Broadway Junior School

Subject: Computing Topic: 3D Modelling Year: 6 Term: Summer 2

NC Purpose of Study
A high-quality computing education equips pupils to use computational thinking and creativity to understand and change the world. Computing has deep links with mathematics, science and design and technology, and provides insights into both natural and artificial systems. The core of computing is computer science, in which pupils are taught the principles of information and computation, how digital systems work and how to put this knowledge to use through programming. Building on this knowledge and understanding, pupils are equipped to use information technology to create programs, systems and a range of content. Computing also ensures that pupils become digitally literate – able to use, and express themselves and develop their ideas through, information and communication technology – at a level suitable for the future workplace and as active participants in a digital world.

Intent	Implementation	Impact
Our vision at Broadway Junior School is that all pupils should enjoy Computing and become confident, passionate and responsible users of technology both inside and outside of school. Through interesting, relevant and inclusive lessons, they will be able to leave Year 6 with a good understanding of how computers and the Internet work, along with being able to complete tasks on them creatively, independently and reflectively for a range of purposes and audiences. The Computing curriculum at Broadway is designed to enable pupils to embrace and utilise new technologies through the application of essential knowledge, principles and concepts. Technology is everywhere and will play a pivotal part in students' lives, therefore, we want to model and educate our pupils on how to use technology positively, responsibly and safely. We want our pupils to be creators, not just consumers of content and our broad curriculum encompassing 'Coding & Computational Thinking', 'Information Technology', 'Computing Systems & Networks' and 'Online Safety' reflects this. We recognise that the best prevention for a lot of issues we currently see with technology and social media is through education.	Computing skills are taught explicitly at Broadway with every pupil receiving dedicated Computing lessons throughout each half-term. Each half-term has a focus on either Information Technology, Coding & Computational Thinking or Computing Systems & Networks with Online Safety lessons also included throughout each half-term. The skills acquired are then embedded throughout the curriculum. Learning is sequenced to build knowledge, skills and vocabulary. Throughout units of work teachers encourage children to make links between past learning and new content. We recognise prior learning and build on it with memorable learning experiences and provide targeted support where necessary. The units address the requirements of the National Curriculum and are broken down to cover all elements of the different strands of Computing. The progression of knowledge and skills statements build year on year to deepen and challenge our learners. We use Purple Mash as the core of our curriculum tied with Teach Computing and activities from Project Evolve to create a comprehensive curriculum providing full curriculum coverage and a variety of skills for our children.	The impact of our Computing curriculum is that we provide pupils with a set of skills to embed a lifelong love of learning and that they build on the knowledge and skills from previous learning. We ensure that every child can become a confident user of technology, while being able to use it to accomplish a wide variety of goals, both at home and in school. Children will have a secure and comprehensive knowledge of how technology works in the world around them and will develop their understanding of how to deal with online situations safely. Children will become confident global citizens. The knowledge organisers outline what we want the children to know within each unit. By nature Computing is going to be practical and hands on. We give the children the opportunity to record individually their responses to key questions. Teachers ensure that children understand and apply the correct vocabulary linked to different elements of the curriculum and this is also recorded within the floor books. Prior and future learning links are also included, so that there is a clear sequence in relation to the progression of skills and activities.

Key Vocabulary
3D Printing The process of making a physical object from a three-dimensional digital model, typically by laying down many thin layers of a material in succession. Model A digital or physical version of an object that shows what it looks like. 2Design and Make Three-Dimensional (3D) Net Computer Aided Design (CAD) Design Brief Prototype Points Two-Dimensional (3D)

Knowledge	Skills
• To explore and develop simple 3D models using CAD software. • To explore the effect of moving points when designing. • To plan, design and begin creating packaging to meet a design brief. • To refine, assemble and evaluate the finished packaging prototype.	• I can explain what CAD is and why it is useful. • I can explore the 2Design and Make tools to create a basic model. • I can view my model from different perspectives. • I can identify and move points on a CAD shape. • I can design a 3D vehicle by adapting and reshaping parts with points. • I can explain how CAD helps in designing real-world vehicles. • I can explain the purpose of packaging. • I can follow a design brief and decide on the size and shape of the packaging. • I can create an initial net that suits my product. • Preparation • I can improve my packaging design with logo, colours and images. • I can print and assemble my packaging as a prototype.

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	• I can evaluate how well my design protects and promotes the product.

Learning Objectives/End Points			
To explore and develop simple 3D models using CAD software. Lesson 1	To explore the effect of moving points when designing. Lesson 2	To plan, design and begin creating packaging to meet a design brief. Lesson 3	To refine, assemble and evaluate the finished packaging prototype. Lesson 4

Careers

Linking Curriculum Learning to Careers
Discuss how the skills developed in this unit are used in a range of careers, including:
Product Designer
Industrial Designer
CAD Technician
Mechanical Engineer
Automotive Designer
Packaging Designer
Packaging Engineer
Architect
3D Modelling Artist
3D Printing Technician
Manufacturing Engineer
Prototype Developer
Graphic Designer
Design Engineer
Interior Designer
Transferable skills:
Digital literacy: Using CAD software to create, manipulate and view three-dimensional models. Creativity and innovation: Developing original vehicle models and packaging designs to meet a specific brief. Spatial awareness: Understanding the relationship between two-dimensional nets and three-dimensional objects.
Problem-solving: Adapting shapes, moving points and refining designs to improve their function. Planning and organisation: Following a design brief and progressing through modelling, designing, prototyping and evaluation.
Attention to detail: Refining dimensions, colours, logos, images and structural features to improve the final product. Evaluation and critical thinking: Assessing whether a prototype meets its intended purpose and identifying improvements.
Resilience and adaptability: Testing ideas, responding to design challenges and improving prototypes through experimentation.

Learning from career and labour market information
Explore how CAD and 3D printing are used in industries such as engineering, construction, transport, manufacturing and product design, including opportunities in the North East.

Addressing the needs of each pupil
Provide demonstrations, visual examples and scaffolded design tasks. Encourage pupils to adapt their models, experiment with points and develop packaging designs that reflect their individual strengths and ideas.

Linking curriculum learning to careers
Apply computing, design technology, mathematics and creative thinking to develop 3D models, manipulate points, create nets and produce packaging prototypes, reflecting professional product design processes.

Encounters with employers and employees
Explore how product designers, engineers and packaging specialists use CAD to develop and refine designs. Where possible, invite a designer, engineer or manufacturing professional to explain how digital models become physical products.

Experiences of workplaces
Set a realistic design brief requiring pupils to design, model, assemble and evaluate product packaging. Discuss how professionals use prototypes to test appearance, practicality and protection before manufacturing.

Encounters with further and higher education
Introduce pupils to pathways in design technology, engineering, digital design and manufacturing through secondary education, college, university, apprenticeships and technical qualifications.