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| **Title of unit:** | Forming and Solving Equations |
| **Overview of unit:** | Function Machines  Solving Linear Equations  Solving Quadratic Equations   * Factorising * Quadratic formula * Completing the square   Iterations  Simultaneous Equations   * Linear * Nonlinear |
| **Cross-curricular/ extra-curricular links:** | Business Studies – formulae  ICT – use formulae to calculate and to interpret data in spreadsheets  PE – formulae such as BMI  Science – use formulae to calculate work, power, mass, density; rearrange formulae/equations |
| **Literacy/ numeracy links:** | Worded problems/exam questions  Keywords displayed on all PPts - equation, expression, term, linear, quadratic, cubic, formula(e), derive, rearrange, solution, trial and improvement, brackets, fraction, complete the square, factorise, quadratic formula  Written plenaries |

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| **Grade:** | **Learning objective:** | **Resources:** |
| **1** | Use function machines to solve basic linear equations. | [Function Machines](https://www.piximaths.co.uk/function-machines) |
| **2** | Solve simple linear equations.  Derive basic formulae from words. | [Solving one and two step linear equations](https://www.piximaths.co.uk/solving-linear-equations)  [Deriving equations and expressions](https://www.piximaths.co.uk/deriving-expressions-equations) |
| **3** | Solve linear equations with unknowns on both sides.  Solve linear equations with an unknown on one side with brackets.  Derive more complex formulae from words. | [Solving one and two step linear equations](https://www.piximaths.co.uk/solving-linear-equations)  [Solving linear equations with brackets](https://www.piximaths.co.uk/solving-linear-equations)  [Deriving equations and expressions](https://www.piximaths.co.uk/deriving-expressions-equations) |
| **4** | Solve linear equations with unknowns on both sides involving brackets.  Rearrange linear formulae. | [Solving linear equations with brackets](https://www.piximaths.co.uk/solving-linear-equations)  [Rearranging formulae/ changing the subject](https://www.piximaths.co.uk/rearranging-formulae) |
| **5** | Factorise and solve quadratics in the form ax² + bx + c = 0 where a = 1.  Solve linear simultaneous equations.  Rearrange formulae that include brackets, fractions and square roots.  Rearrange formulae where the variable appears twice. | [Factorising quadratics](https://www.piximaths.co.uk/solving-quadratic-equations)  [Linear simultaneous equations](https://www.piximaths.co.uk/solving-simultaneous-equations)  [Rearranging formulae/ changing the subject](https://www.piximaths.co.uk/rearranging-formulae) |
| **6** | Find approximate solutions to equations numerically using iteration.  Factorise and solve quadratics in the form ax² + bx + c = 0 where a > 1.  Solve quadratics using the quadratic formula. | [Iterations](https://www.piximaths.co.uk/iterations)  [Factorising quadratics](https://www.piximaths.co.uk/solving-quadratic-equations)  [Quadratic formula](https://www.piximaths.co.uk/solving-quadratic-equations) |
| **7** | Solve fractional linear equations with an unknown in the denominator.  Complete the square to solve quadratic equations. | [Solving algebraic fractions](https://www.piximaths.co.uk/algebraic-fractions)  [Completing the square](https://www.piximaths.co.uk/solving-quadratic-equations) |
| **8** | Solve fractional quadratic equations.  Solve a pair of simultaneous equations where one is nonlinear. | [Solving algebraic fractions](https://www.piximaths.co.uk/algebraic-fractions)  [Nonlinear simultaneous equations](https://www.piximaths.co.uk/solving-simultaneous-equations) |
| **9** | Use completing the square to find maximum and minimum values. | [Completing the square](https://www.piximaths.co.uk/solving-quadratic-equations) |