



Institut Català de Paleoecologia
Humana i Evolució Social

Dossier

The Palaeolithic

Student

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The Palaeolithic

The Paleolithic is the period of human history in which the only way to get food was to hunt or to collect wild vegetables or fruits. The name Paleolithic means “**old (paleo) stone (lithic)**”, since the tools of this period were all made with the “knapping” technique. To knap consists of skillfully striking a stone with another one to remove sharp flakes that can be used as a tool or to shape the whole block into a large tool.

During the Paleolithic, human groups were **nomads**: they did not live in a fixed place; they often moved from settlement to settlement, mainly because the animals were also in constant movement. It is the longest period of our history since it covers from about 3 million years ago to about 10 thousand years ago. The following dossier is also explained on the YouTube channel IPHES Socialització. *Infants i Pedres: el Paleolític*.

https://www.youtube.com/watch?v=Ct7kGL_m_OE&list=PLbv8ZPhhizgkLWo79I4pJeFyHfa4JEak8

Early Palaeolithic or Oldowan (Mode 1)



Detall d'un cobai tallat del jaciment del Barranc de La Boella (La Canonja). Autor: A.Ollé



The most accepted scientific evidences of the first stone tools are 2.6 million years old and have been located in two sites from Ethiopia (Bokol Dora I and Kada Gona), in Northeast Africa. There is a site in Kenya (Lomekwi 3) where there might be 3.3 million years old tools, but not all of the scientific community accepts this dating.

Oldowan or **Mode 1** is a basic stone knapping technique that consists of striking a stone or a pebble to extract flakes (the sharp parts of the stone) in order to use them as knives. Some of these flakes were retouched (struck on the edge) to get a different, more resilient cut. (https://www.youtube.com/watch?v=Ct7kGL_m_OE&t=862s, starting on the third minute).

During this period, most of the tools were manufactured where they were needed, with the stones that were there, and were later abandoned right there. Mainly, they improvised the tools in the places where they would use them.



We know that humans began to eat meat quite early, but how they got the animals is still unclear. We still do not know if they hunted or if they took advantage of the leftovers from the food of great predators, like lions. Their subsistence strategy is considered “opportunistic”, although there are researchers who believe they could hunt better than we think. Moreover, they probably consumed vegetables, but there is no scientific record of this. In the early days, hominins had yet to discover how to make fire, so caves were a dangerous, cold, humid and dark place. They primarily lived outdoors.

The environment: climate and fauna

The environment was different from what we have now. For example, African and Asian animals lived in Southern Europe, but the vegetation was similar to the current one, with species of Mediterranean trees and plants, adapted to a warmer climate than the current one.

In Europe, due to the change in cycle that happened around 2.6 ma, new species of animals appeared, such as a new elephant (*Mammuthus*) of African origin, a new bovid of Asian origin (*Leptobos etruscus*) and the horse, which came from America, as well as a type of

deer (*Eucladoceros*) and the fallow deer (*Dama*), which came from Asia. The wolf, which came from America, also dispersed throughout Europe from the cold period of 2.1 ma. From 1.2 ma, Europe had a more diverse animal population, especially of animals from Asia and Africa.

And in Catalonia?

The oldest scientific evidence of human presence in Catalonia is in La Canonja (Tarragona), at the Barranc de La Boella site (approximately 900,000 years old). There, the remains of several animals were found, including a type of elephant called *Mammuthus meridionalis*, an ancestor of the well-known woolly mammoth, which lived between 2.5 million and 700,000 years ago. It was similar in appearance to the current Asian elephants: it did not have hair its forelimbs were higher than its rear limbs and its tusks were curved. However, it was considerably larger than current elephants and it could weigh more than 10 tonnes. Moreover, remains of hippos, rhinoceros, horses, bulls, deer, lions and hyenas were also found in La Boella.

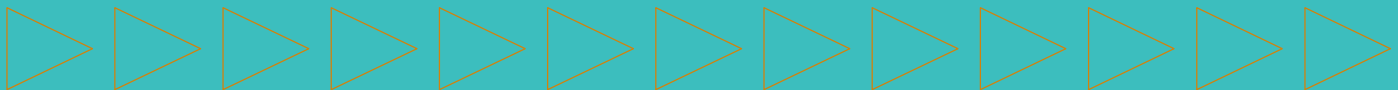


Figure 1: landscape of the La Boella site (La Canonja, Tarragona). A lagoon full of African animals. Drawing Mauricio Antón).



