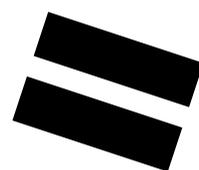
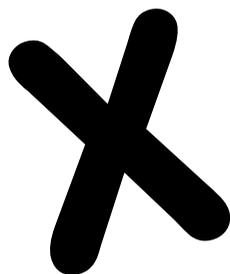


COLCHESTER  
ZOO  
Action for the Wild



# Maths Trails

This pack is designed to provide teachers with information to help you lead a trip to Colchester Zoo focusing on Maths

# How to use these Activities

This Maths tour pack contains many different activities and worksheets to create a Maths themed visit to Colchester Zoo! The worksheets encourage the use of different mathematical skills, particularly estimation, graphing, measuring and real world problem solving.

This pack contains activities for a wide range of ages and learning outcomes. The top left of the page indicated the target age. When selecting activities to use with your pupils, please select appropriate ages. Some activities can be completed in the classroom after the trip, but require collection of initial data (usually estimating measurements, counting number of animals etc.) at Colchester Zoo.

All the activity worksheets are discrete, and teachers can pick and print only the pages they wish their students to completing. Omitting any specific page will not impact on the others.

A beneficial activity before your visit to the zoo is discussing and experimenting with ways to estimate things (length, maths, etc.). Many of the worksheets require estimations and they will be easier to complete with this prior knowledge.

There is not an answer sheet included in this pack, because most of the calculations are based on student observation (so there is not a specific numerical answer as the answer is dependant on what the students record).

If you would like some guidance for any of the calculations or examples of the calculations completed by other groups, please contact the education department at [education@colchesterzoo.org](mailto:education@colchesterzoo.org)

# Contents

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# Map KEYS

-  First Aid
-  Information
-  Gift Shop
-  Picnic Area
-  Play Area
-  Toilets
-  Fire Assembly Point
-  Face Painting



## Locations for Maths Worksheets at Colchester Zoo:

Download a more detailed map from our website:  
[www.colchesterzoo.org](http://www.colchesterzoo.org)

# Locations for Maths Worksheets

Many of the maths worksheets are designed to be completed in any location around the zoo, with pupils able to decide which animal they want to study or record.

There are a few sheets which need to be completed in specific locations, please see the previous page for the map of the following locations.

For a more detailed map, see our website, or visit Guest Service.

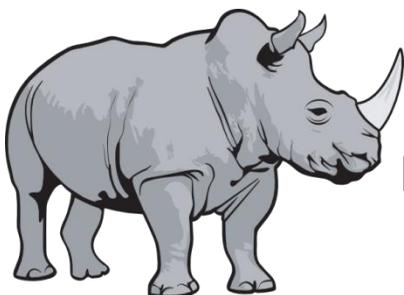
- ★ 1. Worlds Apart exhibit (sloths, anacondas, komodo dragons, monkeys, piranhas and more)
- ★ 2. Orangutan forest (organutans, and aquarium)
- ★ 3. Kingdom of the Wild paddock, the mixed African animals paddock housing: white rhino, ostrich, zebra, giraffe and greater kudo. Across the path is the Elephant paddock, housing African elephants.
- ★ 4. Tiger enclosure, home of the Amur tiger
- ★ 5. Wilds of Asia exhibit (red panda, gibbons, pythons)
- ★ 6. Chimp World, the chimpanzees

# African Paddock Counting

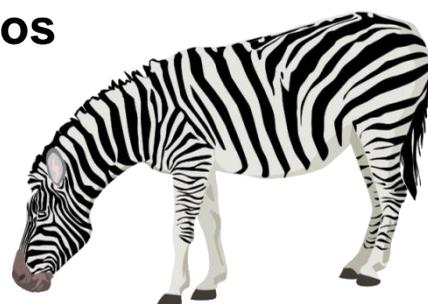
Visit the Kingdom of the Wild, African Paddocks.  
Count how many of each animals you.



