## Goal 11: Sustainable Cities and Communities

Make cities and human settlements inclusive, safe, resilient and sustainable.

Have you ever thought about what makes up a village, a town or a city? It has houses, transport, energy, clean water and sanitation, and ways to manage waste. It may have schools, healthcare, shops, and businesses.

It will also have people who create communities that can work together to build a better future. As our villages, towns and cities grow in size we must ensure that we build responsibly and work together to ensure that everyone can enjoy a good quality life.

Working together may involve doing an important job on your own or working in a team. We are now going to explore teamwork in nature and learn from the world of bees.

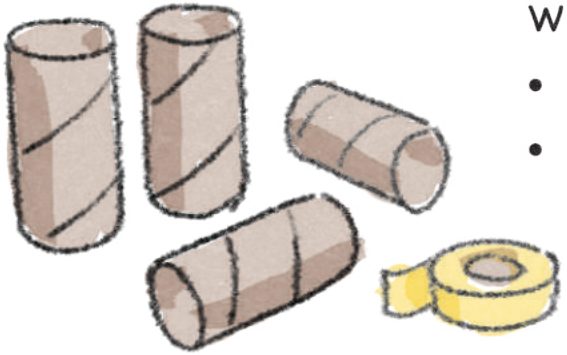
### Bees work together in communities

Nature can teach us about building cities and communities as we explore how a bee colony works.

The home of a bee, the beehive, is an excellent example of efficient engineering and construction, and provides inspiration for humans in the design of buildings. The walls of the beehive are very strong and can support thirty times their own weight. The shape of a beehive is a hexagonal structure as this will hold the most amount of honey.

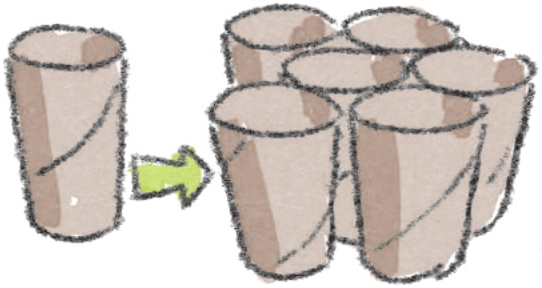
By working together, bees create a happy and sustainable community and hive where they help each other and the environment around them!

# Experiment - Build a Bee-Inspired Structure

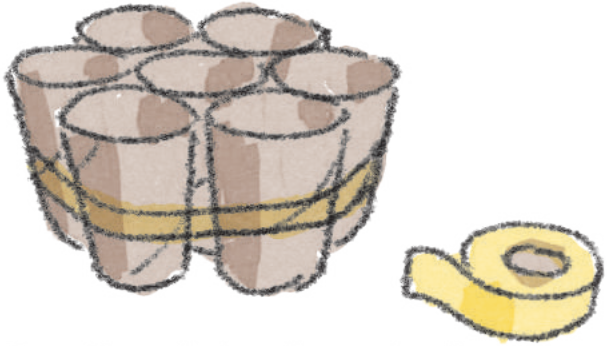


What you need:

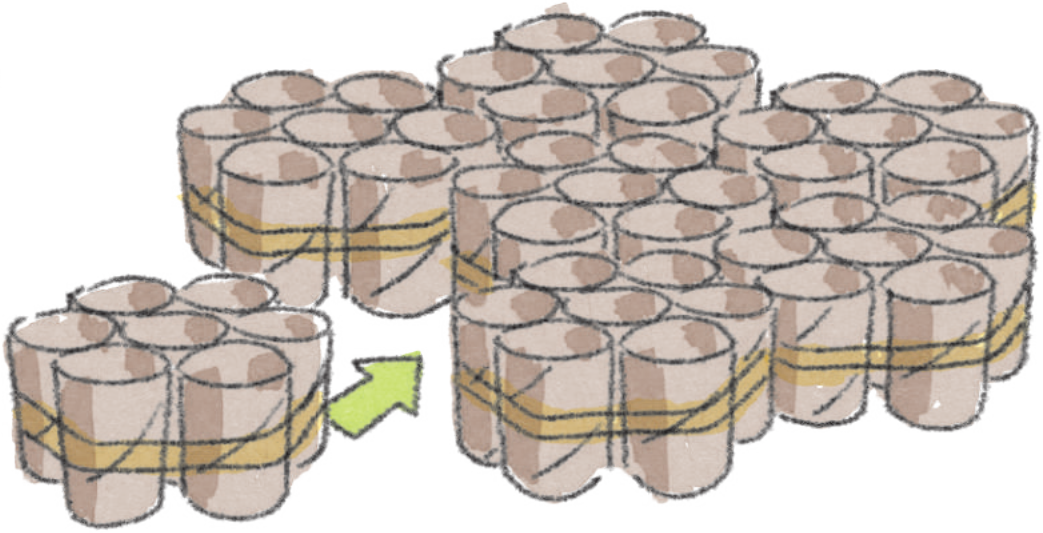
- Empty toilet-rolls
- Sticky tape



1. Place the rolls together in a hexagon shape as shown.



2. Tape the rolls together using the sticky tape.



3. Place all the structures made by the class on the ground to make one hexagon shape.

The structure you have made should be very strong.

Test the structure by slowly walking across it.

How would you improve it?

### What are your thoughts?

Have you learned something new about communities in nature?

What would you do to ensure we have sustainable cities and communities?