Figure 2: artistic reconstruction. Sometimes, elephants would get stuck in the mud, which was a great opportunity for hominins to kill the animal. Drawing: Mauricio Antón

The Lower Palaeolithic or Acheulean (Mode 2)



Acheulean was a new way of making stone tools that consists of knapping a block of stone on both sides to make a large pointed knife called hand-axe. **Hand-axes** were large knives that could make bigger cuts and let you use more strength since they could be held better. From what we know, they were used mainly for butchering (quartering large animals). In addition, we begin to find some wooden tools in this period, which have been exceptionally preserved in some special sites.

The first sites with such tools are in Africa and date back around **1.7 million years**, while in Europe it seems that they date back 900,000 years, as it has been found in the La Boella site, but they became more abundant around 500,000 years ago.



Figure 3: Sima de los Huesos handaxe

The environment: climate and fauna

Around 700,000 years ago, there was a major change in the climate that moved the fauna, and many of the animals became extinct. Similarly, they were replaced by other similar animals, and we can still find different types of elephants, hippos, rhinoceros, horses, lions, etc.

From what we know, **humans discovered how to make fire** during the Lower Paleolithic. The oldest evidences of fire production are very controversial since it is extremely difficult to prove that the fire was intentionally made. At first, lightning, natural fires and volcanic eruptions were the main ways to get fire, but then they discovered how to make it, by rubbing two sticks or by hitting two very special types of stone (YouTube). It seems that in Europe, they began to master how to make fire around 400,000 years ago.

And in Catalonia?

One of the most important documented events in the La Boella site is the presence of a type of tool from the next period, the Acheulean. We are talking about large biface tools (more than 15 cm long) which are accompanied by more basic tools from Mode 1.

Therefore, the La Boella site is the place where the oldest biface tools have been found in all of Europe.

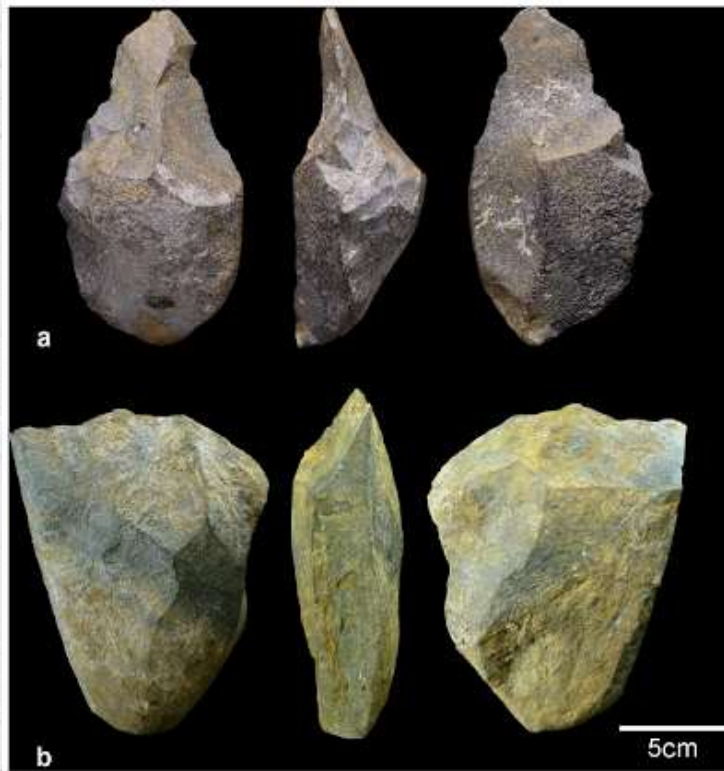
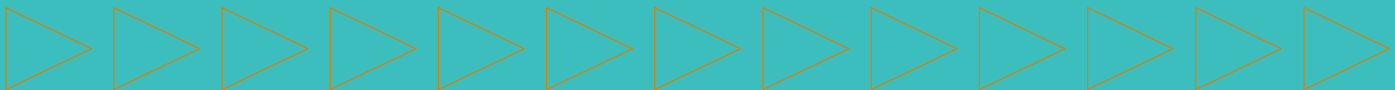


