

## **Build a structure** *Playground/school hall/classroom activity*

**Key Stage:** 2    **Time:** 1.5 hours

**Resources:** Newspaper (broadsheet or tabloid)

5 x rolls 1" masking tape

architectural reference (supplied):

The Eden Project, The Great Court, Geodesic Dome

### **Activity summary:**

- Each member of the class can make a triangular unit which when combined forms a three-dimensional modular structure.
- The activity references architectural structures that use the same modular principal: The Eden Project, The Great Court and Buckminster Fuller's invention the Geodesic Dome.
- Links can be made with National Curriculum schemes of work:
  - D&T: Construction, Structures (Unit 1D, 1B)
  - Science: Materials (Unit 1C, 2D, 3C) Habitats (Unit 4B)
  - Maths: Measures, Shape & space, Solving problems
  - History: Home (Unit 2)
  - Citizenship: collaborative teamwork, affordable housing
- Extension tasks:
  - Art: Draw the structure
  - Art: Clad and decorate the structure using a range of themes, refer to Islamic Art
  - D&T: Scale - develop ideas for a range of dwellings
  - Make small-scale prototypes using same technique

### **Lesson Plan:**

#### **Introduce building**

1. Buildings are made by people. They are made up of individual modular components like bricks which are combined to make larger structures.  
Identify any examples within sight e.g. wall, paving  
Reference Buckminster Fuller's Geodesic Dome  
Reference architectural structures: The Eden Project and The Great Court.

#### **Introduce the properties of materials**

2. Consideration needs to be given to the properties of materials in order to use those that are appropriate and available.  
Consider the properties of flat sheets of newspaper  
(Keywords: flexible, section / component, 2d, rectangular, geometric shape)

### **Demonstrate making a unit**

3. Demonstrate how the properties of newspaper can change by making a modular triangle unit:  
Select 5 sheets of newspaper per unit.  
Roll into a baton starting with the short side of a broadsheet and long side of a tabloid paper. Roll quite tightly keeping edges aligned.  
Secure each end with masking tape (5cm strip)  
Make 3 batons for one triangular unit. Attach ends with tape.  
(Keywords: modular unit, inflexible, section / component, 3-dimensional, equilateral triangle, tessellating shapes)

### **Organise building teams**

4. Working together as a team of builders involves collaboration, planning and design, like working in a classroom  
Outline activity, organise teams

### **Make and build the structure**

5. Each child makes a triangle unit
6. Combine 15 units (45 batons) to make a geodesic structure (refer to Geodesic Dome reference)

### **Clad and decorate the structure**

7. Demonstrate folding a sheet of newspaper into a triangle. These can be painted and used to clad the structure like tiles. Attach tiles to the structure using masking tape.  
Each child could make an individual tile based on a theme (a place, materials, a season) or the class could design and plan a co-ordinated design.

### ***Recommendations:***

- The support of a classroom assistant is helpful
- Consider similar architectural structures, a climbing frame or tepee, that use alternative building materials
- Small-scale versions could be made instead or as prototypes
- Use brightly coloured display paper for cladding rather than painted tiles, can then attach items or paint onto final structure
- The building of the structure requires a smaller number of pupils so an extension class is required e.g. evaluation, draw structure
- The cladding is time consuming, use as an extension task
- The final structure requires a large display or storage area

## Resource information:



**Buckminster Fuller** invented the Geodesic Dome, the lightest, strongest, most cost-effective structure ever devised. There are now over 300,000 domes in the world, some of them the centrepieces of major world exhibits: Epcot Center at Disney World in Florida. Geodesic domes are also used as

“radomes” to house delicate radar equipment in the Arctic, withstanding 180 mph winds. Fuller designed the geodesic dome and other industrially-produced housing prototypes to counter the trend toward resource-intensive, prohibitively expensive housing, part of his design to make adequate shelter available to 100% of humanity. His structural designs were explorations in providing solutions to global homelessness, both for inner city slums and the rural poor.



The Eden Project, Photographer: Peter Cook

**The Eden Project, St Austell, Cornwall** was designed by the architect Nicholas Grimshaw. It comprises eight interlinked biomes – geodesic domes– which form the largest plant enclosure in the world. The domes have been made out of sections so that they can be adapted to cover any possible shape. The sections are made out of steel covered in a lightweight plastic (ETFE) skin.



General view of the Great Court, Photographer: Nigel Young/Foster and Partners

**The Great Court at the British Museum, London**, was designed by the architects Foster and Partners. The Great Court's magnificent 11kms glass and steel roof was designed by computer. The 478-tonne steel

structure, which supports 315 tonnes of glass has been built like a giant jigsaw puzzle. The lightweight light transmitting roof, complements the 19th century architecture of the Museum.

