Knowledge Organiser for Year 4

Big question: How can we break down problems and use programming to design, test, and improve solutions?

National curriculum specification (KS2)
- Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller part   - Use sequence, selection, and repetition in programs; work with variables and various forms of input and output   - Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs

In this unit, the children will:
Develop their understanding of computer science as they create sequences and loops, decompose problems, and improve programs to meet specific needs. They'll investigate ways of accurately describing the decisions they've made when creating a program, carry out fair tests, and develop their ability to generate and debug multiple solutions. Students will recount experiences using relevant facts and descriptive details. This will help them to improve their communication skills.

Key vocabulary:	
Sequence	A set of instructions executed in a specific order to achieve a task.
Decompose	Breaking a complex problem into smaller, manageable parts.
Algorithm	A step-by-step set of instructions to solve a problem.
Computational thinking	A problem-solving approach involving decomposition, pattern recognition, abstraction, and algorithms.
Modify	Changing parts of a program to improve or adapt it.
Test	Running a program to check if it works as intended.
Loop	A programming structure that repeats a set of instructions until a condition is met.

Teacher Subject Knowledge:	
Best practices when using Lego Essentials Kit	**Rules**: Create classroom rules for hands-on work (e.g., only use elements from one set, use storage box lids as trays for working on/presenting/transporting models, ask peers for help first, guidelines for speaking/listening vs. working). **Tidy-up**: Reserve time for students to store or disassemble their creations. **Lost & found**: Create a "lost & found" jar for LEGO elements found on the floor. Students missing an element should look in the jar. **Evaluation**: Evaluate your lessons and reflect on the experience. Compare notes with a colleague or search social media for tips and tricks.

	• **Checking & sorting**: Regularly check and sort the sets. Use the element overview on "side 2" of the top card inside the storage box as a checklist. • **Exploration**: Allow time for your students to explore the tutorial activities under Start in the app. • **Grouping**: Decide the best way to group your students for effective collaborative learning.
Lesson objectives	Lesson 1: • Develop a sequence to solve a problem • Decompose problems into smaller parts • Recount an experience using relevant facts and descriptive details Lesson 2: • Identify and fix errors in a program (test and debug) • Explore two-dimensional shapes and angles • Recount an experience using relevant facts and descriptive details Lesson 3: • Describe the choices they've made when creating a program • Create and test automated solutions • Recount an experience using relevant facts and descriptive details Lesson 4: • Identify the parts of an existing program that should be modified • Carry out tests to identify where a program can be modified • Recount an experience using relevant facts and descriptive details Lesson 5: • Use sequences and loops to program their models • Identify and fix errors a program to ensure it works as intended (test and debug) • Recount an experience using relevant facts and descriptive details Lesson 6: • Improve a program to meet a specific need • Test and evaluate solutions to determine whether they meet a specific need • Recount an experience using relevant facts and descriptive details Lesson 7: • Apply computational thinking skills to solve a problem • Recount events using relevant details, clearly expressing their feelings and ideas
Resources	Student: LEGO® Education SPIKE™ Essential Set iPad with the LEGO® Education SPIKE™ App installed Teacher: Year 4 Unit Overview- Happy Traveler Training: https://education.lego.com/en-us/teacher-resources/lego-education-spike-essential/start-here/lego-education-spike-essential-start-here-prepare-to-teach#Choose%20Your%20First%20Lessons