Bird Maths and Data Work

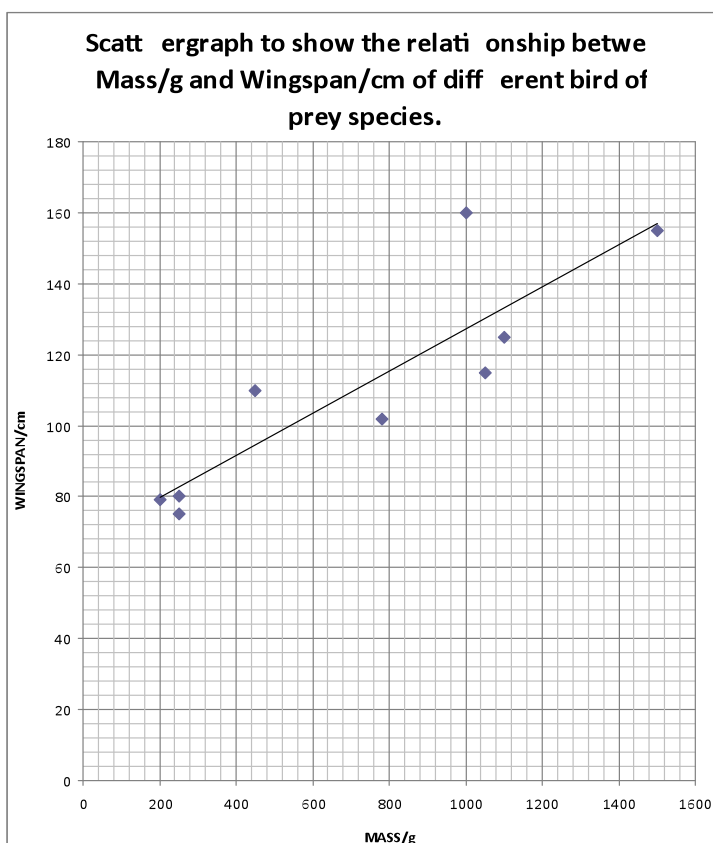## Aims & Objectives

1. Students can be encouraged to develop the following data skills ...
    a. Identifying and describing patterns in data
    b. Producing a scatter graph with a "best line of fit" to show "trends" in data.
    c. Identifying data which does not fit the trend.

Advance Preparation

1. Visit BTO website to see what the current ringing information is available (changes weekly)

2. Graph paper to produce a scatter graph by hand.

3. Access to computers with graph plotting data
    Usually data must be transferred into a spread sheet before a graph is plotted.
    This could be done in advance of the lesson or students could transfer the data from the table into a spread sheet first.
    Students may need help in producing the scatter graph and then a best line of fit.

BIRD SPECIES	MASS /g	WING SPAN/cm
OSPREY	1500	155
KESTREL	200	79
RED KITE	1000	160
BUZZARD	1100	125
PEREGRINE FALCON	780	102
SPARROW HAWK	250	75
HEN HARRIER	450	110
HOBBY	250	80
GOSHAWK	1050	115

Scatergraph to show the relationship between Mass/g and Wingspan/cm of different bird of prey species.

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Lesson Plan and Discussion points

1. **Introduction** - Bird ringing and data gathered during ringing.
   Visit BTO website to look at current bird ringing profiles.

2. **Look at the data** - discuss the measurements, units, species listed (all birds of prey)

3. **Pattern;** As mass increases the wing span increases
   If a bird is heavier it will require larger wings to fly (power and to gain lift)

4. **Trend;** a "best line of fit" will show a positive correlation between mass and wingspan.

5. **Which bird does not fit?**
   This will depend on how the best line of fit is drawn, or how Excel determines its position.
   On the graph provided above the Red Kite is further from the best line of fit.

Suggestions **why** could make a good discussion

   - It has a large wingspan compared to its mass.*

   - Ask for suggestions why? Red kites are "soaring birds" and feed on carrion - dead
     animals. Large wingspan and light body are ideal for effortless flight over large dis-
     tances looking for food. Birds have to be more powerfully built to catch and kill live
     animals, and usually have a relatively larger mass compared to their wingspan.

* More able students of maths could calculate **wingspan : body mass** ratios This could allow
them to compare bird habitat and feeding strategies in relation to these ratios.
An ideal opportunity to discuss ratios as a way of data interpretation.

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6.   **How good is the data?**

Distinguish between **accurate** (how the bird is measured- method and equipment) and **reliable**, i.e. how much data there is.

The data table shows only **ONE** bird for each **species**.
It would be better to have 10 birds of each species and calculate a mean (average) mass, and wingspan. This "evens out" variation.

Causes of variation in individuals...

-    Males vs females
-    Age of bird
-    Time of year
-    Availability of food
-    Time since feeding