# What Do We Learn From This Experiment?

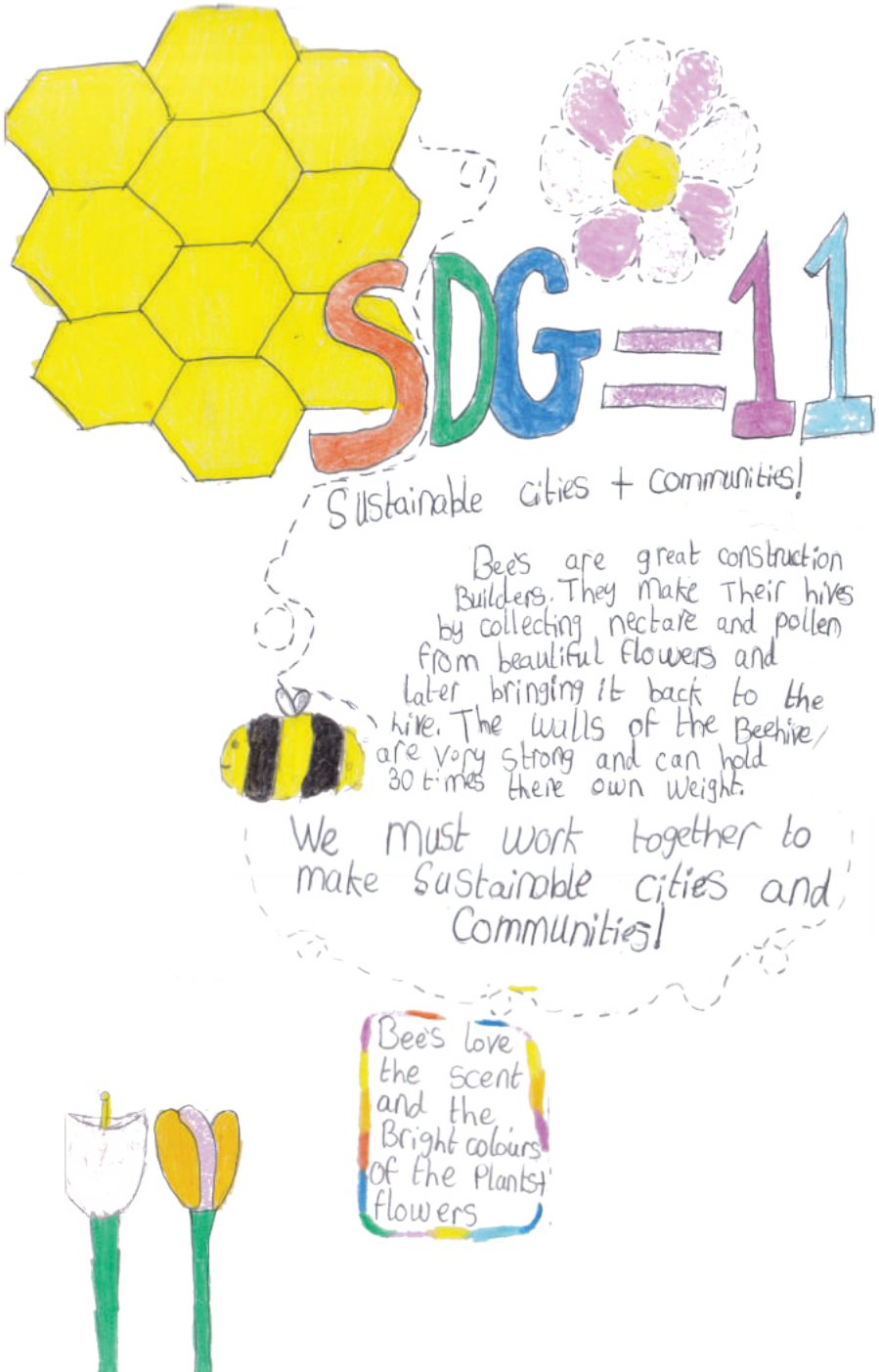
## Build a Bee Inspired Structure

The hexagon is a six-sided shape. It is a closed shape with 6 interior angles measuring 120° each. There are many reasons why bees use this shape to build hives.

Hexagons fit together very neatly with no gaps or spaces between the hexagons. This allows the bees to build the most amount of cells in a space and is the most efficient use of the space. Imagine if the bees build the hive using circle structures. There would be a lot of empty spaces between each of the circles. Also, as the hexagons are joined to each other without any spaces the bee will not waste any wax when building the hive. This is efficient building.

The hexagon shape also provides strength to the hive. The weight of the hive is distributed evenly because of the hexagon shape, and it is able to hold the weight of the honey much better than other shapes.

Some other interesting examples of hexagonal structures in nature include the eyes of dragonflies and the cells of the tiny marine microorganism the diatom. Explore these structures further in your own time.



# What Can We Do?

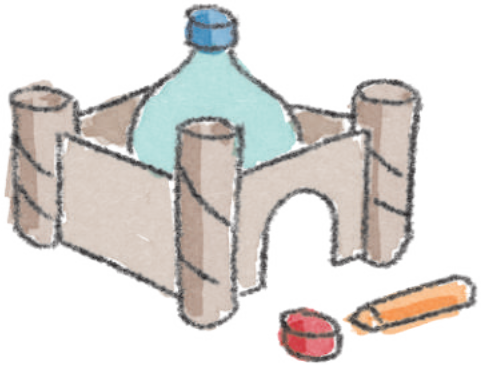
Participate in clean-up events in your local community.

**SDG 11 is all about making cities and human settlements inclusive, safe, resilient and sustainable.**

It can be hard to know the things we can do in our lives to make a difference, but by following some of the tips on this page we can start making the world better for everyone. You may not think that little changes will make a difference, but everyone making little changes adds up to big change.


Encourage family and friends to walk, bike or use public transport where possible.

Learn about heritage sites in your area and create posters to promote them in your school and community.



Create art projects in class from recycled items.

Learn about green and blue spaces and create posters to promote the benefits of these spaces.