Grade 4 Early Assessment - Teacher Resource

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Front Matter

This assessment includes 9 items from four CT topics (1 Decomposition item; 4 Variables; 2 Conditional items; 2 Sequencing items). Four items (#1, #6, #8, and #9) use images of the Scratch interface and/or Scratch blocks.

Each item has an exemplar response(s) and a scoring guide and/or rubric included (and when applicable, other information to help with interpreting student responses). The scoring guidance and rubrics were developed by our project to assist in coding and interpreting student responses, and are explicitly focused on using student responses to make inferences about the relevant knowledge, skills, and abilities that we identified from the learning trajectories and built into our item design process. As such, other end users of these assessment instruments may choose to adapt the scoring guidance and/or rubrics to match their purposes and students.

Two of these items (#6 and #9) have associated rubrics. Further details on these rubrics are provided in the items' details.
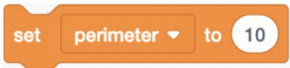
Items

#01

Item

In Problems 1 and 2, circle True or False.

1) In this Scratch block, `set perimeter ▾ to 10`, Alt Text Description: [Variable block: sets a variable named perimeter to 10] "perimeter" is a variable.

- **True**
- **False**

Exemplar response(s)

True

Scoring Guidance

- True=1
- False= 0

Rubric(s)

None

#02

Item

In Problem 2, circle True or False.
2) A computer program cannot be broken down into smaller parts.

- **True**
- **False**

False

- True=0
- False=1

None

#03

- Item code: V.03.b
- Trajectory: Variables

3) A formula for calculating the perimeter of a rectangle is
$$perimeter = \ length+width+length+width.$$
In this formula, what term do we use to describe *length*?
- A. Loop
- B. Sprite
- C. Variable
- D. Block

C

- Choice "C"=1
- Any other choice= 0

None

#04

- Item code: C.06.a
- Trajectory: Conditionals

Item

4) Fill in the blanks to make conditional statements that are valid.
    A. If _____, then put on a jacket.
    B. If I see a spider, then _____.

Exemplar response(s)

    A. If {condition} then put on a jacket.
    B. If I see a spider, then {action}.

Scoring Guidance

- "condition","action"=1
- "action","condition", any other answer = 0
- score in two parts (part a and part b)
- "condition" must be a condition, an action is not a valid response for making a conditional statement

Rubric(s)

None

#05

- Item code: C.01.a
- Trajectory: Conditionals

Item

5) Which statement is a conditional?
    A. If number is 10, then say "hello world".
    B. If number is 10.
    C. Repeat 2 times: Say "hello world" for 2 seconds.
    D. Say "hello world" for 2 seconds.
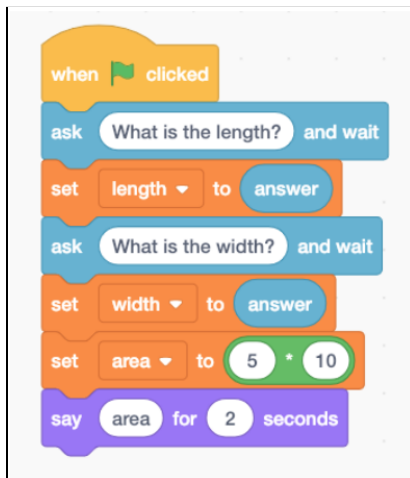
Exemplar response(s)

A

#06

Meta-data

- Item code: V.07.c
- Trajectory: Variables

Item

6) Helena wrote this code.
How would you change the code so that it would use the user input for length and width of a rectangle to calculate the area of that rectangle?

