



Sheet 3 :

The movement of species

A) DESCRIPTION OF THE ANIMATION

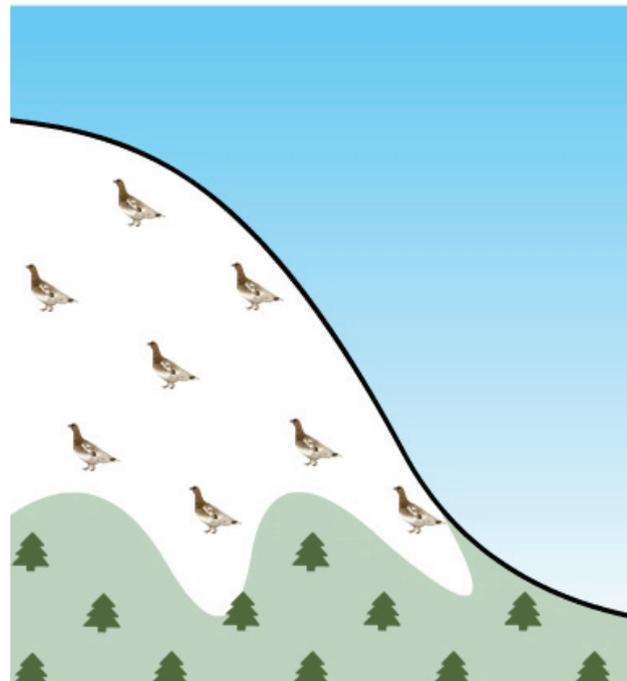
This animation shows that over the course of the Earth's climate's history, species have often had to move in order to benefit from the types of living conditions that suited them. It also demonstrates how, for various reasons, it is impossible for some species to continue being displaced: either they are at the maximum extent of their distribution area (such as the polar bear in the Arctic or the ptarmigan in the mountains), or the rate of change has been too rapid and the species in question have been unable to adjust at the same rate. Or again, in the case of the Iberian lynx, the species has already been weakened by other threats.



PTARMIGAN



THE PYRENEES THE ALPS



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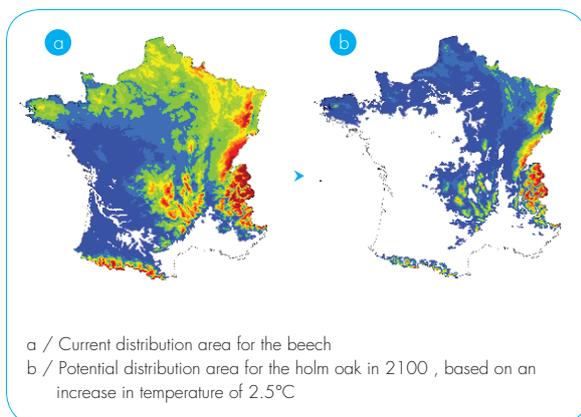
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B) LET'S TAKE A CLOSER LOOK...

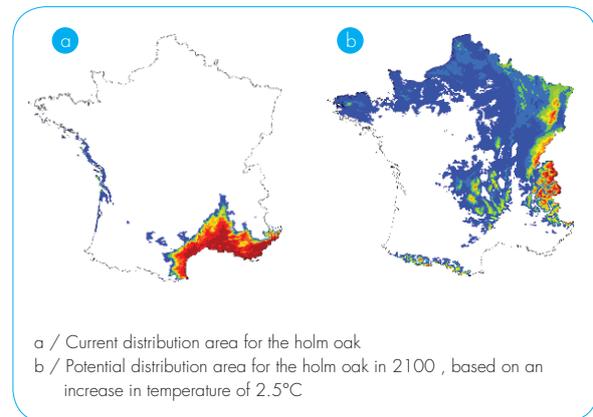
1/ CHOOSING TOMORROW'S WOODLAND VEGETATION TODAY

Some species will not disappear. Instead, they will move habitat because they are unable to sustain life in the type of climate our region will experience in the future. When the usual cycle of temperatures or rainfall changes, the natural areas of distribution for both plant and animal species also change. Researchers have used a scenario in which the temperature increases by 2.5°C to estimate the potential areas of distribution for certain species, based on the projected climate parameters that may exist in 2100.

