



Integration Opportunities

History 2.10 Students will create a set of step by step directions to sort the roles of changemakers in Virginia.

Science 2.4a,b Students will create an algorithm to model a plant or animal life cycle.

Physical Education 2.e Have students demonstrate moving to a rhythm by planning and creating step-by-step instructions for a basic dance sequence with simple repetition.

2.AP.2 Algorithms and Programming

The student will plan and implement algorithms that consist of events and loops using a block-based programming language. (a) Plan and create a design document to guide the construction of a program using plain language or pseudocode. (b) Identify a section of repeated actions within an algorithm and replace it with a loop. (c) Construct step-by-step instructions that include events and repetition.

Understanding the Standard

In second grade, students continue to create step-by-step instructions, called algorithms, guiding both humans and computers to complete tasks. Students develop problem-solving skills and think logically by breaking down tasks into smaller steps (called "decomposition"). They also explore how they might incorporate repetition into algorithms to make them more efficient. The process of planning, creating, and testing a program or algorithm is called "programming" and is used to create a wide variety of products such as video games, interactive art projects and digital stories. In second grade, students learn to create simple programs using sequencing (putting steps in order), simple loops (repeating steps), and events (actions or things that can happen that the program can detect, like mouse clicks or keystrokes).

Term	Definition
Sequence	An ordered set of instructions.
Loop	A set of actions repeated until a condition is met.
Event	Something that causes a portion of a program to run (e.g., a mouse click).

Prerequisite Knowledge

Students should have a foundational knowledge of following step-by-step instructions and some experience with writing step-by step instructions with simple repetitions.

Summary of a Lesson

Demonstrate an algorithm by having students give you step-by-step instructions to accomplish a task (e.g. making a sandwich, pouring water into a cup, etc). As students give instructions on how to accomplish the task, follow the instructions exactly (even if this leads to problems). Have students edit the instructions until they work properly. Explain to students that what they created is an "algorithm". Algorithms are step-by-step instructions. Break students into groups, provide each group a different shape. Ask students to work as a group to create an algorithm (step-by-step instructions) to draw the shape. Once students have completed their algorithms, students will switch with another group to see if the group can draw the shape by following their algorithm.

