CURRICULUM ROADMAP - Nursery to Year 13 BIRKENHEAD Mathematics HIGH SCHOOL ACADEMY G D S T Year 13 (SUM) Vectors Year 13 (SPR) Exams Differentiation; integration; numerical methods; trigonometry; trig & modelling Probability - conditional; normal distribution; constant arc (2D); projectile motion; non-constant Statistics/Mechanics Year 13 (AUT) Functions; partial fractions; factor theorem; sequences and series; binomial expansion Core Statistics/Mechanics Statistics with friction; inclined planes; non-linear correlation Year 12 (SUM) Calculus: integration / exponentially Core Mock Exams Statistics/Mechanics Non-constant acceleration **Year 12** (SPR) Trigonometry; vectors; calculus: differentiation; hypothesis testing Core Year 12 (AUT) Statistics/Mechanics Constant acceleration modelling; forces statistics diagrams Graphing equations; discriminant equations-linear; quadratics-solving; inequalities; surds; indices; straight-line graphs; coordinate geometry Statistics/Mechanics Standard deviation; hypothesis testing; discrete distn; binomial distn; probability-not conditional Year 11 (SUM) evision Exam technique KEY: Revision and recall Core **Year 11** (SPR) • Statistics/Mechanics Exam technique Modelling answers Review and recall Year 11 (AUT) Geometry Pythagoras; trigonometry; vectors Statistics Probability of combined events Alaebra Sequences Year 10 (SUM) Ratio & Proportion Units of proportionality Cumulative frequency; box plots; averages from grouped frequency tables; probability of Statistics Year 10 (SPR) Algebra Inequalities graphically; on number lines and solving; quadratic equations Geometry Trigonometry Year 10 (AUT) Repeated percentage change; reverse percentages Number Pythagoras; volume of solids Geometry Linear graph Algebra Year 9 (SUM) Geometry: 2D Working in 2D; similarity/enlargement; transformations; exploring trigonometry; area/perimeter Year 9 (SPR) Number Powers and standard form Problem solving with FDPs Fractions, Decimals & Percentages Dividing using ratio/compound measures; speed; density Ratio Construction & loci; congruence & similarity; Pythagoras; angles in polygons Geometry: 2D Year 9 (AUT) Linear equations Alaebra Probability of events Statistics Number Calculations Algebra Expressions; linear equations; changing the subject of formulae Geometry Angles & polygons; bearings; construction & loci Year 8 (SUM) Statistics Averages; Stem leaf diagrams Rect areas; circles (circumf/area); 3D shapes/nets; vol of cuboids/prisms/cylinders; surface area; Geometry angles in polygons Year 8 (SPR) Algebra Real life graphs/rate of change Number Accuracy and estimation Data Univariate Data (mean, median, mode & range including grouped data); bivariate data: scatte Year 8 (AUT) Equivs; +/- fractions; prob solving involving fractions Fractions Form algebraic expressions; substitution; form/solve linear equations & inequalities linear graphs; Algebra linear sequences; nth terms; complex algebraic expressio Year 7 (SUM) Transformations; enlargement; translation; rotation; reflection Geometry: 2D shape Fractions Prime factor decomposition; LCM/HCF; square/cube roots; equivs; convert using 4 ops Percentages Convert FDPs; %s of amounts (increase/decrease); find original amount; in context problems Ratio & Proportion Ratio notation (fraction link); calculate with ratios Year 7 (SPR) Measuring/drawing/calculating angles (on a line & round a point); angle properties of parallel Geometry: 2D shape lines; classifying shapes; constructing shapes (ASA/SAS/SSS/right-angled); Cartesian plane coords; formulae for areas; areas from coords Year 7 (AUT) Number Positive & negative numbers; used in context; the four operations Algebra Sequences; nth terms; writing expressions; forming equations Year 6 (SUM) Convert units (length/mass/volume/time) from smaller to larger up to 3dp Measurement Find unknown angles in triangles/quads/reg polygons; recognise