



### MODULE 3

## 'Will I survive?' Extinction Game

### Introduction

This role-play game introduces the concept of plant species extinction, and covers the causes and the different levels of risk that plants could face.

Each child plays the part of a plant and is given a set of the available resource cards (water, light, nutrients). Children are then assigned the number of sites where they can grow.

During the game a narrator tells a story in which many events happen. Some of these events are natural; others are brought about by human action. As a consequence, the resources and the number of sites available vary from plant species to species, and in general decrease. Those species with very specific or high resource requirement will often find that they are not able to survive and eventually go extinct. At the end of the game the students are asked to discuss the likely causes of extinction and the reasons why some species become extinct while others survive. This game can be played either indoors or outdoors, but outdoors is recommended.

The game lasts approximately 2 hours.

### (I) Resources

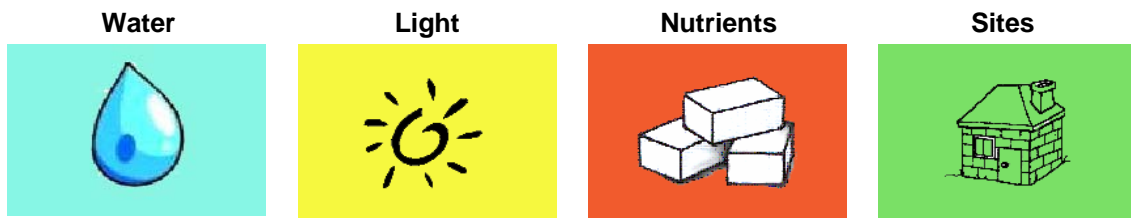
- 25 plant character cards (see list of plants in table 1 below) in which each plant and its requirements are briefly described (separate file)
- 3 types of resource card (water, light, nutrients) and site cards (separate file)
- 4 containers for holding / collecting excess resource and site cards.
- Story
- Outcome recording sheets

All the materials listed are here in Media Gallery Conservation M3.

## (II) Pre-preparation for game

### 1. Resource cards

- You will need to download the resource cards, site cards and plant character cards from the Media Gallery and photocopy them for the children to use
- The list of plant species for the character cards is shown in table 2 below. If there are more children in the class than the number of plant species, duplicate a few of the commoner plant species character cards in the list
- You will find that there are multiple symbol sheets that you can photocopy for each type of resource (see Media Gallery Conservation M3 Resource cards). We recommend that you print out the water symbols on blue paper, light on yellow, nutrients in red and sites in green.



- The number of resource cards (water, nutrients and light) needed per child is shown in table 1 below
- For the site cards, each student receives the number of sites specified on their character card.
- For ease, the photocopyable site sheets are of 2 types; one with groups of 10 sites blocked together and one with single sites
- If you laminate the cards as you go, they can be re-used later.
- Have 4 containers ready; one each for water, light, nutrient and site cards, as during the game children will be giving up cards / gaining extra cards according to events in the story. You need to make up extra resource and site cards and have them ready in their respective containers.

**Table 1: Resource cards required per child for game**

Number of participants	Resource cards (water (w), light (l), nutrients (n))							
	to pre-assign to each child (total cards 'X' to each player after shuffling them)		to disperse on the ground				Total cards needed	
			high extinction		low extinction			
	for each resource type w, l, n	total	for each resource type w, l, n	total	for each resource type w, l, n	total	high extinction	low extinction
	1	2	6	3	9	4	12	15
2	4	12	6	18	8	24	30	36
3	6	18	9	27	12	36	45	54
4	8	24	12	36	16	48	60	72
5	10	30	15	45	20	60	75	90
6	12	36	18	54	24	72	90	108
7	14	42	21	63	28	84	105	126
8	16	48	24	72	32	96	120	144
9	18	54	27	81	36	108	135	162
<b>10</b>	<b>20</b>	<b>60</b>	<b>30</b>	<b>90</b>	<b>40</b>	<b>120</b>	<b>150</b>	<b>180</b>
11	22	66	33	99	44	132	165	198
12	24	72	36	108	48	144	180	216
13	26	78	39	117	52	156	195	234
14	28	84	42	126	56	168	210	252
<b>15</b>	<b>30</b>	<b>90</b>	<b>45</b>	<b>135</b>	<b>60</b>	<b>180</b>	<b>225</b>	<b>270</b>
16	32	96	48	144	64	192	240	288
17	34	102	51	153	68	204	255	306
18	36	108	54	162	72	216	270	324
19	38	114	57	171	76	228	285	342
<b>20</b>	<b>40</b>	<b>120</b>	<b>60</b>	<b>180</b>	<b>80</b>	<b>240</b>	<b>300</b>	<b>360</b>
21	42	126	63	189	84	252	315	378
22	44	132	66	198	88	264	330	396
23	46	138	69	207	92	276	345	414
24	48	144	72	216	96	288	360	432
<b>25</b>	<b>50</b>	<b>150</b>	<b>75</b>	<b>225</b>	<b>100</b>	<b>300</b>	<b>375</b>	<b>450</b>
26	52	156	78	234	104	312	390	468
27	54	162	81	243	108	324	405	486
28	56	168	84	252	112	336	420	504
29	58	174	87	261	116	348	435	522
<b>30</b>	<b>60</b>	<b>180</b>	<b>90</b>	<b>270</b>	<b>120</b>	<b>360</b>	<b>450</b>	<b>540</b>

