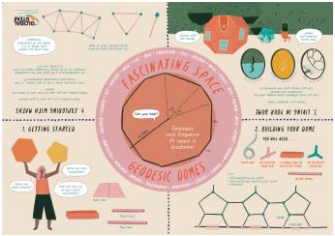
Geodesic Domes



Overview: Learners build a geodesic dome, using the mat as a base, by accurately cutting the straws and fitting them together with the connectors provided. It requires a team effort to hold pieces in place while other parts are added. Opportunities here to explore the patterns of pentagons, trapeziums, and hexagons. Further straws can be incorporated to divide everything up into triangles.

Extension: The dome can be scaled up by adding further sections – exploring how many sections need to be added to keep the patterns repeating.

Topics that can be explored through this activity: measuring, angles, angle rules, 2D shapes, shape nets, symmetry, perimeters, areas, volume, similar shapes.

Context: Structures like Eden project that use Geodesic domes for roofs are large span and lightweight. Can children cover the dome in film and use as a greenhouse? Or used as a basis for geodesic dome housing?

Stadium Arch

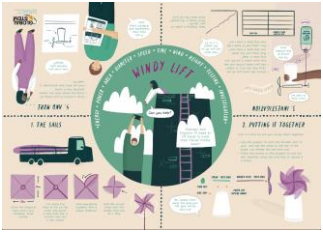
Overview: Learners can start by either designing their nets and working out the geometry, or by having a net provided to them. They build 6 accurate blocks – accuracy is important to make sure the blocks have square ends and that they stack together. Once the blocks are made the arch can be built. If there is too little friction at the ends it will slide away. Learners explore how much their arch can carry with different amounts of friction and load – do they add all the weights at one point, or do they distribute them?

Extension: Can two or more arches be added together, like a Roman aqueduct? Can they 'push' against each other?

Topics that can be explored through this activity: Maths - measuring, angles, angle rules, 2D shapes, Shape nets, symmetry, perimeters, areas, volume, similar shapes. Science - working scientifically, forces, friction.

Context: Historical construction, especially engineering in Roman structures and castles.

Windy Lift



Overview: Learners construct a cone shaped support and a simple windmill sail. There is some useful geometry in the cone support and the sail needs to be made balanced and symmetrical for it to work efficiently. Learners can use a desk fan to test their design, seeing how much weight or how quickly it can lift.

Extension: Do bigger sails give more power? What happens in the string is wound round a bobbin rather than just the dowelling?

Topics that can be explored through this activity: Maths - measuring, angles, angle rules, 2D shapes, Shape nets, symmetry, perimeters, areas, volume, similar shapes. Science - working scientifically, forces, friction.

Context: Harnessing energy from the wind, could lift water from a well, people and materials up a tower.