angles round a point/straight Geometry line/vert opp; coords on 4quads; translation; reflection Year 6 (SPR) SATs arithmetic & reasoning Summer investigations Percentages FDP equivs; find %s of amounts Statistics Interpret & construct pie charts and line graphs; calc means as an average Ratio & Proportion Solve problems involving missing values, unequal sharing, scale factors, similar shapes Year 6 (AUT) 🔷 Measures: Area/Perimeter/Vol Calculate areas of triangles/rects/parallelograms; vol of cubes/cuboids Geometry: 2D/3D shape Draw 2D shapes; recognise/build 3D shapes incl. nets; name parts of circle; find diam/radius Numbers up to 10,000,000; round any number; neg. no.s across zero Number: Place Value Factors/multiples/primes; mixed operations Number: Addition & Subtraction Algebra Use simple formulae; express missing no. problems algebraically; generate/describe linear no. .з 0.7 ThHTO x TO (formal); ThHTO ÷ TO (formal); remainders as fractions; order of operations Number: Multiplication & Division sequences; find pairs of no.s satisfying no. sent.s inv. two unknowns; poss of two variables Year 5 (SUM) x/\div by 10,100,1000 up to 3dps; compare/order; dec/fra equivs; simplify fractions; \pm /- with Fractions & Decimals **2** _{0.1} **2.2** diff denoms & mixed no.s; x fractions e.g. $\frac{1}{4} \times \frac{1}{2} = \frac{1}{8}$; \div fractions by integers e.g. $\frac{1}{3} \div 2 = \frac{1}{6}$ Decimals Read/write/order/compare no.s up to 3dp; round decimals to 2dp to 1dp/integer Geometry Identify 3D shapes from 2D representations; estimate/compare/measure/draw angles; identify acute/obtuse/reflex/round a point/straight line/multiples of 90°; calc missing angles within right-Year 5 (SPR) angles; distinguish between regular/irregular polygons; reflect/translate shapes Measurement Convert units of metric measure; use equivs of metric/imperial; estimate volume/capacity Formally multiply ThHTOxTO (or Os); formally divide ThHTO÷O using short division Number: Multiplication & Division Equivs; decimals as fr e.g. 0.71=71/100; % as parts/100; % as decimals; link 1000ths to Fractions, Decimals & Percentages 10 ths/100 ths; mixed no.s/improper fr convert; $\pm/-$ fractions writing answers ≥ 1 as mixed no.s; Year 5 (AUT) Compare/order/+/- fractions with denoms that are multiples of each other; multiply proper fractions $Number: Place\ Value\ \ Read/write/order/compare\ no.s\ to\ 1,000,000;\ know\ value\ of\ digits;\ count\ fwd/back\ in\ powers\ of\ digits$ of\ digits\ of\ digit & mixed no.s by integers; solve problems inv no.s up to 3dp requiring knowledge of %/dec equivs of $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{2}{5}$ and fractions with a denom of a multiple of 10 or 25 10; round any no. up to 1,000,000; interpret neg no.s; Roman Numerals to 1000 Number: Addition & Subtraction +/- no.s with more than 4-digits (both formally & mentally); multi-step probs Year 4 (SUM) Number: Multiplication & Division Multiples/factors/factor pairs/common factors of 2 no.s; primes to 19; prime factors; composite no.s; +/- fractions with same denom; round 1 dp decimals to n. whole no.; compare no.s with same decimal Fractions & Decimals square/cube no.s (use notation); x/\div mentally using known facts; x/\div integers by 10,100,1000 $\textbf{Measurement: Perimeter \& Area} \quad \textbf{Measure/calc perim of composite rect shapes; calc/compare area of rect/sq (use cm²/m² notation)}$ places up to 2dp; solve problems; divide quantities & link to fractions Solve measure/money problems inv. fra/dec to 2dp; estimate/compare; read/write/convert time Measurement: Money & Time Statistics Solve comparison/sum/diff probs from line graphs; complete/read/interpret tables & timetables between analogue/digital (12/24hr); convert hours-mins/mins-secs/years-months/weeks-days Year 4 (SPR) Interpret/present discrete/continuous data on bar charts/time graphs; solve