In Belgium, the potential distribution area for two of our main plant species, the spruce and the beech, could shrink significantly. This is also the case in France as the result of hotter temperatures in summer, a reduction in rainfall and a lack of cold weather in winter which is required for the beech seeds to germinate properly.



By contrast, southern species will be favoured by climate warming. This is the case for the cork and the holm oak, the quintessential trees of the Mediterranean region.



By 2100, the area of distribution for this tree could stretch up beyond the Loire. The example of the holm oak can be applied to the vast majority of Mediterranean species, such as the olive tree, the Aleppo pine, the umbrella pine, the cypress, etc.

While this scenario may reflect the climate in 2100, these results should not be seen as a firm forecast of our forests, but merely as one of the possible scenarios. This is because there is still a great deal of uncertainty regarding the way forest vegetation is likely to behave. To what extent, for example, will the species already here be able to adapt to competition from new species and the new micro-organisms that cause diseases? Most especially, how well will various species be able to colonise new climate niches and survive?

2/ KEEPING PACE WITH CHANGE...

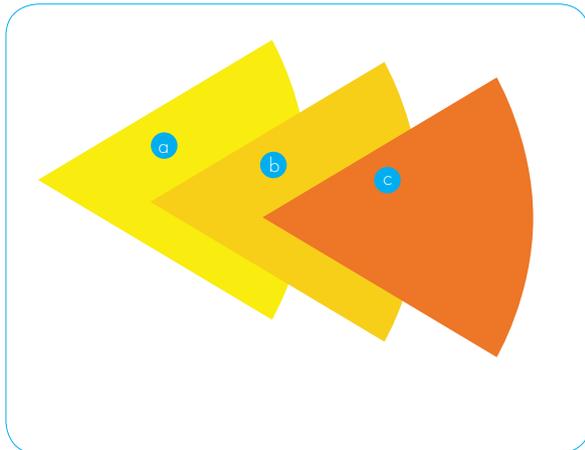
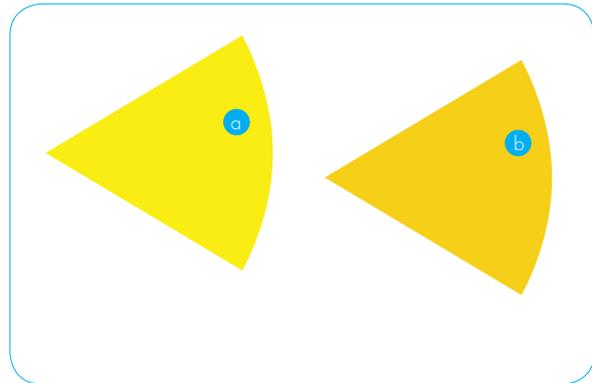
Plants have their roots in the soil, of course. If conditions cease to be favourable for their development, plants will only be able to rely on the dispersal of their seeds as a way of moving to new areas where they can survive. For instance, we know that it took

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2 000 years for oaks to flourish again from the south to the north in France during the last period of post-Ice Age warming 10 000 years ago.

If the warming process takes place sufficiently slowly to enable the species to grow to sexual maturity before climate change overwhelms them, plants on the edge of their area of distribution will then have the time to produce seeds that can germinate before the area they are living in ceases to provide the right conditions for growth. This would allow the population to survive.



By contrast, the rate at which climate is warming now may simply be too rapid for certain types of plant to keep pace with the change. The speed at which a species is able to migrate may be slower for all sorts of reasons. For example, if the plant needs a long time to reach sexual maturity, the area where it grows may become unsuitable for germination before it can produce any seeds. Or perhaps the seeds are heavy (like acorns) and are likely not to be dispersed as far. As a result, this particular species is likely to die out simply because it is unable to move quickly enough.

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C) GROUP ACTIVITY TO BE CARRIED OUT IN CLASS:

MIGRATING SEEDS

Aims

- To learn how to observe certain types of seed and visualise the way in which they travel.
- To think about the consequences that climate change may have on plants and vegetation.

Equipment

- Photocopies of the table showing seeds (see box below)
- Or
- Gather all of the seeds collected during an outing close to school.

Timing : 20 minutes

Process

Preparation

- Hand out the photocopies and/or collect seeds during an organised walk

Step 1

- Ask the pupils to observe the seeds and think about how they might migrate from where they fall, based on their shape. Ask them to classify the seeds by "method of movement": seeds carried by the wind, water, animals, seeds that roll, etc.

