EVERYTHING IS INTERCONNECTED

OBJECTIVES	• Understand that species are interrelated; • Understand that biodiversity enables the maintenance of balances on both local and global scales; • Discovering the threats to biodiversity; • Understand how the loss of biodiversity also endangers our survival.
THEME	Trophic network and biodiversity loss: causes and consequences of altering local and global balances
WHERE?	In the classroom (moving the desks to the walls), or rather in the atrium or courtyard
HOW LONG?	1 hours
TARGET	8-10 years
WHAT DO I NEED?	• Ball of wool or string • Cards with animals and plants (Annex 1) • Threat Cards (Annex 2) • Inflatable globe or balloon

HOW TO DO IT

Our world is like a network made up of many threads, all interconnected. For a balanced ecosystem, the interaction between different components is of fundamental importance. Living organisms, i.e. the animal and plant species that live in a habitat, are all interconnected by a system of food relationships that forms a trophic network. For example, plants need sunlight, rain and nutrient-rich soil. Insects such as bees and ants, which derive their nourishment from plants, help them produce seeds by carrying pollen from flower to flower. Animals such as deer, rabbits and grasshoppers also eat plants.

Their droppings return nutrients to the soil, making it a healthy place for plants to grow. But if there were too many herbivorous, they would eat too much plants! Fortunately, predators such as snakes, foxes, jaguars and even some insects keep the number of herbivores in check. In this delicate balance, the disruption of one connection can cause the collapse of the entire network.

Through this activity, you can explain to your students that all living things in an ecosystem have a connection with each other and that they depend on each other. The interaction is represented with a network, which the class creates during the game.

Preparation:

Before proposing the activity in class, print out and cut out the cards with the living organisms of the forest (annex 1). If necessary, add or remove items according to the number of pupils in your class. Make a small hole in each picture and thread a piece of string through it, approximately half a metre long, tying it at the end, so that the tile becomes a kind of necklace and can be worn by the children.

Running of the game:

Have the children stand in a circle. Randomly give each boy or girl a card with a picture of a living organism (fungus, plant or animal) that lives in the forest and tell them to wear it like a necklace, so that everyone can see the picture on the card. Choose which boy or girl to start the game with, choosing among those who have received a card with a maker. The one who starts holds the end of the ball of yarn in his or her hand and describes what is depicted on his or her card.

At this point the boy or girl throws the ball of yarn (holding the head in his or her hand) to a partner or companion who has a card that depends on his or her own, answering the question 'who can eat me?' or 'who can I eat?'.

The activity continues in this way, with each child throwing the ball of yarn while holding it between themselves and the previous child, until everyone has been called upon and a net has been formed with the rope. If you have chosen a producer as the starting tile, the end of the net will probably come with the tile representing the man.

Once the net is formed, point out to the children how all the organisms are intertwined and how in some cases each of them can relate to more than one partner or companion.

At this point, place the inflatable globe (or the balloon representing the Earth) on the net and reflect with the children on how the net (and thus biodiversity) sustains our planet.

Draw one of the 'threat cards' (annex 2) and reflect on its consequence on your net: when some species becomes extinct, the boy or girl with the corresponding card lets go of the string.

As you add more threats, it will become clear that the network can no longer sustain the Earth.

USEFUL TIP

The activity can also be customised to other ecosystems depending on the geographic location of your school (e.g. proximity to the sea or a lake) by modifying the living organism tiles accordingly.

WHAT SCIENCE SAYS

Biodiversity is threatened by the disruption that human activity causes to ecosystems globally. There are many ways in which humans endanger biodiversity: pollution, deforestation and loss of natural habitats, over-exploitation of land, intensive and uncontrolled fishing, and the introduction of invasive species. Among the greatest threats are the consequences of global warming. Damaging even just one of the knots in the complex

web of balances on which life on Earth is based, means compromising others, causing not only damage to ecosystems, but also to the health and survival of humans.

VERSION FOR 11-13 YEARS OLD STUDENTS

TARGET	11-13 years
WHAT DO I NEED?	• Ball of wool or string • Cards with animals and plants (Annex 1) • Threat Cards (Annex 2) • Gaia Matrix (Annex 3) • Vicious circle elements (Annex 4) • Inflatable globe or balloon

HOW TO DO IT

For secondary school students, the trophic net building phase can be done more quickly so that they have more time to expand the final part.

After drawing the 'threat cards' and noticing how after a while the net can no longer support the Earth balloon, reflect on what the consequences of the loss of biodiversity might be for humans.

Print out or project the attached image of the Gaia matrix and comment on it with the boys and girls.

Try to construct together an example of a possible vicious circle. You can use the elements in annex 4, which take the life of a farmer in a poor country as an example, and link them together.

Cut out the cards and link the cards describing the situation according to a cause-effect criterion, then match each card with the corresponding problem.

WHAT SCIENCE SAYS

To understand the significance of the effects of climate change in terms of justice, equity, socio-economic development and gender equality, an approach is needed that looks not only at individual phenomena, but at the complex relationships between them. The Gaia matrix highlights the dynamic relationships between four factors: environment, development, peace and stability, and human and social rights. The so-called negative 'cumulative cycle' linking these aspects is quite simple to understand, because we often see it before our eyes: where war breaks out, development stops, human rights decline and the environment also inevitably ends up being degraded. Virtuous or vicious circles can be established between these elements.

