viewing of the finished product. One hour later, the participants can purchase the DVD containing the programme at the Museum shop.

### **Red Hot**

This demonstration shows the concept of temperature and the infrared image, observing how the heat of an object travels to other one, the difference between the animals of cold blood and those of warm blood and even seeing their own image across an infrared camera.

## **OTHER SPACES**

### **Auditorium**

The Science Museum Príncipe Felipe has a grand 300-seat auditorium, equipped with the latest technology, where various events can be staged.

### **Shops**

The Museum has three shops situated in the Side Street where visitors can purchase souvenirs and specific products linked to the contents and exhibitions. There is also a small souvenir shop situated in the Main Street.

### **Cafeteria**

The services area has a cafeteria open to the public and a dining room for school groups.

## **CALLE MAYOR (MAIN STREET)**

### **I. Exhibitions**

#### **1. Artistic Representation of the DNA molecule**

The Science Museum devotes a large exhibitory space to Life. One of its main components is deoxyribonucleic acid (DNA), whose molecule is

represented on this floor from an artistic point of view through a 15 meters high sculpture. The molecule contains a genetic message that can be decoded by the more understanding public.

## **2. Foucault's Pendulum**

In the middle of one side of the Main Street, a pendulum hung from the top of the ceiling structure, and with a circular base with mobile elements, shows how the world revolves on its own axis. With a length of 34 metres, this Foucault's pendulum is one of the longest in the world.

## **3. Flight...**

An exhibition composed of various flying machines throughout the history of mankind. Since the drawing of the genius Leonardo, which takes us back to a time when Man tried to imitate the flight of birds up to the current Mirage III, the delta-winged supersonic mono-reactor prototype of military and civilian aviation during the last century. Moreover the public can see a replica of the famous aircraft built by Gaspart Brunet, the first man to fly in Spain on 5<sup>th</sup> September 1909 and which was piloted by the Valencian Juan Olivert.

## **4. Marvel Superheroes**

Discover Spiderman's secret and imitating the Daily Bugle's photographer by scaling a wall, investigate into whether there is a scientific base behind The Hulk's rage, or even operating Doctor Octopus' mechanical arms as we learn concepts about physics, neuro-anatomy and biomechanics - these are some of the interactive proposals that the Science Museum is offering with the "Marvel Superheroes" exhibition.

The exhibition is set up such that the visitors are invited to immerse themselves into the comic world and discover little by little how the superheroes bring science into their adventures. The psychology of fear, arachnology, biomechanics and prosthetics, neuro-anatomy and emotions, visual perception, hydraulic and robotic engineering, physics and sound waves, genetics and evolution, magnetism, chemistry and the different states of matter, cryogenics, sciences of the atmosphere, and the development of sensorial abilities – these are just some of the principles that are explained in the exhibition.

Stan Lee's incredible Marvel universe has inspired the creation and the design of this exhibition. Each of the spaces presents a specific character and the associated scientific principle, and invites the visitor to carry out a "mission" so he/she can discover for him/herself the various associated scientific aspects. Hulk, Storm, Spiderman, the Patrol X, Daredevil, the Human Torch, Banshee and the Invisible Woman, explain across interactive modules aspects related to their superpowers.

The module dedicated to Hulk visitors can step inside the Incredible Hulk's brain to explore its wiring: by pointing with a probe to different brain areas and depending on the highlighted areas, Bruce Banner loses his temper or controls his emotions.

In the zone of Spiderman, the public finds a brick wall amplified from a spider point of view, where the visitors can emulate the photographer of the Daily Bugle. In the 'Super Heroes' exhibit Daredevil shows visitors how the complex smell mechanism works to distinguish among 3,000 and 10,000 different smells. Furthermore visitors can control Doctor Octopus' mechanical arms, discover the biomechanics implants with Wolverine or the infrared world with The Human Torch, between other interactive offers.

Observe some of the basic principles of magnets - visitors feel how Magneto power repels them when they try to push a shield- or test their try their sonic powers by hitting the right volume level, emulating Banshee, to defeat villain Sentinel – visitors have to shout over 100 decibels at 'Danger Room' - are some of the "missions" that will turn the public into superheroes.

## **5. Science Profiles**

The silhouettes of 55 of the best scientists of all times, with their names, their dates of birth and death and a sentence that identifies them to us, reminds us that scientific knowledge is the work of many people.