Alt Text Description: [A script displays blocks in the following order:
1. Event block: when the green flag is clicked
2. Sensing block: asks user to input a value (asks "What is the length"?)
3. Variable block: sets a variable named length to the user input value
4. Sensing block: asks user to input a value (asks "What is the width"?)
5. Variable block: sets a variable named width to the user input value
6. Variable block: sets a variable named area equal to the product of two variables (which contain the values 5 and 10)
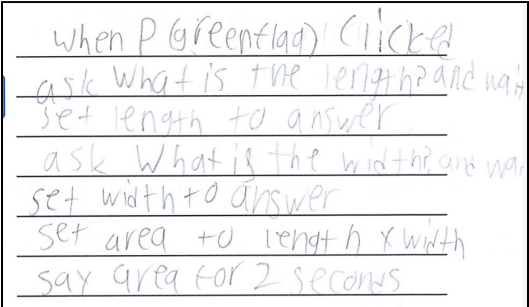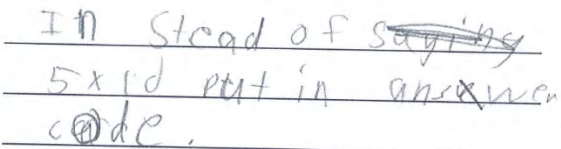7. Looks block: say the value of the area variable for 2 seconds

In the block "set area to 5 x 10" I would replace the 5 with the length variable and the 10 with the width variable.
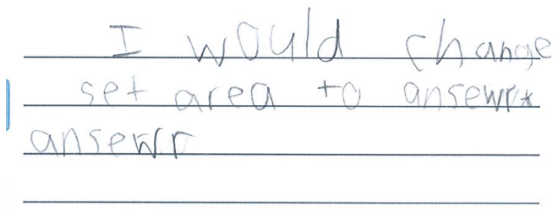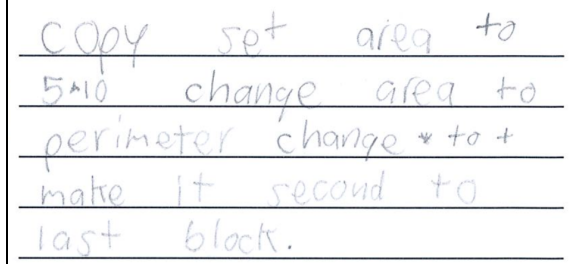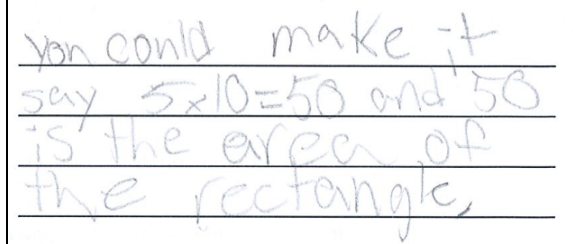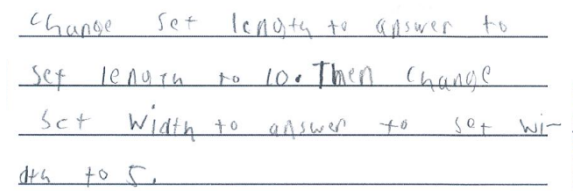
Scoring Guidance

See Rubric

Rubric(s)

This rubric allows partial credit to allow for student responses that seem to demonstrate some understanding and ability to modify existing code to replace constants with variables, even if they did not replace all constants correctly.

	Description	Example
2	Replaces each value (5 & 10) with a different variable (width and length)	Alt Text Description: [The student writes: when green flag clicked, ask what is the length and wait, set length to answer, ask what is the width and wait, set width to answer, set area to length x width, say area for 2 seconds.]
1	Replaces one value (5 or 10) with a variable (width, length), or replaces one or both values (5 and/or 10) with the answer variable	Alt Text Description: [The student writes: instead of 5*10 put in answer code.]

		Alt Text Description:[The student writes: I would change set area to answer*answer.]
0	Anything else	Alt Text Description:[The student writes: copy set area to 5*10, change area to perimeter, change * to +, make it second to last block.]
		Alt Text Description:[The student writes: you could make it say 5*10=50 and 50 is the area of the rectangle.]
		Alt Text Description:[The student writes: change set length to answer to set length to 10. Then change set width to answer to set width to 5.]

#07

Item

7) Paula bought her 6 friends each an ice cream cone and is taking them over to her friends. She can only carry 4 cones at once. One way to carry the cones is listed below. Write two other ways that Paula can carry the cones without dropping them.

