

## Osprey Egg Incubation Investigation

### Introduction;

Like all birds ospreys lay eggs in a nest and sit on them to keep them warm while they develop. This is called incubation. Ospreys make very large open nests so if a parent bird is not sitting on the eggs they can cool down very quickly. If the eggs get too cold they do not develop into healthy chicks or they may even die.

Parent birds are sometimes forced to leave their eggs if an intruder needs to be chased away. Your task is to investigate how quickly an osprey egg will cool to danger level.



You can see pictures of ospreys on their nest on the website [www.lrw.org.uk/rutland-ospreys](http://www.lrw.org.uk/rutland-ospreys)

### Equipment;

Large chicken egg, which is at 37°C. The egg has been hard boiled.

Thermometer or temperature probe

Timer

Egg cup made from the egg box. This is your nest.

### Instructions;

1. Draw a results table, so that you can write down the temperature of the egg at two minute intervals, for as long as your lesson time will allow.  
Do not forget to put the units in the heading of each column.
2. Take the temperature of the room and write this down.
3. When both of the above are done collect your egg which is being kept at 37°C, sit it in your 'eggcup', start the timer, take its temperature and record this in the table.
4. Take the egg temperature, every 2 minutes.
5. While you are waiting draw the scales of a graph so you can also graph your results as you go.

## Osprey Egg Incubation Investigation - cont

### Questions;

Name \_\_\_\_\_

1. Ospreys like all birds keep their body at a constant temperature of 40°C.  
Suggest why we started with the eggs at 37°C?

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2. (a) Apart from the fact that we used chicken eggs instead of osprey eggs, describe another difference between our investigation and real life?

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(b) What difference might this make to the results?

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3. We do not know exactly at what temperature osprey eggs would die, but experiments with ducks have shown that they die at 21°C

How long did your egg take to get to this temperature? \_\_\_\_\_

(hint: if your egg did not drop to this low temperature, use your graph to estimate the time)

4. Other groups in your class have done the same experiment at a different ambient temperature. Swap data tables with another group and plot their results onto your graph in a different colour. Then answer the following questions.

(a) What was the ambient temperature of the other group? \_\_\_\_\_

(b) What difference did this starting temperature make to the cooling of their egg compared to the cooling of yours?

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## Osprey Egg Incubation Investigation - cont

(c) Ospreys breed at Rutland Water, and they also breed in Scotland and Wales. In which location is it more likely to be a problem to the adult birds to keep their eggs warm?

Suggest a reason for your answer.

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Further investigation; If a bird left the nest and it was raining, would the cooling be faster?

Plan an investigation to simulate egg cooling in rainy conditions.  
How would you make sure the test was fair?

### Extension;

Ospreys are very rare birds, so every egg that hatches is really important to the conservation of this species. Volunteers therefore monitor osprey nests to see that they are not interfered with by humans, but they cannot do anything about other birds causing a problem. Have a look at the blog post on page 5.

The photograph shows an osprey on its nest with a red kite intruding above.



## Osprey Egg Incubation Investigation - cont

In this real life drama, the female bird was away from the nest for 42 minutes.

It was a sunny day, so what was the temperature likely to be in April in central England  
(Hint; Use the internet to find UK temperature data) \_\_\_\_\_

Use your experiment data to predict how long the eggs could have remained uncovered before they cooled too much.(assume 21°C is the critical temperature) \_\_\_\_\_

In this real life drama only 2 of the 3 eggs finally hatched. This was almost certainly due to it being too cold for one of the eggs to survive after 42 minutes exposure with no incubation from the female osprey.



## Incubation at Site B

Having raised three chicks at Site B last year, we are hopeful that 03 and his mate will be similarly successful this summer. On Saturday evening last weekend the female began sitting low in the nest for the first time; a sure sign that she had laid the first egg. They have been incubating solidly since then with little to disturb them. However on Easter Saturday morning, a worrying development occurred. Richard Jagger and Carol Pilson, who were on duty at 6am, take up the story...

"03 lazily floated in from the east. I, Carol, and the unringed female turned our heads to watch. It was an early return from his first fishing foray of the day. He gradually picked up speed and . . . did he just dive-bomb the female? This wasn't 03. She mantled her wings and took to the air. He circled to return. An intruder. 09(98)?

She followed after him and they spun low round the nest before straightening out and disappearing over the trees behind our heads. But, was the unringed female in the lead? And the eggs were alone in the nest, unsheltered and unguarded. Nervous smiles passed between us. From the minute they are laid to the minute they hatch osprey eggs are rarely left alone day or night. Whole four hour shifts can pass without the female stirring from her prone position warming the eggs and protecting them from danger, or perhaps a quick changeover between male and female when he brings her back a fish.

The seconds turned into minutes and mounted up uncomfortably. Still she had not returned. Still the eggs were uncovered. Then in the distance – an osprey. At last she had returned, we hoped. But, no, it wasn't her. A fish carried in that characteristic Osprey way was clasped in his talons. 03, it had to be. At least he would take up the incubation when he realised what was wrong. 03 sauntered in, approached the nest and – passed right on by, alighting in a nearby tree and proceeded to eat the head of the trout with his back to the nest. Had he even noticed the female was not there? He had passed literally within a few feet on the nest.

This was getting too much to bear. Ten long minutes passed before he bothered to return to the nest with the rest of the fish, seemingly to pass to his mate, for when he landed on the side of the nest he seemed to stare in confusion, looking one way then the other, then down at the eggs, then repeat, until finally it was all too much and he simply tucked into the rest of the trout, still leaving the eggs un-incubated. All had not gone unnoticed by a watching magpie who boldly landed on the other side of the nest to only muted protests by the much bigger Osprey.

Our hearts were in our mouths and our eyes glued to our binoculars until our arms ached as the magpie repeatedly plunged its beak down into the nest, tossing nesting material into the air, hoping an egg would not appear in its mouth, until finally 03 exerted enough threat to see the magpie off. At least now he would sit on the eggs. Well, after a few more mouthfuls of fish that is. And when he finally hunkered down the eggs had been uncovered for 42 minutes. And we can only hope they haven't chilled in this time and no permanent damage has occurred. The fact it was a relatively warm sunny morning should swing things in their favour, but a little nervousness will reside within us until that first little head peeps above the nest rim.

And as for the female, she finally returned an hour and a half after she had left, taking over the incubation as if nothing had happened. And as we left our shift all seemed well, and calm. The call of cuckoos in the woods a faint reminder that not all eggs out there would come to hatch. Thank goodness the cuckoo doesn't parasite Ospreys! The eggs today would have stood no chance."



We hoped that 09's intrusion would be a one-off, but worryingly the same thing happened when 03 went fishing this morning. Once again the female chased the rival male off, but in doing so she left the eggs unattended for 45 minutes. At this early stage this should not result in the eggs failing, but if 09 continues to cause trouble then there is no guarantee that the eggs will hatch. All we can do is keep our fingers crossed that his intrusions become less aggressive...