## **FIRST FLOOR**

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### **SCIENCE SHOWCASE**

#### **1. CVIDA**

This initiative has been developed by the Valencia Biomechanics Institute in collaboration with the Science Museum and promoted by the Association for Promoting the Quality of Life (*Asociación para el Cuidado de la Calidad de la Vida*, CVIDA), an entity that groups together the companies and bodies of this sector. It is promoted by the Regional Ministry for Industry, Commerce, and Innovation.

The sample combines audiovisual elements and interactive modules that are distributed in five differentiated categories: the home, the working day, leisure wear, and health. In this way the visitor moves through various areas in an immersive experience in which the importance of innovation in everyday welfare is highlighted.

In this way the spaces of the visit represent various aspects of daily life, in each of which the visitor can interact with modules that will give him/her information about him/herself and his/her relation with the products and services represented. Moreover, he/she may also get to know the biomechanical and technical principles on which they are based.

The sample thus includes over twenty interactive modules, such as the three-dimensional scanner in “You are the measure of all things”, in which the visitor enters a booth in order to obtain specific data on the dimension and shape of his/her body and even experiment with a virtual changing room, or “The sound of muscles” in which he/she can see how muscular effort is converted into a sound so as to discover the pressure exerted on a control. Both these experiences can be applied to clothing or health at work respectively.

A personalised report (which can be viewed by means of the portal [mibienestar.es](http://mibienestar.es)) will be generated from the information obtained in a personalised manner from some of the interactive modules (facial recognition systems and biomechanical data). This report will contain the facial image, the result of some measurements, and recommendations for the selection of products designed for your wellbeing.

The main objective is that when his/her visit ends the user is more aware of what innovations are being implemented in the Region of Valencia for his/her life to be improved, and that he/she can obtain information in order to take better care of him/herself.

## **2. Exploratorium**

This exhibition involves themes so diverse as optics, electromagnetism, light effects, experiments in colour, vision, mechanics and physics. To do so, it reproduces the main phenomena of nature as they are perceived, providing an explanation of their corresponding scientific principles. Play by experimenting with light, colour, sound, electricity, gases, basic geometrical forms, elemental physical forces...elements that are commonplace. At *Exploratorium*, you can weave and unravel a rainbow, split beams of white light, hunt your own shadow, package air, get to know the “fingerprints” of different colour gases, mix sounds, create light, make square wheels revolve or blend your own face with that of your friend to make a single one.

The exhibition is divided into five areas:

- 1) Sound emission and perception.
- 2) Electricity and magnetism.
- 3) Light.
- 4) Perception.
- 5) Patterns and guidelines.

Nature is an extraordinary book that we can learn thanks to science. At “Exploratorium” we open this treatise and flick through some of its most

interesting pages. "Exploratorium" reproduces various natural phenomena just as we perceive them, providing an explanation of their corresponding scientific principles.

### **3. Electricity Theatre**

Across of some surprising experiments, this animation produces honouring to the electricity. In front of an audience composed by half a hundred of persons and in the middle of a scenery that simulates the laboratory of a scientist - inventor, a scientific entertainer will try to make understandable the concepts related to the physical phenomena that the electricity produces.

Bells that ring without touching them, candles that go out with a metallic wand without the need to blow, jumping rings, electric arcs that cross space, and neon tubes that light up on touching their ends, these are some of the experiences that make one's hair stand on end in the Electricity Theatre.

### **4. "Top Sail"**

Produced and designed by the Science Museum itself, with a didactic and multidisciplinary approach, this new exhibition aims to arouse public interest in sailing. The basic idea is to make the world of sailing more accessible and to show how its development has been possible through two factors: the wind and the sea.

The exhibition includes the most representative aspects of each of the main themes developed by the exhibition (wind-sea-navigation). Navigation is presented as the meeting point between wind and sea, the America's Cup being presented as an outstanding example.

Each of these areas is made up of a series of interactive modules linked to these themes, as well as computer programmes, scale-models and graphic panels, as the main elements.

## **II. Attractions**

### **1. Space Cadet School**

A futuristic classroom where, thanks to an audiovisual show, helped by "Professor Light bulb" and his assistant "Sparky", future space cadets can be trained. The theme tackled during the sessions aim to make the distances between the planets of the solar system understandable on a human scale. The sessions last 10 minutes and there is an interval between sessions of 30 minutes.

### **III. Experimental Rooms**

#### **1. L' Espai dels Xiquets (Children's Space)**

"Children's Space" is an exhibition area dedicated exclusively to children between four and seven years of age, in which they can play and experiment in the company of specialist monitors. This exhibition is complemented by two adjoining modules:

- "Welcome to life", a macro-incubator where approximately every 10 minutes cute little chicks are hatched, literally from the shell;
- "Animated mascot", a friendly virtual creation that directly communicates with children by means of a large screen.

