



# DINOSAURS UNDER **X-Ray**

A GAME OF OBSERVATION WITH MAGIC UV TORCH



This kit will let you discover the world of the dinosaurs in an exciting trip back in time, like a real palaeontologist.

You have different tools at your disposal:

- The information you will find in the pages of this booklet
- The scenes to reconstruct, divided by geologic period
- Cutouts of some of the most famous dinosaurs, and cards with missions to compare them and analyse their skeletons using the UV torch
- Dinosaur cards to let you discover the names, characteristics and habits of 40 dinosaurs from the Triassic, Jurassic and Cretaceous periods.

What's more, you can also challenge your friends to an easy and fun game with the dinosaur cards! Find out how to play by reading the rules on page 7.

### Skills

This game helps develop the following skills:

- Knowledge and classification of dinosaurs
- Analysing dinosaur skeletons
- Learning about the evolution of the dinosaurs and their extinction
- Drawing a timeline of the era of the dinosaurs
- Following rules.



### Intelligences involved

Intelligence is the ability to adapt thinking to changing circumstances in order to attain specific objectives.

To help achieve independence, this didactic tool promotes a predominant intelligence, which in this case is the "naturalistic" one. Nevertheless, it is clear that achieving expertise in one area actually involves and activates other intelligences.



## The era of the dinosaurs

Dinosaurs ruled the earth for around **186 million years**, in a long period called the Mesozoic era. The **Mesozoic era** can be divided into three parts: the **Triassic**, from 251 to 200 million years ago; the **Jurassic**, from 200 to 145 million years ago; and the **Cretaceous**, from 145 to 65 million years ago, when the dinosaurs died out.



During the **Triassic**, the first period of the Mesozoic, the oldest species of dinosaurs appeared. In this period, the earth was very different from today: the continents were joined together in a large land mass known as **Pangaea**, which split up only many millions of years later. At the end of the Triassic, volcanic activity also increased, making the climate very hot and causing the extinction of many living species.

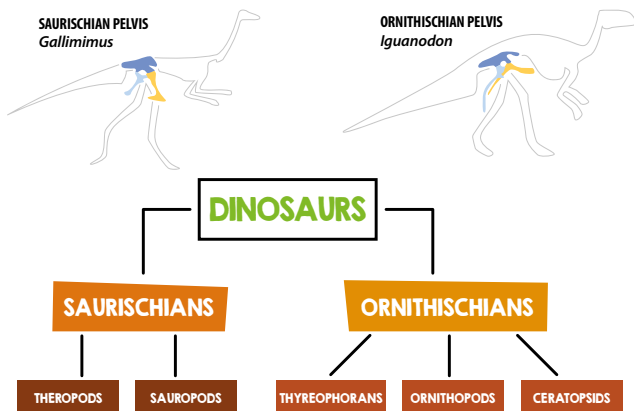
*Observe the Triassic scene. You can use the UV torch to find the names of some of the dinosaurs which lived in this period.*

During the course of the **Jurassic**, the earth's climate became a bit cooler and more humid. This allowed both the growth and spread of plants and trees and the development of numerous species of dinosaurs. In this period the **Sauropod** dinosaurs – with their characteristic very long tails and necks – emerged. Their long necks allowed these dinosaurs to eat the leaves of the highest trees. This period also saw the appearance of another family of dinosaurs: the **Thyreophorans**. This was a group of herbivorous dinosaurs with bodies covered with sharp, bony plates with which to defend themselves from predators.

*Did any dinosaurs have bony plates on their back? Observe the scene and use the UV torch to discover their names.*

The **Cretaceous** lasted around 80 million years, during which the earth took on a very different appearance to previous periods. Over the course of the Cretaceous, the dinosaurs evolved into all forms and sizes. Thanks to studies carried out on the fossilised skeletons of dinosaurs, it is possible to group these fascinating creatures into two broad families: **Saurischians** and **Ornithischians**.

The Saurischian dinosaurs are so called because their pelvic bones are similar to those of reptiles. The Ornithischians, on the other hand, have pelvises similar to those of birds. The Saurischians and Ornithischians can also be grouped into another five subfamilies. One of these is the **Theropod** subfamily, a group of predatory dinosaurs that walked on two legs. They were carnivorous dinosaurs, with strong jaws and very sharp teeth.



During the Cretaceous period, other groups of Ornithischian dinosaurs evolved: the **Ornithopodan** and the **Ceratopsian**. The first were a very extensive group of small herbivorous Ornithischian dinosaurs. They had short, sharp teeth, and used their bills to graze. **Ceratopsids** were also herbivorous, but were large in size, and had horns on their foreheads.