**Site cards**

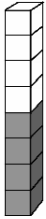
NB that the amount of sites each plant occupies is written on each character card. There are multiple site cards available (each having 10 sites drawn on) to use for plants which have a wider distribution e.g. if a plant can occupy 21 sites - give out 1 of the x10 site cards plus 11 single site cards. This will allow children to 'give up' individual site cards when required.

## 2. Plant cards:

The 25 plant character cards listed in table 2 are available in the Media Gallery Conservation M3 Character cards. Print the cards in colour and fold paper to get a card with face and back (A4 to A5) and laminate for re-use.

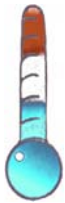
### 2.1 Explanation of symbols on plant character card:

#### Water, nutrients:



The number of marked cubes in the block diagram represents the number of cards required for that particular resource.

#### Temperature:



+35°C  
+22°

Each card shows the temperature that each plant can tolerate up to a specific maximum. This information will be needed for a particular part of the story.

### 2.2 Distribution of species in the European vegetation (Alpine species)

The table lists the 25 plants/characters (below). The minimum number of growing factors every plant needs to survive is also shown. The last column illustrates the maximum temperature that each species is able to tolerate. All of these parameters are described on the character cards.

Three categories have been chosen to represent the distribution of the species in a typical European region:

**Common plants 60 %** of which:

70 % herbaceous plants

20 % shrubs

10 % trees

**Invasive plants 10%**

**Endangered plants 30%** of which:

25% narrowly distributed plants

25% plants medium size distribution area

50% widely distributed plants

### **2.3 How to play the game with less than 25 children**

If only a few children play this game, it is important that the character cards are chosen according to the following criteria:

The plants marked with 'R' should be considered to be a 'Reserve' and should not be used with smaller classes; this will maintain a realistic proportion of common/rare species. For even smaller classes the plants marked with 'SR' should be skipped.

