

More Bang for Your Buck  
How to forage optimally

1. The amount of groceries I will buy in one trip to the store depends on how far the grocery store is from my home.

A) True

B) False

2. I will buy \_\_\_\_\_ groceries in one trip if the store is closer to my home and \_\_\_\_\_ groceries if the store is far away.      MORE/LESS

1. Why do animals forage?

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2. How does a food patch change as animals feed from it?

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**Exercise 1: Foraging in a single patch**

Each student will forage in a single food patch for a given duration (30 Scoops) and observe how foraging changes over time as they use the patch.

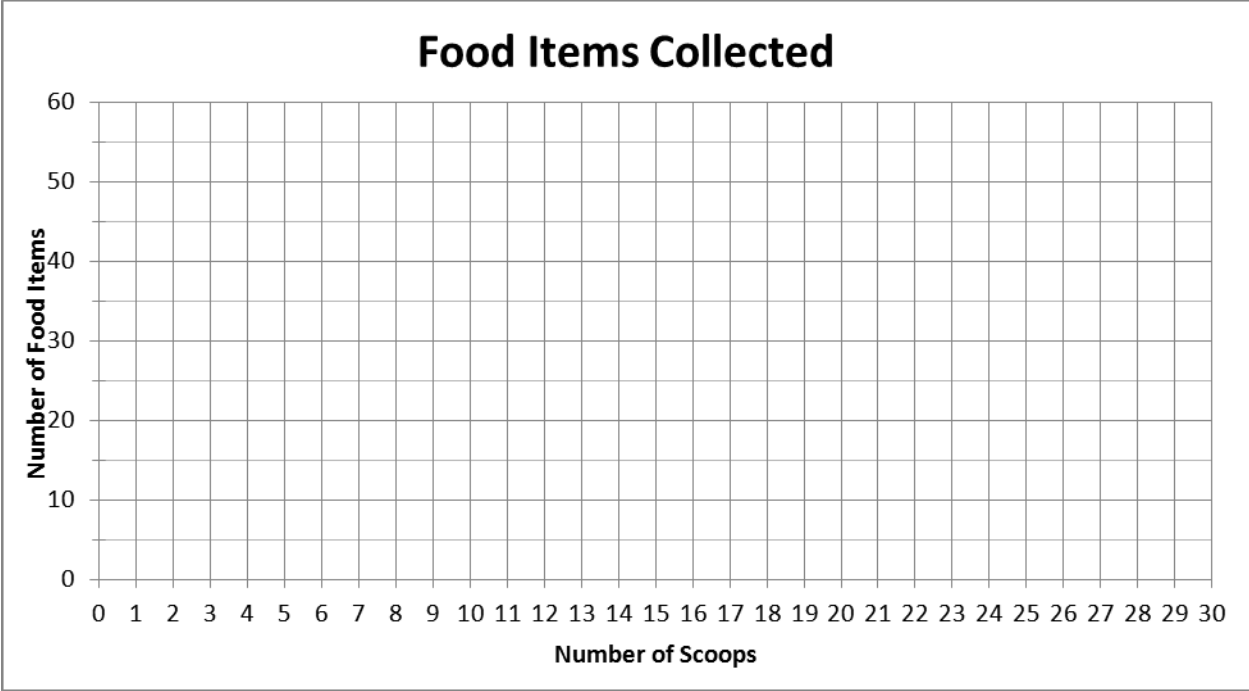
**Materials**

- food patch (paper bag with a mixture of jellybeans and pinto beans)
- receptacle for collected food items
- pencil
- student packet

**Instructions:**

In order to forage, simply take a scoop of beans from the bag with the spoon (without looking!), count the number of jellybeans in the scoop and place them in your food receptacle. Replace the other beans in the bag and repeat this 30 times.

Scoop Number	Number of Food Items in Scoop	Total Number of Food Items Collected	Scoop Number	Number of Food Items in Scoop	Total Number of Food Items Collected
1			16		
2			17		
3			18		
4			19		
5			20		
6			21		
7			22		
8			23		
9			24		
10			25		
11			26		
12			27		
13			28		
14			29		
15			30		



What happened to your food patch as you foraged from it? How do you think animals deal with this problem in nature?

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When is the best time to leave the current patch and look for a different patch?

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**Exercise 2: Foraging from multiple food sources**

Foraging in food patches that are close (1 & 2, 3 & 4) and distant (2 & 3, 4 & 5) to each other. For patches that are close to each other, one can switch immediately while for patches that are distant, one has to wait (travel) 3 minutes before making the switch.

This exercise will be performed in groups. Each student in the group will once again have one patch, but the group will be foraging as a single unit. One student will forage at a time and the group will decide when it is time to move on to the next patch. This time, students will not need to count the food items in each spoonful, just the total number of food items collected from each patch and the number of spoonfuls taken from each patch.

Patch Number	Number of Scoops from Patch (tally)	Number of Food Items Collected from Patch
1		
0 min		
2		
3 min		
3		
0 min		
4		
3 min		
5		

Students will now use the graph from Exercise 1 and mark the number of scoops you took out of each patch. Either use different colors or label the points so you can tell the difference between the patches that were “close together” and those that were “far apart”.

What difference do you notice in terms of Giving Up Time (number of scoops) for the food patches that are close together versus food patches that are far apart?

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What does this tell you about how the distance between the food patches changed foraging behavior?

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Describe what you would consider an "optimal foraging strategy." In other words, how could you get the most jelly beans in the shortest amount of time when foraging in food patches that are far apart in comparison to patches close together? Compare and discuss with group/class.

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1. When you are in a food patch collecting food items, when would it be best to leave the patch?

- A) When you are collecting just as many food items as when you started
- B) When you are starting to collect fewer food items than when you started
- C) When you are collecting more food items than when you started
- D) It doesn't matter how many food items you are collecting.

2) If the animal is gathering food in a patch that is far away from other patches, it will leave the patch \_\_\_\_\_ than if it was gathering food in a patch that was near other patches.

- a. Sooner
- b. Later
- c. At the same time

3. Animals use math to decide when to switch between food patches

- A) True
- B) False