Example:
- Carry 2 cones to her friends
- Carry 1 cone to her friend
- Carry 3 cones to her friends

One way:

Another way:

Exemplar response(s)

One way
> *Students can provide any combination such that when summed they equal 6, but no step can exceed 4 cones.

> Example 1
> - Carry 4 cones to her friends
> - Carry 2 cones to her friends

> Example 2
> - Carry 3 cones to her friends
> - Carry 2 cones to her friends
> - Carry 1 cone to her friends

Another way
> *Students can provide any combination such that when summed they equal 6, but no step can exceed 4 cones.

> Example 1
> - Carry 3 cones to her friends
> - Carry 1 cones to her friends
> - Carry 1 cone to her friends
> - Carry 1 cone to her friends

> Example 2
> - Carry 1 cone to her friends
> - Carry 1 cone to her friends

- Carry 2 cones to her friends
- Carry 2 cones to her friends

Scoring Guidance

- 2 correct ways=1
- Incorrect way(s)/only 1 way=0
- For a response to be correct, must specify how all 6 cones are carried (i.e., # of trips and how many cones to carry on each trip).
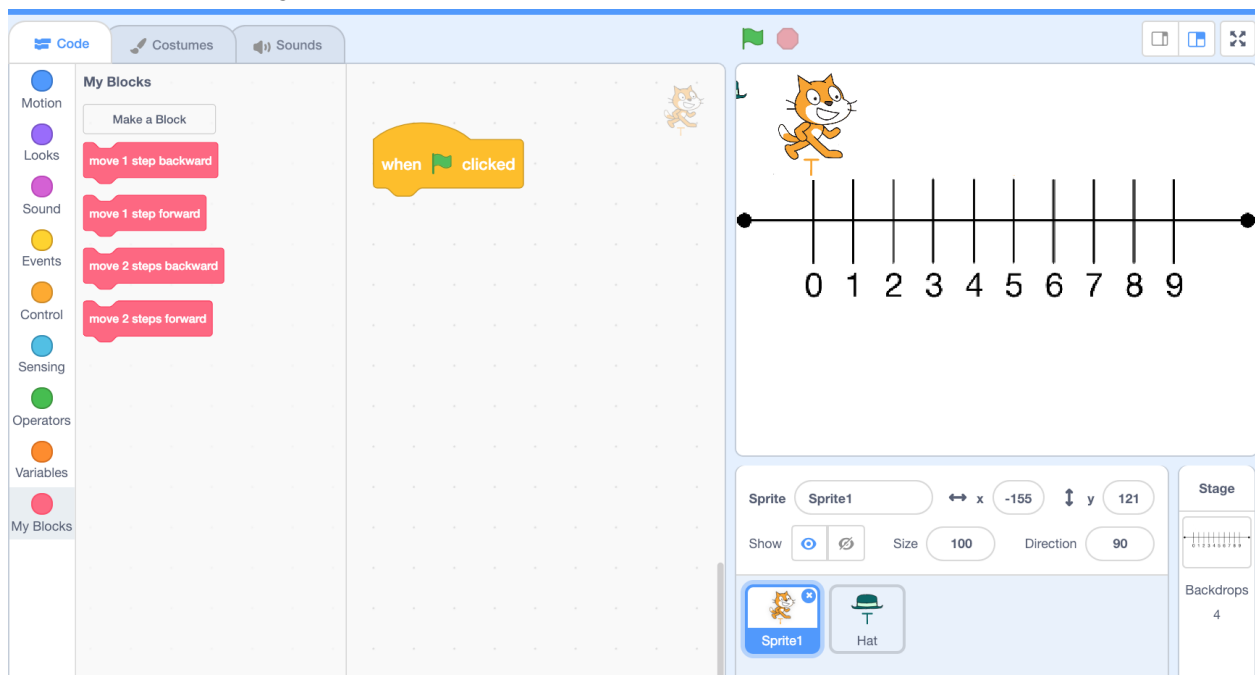
Rubric(s)

None

#08

Meta-data

- Item code: S.01.a
- Trajectory: Sequence

Item

8) Create 2 different scripts (sets of instructions) to move the cat so that he stops at 5 on the number line. **Use only the blocks shown above.**

Alt Text Description: [A Scratch environment displays the following independent blocks in the "Make a Block" section:

- move 1 step backward

- move 1 step forward
- move 2 steps backward
- move 2 steps forward

In the workspace section a "when the green flag is clicked" event block is displayed. In the stage section a number line ranging from 0 to 9 with a cat on position 0 is displayed.]