Table 2: Plant character cards



		Latin name (Common name)	Water	N° Growing sites	Light	Mineral nutrients	Actual T °C	T max
<b>Common 60%</b>								
C1	Herbs (70%)	<i>Papaver rhoeas</i> (Poppy)	1	20	3	2	+30	35
C2		<i>Leucanthemum vulgare</i> (Ox-eye daisy)	1	20	4	1	+28	35
C3		<i>Silene vulgaris</i> (Bladder campion)	2	20	2	3	+28	35
C4	SR	<i>Hepatica nobilis</i> (Liverleaf)	3	20	1	2	+28	35
C5	SR	<i>Helleborus niger</i> (Christmas rose)	2	20	1	1	+30	35
C6		<i>Cyclamen purpurascens</i> (Cyclamen)	3	20	4	2	+28	35
C7	R	<i>Achillea millefolium</i> (Yarrow)	2	20	3	1	+30	35
C8	R	<i>Salvia pratensis</i> (Meadow clary)	3	20	5	2	+30	35
C9	R	<i>Bellis perennis</i> (Daisy)	1	20	5	3	+28	35
C10	Shrubs 20%	<i>Cornus mas</i> (Cornelian cherry)	1	20	2	2	+28	35
C11		<i>Corylus avellana</i> (Hazel)	1	20	1	1	+28	35
C12	R	<i>Crataegus monogyna</i> (Hawthorn)	1	20	1	2	+26	35
C13	Trees 10%	<i>Fagus sylvatica</i> (European beech)	1	20	3	1	+26	35
C14	SR	<i>Picea abies</i> (Norway spruce)	1	20	4	2	+26	35
<b>Invasive 10%</b>								
I1	R	<i>Solidago gigantea</i> (Giant Goldenrod)	1	5	3	1	+28	35
I2		<i>Buddleia davidii</i> (Butterfly bush)	1	5	2	1	+26	35
I3		<i>Robinia pseudacacia</i> (False acacia)	1	5	3	1	+30	35
<b>Endangered 30%:</b>								
<i>Nigritella buschmanniae</i>								
E1	Endemics 25%	(Dolomite orchid)	4	3	4	4	+21	23
E2	SR	<i>Daphne reichsteinii</i> (Lake Garda laurel)	3	3	3	5	+24	28
E3	Intermediate 25%	<i>Centaurea alpina</i> (Yellow knapweed)	3	4	4	6	+21	27
E4		<i>Dracocephalum austriacum</i> (Austrian Dragon's-head)	3	3	5	4	+22	28
E5	Widely distributed 50% R	<i>Limodorum abortivum</i> (Limodore)	7	5	1	5	+26	30
E6		<i>Nuphar luteum</i> (Yellow water lily)	8	3	5	6	+24	30
E7	SR	<i>Drosera longifolia</i> (Great sundew)	8	4	4	4	+25	30
E8		<i>Epipactis palustris</i> (Marsh Helleborine)	7	6	3	5	+27	30
<b>Totals N° of cards</b>			69	326	76	67		

### **(III) Starting the Game**

#### **1. Introduction**

The game is briefly explained. Plant requirements for survival and the concept of extinction are discussed.

#### **2. Handing out character cards**

Every child should be given his/her own plant character card and plays the role of the plant described in it.

#### **3. Reading character cards**

Each child should read their own card carefully to understand which growing factors are necessary for the survival of their plant species.

#### **4. Distribution of 1st set of resource cards**

For each child the teacher should first have 2 of each of the resource cards (light, water and nutrient cards – see photocopiable sheets). These cards are shuffled and 6 cards are distributed to each student. This means that children will have a random distribution of resources, e.g. one child might have 2 water and 4 light cards, and another might have 1 water, 3 light and 2 nutrient cards.

#### **5. Collection of extra resource cards**

The teacher should have ready a further 3 or 4 resource cards per child (3 cards per child will result in higher extinctions, 4 per child will result in less extinctions during the game – make your own choice). These again should be shuffled and distributed randomly on the ground. Give the children a few seconds (e.g. 30 seconds) to hunt for and collect any resource cards they need for survival. This helps to ensure that the growing factor cards are roughly equally distributed and that each character starts to play with more or less similar resources.

#### **6. Assessing your resources**

Before the game begins each student should double check that their plant can survive with all the resources that they have collected or been given. Please note that some children may not have enough to survive even at the beginning of the game. Explain that some plants require such demanding conditions that they die easily. Explain too that they may look as though they are extinct, however their seeds may have survived and if they wait until they can collect more nutrients, water and light (allocated during the story) these seeds may grow and they will be back in the game.

#### **7. Site cards**

Site cards are then distributed according to what is on each individual character card i.e. if the plant can grow on 10 sites, the child should receive 10 sites (see photocopiable sheets).

## The story begins!

**Storyboard section (30 min):** Now the action begins! A narrator, the teacher or one of the children, should read out the story (see below). A series of both man-made and natural events are described. To enhance the activity, large pictures of the events could be used as props and scattered along a story trail that the children follow as they play. Each event impacts on the growing factor and site availability of every character. Sites and resources might increase if the event, e.g. a new protected area, has a positive impact on plant life, or decrease if the event is negative, e.g. new ski-slope, new shopping centre. Depending on what happens – each character will either receive extra cards or lose cards. These can be collected from, or put back into, the containers with 'extra' cards that the teacher prepared earlier.

