

**Teacher:** Iulian J Irimina

**Unit: 1** Intro to Programming, Modern art with programing

**Level:** AP CSP, 10th grade

**AIM:** Trace the values of variables in a loop

**Essential Question:** [Danielson 1c] How can tracing a variable in a loop help us with the control flow of our program?

**Standards:** [Danielson 1c] Develop a program that effectively uses control structures in order to create a computer program for practical intent, personal expression, or to address a societal issue.

**Materials:** [Danielson 1d, 1e, 3c] computers, Snap code editor, paper/pencil

**Do Now/Warm-up Activity ( 5-8 minutes):** [Danielson 3d]

*(Reinforce prior learning, connecting activity to the day's lesson, activity should be engaging)*

1. When is a good idea to use a loop in your program?
2. Can we draw some rules about when to use a loop? Look at these blocks and jot down some notes about what each does and when it would be useful to use.



Students check with each first in pairs.

**Mini Lesson – Step by Step Procedures ( 10 minutes):** [Danielson 1a , 3a]

**Teach/Model (You do):** Teacher models and demonstrates while talking aloud her/his thing process, steps, etc.

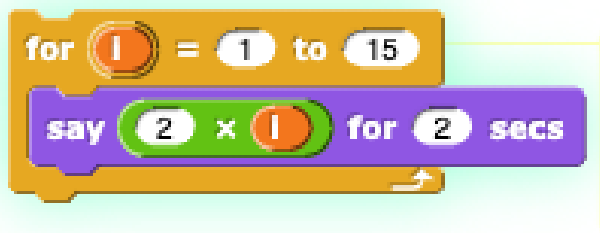
**Teach using Live demo strategy :**

A trace table is a tool used to test algorithms, and make sure that no logical errors occur while the algorithm is being processed. It can be essential in helping you understand how an algorithm works.

It is useful to keep track of variables, especially if they are changed in for loops, while an algorithm is executed.

**Previous example demo:**

Methods 1  
Hunter

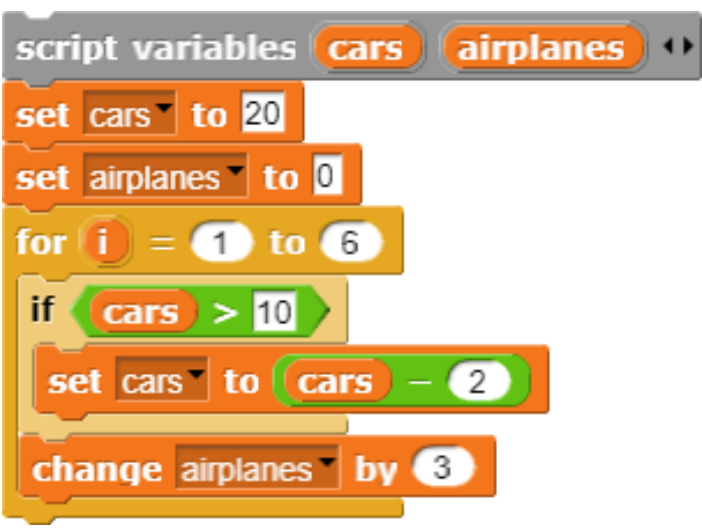


i	value
1	2

What is the value of i when 10 seconds have passed?

**Guided Practice (*We do*):** [Danielson 3c, 3d]

Using a Trace table



Consider the above code:

The following is a sample trace table for this code:

Iteration i	cars	airplanes
(initial value)	20	0
1	18	3
2		
3		
4		
5		
6		

What would values be in the remaining rows?

**Work Period (*They do*) ( 30 minutes): [Danielson 1e, 2b, 2c]**

**Exercise 1.** Examine the code. Fill out the trace table for each iteration. Add more rows if necessary.

Iteration i	iphones
(initial value)	
3	

```

script variables iphones
set iphones to 1
for i = 3 to 12
  if iphones > 6
    set iphones to iphones + 2
  else
    set iphones to iphones + 1
  
```

-----scroll down -----

### Exercise 2

Note: Mod function means remainder.  $4 / 2 = 2$  with 0 remainder. So  $4 \bmod 2 = 0$ .  
Since  $3 / 2$  is 1 remainder 1.  $3 \bmod 2 = 1$ .

Iteration i	candy	pumpkins
(initial value)	<b>0</b>	<b>20</b>
1		
2		
3		
4		
5		
6		

### Exercise 3

More For Loop  
Practice

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## Methods 1

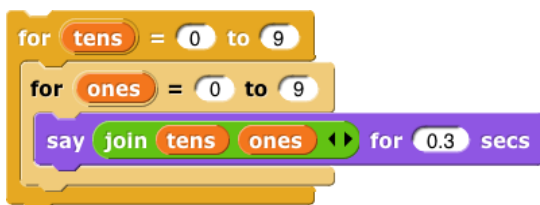
### Hunter

After building this script per the lab:



Modify it so that the sprite says 0, 2, 4, 6, 8, ... up through 30. Provide a script pic:

Predict what this script will do before you try it:



What was your prediction?

Was your prediction correct? If no, explain where you may have had a misunderstanding.

**Support:** Teacher-student team support. Students benefit from the partner work, notes and feedback from the computer.

**Strategic:** Students discuss tracing tables with a partner and share out choices in their groups.

**Enrichment:**

**Share ( 5 minutes):** [Danielson 1c] Students share out with the larger class.

**Summary:** [Danielson 3c, 3d, 4a] This lesson is aimed at providing students more practice with variables and loops, especially tracing variables.

**Homework/Follow-up Activity:** [Danielson 3d]