I saw \_\_\_\_\_ giraffes



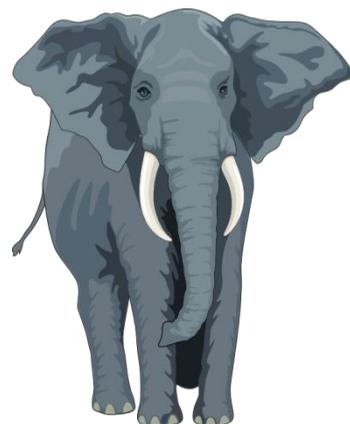
I saw \_\_\_\_\_ rhinos



I saw \_\_\_\_\_ zebra



I saw \_\_\_\_\_ ostriches



I saw \_\_\_\_\_ elephants

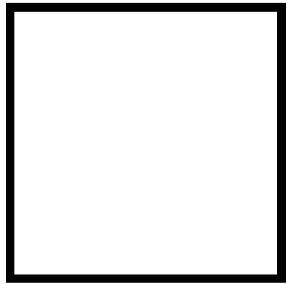
Today I saw a total of \_\_\_\_\_ African animals in  
the paddock at Colchester Zoo

\_\_\_\_\_

\_\_\_\_\_

# Searching for shapes

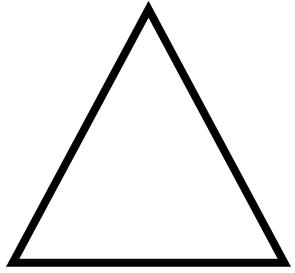
Visit the giraffe building and go inside.  
Look around inside for each of these shapes.  
Record how many of each shape you find.