### The role-play story - 'Will I survive?'

*Our story begins in a quiet and peaceful land in the mountains of northern Italy, rich in forests, streams, lakes and meadows. The area is full of flowers, animals, insects and wildlife in general. People are happy and lead a quiet and contented life, enjoying the countryside and playing in woodlands and grasslands.*

*Usually the area is naturally rich in freshwater; many springs provide a good water supply to the people living there. However, over the last year, rain has been very scarce and during the winter there has been no snow at all. All the reservoirs have a very low level and the springs are all supplying reduced amounts of water. These are all signals of a widespread drought in the area.*

#### **What happens to the plants?**

- **less water is available**
- **less nutrients are available because without water they are not available for uptake by the roots**
  - every plant loses 1 water card
  - every plant loses 1 nutrient card

*Many people used to be farmers, growing cereals and vegetables and keeping herds of cows, sheep and goats. However in recent years, less young people are willing to take up a career in farming. Consequently, lots of grasslands are no longer grazed and many fields are abandoned. These areas are being replaced by shrubs and young trees.*



### ***What happens to the plants?***

- **nutrients decrease because the soil is not being fertilised by the cattle.**
- **grasslands and fields are slowly replaced by shrubs and trees.**
  - every plant loses 2 nutrient cards
  - every plant loses 4 light cards

*The population is rising and new houses are being built to accommodate new families. Additional electricity is needed to light and warm these houses. A new power plant is necessary and a new dam is built to provide energy for the power plant.*

### ***What happens to the plants?***

- **some areas are flooded and others suffer a lower water availability**
  - every plant loses 1 water card
  - **the following plants lose 1 site:** Yarrow, Meadow clary, Hazel, Hawthorn, Norway spruce, Dolomite orchid, Poppy, Oxeye daisy, Bladder campion, Daisy, Lake Garda laurel and Austrian dragon's head
  - + **the following plants gain 5 sites:** Giant goldenrod, Butterfly bush, False acacia

*Major developments are being built all over the land, the population is rising and new roads, shopping centres and new facilities such as shops, restaurants, hotels and ski slopes are under construction. Large portions of the land (meadows and forests) are used for this purpose.*

### ***What happens to the plants?***

- **Concrete and tarmac rob space for many plants to grow.**
- **Some plants colonize new sites that have been made available after clearing the forest**
- **More light and open areas to the side of the building become available**
  - + every plant gains 2 light cards
  - every plant loses 2 sites
  - + **except for:** Giant goldenrod, Butterfly bush **that gain 4 sites**

*The intensive building work and the unsustainable rate of land use has alarmed many people and a newly formed action group of residents have urged the local government to create new areas to protect the environment and conserve the rare and vulnerable plants and animals. A new reserve is created in a special place, where botanists recently discovered a new site for Lake Garda laurel.*

### ***What happens to the plants?***

- **New protection is in place and many plants are now better off**  
+ gain of 1 site for: Christmas rose, Cyclamen, Dolomite orchid, Lake Garda laurel, limodore, Austrian dragon's head

*Suddenly a column of smoke rises in the distance ...a fire is burning fast in the valley.*

### ***What happens to plants?***

- **Many plants die out but new nutrients are available from the ashes of the fire**  
+ every plant gains 2 nutrient cubes  
- every plant loses 1 drop of water  
- every plant loses 1 site

*Our story is now drawing to an end! Let us think about the key events that have affected the land so far! It was mainly human activities and developments that cause most of the land changes and therefore the problems for the plants and animals. What events can you remember? What kind of effects do these events create in the habitat?*

*Is the habitat modified? How? These same events are happening all over the world and they have a global effect! The temperature is rising everywhere, and may rise as much as by 4°C. Now check the maximum temperature on your character card, this is your limit for survival. Can you still live with this rise in temperature?*

STORY ENDS

## **9. Conclusions and outcome**

At the end of the story each character checks how many resource cards they have lost or gained. They need to assess if their plant can still survive with the remaining cards they have and in how many sites. The likely outcome is that the more demanding species and those that occur only in few sites will go extinct.

## **10. Discussion**

Together with the teacher, the class discusses:

- what happened to the different species?  
The class should fill in the outcome sheet at the end of the discussion. One sheet can be used for the whole class.
- the reasons that caused the extinction of some of the species.
- the significance of extinction of different plants. Common plants that go extinct locally, but which exist in other parts of the country, or in other countries, will not cause a major problem. However, if a plant that only grows in one area goes extinct, then it gone forever.