Grand Designs

Recommended year group: Year 8
Subject focus: Design, Computing, Geography, Maths

Driving Question

What must we consider when building for our community?

Introduction

The intention of this theme is for students to apply key design and mathematical skills to their own Grand Design. They will take on the role of an architect bidding for a new project in the local area, planning and building models of their designs and considering how to fund them for the future. They will conduct research, plan, build and use feedback to make improvements throughout the project. By the end of the theme they will participate in a competition, where they will deliver their pitch in the hope of it being chosen by the local community.

Assessment outcomes

The design process

The mathematics of design: The BIG problem

Materials science

Energy efficiency

Web design

Marketing my design

Design competition portfolio

Key vocabulary

analyse, annual percentage rate (APR), architect, Baroque architecture, budgeting, building societies, building, calculations, collect, colosseum, conduct, construct, corrugated, define, design, develop, durability, efficiency, elevation, energy, exhibition, fixed rate, flexible, fluorescent, halogen, junior simulations engineer, loan to value (LTV), marketing, materials, mind map, modelling, modernism, mortgage, polymers, portfolio, product, properties, property, regeneration, repayment, revenue, settlement, specification, strait, urbanisation, utility

Linked reading

- *The Best of Grand Designs* by Kevin McClough. This will provide you with inspiration of Grand Designs which can be used in your design throughout this theme.

Flipped learning opportunities

- **Choosing materials:** Encourages students to think about the properties of lots of different materials and how constructors choose the correct materials for different parts of building
- **Careers:** Personal career aspirations
- **Careers:** Why is the construction industry so important to the UK?

Family learning opportunities

What on Earth resources:
The 'People, Place and Time' resources will provide support to key knowledge throughout the theme. More specifically:

- The 'People' resource provides fact files on key people who have an influence in this theme. You can also use this document as a WAGOLL for any additional fact files you need to create.
- The 'Place' resource provides you ten great building projects around the world. This allows you to appreciate the influence of Grand Designs on a global scale.
- The 'Time' resource provides you with epic buildings throughout the ages. You will explore some of these in more detail during the lessons from this theme. Other highlights will provide you with further context and inspiration for your own design.
- The 'Hidden Secrets' and 'Nuclear Survival' activities allow students to complete quests with friends, family or guardians outside of the classroom environment. These activities are engaging and provide additional context to the lessons studied in the theme.

Consider together:

- What different buildings are in your community and what regeneration is occurring in your area?
- What jobs are there within the construction industry?
- How do building projects get started and how are they financed?

Extended learning opportunities

You should use these areas to explore different features of the theme. The places to visit offers a selection of virtual trips which will support your knowledge of key areas and attractions from the lessons. The careers section can be used alongside the careers lesson from the theme in order to discover career pathways associated with key elements of your learning from this theme.

Explore careers in construction:
https://successatschool.org/careerzonesummary/30/Construction-Property

Places to visit

- Virtual field trip of a Grand Design and Park and Landscape Project.
- Virtual tour of a property.

Cultural capital suggestions

Read: *How to Use Graphic Design to Sell Things, Explain Things, Make Things Look Better, Make People Laugh, Make People Cry, and (Every Once in a While) Change the World* OR *The Best of Grand Designs*
Look: Wall and Piece
Listen: **We Built This City**

Lessons

Lesson title	Subject	Essential knowledge/concepts	Competencies	National curriculum coverage
The design process	Design and Technology	• Identify and understand each element of the design process. • Define the purpose of a project using a range of sources.	**C.RD.01** Refining the processes and techniques through initial practice. Selecting and testing ideas. Developing an in-depth understanding of skill.	**Design and Technology** Use research and exploration, such as the study of different cultures, to identify and understand user needs. Identify and solve their own design problems and understand how to reformulate problems given to them. Develop specifications to inform the design of innovative, functional, appealing products that respond to needs in a variety of situations. Use a variety of approaches (for example, biomimicry and user-centred design), to generate creative ideas and avoid stereotypical responses. Develop and communicate design ideas using annotated sketches, detailed plans, 3-D and mathematical modelling, oral and digital presentations and computer-based tools.
Settlement, urbanisation and regeneration	Geography	• Investigate how London became our capital city. • Explore the Burgess model of typical urban areas and how certain cities do not fit this model. • Examine factors that lead to a city's regeneration and changing identity.	**SE.GE.02** Demonstrate understanding of human geography concepts and its interrelationships with places, environments and processes	**Geography** Understand the processes that give rise to key physical and human geographical features of the world. Human geography relating to population and urbanisation; international development; economic activity in the primary, secondary, tertiary and quaternary sectors; and the use of natural resources.