ANNEX 1 - CARDS WITH ANIMALS AND PLANTS

















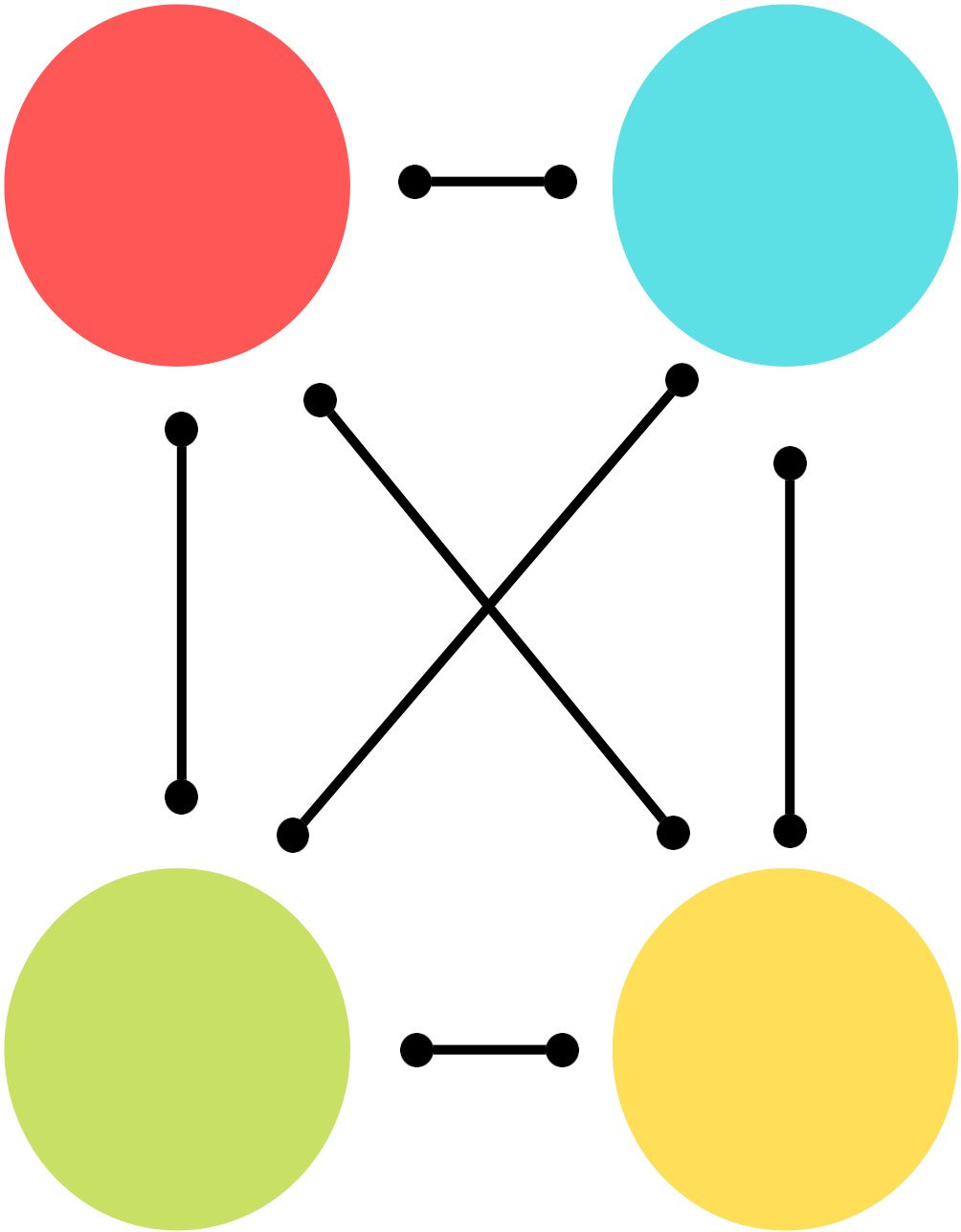


ANNEX 2 – THREATS CARDS

SOIL POLLUTION **(e.g. threat to animals that living in the soil, fungi and plants)**	**FELLING OF TREES** **(e.g. threat to animals that use them as refuges)**
INTRODUCTION OF INVASIVE SPECIES **(e.g. grey squirrel puts the the survival of the red squirrel)**	**FIRE** **(e.g. risk to trees and vegetation)**
USE OF PESTICIDES **(e.g. endangering insects pollinators)**	**LONG PERIOD OF DROUGHT**
RISING TEMPERATURES	**CONSTRUCTION OF A MOTORWAY** **(e.g. danger to animals that moving: deer, wolves, wild boars...)**

ANNEX 3 – GAIA MATRIX

- In red globe: PACE AND STABILITY
- In azure globe: HUMANS AND SOCIAL RIGHTS
- In the light-yellow globe: ENVIRONMENT
- In the darker yellow globe: DEVELOPMENT



ANNEX 4 – VICIOUS CIRCLE ELEMENTS

Sudden drought causes crop loss	ENVIRONMENTL PROBLEM
The farmer does not earn money from the sale of the produce of the land	ECONOMIC OR DEVELOPMENT ISSUE
The farmer cannot afford to educate his children	SOCIAL PROBLEM
Sudden impoverishment can undermine social cohesion, push people to migrate and facilitate conflicts	STABILITY PROBLEM
The environment is relegated to the background and overexploited without care, leading to increasing degradation of natural resources.	ENVIRONMENTAL PROBLEM