comp/sum/diff probs Statistics Number: Multiplication & Division Formal TOxHTO; use distributive law to multiply 2-digit numbers by 1-digit Coords in 1st quad; translations as L/R/Up/Dn; plot/draw polygons on coord grid; compare/ Geometry Measurement: Area Measure/calc area of rects/squares by counting squares classify shapes (quads/tri); identify acute/obtuse angles; compare/order angles up to 180° ; Fractions & Decimals Count in hundredths; link to ÷100 & div tenths by ten; ÷10/100 (a 1 or 2-digit no.); know pv of Year 4 (AUT) identify lines of symmetry in 2D shapes in diff orientations; complete a symmetrical figure 2dp no.s; know decimal equivs of tenths/hundredths; recognise/show families of equiv fractions; recognise/write decimal equivs to 1/4, 1/2, 3/4 Know pv of 4-digit no.s; 1000 more/less; order/compare no.s 1000+; round any number to n. Number: Place Value $10,\!100,\!1000; \text{ count in mults of } 6,\!7,\!9,\!25,\!1000; \text{ count back into neg no.s; Roman Numerals to } 100$ +/- no.s up to 4-digits using formal method; use inverse ops; solve problems Number: Addition & Subtraction Year 3 (SUM) Recall all xtables to 12x12; x0, x1, ÷1, OxOxO; factor pairs; use commutativity Number: Multiplication & Division Fractions +/- fractions with same denom within one whole; compare/order unit fractions with same denom Convert between kilometres/metres; measure/calc perim of rects/squares by counting squares Measurement: Length & Perimeter Measurement Measure/compare/+/- lengths, mass, volume, capacity; tell 12/24 hr time (analogue); Roman Numerals: read time to nearest minute: vocab: o'clock/am/pm/noon/midnight: no. of secs in a Year 3 (SPR) minute/days in a month/year/leap year; compare durations of events Geometry Draw 2D shapes; make/recognise 3D shapes in different orientations; recognise angles as a Perimeter of simple 2D shapes; +/- amounts of money; give change; use £ and p in contexts Measurement property of a shape; identify right-angles & those greater/less than; horizontal/vertical/ Write/calculate statements for x/÷ mentally progressing to formal methods; solve missing no. problems Number: Multiplication & Division perpendicular/parallel lines Count in tenths; link to ÷10; recognise/find/write fractions of a set of objects: unti & non-unit fractions Year 3 (AUT) with small denoms; recognise & use fractions as numbers: unit/non-unit; use diagrams to show equive Interpret/present data in bar charts/pictograms/tables; solve 1-step & 2-step Qs from them Statistics $Number: Place \ Value \ \ Read/write/compare \ no.s \ up \ to \ 1000 \ (numerals/words); \ pv \ of \ 3-digit \ no.s; \ count \ in \ multiples \ of \ and \ an all \ an all \ and \ an all \ an$ 4/8/50/100; find 10 or 100 more/less than a given number Year 2 (SUM) 🦫 Number: Multiplication & Division Recall & use x/÷ facts for 3x, 4x and 8x Interpret/construct pictograms/tally charts/block diagrams/tables; ask/answer problems Statistics Order/arrange objects in patterns/sequences; describe position/direction/movement in a straight Geometry: Position & Direction line; rotation as turns: right-angles (quarter/half/three-quarter turns); clockwise/anticlockwise vocab Year 2 (SPR) Compare/sequence intervals of time; tell/write time to 5 mins incl. quarter past/to hour; know Measurement Number: Multiplication & Division Recall facts: 2x/5x/10x; recognise odd/even numbers; use x/÷ symbols in number sentences; number of minutes in an hour and hours in a day SATs commutativity of x but not \div ; use arrays, repeated addition & facts to solve x/\div problems Investigations $Fractions \quad \text{Recognise/find/name/write $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{4}$ and $\frac{3}{4}$ of a length/shape/set of objects/quantity; write} \\$ Year 2 (AUT) simple fractions e.g. $\frac{1}{2}$ of 6 = 3; recognise equivalence of two guarters and one half Geometry: Shape Properties of 