

# The Shape of Things to Come

## New Basics referents

### Life pathways and social futures

- Developing initiative and enterprise

### Multiliteracies and communications media

- Mastering literacy and numeracy

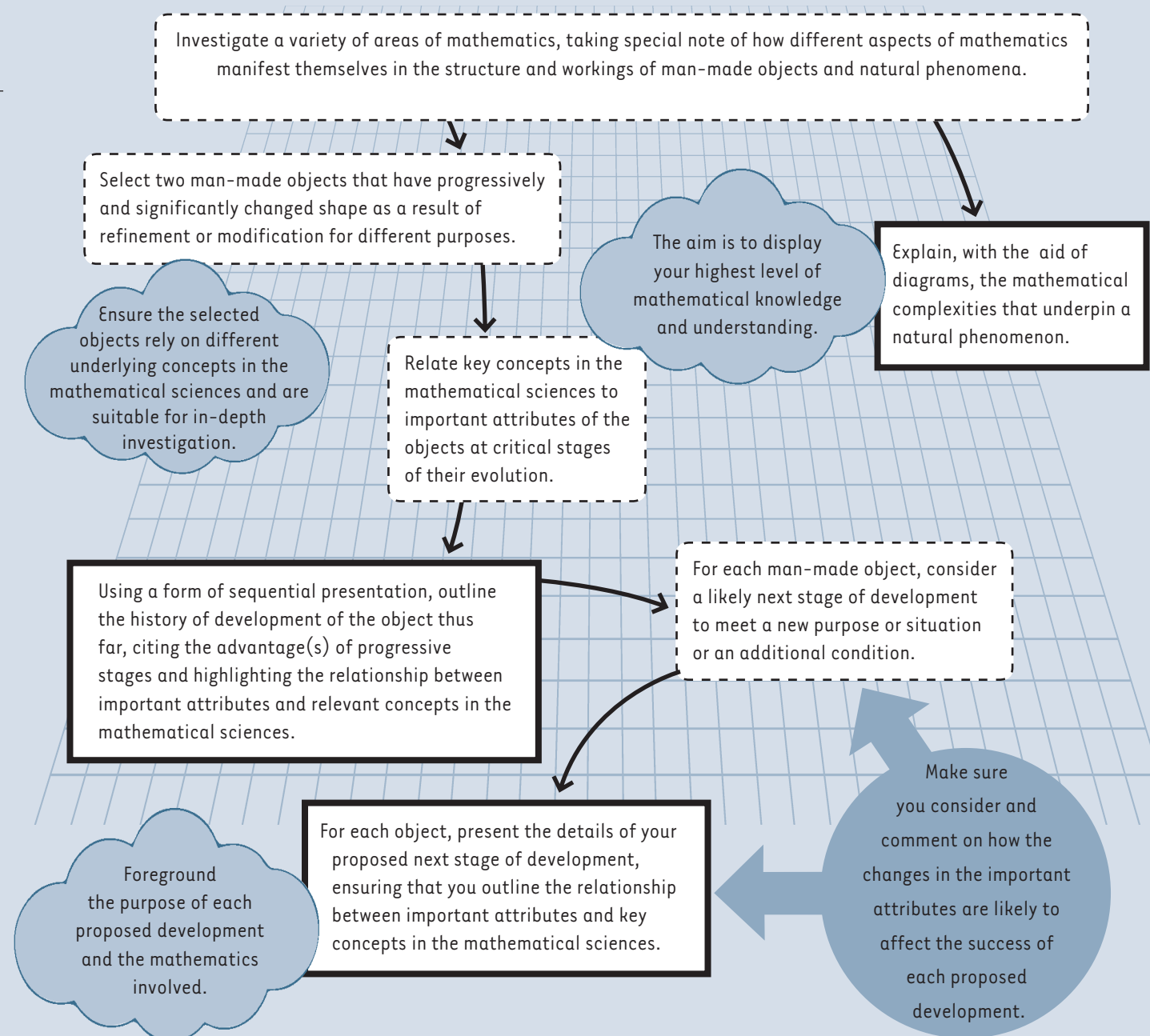
### Environments and technologies

- Developing a scientific understanding of the world
- Working with design and engineering technologies

## Targeted repertoires of practice

- Adapting something to meet a new purpose or situation or an additional condition
- Analysing physico-mathematical and mathematical relationships in different ways
- Comparing and contrasting ideas/information
- Estimating, measuring and calculating
- Identifying and dealing with shapes, their properties, and their constructions
- Identifying, creating, analysing and extending patterns
- Mensuration
- Predicting on the basis of a mathematical model
- Presenting complex ideas simply (e.g. via diagrams, storyboards and comic strips)
- Sequencing the steps that lead to a mathematical solution
- Substituting in formulae
- Translating information from one form to another to make it comprehensible
- Understanding general principles from mathematics and physics and applying them to specific situations
- Understanding how mathematics is used to describe and explain
- Using algebra to effect
- Using technology as appropriate in the representation of mathematics

**Students will use concepts and skills in mathematical sciences – especially in measurement, patterning, space, statics and dynamics – to investigate the structure of something from nature and changes in the shapes and properties of one mechanical and one non-mechanical man-made object. For each of the man-made objects, they will propose a likely next stage which meets an identified new purpose or situation or an additional condition, and explain the mathematics relevant to the proposal.**



## Ideas, hints and comments

- A proposed next stage of development may reflect aesthetic, functional or social needs.
- Natural phenomena include botanical and zoological patterns and structures linked to Fibonacci numbers and/or the golden mean, wave motion, and shape and structure of crystals.
- The choice of the two man-made objects should require students to be exposed to and develop a variety of concepts in the mathematical sciences.
- Man-made objects include amusement rides, bottles or cartons, buildings (ancient or modern), computers, concave mirrors, crockery or glassware, corkscrews, food containers, footwear, furniture, laundry equipment, mechanical clocks, musical instruments, puzzles, radios, robots, sewing machines, sinks, skateboards, surfboards, swimming pools, telescopes, tools or vehicles (land, water and air).
- Investigations might draw on mensuration (length, breadth, height, perimeter/circumference, surface area, volume), mechanics (distribution of mass, centre of gravity, equilibrium, moments and stability, levers, gears, friction, elasticity and tension, mass and power), pattern and sequence, ratio, geometry, trigonometry, statistics (such as average and range), algebra, harmonics, as appropriate.

## Task parameters

- Task intensity: medium–high
- Students may work individually or in groups.
- Available grades: 4