Figure 4: two of the large bifacial tools found in La Boella

El paleolític mitjà (Mode 3)



Detall d'una punta musteriana del jaciment Abric
Romaní (Capellades, Barcelona). Autor: P. Saladié



A new way of making tools appeared around 300,000 years ago. **Mode 3** (or **Mousterian**) is characterized by a very controlled way of extracting flakes, where they tried to produce **flakes of a specific shape** (predetermined), with a reduction system called “**Levallois technique**”. They mainly made flakes in a circular shape to use them as knives, also Levallois points, an artefact that could be used as a knife or as the point of a spear.

Several types of humans implemented this new way of making tools: *Homo neanderthalensis* in Europe, *Homo sapiens* in Africa and Australia, and most probably *Homo erectus* in Asia. Important cultural changes took place during the Middle Paleolithic. We will find the first evidence of intentional burials, which were doubtlessly performed by Neanderthals at least 50,000 years ago.



Figure 5: Levallois core and a preferential flake.



Figure 6: Levallois point, a special type of flake.

The Upper Pleistocene began 130,000 years ago with a period in which forests expanded a lot: the oak, holly, hazel and box could be found in the humid parts of Europe; the holm oak, kermes oak and Mediterranean buckthorn in Mediterranean Europe. Cold cycles were more extreme each time, which led to forests becoming grasslands, until the Glacial Maximum, 18,000 years ago, during the Upper Paleolithic.

In relation to fauna, animals that could adapt to the cold weather prevailed: aurochs, bison, deer, horses, woolly rhinoceros and mammoths were the animals that prevailed in this new cold Europe, and also became the preferred prey of the Neanderthals.



Figure 7: (left) artistic recreation of a woolly rhinoceros (*Coelodonta antiquitatis*), and (right) another type of Siberian rhinoceros (*Elasmotherium sibiricum*). Two kinds of rhinoceros in Europe

The Upper Palaeolithic (Mode 4)



The Upper Paleolithic began around 40,000 years ago. The arrival of a **new human species** to Europe led to the transition into a new period: we, **the Homo Sapiens**, brought a new way of making tools to Europe: **laminar technology**. It consists in extracting **elongated flakes with linear edges**, which are like current knives. In some regions, the last Neanderthals had already developed laminar reduction techniques from Levallois cores. Now, however, the concept of Levallois will quickly disappear.

New types of objects and tools will also arrive, with an **unprecedented artistic explosion**. Thus, we will find **paintings and engravings** from 35,000 years ago with more frequency, but also **“portable art”** (paintings, engravings, sculptures and ornaments made in portable pieces), and even **musical instruments** such as flutes.

In the Upper Paleolithic, we can also find an increase of **individual burials** and, more frequently, **collective burials** (more than one individual), which most often have grave goods, and sometimes have considerable accumulations of offerings. In some cases, they are exceptional, like the well-known burial from Sungir (Russia), dated

