The Mystery of the AGOUTI and the OCELOT

## A C T I V I T Y

Activity Overview

The agouti is a large rainforest rodent and a favorite prey of the ocelot. The agouti can run fast, swim and hide from its enemies. It has powerful rear legs that allow it to bounce through the underbrush. Agoutis are always alert to possible predators and ready to run away at the first sign of danger.

The Barro Colorado Island (BCI) provides researchers with the opportunity to study mammals like the agouti and the ocelot in their natural setting. Using tools, such as radio telemetry, researchers have been able to gain a great deal of knowledge about these and other mammals. Radio telemetry involves the use of transmitters and receivers to track the movement of the animals. The researchers, using a method called triangulation, then change the information received into map coordinates. The researchers use the map coordinates to determine the location of the animal they are tracking at different times of the day by plotting the coordinates on a map of the area the animals traveled.
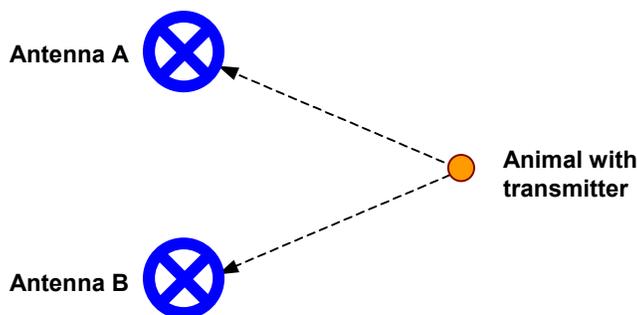
In this activity, you will use the TI-84 and a set of XY coordinates to map the locations of an agouti and an ocelot at one-hour intervals from 12:00 pm until 5:00 pm. After determining the locations of the animals, you will use the information to draw conclusions about each animal's movements and actions during certain time intervals.

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Part A — Tracking the Agouti

The XY coordinates (*ordered pairs*) for the path of the agouti can be found in **Table 1**. Using the instructions provided and the TI-84, plot a graph of the locations of the agouti and record the answers to the analysis questions into your journal.

Table 1

Time	X	Y
12:00 PM	1	2
1:00 PM	6	5
2:00 PM	7	6
3:00 PM	10	7
4:00 PM	12	6
5:00 PM	12	6

TI-84

Procedure

1. **Prepare the TI-84 .**
   a. Clear y= of all equations
   b. Press STAT and clear any data in Lists 1-4.

2. **Enter the coordinates in the TI-84.**
   a. Press STAT, 1.Edit
   b. Enter the X coordinates for the agouti's position in **L1**. After entering each number press ENTER.
   c. Enter the Y coordinates for the agouti's position in **L2**. After entering each number press ENTER.

```
NORMAL FLOAT AUTO REAL RADIAN MP

L1     L2     L3     L4     L5      3
1      2      ------ ------ ------
6      5
7      6
10     7
12     6
12     6
------ ------

L3(1)=
```

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3. **Graph your coordinates.**

   a.   Press 2nd [STAT PLOT] 1 ENTER ▼ ▶ ENTER to select line graph (〰).
   b.   Press ▼ 2nd [STAT] 1 to select **L1** (agouti's X coordinate) for the X-axis.
   c.   Press ▼ 2nd [STAT] 2 to select **L2** (agouti's Y coordinate) for the Y-axis.
   d.   Press GRAPH to see the plot.
   e.   Use WINDOW to set minimum and maximum values to adjust the scale on your graph.

```
NORMAL FLOAT AUTO REAL RADIAN MP
Plot1 Plot2 Plot3
█ Off
Type:〰 ▱ ⊿ ⊞ ⊞ 〰
Xlist:L₁
Ylist:L₂
Mark: ▣ + · ·
Color:  BLUE
```
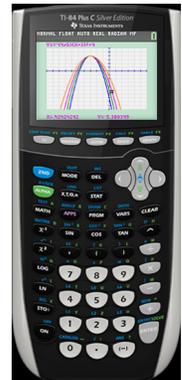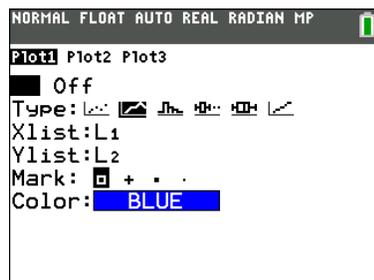
4. Complete the Data Analysis section. Answer the questions in your *Journal.*

Data Analysis

1 During which time interval was the distance between the starting and ending locations the greatest? Explain your thinking.

