

Code Handout

Description

Here, you will find screenshots of the code used in the simulations. Students can use this code to make the predator-prey simulation which is a graphic representation of what happens when the population of certain species is changed. There are also screenshots of the simulation that enables students to input numbers and see what happens to the populations of predators and prey over time.

<https://www.codesters.com/preview/ef72685cc1054a30aab873f67ca804dc/>

Both simulations are coded in Python using the Codesters platform found here:

<https://www.codesters.com/project/>

Predator and Prey Simulation:

The screenshot shows the Codesters interface for a project titled "PREDATORS AND PREY". On the left, there is a preview window showing an underwater scene with a shark, a turtle, and a lobster. Below the preview, the project name "predators and prey" is displayed, along with the user's name "Kate" and a share button. On the right, the code editor shows the following Python code:

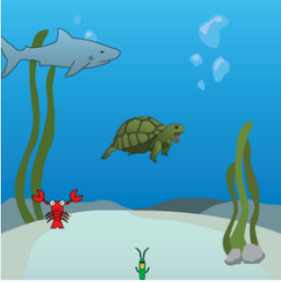
```

1 stage.set_background("underwater")
2
3 shark = codesters.Sprite("shark")
4 shark.go_to(-150, 150)
5
6 turtle = codesters.Sprite("turtle2")
7 turtle.go_to(0, 0)
8 turtle.set_size(1.3)
9
10 lobster = codesters.Sprite("lobster_e21")
11 lobster.set_size(.7)
12 lobster.go_to(-150, -125)
13
14 plankton = codesters.Sprite("plankton_9ec")
15 plankton.set_size(.5)
16 plankton.go_to(0, -225)
17
18 def click(sprite):
19     shark.set_size(1.1)
20     turtle.set_size(0.9)
21     lobster.set_size(1.1)
22     plankton.set_size(.9)
23     # add other actions...
24
25 shark.event_click(click)
26
27 def click(sprite):
28     turtle.set_size(1.1)
29     shark.set_size(1.1)
30     lobster.set_size(0.9)
31     plankton.set_size(1.1)
32     # add other actions...
33

```

CODESTERS PREDATORS AND PREY

< Back to Projects



predators and prey

Kate

24

0

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```

24
25 shark.event_click(click)
26
27 def click(sprite):
28     turtle.set_size(1.1)
29     shark.set_size(1.1)
30     lobster.set_size(0.9)
31     plankton.set_size(1.1)
32     # add other actions...
33
34 turtle.event_click(click)
35
36 def click(sprite):
37     lobster.set_size(1.1)
38     turtle.set_size(1.1)
39     shark.set_size(1.1)
40     plankton.set_size(0.9)
41     # add other actions...
42
43 lobster.event_click(click)
44
45 def click(sprite):
46     plankton.set_size(1.1)
47     lobster.set_size(1.1)
48     turtle.set_size(1.1)
49     shark.set_size(1.1)
50     # add other actions...
51
52 plankton.event_click(click)
53
54
55
56

```

Graphing Populations:

```

1 # Get USR Input:
2 goodX0 = 0
3 while goodX0 == 0:
4     print("Enter Starting Prey Population:")
5     x0 = int(input("There must be at least one prey!"))
6     if x0 > 0:
7         goodX0 = 1
8
9 goodY0 = 0
10 while goodY0 == 0:
11     print("Enter Starting Predator Population:")
12     y0 = int(input("There must be at least one predator!"))
13     if y0 > 0:
14         goodY0 = 1
15
16 goodB = 0
17 while goodB == 0:
18     print("Enter Prey Birth Rate (enter whole number ie, 75% = '75'):")
19     b = int(input("Birth rate cannot be above 99% or below 1%"))
20     if b > 0:
21         if b < 100:
22             goodB = 1
23
24 goodH = 0
25 while goodH == 0:
26     print("How many prey must a predator eat to survive a year?")
27     H = int(input("Predators must eat at least one prey to survive!"))
28     if H > 0:
29         goodH = 1
30
31
32 print("Starting Prey: " + str(x0))
33 print("Starting Predator: " + str(y0))

```

```

32 print("Starting Prey: " + str(x0))
33 print("Starting Predator: " + str(y0))
34
35
36 gen = 0
37 xT = x0
38 yT = y0
39 xTemp = 0
40 yTemp = 0
41
42 while gen < 15:
43     print("Year: " + str(gen + 1))
44     xTemp = xT + b*xT/100
45     #print("TEST 1 " + str(xTemp))
46     xTemp = xTemp - H*yT
47     #print("TEST 2 " + str(xTemp))
48     yTemp = yT / 4
49     #print("TEST 1y " + str(yTemp))
50     yTemp = yTemp + xT/H
51     #print("TEST 2y " + str(yTemp))
52
53     if xTemp <= 0:
54         xTemp = 0
55
56     if yTemp <= 0:
57         yTemp = 0
58
59
60 print("    Prey: " + str(xTemp))
61 print("    Predator: " + str(yTemp))
62 xT=xTemp
63 yT=yTemp
64 gen += 1

```

Example of data generated:

```

-249,483
Enter Starting Prey Population:
(There must be at least one prey!)

100000
Enter Starting Predator Population:
(There must be at least one predator!)

50
Enter Prey Birth Rate (enter whole number ie, 75% = '75'):
(Birth rate cannot be above 99% or below 1%!)

90
How many prey must a predator eat to survive a year?
(Predators must eat at least one prey to survive!)

2
Starting Prey: 100000
Starting Predator: 50
Year: 1
    Prey: 189900.0
    Predator: 50012.5
Year: 2
    Prey: 260785.0
    Predator: 107453.125
Year: 3
    Prey: 280585.25

```