



PEDAGOGICAL GUIDE: THE RAPTOR PELLET





TABLE OF CONTENTS

PELLET PRELUDE

Introduction.....	2
Formation of the raptor pellet.....	2
Pellet analysis	3
Amazing pellets!.....	3

THE PELLET DISSECTION ACTIVITY

Preparation.....	4
List of materials.....	4
Dissection Instruction Sheet.....	5
Activity wrap-up.....	6

SCIENTIFIC METHOD OPTION

The Scientific Method.....	6
Scientific Report Worksheet.....	7

Appendix I: THE BIRD DIGESTIVE SYSTEM.....	8
---	----------

Appendix II: REFERENCE BOOKS.....	9
--	----------



PELLET PRELUDE

INTRODUCTION

Birds of prey are carnivorous birds that possess 3 important adaptations for hunting. They have an excellent vision which allows them to see prey a great distance away. They have powerful feet called talons which they use to catch the prey, and they have a hooked beak to break their prey's neck and tear off meat.

FORMATION OF THE RAPTOR PELLETT

Most raptors eat their entire prey. Some owls even eat them whole, in one gulp, when they are small enough of course! The bird's stomach can digest the meat, the fat and other tissues but not the feathers, fur or bones of the prey. All these non-digested parts create a pellet in the bird's gizzard, an organ of the digestive system. The process of digestion and of forming a pellet can take between 6 and 24 hours depending on the type and the size of the prey eaten. It is important the bird coughs up this mass of non-digested parts because it could get in the way of the absorption of nutrients and cause certain health problems. The pellet gets coated with protective mucus when it leaves the gizzard to be regurgitated; this prevents the throat irritation and makes it easier to regurgitate.



PELLET ANALYSIS

When dissecting the pellet you might find a wide variety of things inside: skulls, beaks, various bones, insect exoskeletons, etc. The content will allow you to identify the type and number of prey the bird ate. For example, if you find three skulls, this means that the bird ate three animals during the last day. Moreover, if the skulls are incomplete, they are likely to be from birds since their bones are fragile whereas if the skulls are intact, they are probably from rodents. Finally, it is usually easy to tell apart the two prey skulls since you can see small teeth on mammal skulls and none on the birds'.

AMAZING PELLETS!

Nocturnal raptors (owls) have a generally less efficient digestive system than that of diurnal raptors and as a result, produce impressive pellets. Owls' pellets can contain up to 10 times more bones than those of diurnal raptors (eagles, vultures, hawks and falcons). They can measure between 2.5 and 10 cm and are good indicators of the prey consumed. Also, the size, colour and content of a pellet can indicate what raptor produced it. If for example, a pellet contains a lot of insects, there is a good chance it was produced by an Eastern Screech Owl since they eat bugs, or if the pellet is very large, it would be from a Great Horned Owl which has larger stomach.



THE RAPTOR PELLET DISSECTION ACTIVITY

PREPARATION

Before starting the activity, it is recommended you cover the work area with newspaper or large garbage bags in order to make cleaning afterwards easier.

Take note that the pellets **are not sterile** and can contain bacteria like Salmonella. It is important to make sure that all students wear plastic gloves during the activity and/or wash their hands afterwards. Work surfaces should also be cleaned with disinfectant at the end.

The activity is to be performed in groups of two or three students, it is therefore recommended to form the work groups beforehand.

LIST OF MATERIALS NEEDED PER TEAM

The following materials may be easily purchased at “Dollar stores” if needed.

1. One strainer
2. One bowl or plastic container
3. Skewer sticks and a pair of tweezers
4. One sports water bottle
5. One pellet (10 provided)
6. Sheets with diagrams of small animal bones (3 provided)
7. Paper towels
8. Plastic gloves (provided)



PELLET DISSECTION INSTRUCTIONS:

1. PUT ON THE PLASTIC GLOVES.
2. PUT THE STRAINER OVER THE BOWL OR CONTAINER,
3. PUT THE PELLETT IN THE STRAINER,
4. POUR WATER OVER IT TO GET IT WET,
5. PRY IT OPEN USING SKEWERS AND TWEEZERS,
6. RINSE AND REMOVE THE BONES YOU FIND. BE CAREFUL, THE BONES ARE VERY SMALL.
7. PUT THE BONES ON A PAPER TOWEL TO OBSERVE THEM.
8. WITH THE DIAGRAMS, TRY TO FIND OUT WHAT THE OWL ATE. THERE MIGHT BE MORE THAN ONE TYPE OF PREY!

DON'T FORGET TO CLEAN UP:

1. EMPTY THE CONTENTS OF THE STRAINER INTO THE GARBAGE,
2. EMPTY THE DIRTY WATER IN THE BOWL INTO THE SINK OR A TOILET,
3. RINSE THE STRAINER AND THE BOWL, RINSE THE TWEEZERS TOO,
4. CLEAN YOUR WORK SURFACE,
5. TAKE OFF YOUR GLOVES AND PUT THEM IN THE GARBAGE,
6. WASH YOUR HANDS.