## **SECOND FLOOR**

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### **THE LEGACY OF SCIENCE**

#### **I. Exhibitions**

An exhibition located on the second floor of the Science Museum. Following a chronological path supported by audiovisuals, the life and research of three of the most outstanding Nobel Prize winners is shown: Santiago Ramón y Cajal, Severo Ochoa and Jean Dausset, member of the scientific committee of the Science Museum Príncipe Felipe. Also on display is part of Ochoa's legacy that consists of his personal and scientific archives, as well as his library containing more than 1,200 volumes.

##### **1. Jean Dausset (1916-2009)**

In 1980, Jean Dausset received the Nobel Prize for his discoveries on the mechanisms of the Human Histocompatibility system (HLA). His research has led to the development of a new type of medicine capable of predicting possibilities of illnesses from the individual genome. In 1982, Jean Dausset founded the Study Centre on the Human Polymorphism (CEPH), where decisive research was begun on the human genome.

##### **2. Santiago Ramón y Cajal (1852-1934)**

Cajal is not only one of the greatest researchers of all time, but also one of the most admired by the international scientific community. His decisive contribution to the knowledge of the structure of the nervous system was recognised in 1906, the date on which he was awarded the Nobel Prize, the culmination of a series of international recognitions. Thanks to the legacy that we can see in this exhibition, the visitor can see for himself how his medical and biological research are still valid and useful today.

##### **3. Severo Ochoa (1905-1993)**

This is probably the most recognised Spanish scientist in history due to his contributions to biology in general, and to physiology, biochemistry and molecular biology in particular. Severo Ochoa discovered the enzyme capable of synthesising a nucleic acid, the RNA, *in vitro*; a revolutionary finding for which he received the Nobel Prize for Medicine in 1959.

#### **4. A century of Nobel Prizes**

An exhibition that goes over the history of these prizes in their first one hundred years of existence: awards, anecdotes, curiosities and the most relevant data make up the contents of this exhibition.

### **THIRD FLOOR**

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#### **I. Exhibitions**

##### **1. CHROMOSOME FOREST**

A large-scale reproduction of the 23 pairs of chromosomes in the human genome is showed in this area. Around each pair of chromosomes, numerous interactive modules are developed linked to the particular genes of each of them and what their function is, as well as several information boards that explain issues linked to genetics and, in general, with vegetal, animal and human life, ending in the latter's case not only with organic questions but also mental questions. The idea is not only to explain the basic keys of the new emerging science of the 21<sup>st</sup> century, Genetics, but also to provide a range of cultural and thought-provoking items on the various life sciences.

Although the visit does not have to follow a predetermined order, a line marked on the floor can always be followed which provides the ideal path for visiting every one of the chromosome exhibitions.

The genetic code is the universal language of life that expresses how all organisms have to develop, what they are like, how they operate and how they perpetuate, from the simplest to the most complex. It is a common language for all living beings that populate or have ever populated this planet.

Each organism is characterised by its own *instructions manual*, which is called the genome. Within a single species, the genomes of each individual are slightly different. Each of the cells of an organism contains an example of this set of instructions. It is like an extensive library whose books – the genes – contain all the information that the individual needs to form itself, to be born, to live and to reproduce. These books, the text of which is written in the language of DNA – are stored on certain occasions on shelves – the chromosomes.

The genome holds, then, the secret of life. However, it is only a setting off point. The future of each organism will also depend on other external factors, both physical and biological, and even cultural in the case of human beings.

## 2. The space adventure

The Príncipe Felipe Science Museum shows in “Space Adventure” modules and audiovisual features to learn about and discover fundamental aspects and curiosities related to astronomy and the conquest of space.

The visitors know different aspects of astronomy: how a black hole works, understanding how the phases of the moon occur, observing the different colours of space, making a small rocket take off, and increasing their knowledge of the nearest star: the sun.

“Space Adventure” has three zones: one is dedicated to 3D vision, another to the International Space Station, and there is an area where animations will be shown and that includes interactive modules and the attraction "gyro-chair". In the hall dedicated to three-dimensional vision, there will also be features from the European Space Agency (ESA), with which the Museum collaborates.