2D shapes (sides/symmetry); 3D shapes (edges/vertices/faces); identify 2D shapes on the faces of 3D shapes use <, > and = signs; read/write no.s to at least 100 in numerals/words Measurement: Length & Height Estimate/measure length/height in any direction; mass; temp; capacity; compare/order use <> = Apply mental/written methods; use +/- facts to 20 fluently; use related facts up to 100; TO+0; Number: Addition & Subtraction Year 1 (SUM) TO+10s; TO+TO; O+O+O; commutativity; inverse to solve missing number problems Recognise/use pounds (£) and oence (p); combine amounts to make a particular value; find Measurement: Money Number: Place Value Count to/across 100, forwards/backwards, beginning with 0 or 1 or from any given number combinations that equal the same amount; solve practical problems Number: Multiplication & Division Reinforce multiples of 2, 5 & 10; solve 1-step x/÷ problems; use arrays Fractions Recognise, find & name a half as 1 of 2 equal parts of an object/shape/auantity Year 1 (SPR) 🌑 Recognise, find & name a quarter as 1 of 4 equal parts of an object/shape/quantity Geometry Describe position/direction/movement incl. whole, half, guarter & three guarter turns Within 50; multiples of 2, 5 & 10 included; count, read & write numbers to 100 in numerals; count Number: Place Value Measurement Money, time in multiples of 2s, 5s & 10s Know number bonds to 20 (and related subtraction facts); add/subtract 1-digit & 2-digit Number: Addition & Subtraction Year 1 (AUT) numbers to 20; solve 1-step problems involving \pm /- using concrete and pictorial representations and missing number problems such as $7 = \square - 9$ Number: Place Value Read/write numbers from 1 to 20 in numerals/words; identify & represent numbers using objects Solve length/height/mass/weight/capacity/volume problems; measure & compare; tell time to Measurement & pictorial representations incl. no. line; identify one more/less hour & half past; use language: hours/minutes/seconds/days of week/months/years; sequence Number: Addition & Subtraction Know number bonds to 10 (and related subtraction facts); read/write/interpret stater Reception (SUM) involving addition, subtraction & equals signs; add/subtract 1-digit & 2-digit numbers to 10 Geometry Recognise/name common 2D shapes (rect/squares/circles/triangles) Counting & recognition; exploring teen numbers Number and 3D shapes (cuboids/cubes/pyramids/spheres) Fewer/less than; counting on/back; doubling/halving; sharing Number: Addition & Subtraction Positional language Geometry Reception (SPR) Capacity (full/empty); money (recognition of coins/notes) Measurement Number: Place Value Counting & recognition Number: Addition & Subtraction Take away: what is left? Geometry 3D shapes Reception (AUT) Measurement Size/weight/capacity; time language: before, after, etc. Securing pre-counting skills; number recognition Number Finding the total by counting Number: Addition & Subtraction 2D shapes Geometry Nursery (SUM) Number Counting forwards/backwards (through songs); writing numbers (as/when ready) Number: Addition & Subtraction Addition/subtraction through more/less/fewer Measurement Introduce money; coin recognition; capacity (full/empty) Nursery (SPR) 8 ssss 9 ssss Geometry Beebots: forwards/backwards positional language Numbers to 10; numerals; counting out objects; sequencing numbers Number Shape recognition; within pictures/contexts (shape in the environment); positional language Geometry Sequencing (baby to adult); length: tallest/shortest Measurement Nursery (AUT) Number Sorting; rote counting; 1:1 correspondence; recognition of 0-5; ordering numerals Geometry Introduction to shape Measurement Longest/shortest; sequencing events; day/night; time language Number: Place Value Number: Addition & Subtraction Number: Multiplication & Division Fractions, Decimals & Percentages Ratio & Proportion

Algebra
Measurement
Geometry
Statistics