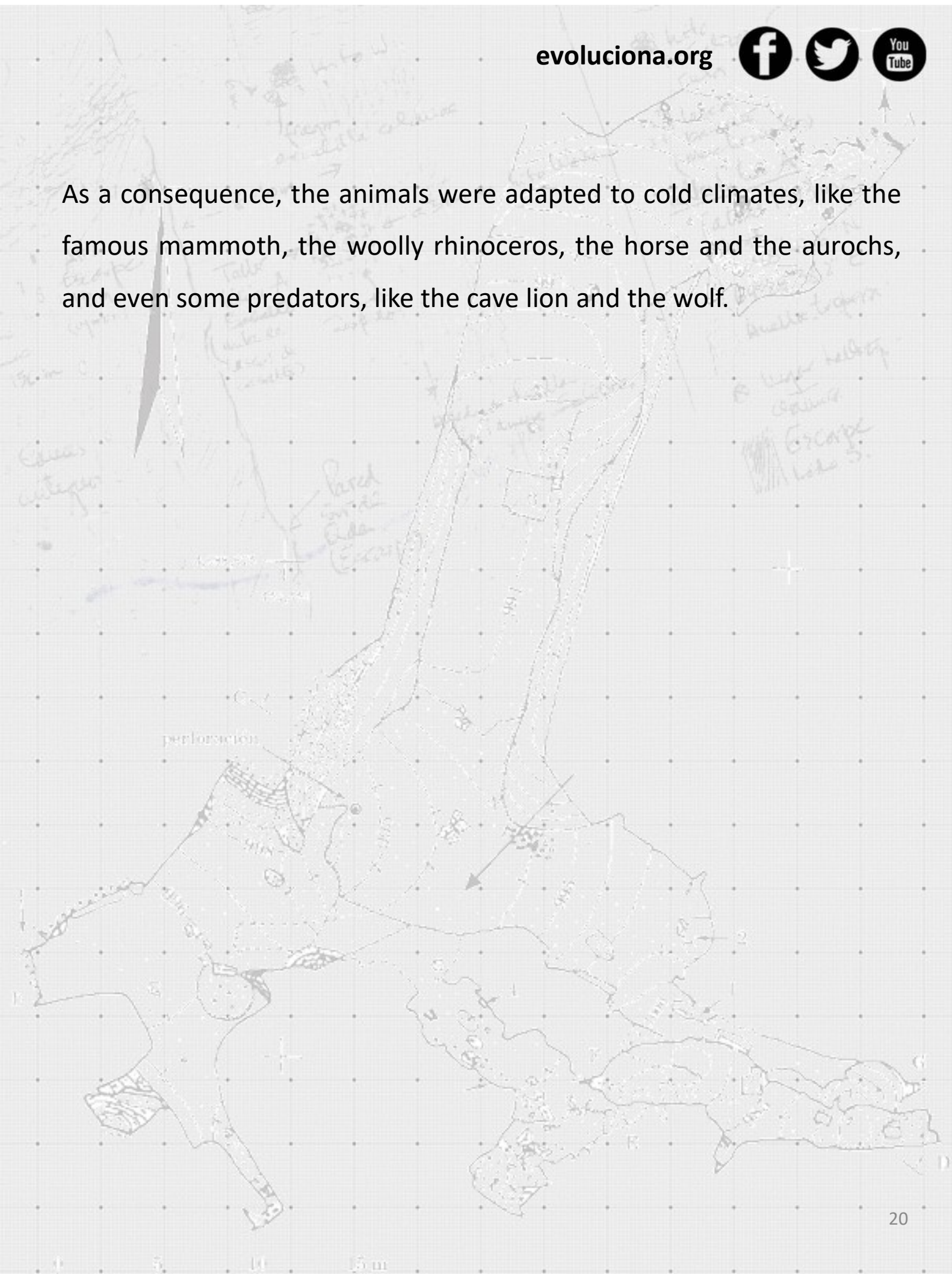
between 31 and 29,000 years old, where there were two children with over 10,000 ivory beads, 20 bracelets, 300 perforated fox teeth and 16 impressive ivory spears, most prominently.

The Upper Paleolithic is divided in different periods according to the different changes in the fabrication of tools: Aurignacian, Gravettian, Solutrean and Magdalenian. The gradual increase of the importance of artistic expression will culminate in the Solutrean and the Magdalenian periods with some of the most spectacular examples of Paleolithic art, such as Lascaux or Altamira or La Cova de la Font Major, in Espluga del Francolí (Tarragone).

The environment: climate and fauna

The climatic dynamics of the Late Paleolithic led to a gradual cooling, where warm periods were increasingly shorter, bringing **the glacial maximum to around 18,000 years ago, the coldest period in the history**. The Upper Paleolithic is a cold period where the vegetation was reduced to forest areas and plants and that could adapt to cold and warm temperatures, mainly grasslands.

As a consequence, the animals were adapted to cold climates, like the famous mammoth, the woolly rhinoceros, the horse and the aurochs, and even some predators, like the cave lion and the wolf.