Furthermore, on 3D cinema film, the short film ‘Fly me to the moon’ lets the audience feel they are inside their own film accompanying the actors: some funny astronaut flies that will go through a thousand adventures in order to get to the moon. And at Lunar Picture module the visitors can see themselves on the moon in 360°, which gives a sensation of three dimensions. The general public will find out about the Cluster and Soho missions carried out by ESA and NASA, with the aim of better understanding the atmosphere and the sun.

The exhibition brings together contents related to mankind’s venture into space, the arrival on the moon, and discoveries about the sun. On 3D cinema film, the short film ‘Fly me to the moon’ lets the audience feel they are inside their own film accompanying the actors: some funny astronaut flies that will go through a thousand adventures in order to get to the moon.

Then in the "Lunar Picture" module (“Foto 3D”) the visitors can see themselves on the moon in 360°, which gives a sensation of three dimensions. The exhibition will be complemented with three different graphs. The aim is to give an idea of the technology used in space and the discoveries made thanks to this.

In addition to taking part in scientific animations, the general public interacts with different features and discoveries related to the conquest of space, such as a gyro-chair that astronauts use in training, find out what a Dumbbell gyroscope is, how spaceships propel themselves, learn curious facts about the Red Planet, and explore impressive images of Mars in three dimensions.

The ‘Space Academy’ attraction allows the visitor to go on a simulated flight in the space shuttle that takes the visitor to the International Space Station (ISS). Furthermore, there is an exhibition on the famous space telescope ‘Hubble: space observation’ with the most spectacular pictures taken in recent years, and hanging in the air there is a 1:10 scale model of the space city being built.

## **2.1 Attractions: Space Academy**

Molecular life inhabited the earth's seas for 3,000 million years. Then, in the last 500 million years, the land and air were invaded. But only now, in the last half-century, have we been able, thanks to space technology, to leave the planet and enter outer Space. A simulated flight in the shuttle takes us to the International Space Station, the space city currently being built: is the Space academy.

The Space Academy shows, across the simulation of the movement, three stages in the preparation to the spatial launch to the International Space station. Guided by the voice and the image of the Spanish astronaut Pedro Duque, visitors cross the space laboratory, the launching elevator and the airlift that allows the access to the space flight simulator. The trip is made by groups of eight people and lasts about thirty minutes.

## **3. A scientific vision of drugs**

The objective of the exhibition is to gain a closer understanding of prevention in the world of drugs and drug addiction through scientific knowledge. It consists of five thematic blocks: the first is the history of drugs; the second neuroscience, showing the brain as a target for the various drugs; the third includes the classification of drugs according to their action on the central nervous system.

A fourth block shows the factors that cause vulnerability to addiction, and the fifth and final block is that of the prevention and attendance available in the Region of Valencia; an interactive map shows all citizen services of this kind.

Moreover, this didactic initiative includes the designing of three thematic spaces named "The researcher's corner", in which groups of researchers from the universities of the Region of Valencia present the results of their studies on the main drugs, i.e. alcohol, cocaine, and ecstasy. It aims to show the direct consequences of these drugs on health, such as the brain damage they cause.

With the help of the 350 m<sup>2</sup> of the exhibition and the use of attractive up-to-date formats, the idea is to create a complete scenography so as to facilitate the acquisition of contents in a simple and entertaining way. This is an interactive recreation experience in which the use of exhibition elements such as interactive modules, images, and audiovisuals, computer programmes, models, and real pieces aims to motivate the spectator to take a closer look at the world of drugs and drug addiction from a scientific viewpoint.

## **4. Climate Change**

This exhibition has gathered together a series of graphic panels, interactive modules, audiovisuals, and objects that show visitors various aspects related to

the concept of climate change, its causes, historical data, its consequences, etc.

Structured conceptually around a call for awareness regarding the causes and negative effects of climate change, this exhibition has been planned as a journey through the most important points so that the public is familiar with the meaning of the term climate change.

Throughout the earth's history there have been numerous changes to the climate owing to various natural phenomena, such as fractional changes in solar radiation, volcanic eruptions, and natural fluctuations in the climatic system itself. However, over the last century the average world temperature has increased by  $0.6^{\circ}\text{C}$  and by as much as  $1^{\circ}\text{C}$  in Europe, which is an unusually rapid rate of warming.

Climate change and the various environmental problems that threaten life on earth are themes for discussion both in public forums and among specialists. Human activity and its possible repercussions, together with the possibilities of its adaptation and attenuation, are subject to debate in all scientific circles. The aim of this exhibition is to show visitors the effect of climate change and to clear up any doubts that they may have on the subject.