SMSC Departmental Overview	Department:	**MATHS**

Whole School Vision:

Corby Technical School are committed to the development of the Social, Moral, Spiritual and Cultural (SMSC) understanding of our pupils. We are a school that delights in being ethnically, religiously and culturally diverse, both within our student and staff composition, and we are proud that within this diversity we **all** share and respect fundamental British values. It is the vision of this institution that all students are: encouraged to recognise and respect central British values; are protected from extremist (or prejudiced) views during the delivery of our curriculum; and that our students are offered a balanced presentation of viewpoints when political issues are brought to their attention.

Whole Staff Commitment:

It is expected that within **every** lesson that is taught at Corby Technical School, regardless of subject or teacher, that the following expectations are adhered to and maintained:

✓ That every opportunity is taken for pupils to develop their **self-knowledge**, **self-esteem** and **self-confidence**.

✓ That opportunity is given for pupils to understand the **difference between right and wrong**, and gain a **respect for civil and criminal law**.

✓ Pupils are made to **accept responsibility** for their behaviour and show initiative towards their own **self-development**.

✓ That provision is given for students to **appreciate their own culture**, the **cultures of others** and develop an **understanding of the world**.

✓ Pupils are aware of the **fundamental values of British society** (democracy, law, liberty, respect, responsibility and tolerance).

✓ That every opportunity is taken to **challenge radical**, and **biased political and social views**.

✓ That the **safety** and **well-being** of students is the main priority of school life and all we do. We will promote student autonomy in making **informed choices** regarding their health, fitness, emotional and mental well-being, as well as their relationship with their peers.

✓ That opportunity will be given to **celebrate** and build **pride** in personal and school **achievement**.

✓ Pupils are aware of the importance of **attendance** and appropriate **conduct** in school and employment.

Departmental Commitment:

It is expected that individual departments within the school will address aspects of the SMSC syllabus throughout the year. Departments are encouraged to devise their own strategies for incorporating SMSC into their schemes of work. Detailed below is how the department identified above intends to incorporate the SMSC strands not covered by the **Whole Staff Commitment.**

Core Departmental Values:

Identified below are those aspects of SMSC that would be prevalent within the majority of the lessons within the department identified above; they would be easily identifiable within most lessons through the work being conducted by the students.

✓ Students will reflect on their experiences and apply their understanding to a range of issues.

✓ Students will be encouraged to develop a sense of enjoyment and fascination in learning about themselves, others and the world around them.

✓ Students will investigate and consider views about moral and ethical issues.

✓ Students will develop an understanding of the consequences of behaviour and action in respect to the impact upon others.

✓ Students will develop and use a range of social skills to learn and socialise with their peers (including those of different religious, ethnic and socio-economic backgrounds).

✓ Students will explore how mathematics influences the next stage of their education and/or employment.

✓ Students will develop an appreciation of a wide range of cultural influences, some of which would have shaped their own heritage.

✓ Students will develop and utilise a range of social skills in different contexts in order to aid their learning.

✓ Students will develop skills and attitudes that will enable them to fully contribute to life in modern Britain.

Topical SMSC:

Identified below are those aspects of SMSC that are identifiable within particular schemes of work that take place over the course of an academic year – as such key elements within these aspects have been distinguished and clarified.

- **Algebra units**

A2
- The use of **symbols** to represent numbers, developing the understanding that a letter can represent any number. Draw students' attention to the **roots of algebra** in the Middle East and India.

A24
- Focus on **sequences** and a look at famous sequences such as **Fibonacci** – an opportunity to discuss mathematicians from other countries.

A17
- **Solving equations**, the enjoyment/success/achievement/ coping with short term failure as students develop their strategies for solving equations.

A18
- **Problem solving approach** – seeking systematic order to solve a problem by breaking down a task into manageable parts.

General
- **Problem solving skills** and team work will be developed.
- Opportunity for students to acquire **critical thinking**, skills of analysis, **evaluation** and **reflection**.

Algebra units are studied according to the following schedule

Year	Term				
	1	2	3	4	5
7		A2			A24
8		A2, A17, A18			A2
9		A2, A24		A17	
10	A2, A17			A2	A2, A17
11	*Revision				
A18	Throughout algebra topics – ensuring logical breakdown of questions.				

- **Number units**

N1
- The pleasures and rhythms of **counting** 'Music is the pleasure the human soul experiences from counting without being aware it is counting' Leibniz.
- Extending the number line to take account of **negative** and **decimal** numbers.

R9
- Work on **percentages** can lead to a discussion of **money** lending and **rates of interest**.
- Using **percentages** in everyday life – link to banking and interest rates.

N4
- Study of **prime numbers** as the building block of mathematics can lead to a discussion of the 'mystical' nature of these numbers.

N10
- Equivalence of **fractions, decimals and percentages** and the validity of comparisons between them. Link to Food nutrition labelling and healthy eating.

Number units are studied according to the following schedule

Year	Term				
	1	2	3	4	5
7	N1, N4, N14	N1	R9, N10	R9	
8	N1, N4, N14		N1		R9, N10
9	N1, N4, N14		R9	N14	
10		R9, N10			
11	*Revision				
	Throughout, we encourage them to apply number to real life problem.				

N14
- Develop student's *estimation* and *rounding* skills to help them make sense of big numbers in the world.

