Ants for lunch (Biology)

Objective

Determine whether ants are more attracted to jam sandwiches or meat sandwiches.

Materials

- At least one ant nest (preferably not fire ants!)
- One jam sandwich and one meat sandwich freshly made each day
- Two identical bowls about 10 cm in diameter
- Large paint brush
- Gloves
- Pencil and paper for recording data

Methods

This activity is an experiment.

- Cut a 3 cm square section from centre of the jam sandwich (eat the rest).
- Cut a 3 cm square section from centre of the meat sandwich (eat the rest).
- Place the two pieces of sandwich on opposite sizes of the ant nest: both exactly the same distance (about 20 cm) from the nearest entrance. (Make sure the ants aren’t dangerous! Wear the gloves for safety.)
- Ensure that the experiment remains undisturbed for 15 minutes.
- After exactly 15 minutes, put on the gloves and then place the bowls over the sandwiches and push down so that the ants inside are completely trapped. (Ensure that the bowl is centred on the sandwich.)
- Use the paint brush to brush away all ants close to the each bowl.
- Lift one bowl and carefully count the number of ants which were trapped on that sandwich.
- Record the date, type of sandwich and number of ants caught on your paper.
- Lift the second bowl, count the number of ants and record your results as before.
- Either repeat across ten different ant nests, or across ten different days, swapping the sides on which each sandwich is placed.

Note: It is important to use the same materials each time you run the experiment. Any change in materials or methods can lead to differences in results. We want to be sure that any differences we see in results relate to the ants' behaviour rather than the differences in how the experiment is run.

Note: It is important to get conditions as similar as possible for the two types of sandwiches. If you always put the meat sandwich on the downhill side of the nest, then it will be hard to interpret the results: you won't know whether the ants actually preferred the meat sandwich or whether they preferred walking down hill. To minimise this type of problem, swap sides of the sandwich each day.

Analysis

- Draw a histogram of the number of ants on the jam sandwich.

- Draw a histogram of the number of ants on the meat sandwich.
- If both distributions are symmetric:
    - Calculate the mean and standard deviation of the number of ants on the jam sandwich.
    - Calculate the mean and standard deviation of the number of ants on the meat sandwich.
    - Comment on whether the results are similar or different.
- If either distribution is skewed:
    - Calculate the median and inter-quartile range of the number of ants on the jam sandwich.
    - Calculate the median and inter-quartile range of the number of ants on the meat sandwich.
    - Comment on whether the results are similar or different

Note: To allow comparison between the two types of sandwiches, the two histograms should be drawn in identical *x* and *y* scales.

Discussion

- Is there any sampling bias in your study? (Is the ant nest you used a normal ants nest in a normal location? Were the days on which you ran the experiment normal days?)
- Is there any measurement bias in your study? (Did you follow identical methods on each day? Do you think any of the ants could have escaped? Did you ever lose count of the ants? Did you use the same type of jam each day?)
- Do you believe that you have proven that ants prefer one type of sandwich to the other?
- What would you do to improve the experiment the next time you ran it?