## #ExpoClock

## RHYTHMS OF LIFE

## **Brochure**

MUSCIENCE

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# CLOCKS Rhythms of life



#### Discover CLOCKS, an exhibition created by ART'M, a plunge into the impressive and little-known world of biological rhythms.

#### 'Does the sunflower really follow the sun? Why do we sleep? Why are there billions of clocks at the heart of life?'

These questions, and many more, are answered in the exhibition, with the help of over 60 activities: 11 tabletop games, 16 tablet applications, 13 installations, 10 panels, 6 videos, 2 comic strips...

The exhibition is suitable for all ages from 6 upwards.

The CLOCKS exhibition is a co-production between ART'M Créateurs associés and the Palais de l'Univers et des Sciences, a Dunkerque Urban Community facility. It is being organised in partnership with La Rotonde, Centre de culture scientifique, Ecole des Mines de Saint-Etienne.

The CLOCK project is supported by the Auvergne Rhône Alpes Region, the Bullukian Foundation and the City of Saint-Etienne.

The content of the exhibition has been validated by researchers from the CNRS, INSERM and the Société Francophone de Chronobiologie.



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# Plants





The first observations of biological rhythms focused on the plant world. Research in this field is still very active today. Flowers, plants and trees have a direct relationship with the environment, and their rhythms need to be synchronised with the rhythms of the day, the temperature and the seasons. In this world, visitors discover the life cycles of different plants and the mechanisms behind their rhythms. A journey back in time also allows them to follow the first research carried out on the subject a few hundred years ago.



#### **Interactive displays**

---- Rhythms in the plant world Introduction and wooden stump

— **Totem scientist** A researcher answers your questions

— At the market ! Seasonal fruit and vegetables

— **The magic garden** A children's album specially created for the exhibition

— Seasonal clock Mechanisms of flowering and fanning

— **Sunflower** Sunflower rotation

— Shhh! I'm asleep... Plant movements at night

--- Dortous and Augustin A comic strip specially created for the exhibition

---- Bamboo flowers The impressive story of bamboo flowers

— What flower is it? Linnaeus and his floral clock



# Animals

AISONS, ANNÉES, DÉCENNIES ANNÉES DE TEMPS; JOURN

**Interactive displays** 

— **Totem scientist** A researcher answers your questions

— Infra Ultra Circa ! Classification of rhythms

— **Biomix** Microscopic rhythm set to music

— Get out of the way! Rhythms in movement patterns

— **The mating season** The rhythms of reproduction

— I like you! Courtship display

— **Migrator** Animal migration

— Against the clock! Animals living at night From the earliest forms of life, rhythm has been present in living beings: feeding, reproduction, movement, etc. Since then, rhythms have evolved and taken on many forms, and are an integral part of all forms of life, from bacteria to complex organisms. In this space, you can take a closer look at the animal world and discover surprising rhythms and their classification, courtship rituals and even rhythms invisible to the naked eye. A game on a large touchsensitive table also allows visitors to experience the exciting journeys of migratory animals.

ES MOUVEMEN

LA REPROD





# Human body



## **Interactive displays**

— Rhythms in the human body Introduction and heart model

— **Totem scientist** A researcher answers your questions

---- It's time! How the body tells time

— The body - clockmaker The human biological clock

— **The beating heart...** The rhythm of our heart

— A breath of fresh air Breathing

---- Rhythm box The rhythms of our brain

— Women's cycle Menstruation

— **The Orchestra Man** Artistic representation of body rhythms

— Human/Animal Comparison of rhythms between different species



The human body is a veritable batucada (Brazilian percussion group). Activities, organs, cells, hormones... all follow a beat that allows the body to play the right music. This section invites visitors to take the time to observe themselves. The various activities allow visitors to listen to the rhythms of their bodies, hearts and lungs, and discover their precise orchestration. A connected headset also allows visitors to see the rhythm of brain waves in their own brains in real time.



# Clocks





## **Interactive displays**

— The clocks of life Introduction and clockwork

— **Totem scientist** A researcher answers your questions

---- Billions of clocks Clocks in living organisms

— I'm swinging! Sustained oscillations

— Clockwork How molecular clocks work

— **Bacterix** Rhythms and evolution

— Photobooth! The SNC, our brain's big clock

— At the baton! The role of the SCN

— A thousand feet underground Michel Siffre's experience

— Out of time Michel Siffre's discoveries

— **Chronotherapy** Biological rhythms and medicine Life's clocks don't look or tick like the clocks on the wall, but that doesn't stop them from telling the time and the rhythm accurately. Over the last fifty years or so, scientists have begun to discover the many mechanisms that regulate the rhythm of life's activities, and research is still continuing. This space sheds light on biological clocks, explaining how they work and the role they play in regulating living organisms. An immersive video also allows visitors to enter an underground cave and experience for a few minutes what it was like to be Michel Siffre, a scientist who used his own body as a research tool.



