DESIGNER MATHS - TEACHING & LEARNING PROGRAM

TEACHING & LEARNING SEQUENCE	ASSESSMENT
CREATIVE CIRCLES 1 – 2D SHAPES TOPIC 3 - GEOGRAPHY	FOLIO
PRE-TEST – Gather baseline data on student pre-knowledge of 2D and 3D shapes. What do students already know?	
INTRODUCTION Class brainstorm - *Where do I see circles in my world?* Discuss cultural / historical importance of circles – Use example of Vitruvian Man from Italian Renaissance, linking circle and square to human and architectural proportions TASK - Short student inquiry – *How important are circles in the art and design of my culture?*	
2D SHAPES • Names of 2D shapes • Classification of shapes as regular or irregular • Classification and naming of different triangles - e.g. equilateral, isosceles, scalene, right-angled • Naming of different representations of circles and their parts *What properties do circles have in common with other geometric shapes? How are they different?* TASK - students create their own reference pages using the shape tools in Adobe Illustrator (or equivalent)	ASSESSMENT TASK 1 – SHAPES IN EVERYDAY CONTEXTS tasks 1-3
ANGLES AND CIRCLES How angles are related to circles, 360 degrees- *Why do you think circles were divided into 360 degrees?* *Can you identify all the whole numbers 360 can be divided by?* • How are angles classified and measured? - Classification of angles as acute, right, obtuse, straight, reflex, revolution • How can unknown angles be determined? – Complementary angles, supplementary angles • How can unknown angles be determined when lines are parallel? – Corresponding angles, Alternate angles, Vertically opposite angles, Co-interior angles	ASSESSMENT TASK 1 – SHAPES IN EVERYDAY CONTEXTS task 4 ASSESSMENT TASK 2– SHAPES IN DESIGN CONTEXTS - LOGO DESIGN ANALYSIS TASK Students complete at least two logo design analyses
HOW TO USE CIRCLES TO DRAW OTHER SHAPES Students ideate techniques for drawing accurate circles How to use circles to draw other geometric shapes	ASSESSMENT TASK 3 – CROP CIRCLES Students solve a crop circle problem ASSESSMENT TASK 4 – 'MY WORLD' LOGO - Students plan, measure and draw a mandala style logo

CREATIVE CIRCLES 2 – 3D SHAPES TOPIC 3 - GEOGRAPHY	FOLIO
3D SHAPES • Names of 3D shapes • Classification of shapes – e.g. prisms, pyramids, sphere, cone • Properties of different 3D shapes TASK - students create their own reference pages using the internet	ASSESSMENT TASK 1– SHAPES IN DESIGN CONTEXTS – 3D DESIGN ANALYSIS TASK Students complete at least two 3D design analyses
SHAPE NETS • How can you use mathematical equipment to measure and construct shape nets? • How to construct various polygons from circles, using a protractor (dividing by degrees), and how to construct shapes using ruler and compass • How to construct cones and cylinders *What measurements might we need?* *What are the mathematical formulas for determining these measurements?* • How to calculate a circle circumference - C=πd	ASSESSMENT TASK 2 – SPOILED MILK Students measure and draw shape nets for design contexts
HISTORIES OF NUMERICAL SYSTEMS AND FRACTIONS Histories of various numerical systems - base/radix, zero, fractions *What numeral systems are you familiar with?* TASK - Group inquiry into a selected historical numerical system – were fractions represented? How? FRACTIONS • Circles and fractions • Symbolism of fractions How to create pie graphs using Microsoft Excel (or similar)	ASSESSMENT TASK 3 – DESIGN A NUMERICAL LANGUAGE Students create their own shape-based numerical system including fractions ASSESSMENT TASK 4 – SYMBOLISM OF FRACTIONS Students calculate to determine percentages of ingredients and create pie graphs
DIVIDING CIRCLES • How to divide circles into various equal parts using mathematical equipment	ASSESSMENT TASK 5 – CUTTING THE CHEESE Students calculate and measure to create shape nets for a variety of different cheese wedge packages

MEASUREMENT TOPIC 5 - MEASUREMENT	SKILLS & APPLICATIONS
LINEAR MEASUREMENT • Units of measurement – metric system, imperial system – *What units of measurement are common in your culture?* • Converting units of measurement • Choosing appropriate units of measurement • Measuring curves, diameter, radius • What is negative space TASK - Students investigate measurement in typography	ASSESSMENT TASK 1– LINEAR MEASUREMENT Students complete at least two logo measurement tasks
MEASURING 3D SHAPES • Calculating surface area of cuboids, spheres, cones and cylinders • Estimating and calculating volume and capacity	ASSESSMENT TASK 2 – MEASURING CUBOIDS ASSESSMENT TASK 3– MEASURING SPHERES, CONES AND CYLINDERS
MEASURING ENERGY • Units of measurement – watts, kilowatts, megawatts, gigawatts, joules, kilojoules • Measuring energy use over time – kilowatt hours • Calculating energy use of an appliance and cost of running an appliance over time TASK - Students investigate Energy Rating labels	ASSESSMENT TASK 4 – MEASURING ENERGY
MEASUREMENT IN DESIGN • Units of measurement used in graphic design including points, picas, pixels	ASSESSMENT TASK 5 – ENERGY DRINK DESIGN HACK

RATIO & SCALE IN THE VISUAL ARTS TOPIC 1.3 – RATIO & SCALE	SKILLS & APPLICATIONS
RATIO • What is a ratio? Notation for recording a ratio • Expressing ratios in their simplest forms • Finding the ratio of two quantities • The relationship between ratios and fractions	SECTION 1 ASSESSMENT TASKS
RATIOS & PHOTOGRAPHY • Ratios and photography – shutter speed, aperture and depth of field • Golden ratio • Rule of thirds • Fibonacci sequence and Golden Ratio	SECTION 2 ASSESSMENT TASKS
SCALE • What is scale? What is a scale factor? • Scale diagrams – calculating using a scale factor	SECTION 3 ASSESSMENT TASKS
CREATIVE USE OF SCALE IN THE VISUAL ARTS • Creative use of scale in art • Estimating and measuring	SECTION 4 ASSESSMENT TASKS