

Learning Intentions

For students to:

- Describe and explain environmental change
- Recognise how people may seek to manage environments sustainably
- Use new vocabulary such as competitive advantage and nutrient cycle
- Work effectively in a group

Context:

- Environmental activity
- Student sheet on bluebells and cow parsley

Resources

Provided

- Student worksheet – Competitive nature

Needed

- Space inside or outside the classroom

Links to National Curriculum subjects

Geography KS2

Enquiry and skills (1a, 1c, 1e, 2a)
Patterns and processes (4b)
Environmental change and sustainable development (5a, 5b)
Breadth of study (6e)

Geography KS3

Enquiry and skills (1a, 1f, 2a)
Knowledge and understanding of places (3d,
Patterns and processes (4b)
Environmental change and sustainable development (5a, 5b)
Breadth of study (6d, 6e, 6j, 6k)

2. Competitive nature

Overview

'Competitive nature' is an activity designed to demonstrate how plants compete with each other for natural resources - warmth, light, water and nutrients. Students are asked to reflect on the outcome of the game and consider the impact of climate change on two plant species.

Teaching activity

- 1 Give the students the worksheet on bluebells and cow parsley. In particular, stress that the bluebells and cow parsley both need water, light and nutrients and that cow parsley responds well to warmth.
2. Explain that you are going to play a game. In total this will take about 10 minutes, from explaining to playing. The aim of the game is to stimulate discussion. The bluebells should win because they need fewer climate variables. However, climate change could mean that the cow parsley wins.

The game

- Select two students (or ask for volunteers) – one to represent bluebells and the other to represent cow parsley.
- The rest of the group represent the natural resources. Ask them to select actions to depict these resources - water (e.g. fingers wiggling as hand moves downwards), light (e.g. hands framing the face), nutrients (e.g. hands clasped together to form a ball) and warmth (e.g. hugging themselves).
- Position the flowers and resources so that they are back to back.
- Ask the resources to each use an action to depict a natural resource.
- Ask the bluebell and cow parsley to do the same (the bluebell can only choose between water, light and nutrients while the cow parsley can also choose warmth).
- Still carrying out their actions, ask the students to turn and face each other. Students who match the actions of the flowers become either bluebells or cow parsley, moving to the other side of the group.
- If the flower chooses an action that is not matched by the resources, then the flower must sit down for the next round as it does not have the resources to grow (mimicking nature).
- The flowers continue choosing resources until they are all used up.
- Count the number of bluebells and cow parsley.
- The objective of the game is to see which flower wins the competition to live in woodland – cow parsley or bluebell.
- Play the game again and explain to the students that the climate has increased in temperature. Every time the 'cow parsley' selects the resource 'warmth', it now gains two of the students matching the action for 'warmth'. This is to represent how well cow parsley grows in warm weather.
- Which flower wins?

3. Follow the game by discussing the questions on the worksheet



Follow up activities for students

Students could be encouraged to monitor flowering times of bluebells and cow parsley in their school garden or park.

Assessment

Student worksheets assessed for levels of response

- No recognition of role of climate change on bluebells and cow parsley.
- Some recognition of role of climate change on bluebells and cow parsley.
- Notice made of small details and an awareness of the role of climate change in the timings of flowering times of bluebells and cow parsley.
- Awareness of the role of a responsible citizen to alter the factors which are causing the change in flowering times.



2. Competitive nature



Bluebells (*Hyacinthoides non-scripta*)

The bluebell is considered Britain's national flower. It grows from a bulb and its flowers are sweet smelling. The bell-shaped flowers stand upright when they are in bud, but hang downwards when they are open. Bluebells seen in large numbers, in woodlands, create the effect of a blue carpet. Although they can be found all over Britain, they are globally threatened and British populations represent 30% of the world's total.

Bluebells prepare their leaves and flowers in underground bulbs during the summer and autumn. This means that in cold weather they are able to use the resources stored in their bulbs. The shoots emerge from early January, before leaves from trees block some of their available sunlight. Other plants - such as cow parsley (*Anthriscus sylvestris*) or dandelions (*Taraxacum officinale*) - need warm weather before they are able to grow. With warmer springs brought on by climate change, cow parsley and dandelions will be able to start growing earlier.

The Spanish bluebell (*Hyacinthoides hispanica*), which has unscented flowers, grows more quickly than the British bluebell. Bees also help to cross-breed the British bluebell with the Spanish bluebell, increasing the British bluebells threat to survival.



Cow parsley (*Anthriscus sylvestris*)

Cow parsley is one of the most familiar wild plants of the British countryside. Most roadsides are lined with the white flowers throughout the month of May. The plant has a number of local names; hedge parsley, wild chervil and Queen Anne's lace - the latter arose from the days when Queen Anne travelled in May, people believed the roadsides had been decorated especially for her.

The growth of cow parsley is usually suppressed with cold winters. However, a study by Kew Gardens has shown that, with changing climate, cow parsley is now flowering on average nine days earlier than it was 20 years ago.

- Which flower won the game?
- Why do you think this flower won the game?
- What do bluebells need to grow?
- What does cow parsley need to grow?
- Which flower will be more successful if our climate becomes warmer? Why is this?
- What can be done to save the British bluebell?