ACTIVITY WRAP-UP

At the end of the activity, each team can compare what they found. Did they find more remains of birds or rodents? Were there odd objects in the pellet?

You should encourage research and reading on birds of prey, their adaptations, ecology and biology.

SCIENTIFIC METHOD OPTION

THE SCIENTIFIC METHOD OPTION

- i. *Observation of an event.*
- ii. *Elaboration of a tentative description or hypothesis that explains the event.*
- iii. *Prediction of results based on the hypothesis.*
- iv. *Experimentation to test whether or not the hypothesis predicted the results and if not, modification of the hypothesis.*

To foster **active exploration** and emphasize the **use of the scientific method**, each team should hypothesize on the content of their pellet before starting the dissection. Students can use the “Scientific Report Worksheet” provided in the appendix to orient their exploration.

They should start by observing the pellet before breaking it apart and collect data on the size, colour and shape of the pellet. They can also draw its outline on a piece of paper before dissecting it. Note that lighter coloured pellets are more likely to contain bird remains than dark coloured pellets, which tend to contain more rodents remains.

Once the dissection is done, the hypothesis can be assessed according to the actual content of the pellet.



SCIENTIFIC REPORT WORKSHEET

Name(s): _____

Date: _____

RAPTOR PELLET DATA:

1. Length: _____ cm
2. Colour : _____
3. Draw the outline of your pellet :

HYPOTHESIS: WHAT DO YOU THINK THAT YOU WILL FIND IN YOUR PELLET?

RESULTS:

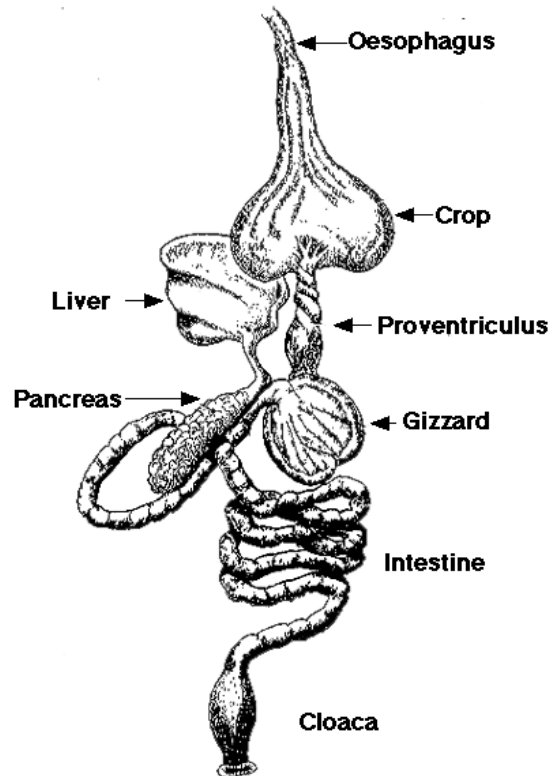
1. **WHAT WAS THE ACTUAL CONTENT OF THE PELLET?**

BIRD		RODENT		OTHERS	NOTES
Feathers :	yes	Fur :	yes		
	no		no		
Number of skulls :		Number of skulls :			
Bones found :		Bones found :			

2. **WHAT TYPE OF BONES - BIRD OR RODENT - DID YOU FIND IN GREATEST NUMBER?**
3. **DID YOUR HYPOTHESIS PREDICT YOUR RESULTS?**
4. **BONUS EXERCISE: COULD YOU RECONSTRUCT THE SKELETON OF A PREY USING THE DIAGRAMS?**

Appendix I : THE BIRD DIGESTIVE SYSTEM

The bird digestive system is similar to that of humans but has some specific adaptations.



ADAPTATIONS:

- **Crop:** Cavity formed by the distending of the oesophagus which can hold the food before it goes down to the stomach or is regurgitated. Owls do not have a crop.
- **Proventriculus:** Also called glandular stomach, it secretes mucus and is lined with digestive glands that secrete digestive enzymes.
- **Gizzard:** Thick walled, muscular organ which breaks up and grinds the food.



Appendix II: REFERENCE BOOKS

- RAPTOR! By Christyna M. and René Laubach and Charles W. G. Smith, Storey Kids Publishing, 2002. 118pp.
- Owl Puke: The Book by Jane Hammerslough, Workman Publishing, 2004. 92pp.
- The Book of North American Owls by Helen Roney Sattler, Clarion Books, 1995. 64pp.
- Discovery Channel Birds, Explore your World Handbook, Discovery Publishing, 1999. 192pp.
- National Geographic Field Guide to the Birds of North America, National Geographic Society, latest edition.