Step 2

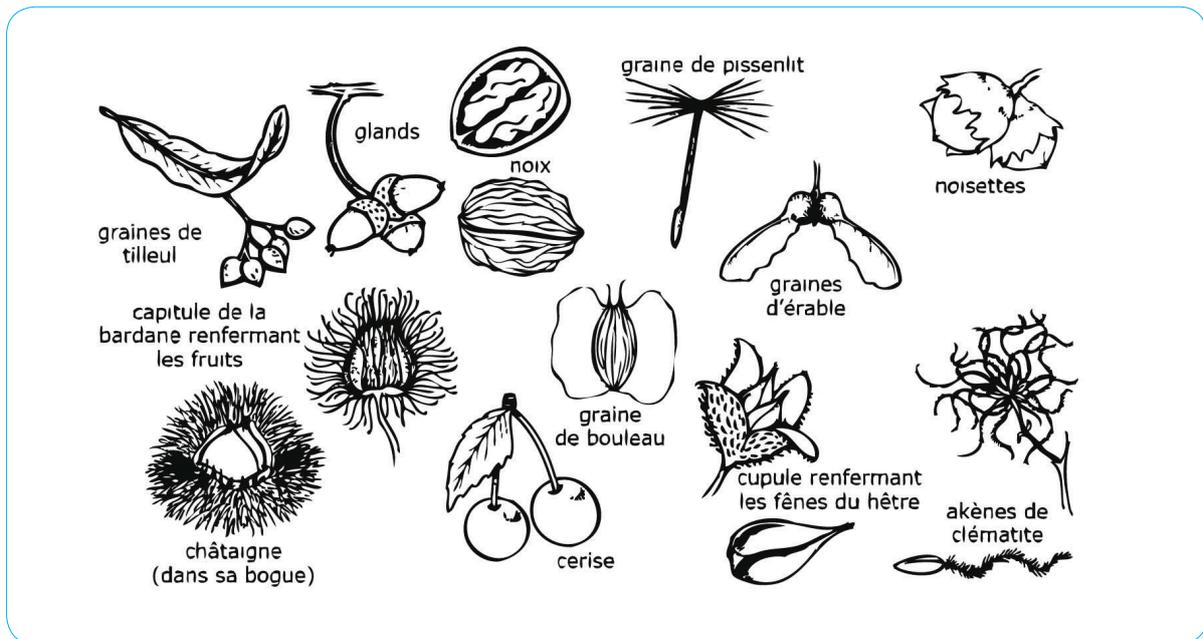
- Then ask them which one of these methods of movement enables the seeds to travel the furthest.

Notice: draw the children's attention to the fact that the pupils themselves and human activities in general, also contribute to the dispersion of seeds. Suggest to them that they scrape off the mud from their shoes after the organised walk and place it in a pot with a little soil and then water it regularly. It is highly probable that after a few days, little seedlings will appear from the seeds stuck to the soles of the children's shoes.

- Finally, ask them which plant types would, in their opinion, have the best chance of surviving climate change.

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D) RESOURCES/ REFERENCES

- The climate is us, WWF Belgium, 2008.
- This file can be downloaded in pdf format from:
http://www.wwf.be/_media/BookWWFProf_fr_889149.pdf
- Nature without borders, keeping our ecological corridors, Frapna – WWF France, 2005. Field kit that can be ordered from:
<http://catalogue-pedagogique.wwf.fr/page2.php?id=9>
As part of the same teaching campaign, see the website with online games at:
http://www.frapna.org/site/region/site_nsf/pages/present.htm
- Greenhouse effect and climate change, animation for primary schools by the Jean-Pascal Van Ypersele climate team, brochure downloadable from:
http://www.astr.ucl.ac.be/doc/brochure_sciences_infuses.pdf
- The influence of climate change on areas of distribution:
<http://biodiversite.wallonie.be/especes/GCbiodiv.html>
- Climate Change, Forests and Forestry Facilities: General Aspects, FAO, 1997, downloadable from:
<http://www.fao.org/docrep/V5240F/v5240f0a.htm>
- Impacts of climate warming on the distribution of French forest vegetation species:
<http://www.nancy.inra.fr/extranet/com/carbofor/carbofor-D1-resume.htm>
- The database of teaching tools provided by the IDée Network:
<http://www.reseau-idee.be/outils-pedagogiques/>