Write or draw your script below.

Script A _____

Alt Text Description: ["when the green flag is clicked" event block]
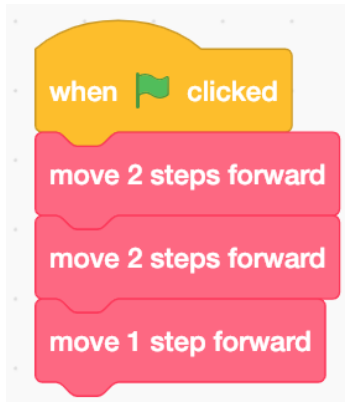
Script B _____

Alt Text Description: ["when the green flag is clicked" event block]
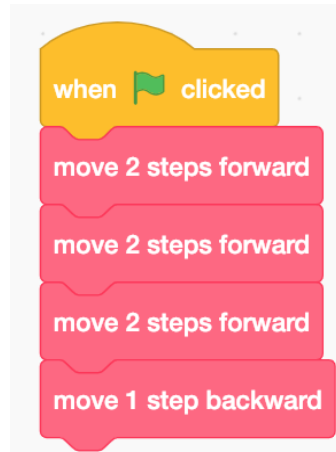
Exemplar response(s)

Script A _____

Alt Text Description: [A script displays blocks in the following order:
1. Event block: when the green flag is clicked
2. move 2 steps forward
3. move 2 steps forward
4. move 1 step forward]

Script B _____

Alt Text Description: [A script displays blocks in the following order:
1. Event block: when the green flag is clicked
2. move 2 steps forward
3. move 2 steps forward
4. move 2 steps forward
5. move 1 step backward]

Note: Any combination of forward and backward steps is acceptable as long as the cat stops at 5.
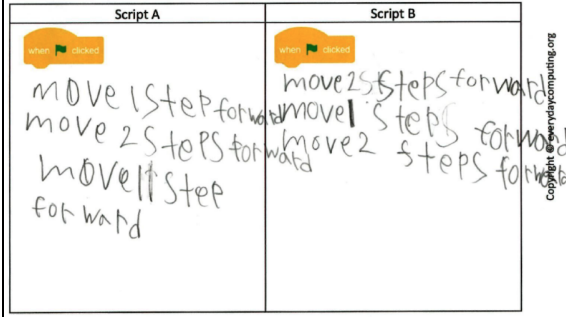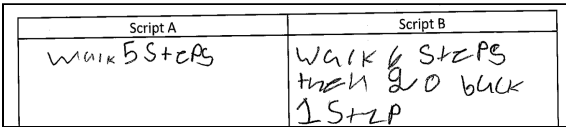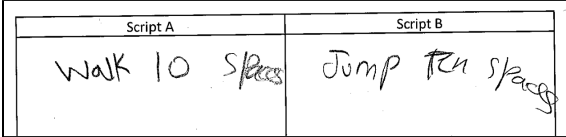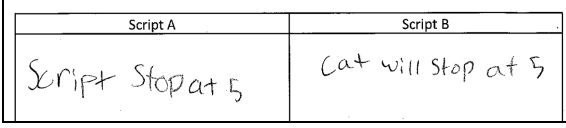
Scoring Guidance

See Rubric

Rubric(s)

This rubric focuses on two important features of this item that relate back to this item's design principles: (1) did the students use the given blocks to achieve the intended outcome and (2) did the students show two different code blocks that would both produce the same intended outcome? The rubric creates different levels of performance based upon those two features.