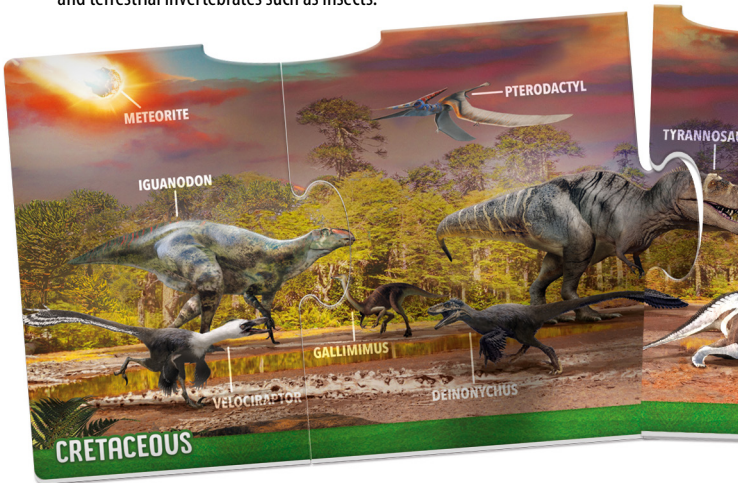
*Observe the Cretaceous scene and use the UV torch to discover the names of the dinosaurs. There is also an example of a Ceratopsid. What is it called? Use the UV torch to see its skeleton as well.*

While the dinosaurs ruled the land, the **Pterosaurs** were the masters of the sky! These flying reptiles had lightweight bones like those of birds, and a very small body, despite which some of them had wingspans of up to 11 metres. Marine reptiles also lived in the same period – the **Plesiosaurs** and **Ichthyosaurs**, which inhabited the earth's oceans and seas alongside fish and molluscs such as **Ammonites**.

*Observe the Jurassic scene and discover the aquatic creatures with the UV torch. Then look at the Cretaceous scene and find out what the flying reptile is called!*

## The great extinction

The dinosaurs dominated our planet for a very long time. But 65 million years ago, an enormous meteorite struck the earth, causing these creatures to die out. The enormous impact of the meteorite on the earth's surface caused a series of earthquakes, tsunamis and volcanic eruptions, and a giant dust cloud rose up, blocking out the sun for a long time. This terrible catastrophe caused a mass extinction, which wiped out over 75% of the species which existed at the time, among them almost all the dinosaurs and many marine invertebrates. Among the survivors of this disastrous event were fish, amphibians, some reptiles (crocodilians, turtles and the "avian" dinosaurs, i.e. the birds), some small mammals, and terrestrial invertebrates such as insects.



## The Mission Cards

Now that you know more about the dinosaurs, you can start comparing some species by observing the dinosaur cutouts and analysing their skeletons with the UV torch. Start with Mission Card No. 1 and read the instructions.

Place the dinosaur cutouts indicated on the cards in the slots in the corresponding scene cards, and begin to observe the skeletons. Continue with the other mission cards up to no. 17. You can use mission cards no. 18-19-20 to inspect some additional details of the scenes which you have not yet analysed using the torch.



## The Dinosaur Cards

If you want to become a real expert on dinosaurs, you can read all the information given on the forty cards, which can be grouped by period and by colour.

For each species of dinosaur, they will tell you: the period when it lived, its length, its weight, its diet, and its classification.

## Go Fish (for dinosaurs!) (2-4 players)

Shuffle the dinosaur cards and deal five cards to each player. The remaining cards are kept in a deck face down in the centre of the table. The aim of the game is to form hands of four dinosaurs from the same period. There are five periods: the Triassic, Early-mid Jurassic, Late Jurassic, Early Cretaceous and Late Cretaceous, and they are listed on the cards with the colour of the corresponding period.

There are eight dinosaurs from each period. It is therefore possible to form two four-of-a-kind hands for each period (with two players remove one hand, with three players it is only necessary to remove one hand). The youngest player starts, and play proceeds clockwise. During their turn, a player must ask a player of their choice whether they have a given card (for example: "Do you have any Triassic cards", or "Do you have any early-mid Jurassic cards"), as long as they hold at least one card from that period. If the opponent does hold the requested card, they have to give it to the requesting player, who can then continue their turn and ask another player of their choice for a card; they can request up to a maximum of three cards, then they draw one card from the deck and the turn moves to the next player. If the opponent does NOT have the requested card, the requesting player draws a card from the deck and the turn moves on to the next player (if there are no more cards in the deck, the turn simply moves on). When a player has managed to form a hand of at least four dinosaur cards of the same period, they declare it and place these cards face down in front of themselves. The game continues until all possible hands have been formed. The player with the most wins. In the event of a tie, the player who holds the card of the heaviest dinosaur (or alternatively, the player with the card of the longest dinosaur) wins.





## **Multiple Intelligences Games**

Texts written in collaboration with Elena Gatti

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