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## **Interactive displays**

— Sleep Introduction and globe

— **Totem 'scientist'** A researcher answers your questions

---- How do you sleep? Drawing up your 'sleep file'

— The night round Human sleep cycles

---- Recipes for good sleep Tips for getting to sleep

— I've had my fill! The importance of light

— Troubled sleep Sleep disorders

— They sleep too! How other animals sleep

— *Time for a nap? The benefits of napping* 

---- Sleep mode! Hibernation and winter rest Whether you're a good sleeper or a bad one, sleep is a rhythmic activity that we perform 365 days a year. In this section, you can question your own sleep, understand how sleep is organised into cycles, understand the influence of artificial lighting on its quality, and discover tips for getting a better night's sleep. And if you feel like taking a little nap, there's a sleeping tent where you can lie down for a few minutes to recharge your batteries!





For a rhythm, the end is very close to the beginning, and vice versa. This is also the case in the CLOCKS exhibition.

In the exhibition forum, visitors immerse themselves in the world of biological rhythms. An artistic video blends images captured in different environments (nature, city, etc.) with original musical composition. A selection of objects will also allow them to discover at a glance some of the major issues related to the exhibition's themes. Before leaving, they can leave a trace of their visit, their learning, their discoveries or their reflections. This final approach opens up discussion to societal topics such as working hours, the influence of new technologies, the control of rhythms in animal and plant production, chronotherapy, and more.



# Press kit - *CLOCK, rhythms of life* : a French success, now available internationally

Supplément « Science & Médecine » - Le Monde - 08/02/2017

#### L'EXPOSITION

#### Les horloges du vivant

A Saint-Etienne, l'exposition « Clock » illustre l'omniprésence des rythmes biologiques

aviez-vous que le lys diffuse chaque soir à la même heure son parfum pour attirer les pollinisateurs, que les plantes aussi subissent le décalage horaire ou que les oiseaux migrateurs s'orientent grâce au Soleil dont ils interprètent la position? Les plantes et les animaux comme nous, les êtres humains, vivent au rythme de leurs horloges biologiques. Et l'exposition «Clock», qui se tient à La Rotonde, le centre de culture scientifique, technique et industrielle de l'Ecole des mines de Saint-Etienne, a pour parti pris de «se couler dans le phénomène pour le comprendre », selon l'expression de son commissaire, le sociologue Jacques Roux. Conçue par le collectif stéphanois Association Recherche Théâtre'Mouvement (ART'M) dont il est le directeur, l'exposition mêle harmonieusement jeux, expériences, vidéos, bandes dessinées et dispositifs interactifs. Installée sous la charpente métallique de l'ancienne salle des calculs de l'Ecole des mines, elle se décline en cinq espaces – le végétal, l'animal, le corps humain, les horloges, le sommeil –, soit plus de 60 activités s'adressant aux enfants du CP à la terminale, en lien avec les programmes scolaires.

Le visiteur découvrira ainsi que le naturaliste suédois Carl von Linné avait conçu en 1745 une horloge florale fondée sur la variété des rythmes circadiens des plantes, et pourra constater l'effet du décalage horaire en comparant le comportement des folioles de deux plants d'oxalis, qui habituellement se referment la nuit. Conditionné sur le fuseau horaire de Sydney, en Australie, l'un des plants de l'exposition se présentera avec des folioles fermées quand il fera jour chez nous, tandis que celles de l'autre plant, adapté à notre fuseau horaire, seront ouvertes.

Dans l'espace consacré au corps humain, le visiteur est invité à observer les rythmes de son propre corps, prolongeant l'expérience réalisée par le spéléologue Michel Siffre en 1962. Claustré durant deux mois dans un gouffre, il avait relevé ses rythmes de sommeil et montré que son organisme, malgré l'isolement, avait conservé un cycle de 24 heures et 30 minutes. Un mannequin stylisé, sur lequel Un mannequin stylisé, sur lequel sont représentées, sous forme de points lumineux, les horloges du corps humain, illustre ainsi le concept de « machine à rythme ». Une horloge centrale située dans notre cerveau indique l'heure aux horloges pulmonaire, cardiaque, intestinale et ovarienne. Un jeu interactif dévoilant sous forme poétique les mécanismes moléculaires de ces horloges biologiques fait écho à cette installation.

Par le jeu de la multiplication des angles et de la diversification d'activités simples mais soigneusement conçues, l'exposition éveille notre curiosité sur les rythmes qui nous animent. Mais aussi sur les pressions que nous faisons subir à notre corps pour l'adapter à un monde de plus en plus contraignant. Une prise de conscience pouvant lancer une transformation. Ainsi que le souligne Jacques Roux, « nous sommes tous des artistes de notre propre vie ». ●

#### CATHERINE MARY

« **Clock »,** La Rotonde, Saint-Etienne, jusqu'au 30 juin.

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#### Écrits, audios et vidéos

#### L'Essor

Clock, une exposition sur l'horloge biologique

#### l'MTech, blog de l'Institut Mines-Télécom

Clock : à Saint-Étienne, La Rotonde prend le rythme du vivant

#### France Bleu

Clock, les horloges du vivant

#### Université Lille3 (vidéo)

Document-rencontre avec Claire Leconte, chronobiologiste



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