Score	Description	Example
3	Provides 2 correct ways to get to 5 using the **given*** blocks	Alt Text Description: [The student writes responses for Script A and Script B. They provide the following steps for Script A: ● Move 2 forward ● Move 2 forward ● Move 1 forward They provide the following steps for Script B: ● Move 2 forward ● Move 2 forward ● Move 2 forward ● Move 1 backward] Alt Text Description: [The student writes responses for Script A and Script B. They provide the following steps for Script A: ● Move 2 forward ● Move 2 forward ● Move 1 forward They provide the following steps for Script B: ● When flag is clicked ● Move 1 step ● Move 1 step ● Move 1 step ● Move 2 steps]

2	Provides 1 way to get to 5 with the **given*** blocks [Clarification: The students' 2nd way might be correct (but using not given blocks), or might be incorrect (using either given or not given blocks) or might be blank.]

Alt Text Description: [The student writes responses for Script A and Script B. They provide the following steps for Script A:
● Move 1 step forward
● Move 2 steps forward
● Move 1 step forward
They provide the following steps for Script B:
● Move 2 steps forward
● Move 1 step forward
● Move 2 steps forward] |
| 1 | Provides 2 correct ways to get to 5 using blocks that are **not given*** |

Alt Text Description: [The student writes responses for Script A and Script B. For Script A they write: walk 5 steps. For Script B they write: walk 6 steps then go back 1 step] |
| 0 | Shows incorrect block usage (cat will not reach Step 5), or provides only 1 way to get to 5 with blocks that are **not given*** |

Alt Text Description: [The student writes responses for Script A and Script B. For Script A they write: walk 10 spaces. For Script B they write: jump ten spaces]

Alt Text Description: [The student writes responses for Script A and Script B. For Script A they write: script stops at 5. For Script B they write: cat will stop at 5] |

Note. "Given block" means that the student is constrained to using commands that move the cat

either 1 or 2 steps, in either a forward or backward direction.

- ***Given blocks** define a limited number of steps and directions. Valid options are 1 step backward; 1 step forward; 2 steps backward; 2 steps forward.
- ***Non-given blocks** would be other blocks (e.g., "repeat 5 times") or blocks that do not use the defined number and direction (e.g., "move 5 steps forward").
- A student's response can alter the wording and it can still be considered a "given block", as long as it represents a valid option (e.g., "1 step backward", "1 step back", "1 back", etc., are acceptable)
  - A command like "step forward" with no number of steps can be assumed to indicate 1 step forward, but no more and no less.
  - A command like "move 1 step" can be assumed to mean forward if no direction is given, but should not be assumed to mean backward.
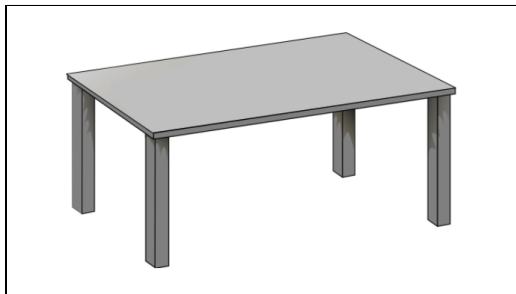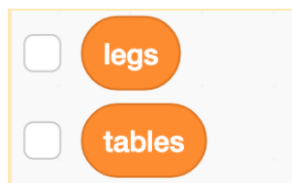
#09

Meta-data

- Item code: V.14.a
- Trajectory: Variables

Item

9) A factory makes tables. Each table has 4 legs. Write instructions to program a computer to ask for the number of tables and then say the number of legs needed. Pretend that the computer has variables named "tables" and "legs."

[Alt Text: A table with 4 legs]

[Alt Text: one reporter block of a variable named legs and one reporter block of a variable named tables, both with a preceding blank box.]

Your instructions:

Exemplar response(s)

1. Ask for number of tables
2. Set "tables" variable to the answer/ number
3. Set "legs" variable equal to 4 x "tables"
4. Say "legs"

Scoring Guidance

- Code "features" of the student response individually:
  - Feature 1: Student's instructions asks the user to input a value (e.g., tables) = 1
  - Feature 2: Student's instructions store a value in a variable (i.e., assignment) = 1
  - Feature 3: Student's instructions perform a calculation using a variable (e.g., tables x 4) = 1
  - Feature 4: Student's instructions outputs the value in a variable (e.g., say legs) = 1

Rubric(s)

None