2 During which time interval was the distance between the starting and ending locations the least? Explain your thinking.

3 Does the data suggest that the agouti was moving faster during the 12:00 pm to 1:00 pm time interval or the 2:00 pm to 3:00 pm time interval?

4 Using the radio telemetry data collected, the researchers were able to determine that the agouti was actually moving at the same speed during the interval between 1:00 pm to 2:00 pm as it was during the interval 12:00 pm to 1:00 pm. What reason might explain why the distance between the 1:00 pm and 2:00 pm locations was smaller than the distance between the 12:00 pm and 1:00 pm locations?

5 Using the information provided about agoutis in the research article and the locations of the agouti, write a brief story describing what may have happened while the agouti traveled along its path during the five-hour time interval.

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TI-73 Explorer™

Part B — Tracking the Ocelot

Procedure

The XY coordinates (*ordered pairs*) for the path of the ocelot can be found in **Table 2.** Using the instructions provided and the TI-84, plot a graph of the locations of the ocelot and record the answers to the analysis questions into your journal.

Table 2

Time	X	Y
12:00 PM	8	1
1:00 PM	15	3
2:00 PM	5	3
3:00 PM	11	5
4:00 PM	14	8
5:00 PM	10	12

1. **Enter the coordinates in the TI-84.**

a. Press STAT, 1.Edit. Use the arrow key ▶ to scroll to **L3**.

b. Enter the X coordinates for the ocelot's position in **L3**. After entering each number, press ENTER.

c. Enter the Y coordinates for the ocelot's position in **L4**. After entering each number, press ENTER.

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2. **Graph your coordinates.**

  a.   Press 2nd [STAT PLOT] 2 ENTER ▼ ▶ ENTER to select line graph (L⌃).
  b.   Press   ▼ 2nd [3} to select **L3** (ocelot's X coordinate) for the X-axis.
  c.   Press ▼ 2nd 4 to select **L4** (ocelot's Y coordinate) for the Y-axis.
  d.   Press GRAPH to see the plot. The paths of both animals can be seen.

```
NORMAL FLOAT AUTO REAL RADIAN MP      ▯
Plot1 Plot2 Plot3
On Off
Type: ⌐∙ ⌐▲ ⊥ₕ ⊞∙∙ ⊞⊞ ⌐▱
Xlist:L₃
Ylist:L₄
Mark: □ ✚ ∙ ∙
Color:    RED
```
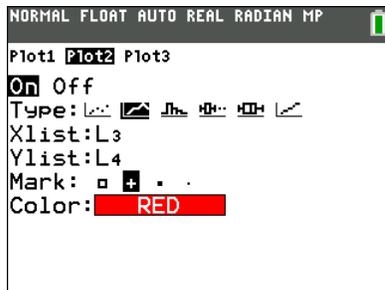
  e.   Press WINDOW to adjust the scale to display the entire paths of
       both animals.

3. Use the TRACE key and toggle between the plots to explore the relationships
between the graphs. Complete the Data Analysis section.
Answer the questions in your *Journal.*

Data Analysis

Note: It may be helpful to make a draft sketch of the paths of the two animals in
your *Journal*. If you place the time next to each point, it will be easier to analyze
the data.

6   During which time interval was the distance between the starting and ending
locations of the ocelot the greatest? Explain your thinking.

7   During which time interval was the distance between the starting and ending
locations of the ocelot the least? Explain your thinking.

8   Does it appear that the agouti and the ocelot were ever in the same location
during any of the recorded times?

9   Do the data tables provide evidence that the ocelot and the agouti may
have met?

10   Does the graph provide evidence that the agouti and the ocelot may have
met?

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11 Based on the information provided in the research article and the activity, what do you think happened to the agouti at the end of its path? At what time did it happen?

12 Does the story you wrote in Part A agree with the information provided in Part B? If the answer is no, rewrite your story

13 What other evidence do you need to get an acceptable answer to the question, "Did the agouti and the ocelot meet?"