Algorithms & Programming: Variables   Grade: 2

Standard 2.AP.V .01
Model the way programs store and manipulate grade-level data by using numbers or other symbols to represent information (e.g., encode or decode words using numbers, pictographs or symbols to letters, words, or direction).

Essential Skills
Encode or **decode** messages that use representations such as arrows, pictographs, etc. when given a key.

Essential Questions
What are examples of symbols we use to give each other information?
Why is it useful to use symbols to represent information?

Explanation
Students will model the ways computers store information by using representations for real world information. Thumbs up/down can represent yes/no, letters and musical notes represent sounds, arrows represent directions; "secret" codes can be created for letters or words using numbers or other symbols. Note: Despite the name of the standard, it is not essential to use the term variable at this stage

Think of this as similar to….
Emojis are used to let people know how you are feeling.

Implementation Examples—What would this look like in the classroom?

Title	Description	Link	Content Connection & Notes
Dancing Alone	**Grade K**--Students use Scratch Jr. to create a silly dance for Scratch Cat using motion blocks. Students are introduced to creating sequences of code in Scratch Jr. Students should demonstrate an understanding that the coding blocks determine what the Scratch Cat does. **Grade 1**--Students should be able to identify a number of the code blocks and describe what they ""tell"" the Scratch Cat to do. **Grade 2**: Students should look at a sequence of code blocks and describe what the Scratch Cat will do; conversely, they should be able to watch the Scratch Cat do a simple dance and be able to make a reasonable guess of a code that could be used to accomplish that dance. "	Dancing Alone	This lesson also aligns with **CS** AP.C.01, AP.PD.01, AP.PD.03 and AP.PD.04 and is similar to Getting Loopy
Graph Paper Programming	**Grade 2**-- Student "program" one another to draw pictures by using symbols to instruct each other to color squares on graph paper in an effort to reproduce an existing picture. Each student should get an opportunity to both encode the picture, by translating the picture into symbols, and decode the picture by using the symbols a classmate to try to recreate the original picture.	Graph Paper Programming	
Classroom Map Symbols	**Grade 2**--Students identify symbols on a map and decode and explain what they represent in the real world, Students then use the symbols, or create their own symbols and create a corresponding legend. They create a map and use the symbols to encode what makes their school community unique. Students write directions for visitors to the school community so they can visit the human-made features of interest.		This lesson also aligns with **SS** 2.2 Geography: Place; 2.6 Skills and Processes: Applying Disciplinary Concepts and Tools

Standard: AP.V.01 Grade: 2
These annotations are a collaboration between Maryland Center for Computing Education and the Maryland State Department of Education.