Some important scientific disciplines in the study of prehistory

Experimental archaeology: branch of archaeology in which experiments are used to understand what is found in archaeological sites. There are many types of experiments: experimental technology, use-wear analysis, geology, etc. Each experiment is designed to delve into an initial issue, therefore usually intended to shed light on a small aspect of the issue.

Use-wear analysis: study of the edges of the tools in a microscopic scale, comparing them to experimental tools (made nowadays, with the same rocks and tools found at the site that is being studied). The goal is to identify the type of material that was cutted or worked and the length of time it was used.

Zooarchaeology: discipline that studies the remains of animals found in archaeological contexts. Therefore, these animals are usually related to the activities that humans carried out (usually for their consumption), but the use that these groups made of the materials that they could recover is also studied.



Micropaleontology: branch of paleontology that studies the remains of small animals, which are important in a climatic and evolutionary level, since these small beings (mice, shrews, amphibians, reptiles, bats, etc.) evolve quickly. In archaeology, micropaleontology allows us to learn the approximate chronology, the environment of the site, the climate, and other information.

Paleobotany: discipline that studies the plants that have existed from their remains (seeds, pollen, microscopic remains or phytoliths, carbons, etc.). For prehistoric archeology, the paleobotanical studies rely of the conservation of these small vegetal remains, which does not happen often, especially in the oldest sites of the Lower Paleolithic. The information it provides is of great value and complements the studies of micropaleontology in the reconstruction of the environment.

Taphonomy: the study of the processes of formation of a site. It relies on other disciplines such as ecology, geochemistry or sedimentology. It is important to understand the state of conservation of the dispersal of fossils and tools in a site, and if water, animals or humans have subsequently altered the dispersal of elements such as bones, tools, etc.



GLOSSARY

Scientific evidence: scientific facts provided by research. The evidence can be disputed, but not the fact (e.g. an animal bone with a nailed flint fragment is found. The way in which the fragment was nailed can be disputed, but not the fact that it is nailed).

This expression has been misused, and it is often used interpretatively. Using the example of the bone, some would say that they already had bows and arrows, but that there were different ways of shooting projectiles, so we cannot know which was used in this instance.

Scientific hypothesis: an acceptable proposal, which was formulated after collecting data, that is meant to answer a problem scientifically. Once the hypothesis is refuted (scientifically proven), it stops being a hypothesis and becomes a verified statement.

Scientific theory: set of scientific ideas and laws that try to explain a phenomenon or fact. The strength of a theory is related to the quantity of phenomena that it can explain, and its ability to predict these phenomena before they happen. Scientists use theories as foundations for scientific knowledge.

Site: the place where prehistoric fossil remains, or tools can be found. We suspect that humans have lived in all types of places, but we often find them in caves, since the archeological levels are better preserved, and it is easier to locate a cave than an open-air site. Still, it is believed that, at the beginning, humans did not live in caves.

Quaternary: geological period after the Tertiary. For most researchers, it began 2.6 million years ago until nowadays. It is characterized by the cyclicity in the alternation of warmer periods and cold or very cold ones. The glacial maximum occurred about 18,000 years ago.

Hominins: all bipedal primates. The first ones to be considered as such are the Australopithecus, our most direct ancestors. From what we know so far, the genus Homo appeared around 2.8 ma.

Australopithecus: the first hominins that existed (from what we know so far). It is the *Australopithecine* tribe, ancestors of the first humans, although they cannot be included in the genus Homo.

Core: block of raw material from which we extract flakes. Many types of rocks can be used to extract flakes, although some materials are better suited for reduction, particularly flint and obsidian, but also quartzite, basalt and other types of rock.

Flake: flakes are produced by striking a core with a hammerstone (stone hammer used for reduction). The goal is to create sharp-edged fragments from the rock to use them as knives or to create another type of tool.

Blade: officially, a blade is a flake twice as long as it is wide. Blades are long and narrow flakes that have parallel sides. Although they can be found in sites from the Lower and Middle Paleolithic, they will be systematically sought after during the Upper Paleolithic.

Grave goods: in archeology, grave goods are the items placed in a burial as an offering or to accompany the deceased.

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