General
- Solving *real life problems*, a chance to put new skills in to context and reflect on how mathematics is relevant to everyday life.
- Encouragement of *self-discipline* as problems become more complex with multiple steps.
- Students will develop the ability to *review and check back* through their working to eliminate errors.
- Encouragement of the *wonder and awe* of the beauty of mathematics, the simplicity of mathematics, the complexities of mathematics, the particular qualities of mathematics.
- *Problem solving* fosters resilience as students try different methods to solve real life questions
- Students are required to explore 'proof' and consider what makes a convincing *mathematical argument.*

- ## Geometry units
G1
- Discussion of different types of *measurements*, which *units* are used at home, comparison of *metric* and *imperial* units.
- Work on *angles* lends itself to a look at the history of the development of measuring equipment and techniques and the importance of other cultures in this.
- History of the early beginnings of angle in Egypt the recognition of other powerful culture through the medium of mathematics.

G17
- An introduction to *Pi* as an *infinite* number, link to its use in astronomy. Discussion of the independent discovery of Pi by various cultures and the work carrying on today across the globe investigating this fascinating ratio.

G5
- In *congruence* and *symmetry*, looking at repetitive patterns used in other cultures, i.e. Greek Frieze patterns, categorising wallpaper patterns and tiling patterns.

G7
- Extend the study of *transformations* to include Islamic tiling patterns and Rangoli patterns.

G13
- Visualisation of *3D shapes* and an appreciation that there are more than 3 dimensions and that mathematics can be used to solve problems in a multi-dimensional universe.

G6
- Introduction to *Pythagoras*, link to the importance of Greek mathematical knowledge and its rediscovery during the Renaissance.

General
- An early look at *proof* through investigation and the search for counter examples.

Geometry units are studied according to the following schedule

Year	Term				
	1	2	3	4	5
7		G1		G1	G5, G7
8	G17, G13		G1		
9				G1, G17, G6	G5, G7
10			G1, G5	G7	G1, G17
11	*Revision				
	Throughout we encourage pupils to look at proof of geometrical properties.				

- Teamwork skills developed during practical lessons.
- Look at the **Platonic solids** and discussion of the importance of the ancient Greek culture to mathematics.

- ## Statistics & Probability Units

P1;P5;P6
- Looking at **random events** and the **laws of chance** events happening, the mathematics of risk, an opportunity to discuss the Lottery and aspects of gambling.

S5
- Use of **statistics** to compare gender differences.

S2
- Use of statistics as a way of measuring and making sense of the world around us. Geographical **data** comparing populations, climate, environment data of different countries

S4
- **Comparing** data sets, using statistical data to make judgements.

General
- **Group** work to answer a hypothesis.
- Students have the opportunity to carry out their own statistical investigation; they will develop skills in independent working and **enquiry**.
- Understanding that approaches to the analysis of data may lead to different conclusions.
- **Awareness** of the potential for sexist and stereotypical bias in data collection methods.
- Discussion of **bias** in **questionnaires** and **surveys**.
- Use of geographical and scientific data in graph drawing and analysis. Chance to make **comparisons** between different countries and genders.

Statistics units are studied according to the following schedule:

Year	Term				
	1	2	3	4	5
7	S2, S4		P1;P5;P6		
8					S2, S4
9			S2, S5	S4	
10	P1;P5;P6			S2, S5	
11	*Revision				

Throughout, we encourage discussion about implications, trends, and limitations and get them to work in group formats to promote enquiry, independence and teamwork.

- ## A-Level Mathematics

AL1: Differentiation & Integration

- Exploration of **calculus** – finding **derivatives** and **integrals** of functions and understanding properties of this.
- Link this to the work in history from Issac Newton and Gottfried Leibniz and their dispute over who discovered it.
- Also discuss how both of their work influenced notation used today.

AL2: Binomial Expansion

- Link **Pascal's triangle** – although used and discovered before Pascal, to coefficients in **binomial expansion** and **combinations**.

AL3: Sequences

- Looking at deriving, generating and forming **geometric** sequences and links to Euclid's work on properties of geometric progressions.

A Level is studied according to the following schedule:

Year	Term				
	1	2	3	4	5
12	AL4	AL1, AL2, AL3	AL1	AL5	AL1, AL2

AL4: Quadratics

- Looking at *discriminants* and what it means for the discriminants to be less than zero – understanding there are no real roots. Develop this in further mathematics with introduction of *complex numbers* – with imaginary and real components. This develops the number system we have been used to up until this point.

AL5: Data Collection

- Working with real life data sets within the course to add context to statistical work and comparisons in climates between different time periods.

- Finding patterns and *correlation* between to variables and connect them to patters in the real world.

General

- Understand mathematics and mathematical processes in a way that promotes confidence, and enjoyment for the subject.

- Understand how different areas of mathematics are *connected* and linking this to history.

- Use mathematical knowledge to make *logical* and *reasoned* decisions in solving problems both within pure mathematics and in a variety of contexts.

- Read and *comprehend* articles and data sets concerning applications of mathematics and *communicate* their understanding

- Take an increased *responsibility* at A Level for their own learning and the evaluation of their own mathematical development.

Signed HOD:	Helen Ferns	Date:	6.11.2017
Checked and Signed SMSC:		Date:	
Checked and Signed Principal:			