## Build a structure *demonstration*



Use broadsheet or tabloid newspaper



Roll the paper on a hard surface



Cut or tear strips of masking tape



Secure the roll with tape at both ends



Work in pairs to join the rolls together



15 triangular units made this model



Collaborate to position the sections



Hold and secure with masking tape



Fold a sheet of paper for the cladding



Paint the tiles or use display paper



A geodesic structure



A dwelling

Work completed by twenty Year 5 pupils at Melcombe Primary School, London

### **What they said about it** *Evaluation by Year 5 and their teacher*

“The children thoroughly enjoyed the project and got so much out of it. It fulfilled aspects of the D&T curriculum and there were lots of opportunities for cross-curricular links. Not only that but the children loved working as a team and had to collaborate at every stage of the process. Some have even gone home and built a similar structure using different materials!”

*Year 5 Teacher*

“It was good to work in a team and make something out of things you normally throw away, it’s like we made something out of nothing.” *Year 5 Pupil*

“Out of one simple thing, a shape you can make something more complicated, so if I wanted to build something now I’d know what to do.” *Year 5 Pupil*

“It was really good fun. It was fun to work together and make something in a group, as we all had something to do with it.”

*Year 5 Pupil*

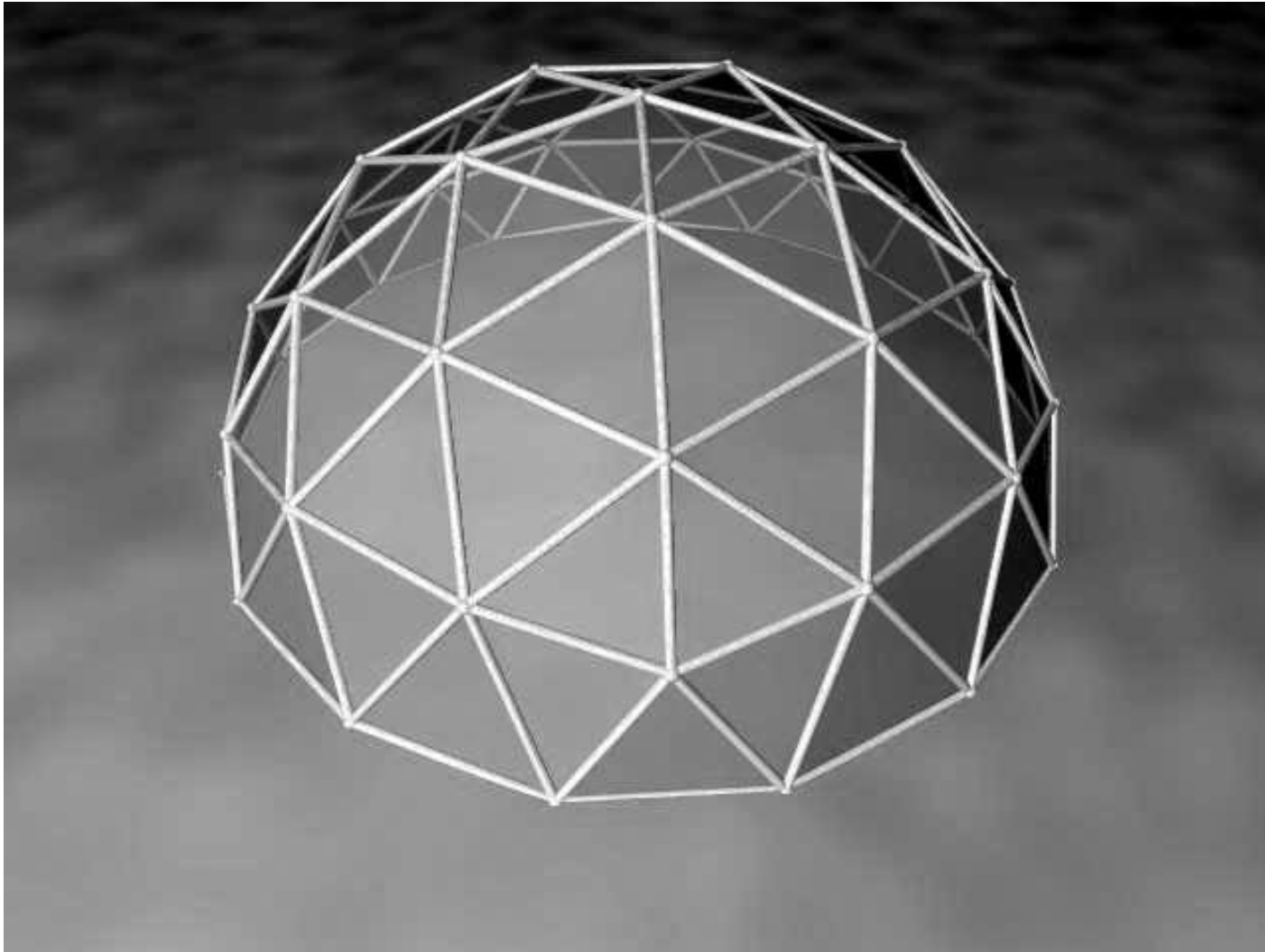




The Eden Project, Photographer: Peter Cook



General view of the Great Court, Photographer: Nigel Young/Foster and Partners



Buckminster Fuller's invention: The Geodesic Dome