Architecture around the world	Geography	• Describe different architectural styles. • Obtain inspiration from various iconic buildings from around the world. • Research the work of some famous architects. • Consider the structure of buildings in the future.	**SE.GE.01** Demonstrate knowledge of locations and places, environments and different scales **C.RS.01:** Identify and explore relevant contextual artist research and express thoughts and ideas through written analysis	**Geography** Understand geographical similarities, differences and links between places through the study of human and physical geography of a region within Africa and a region within Asia.
The mathematics of design: The BIG problem	Mathematics	• Identify methods to work with shapes and scales. • Use scales and calculate scale factors when representing very large or very small objects. • Create your own drawings using scales.		**Mathematics – working mathematically** Develop fluency: use language and properties precisely to analyse 2-D and 3-D shapes. Reason mathematically: begin to reason deductively using geometrical constructions. Solve problems: select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.
Plans and elevations	Mathematics	• Name the different views of a house an architect would create. • Construct the plans for some simple shapes and buildings. • Represent 2-D drawings as 3-D shapes, and vice versa.		**Mathematics – working mathematically** Develop fluency: use language and properties precisely to analyse 2-D and 3-D shapes. Reason mathematically: begin to reason deductively using geometrical constructions. Solve problems: select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.

Materials science	Science	• Explain my ideas, selecting, using and evaluating complex models or science concepts and key words. • List the properties and uses of ceramics and polymers. • Describe how forces affect materials.	**SC.CS.01** Using scientific ideas	**Science** Obtain materials that are used in construction (materials from rocks – extracting metals, ceramics, glass etc; crude oil – polymers). Know the properties of metals, ceramics, polymers and composites (qualitative). Understand the links between structure and properties of polymers. Understand the links between properties and uses of materials used in construction. **Design and Technology** Understand and use the properties of materials and the performance of structural elements to achieve functioning solutions. Understand how more advanced mechanical systems used in their products enable changes in movement and force.
Energy efficiency	Science	• Define and calculate energy efficiency. • Identify how energy can be dissipated in a building. • Use data to evaluate materials and design features that aim to improve the energy efficiency of a building.	**SC.CS.01** Using scientific ideas **SC.MS.01** Using equations and solving problems	**Science – working scientifically: Physics** *Energy changes and transfers* heating and thermal equilibrium: temperature difference between two objects leading to energy transfer from the hotter to the cooler one, through contact (conduction) or radiation; such transfers tending to reduce the temperature difference; use of insulators. *Energy: changes in systems* energy as a quantity that can be quantified and calculated; the total energy has the same value before and after a change.

Budgeting and mortgages	Personal Development	• Assess mortgages available based on income and the price of the house. • Describe the difference between various mortgages available. • Produce a monthly mortgage balance sheet when given the APR and loan details.	**PD.BF.02** Financial management	**Citizenship** Students are equipped with the skills to think critically and debate political questions, to enable them to manage their money on a day-to-day basis, and plan for future financial needs. Students understand the functions and uses of money, the importance and practice of budgeting, and managing risk.
Mind mapping and modelling	Design and Technology	• Design and draw a building model. • Select from and use a wider, more complex range of materials. • Create a model of the building designed.	**C.RD.01** Refining the processes and techniques through initial practice. Selecting and testing ideas. Developing an in-depth understanding of skill.	**Design and Technology** Select from and use specialist tools, techniques, processes, equipment and machinery precisely, including computer-aided manufacture. Select from and use a wider, more complex range of materials, components and ingredients, taking into account their properties.
Web design	Computing	• Analyse website designs. • Identify computer components and their functions. • Design and construct your own website considering audience, purpose and design.	**TL.PU.01** Presenting Information Using ICT (Word, PowerPoint, Websites, Media)	**Computing** Understand the hardware and software components that make up computer systems, and how they communicate with one another and with other systems. Undertake creative projects that involve selecting, using, and combining multiple applications, preferably across a range of devices, to achieve challenging goals, including collecting and analysing data and meeting the needs of known users.
Marketing my design	English	• Identify key features in my design to market it effectively. • Use a range of persuasive writing	**CL.WP.02:** Produce clear and coherent writing in which the development, organisation, and style are appropriate to task, purpose, and audience (Voice).	**English – writing** Write accurately, fluently, effectively and at length for pleasure and information through:

		techniques and vocabulary to promote my design.	**CL.WP.05:** Select effective vocabulary appropriate to task and purpose (Word Choice).	• Writing for a wide range of purposes and audiences, including: material, and supporting ideas and arguments with any necessary factual detail. • Applying their growing knowledge of vocabulary, grammar and text structure to their writing and selecting the appropriate form. Plan, draft, edit and proof-read through: • Considering how their writing reflects the audiences and purposes for which it was intended.
Design competition portfolio	Design and Technology	• Identify components of a portfolio. • Reflect systematically and improve based on self-assessment. • Create a design portfolio.	**C.RD.01** Refining the processes and techniques through initial practice. Selecting and testing ideas. Developing an in-depth understanding of skill.	**Design and Technology** Analyse the work of past and present professionals and others to develop and broaden their understanding. Investigate new and emerging technologies. Test, evaluate and refine their ideas and products against a specification, taking into account the views of intended users and other interested groups. Understand developments in design and technology, its impact on individuals, society and the environment, and the responsibilities of designers, engineers and technologists.
Review and reflection	English	• Reflect on our learning in the Grand Designs theme. • Explain the knowledge and skills which have been learned throughout the theme.	**PL.RL.01:** Evaluate personal strengths and weaknesses and plan for improvement. **CL.SL.03:** Develop and adapt speaking skills and strategies in formal and informal contexts (speeches and presentations).	**English – spoken English** Speak confidently and effectively, including through: • using Standard English confidently in a range of formal and informal contexts, including classroom discussion • giving short speeches and presentations, expressing your own ideas and keeping to the point.