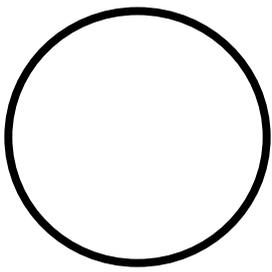
Squares: \_\_\_\_\_



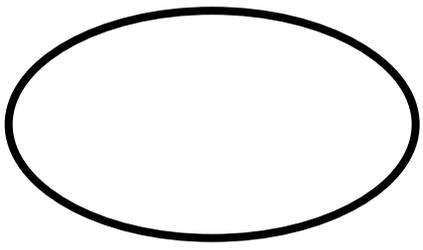
Rectangles: \_\_\_\_\_



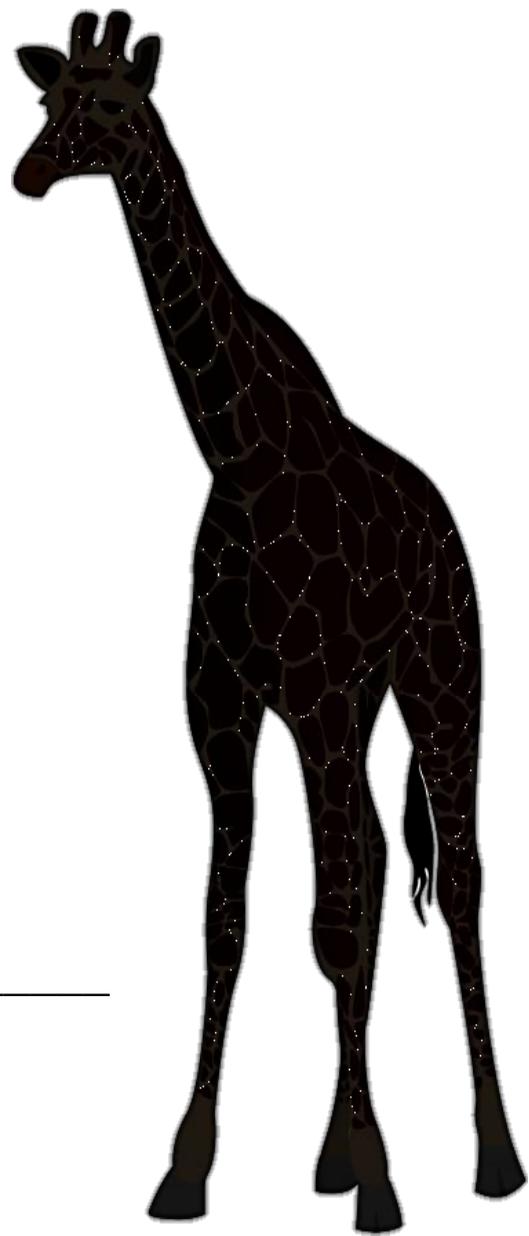
Triangles: \_\_\_\_\_



Circles: \_\_\_\_\_



Ovals: \_\_\_\_\_

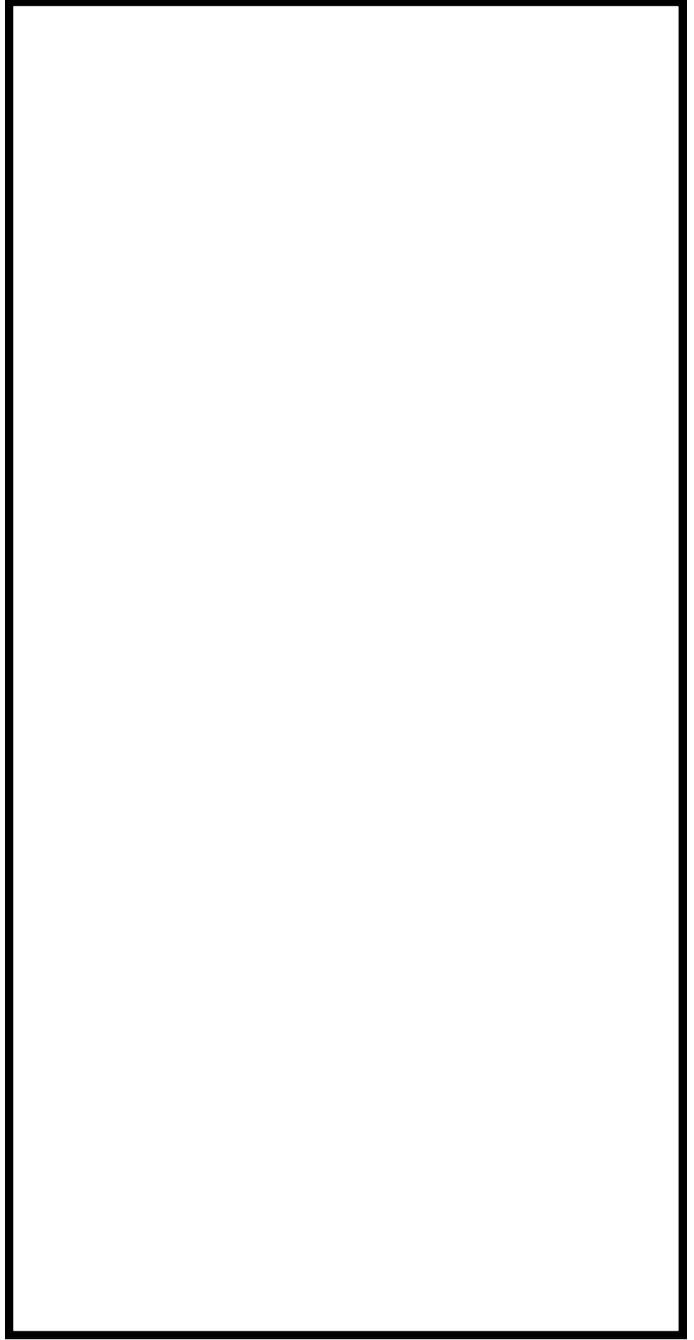
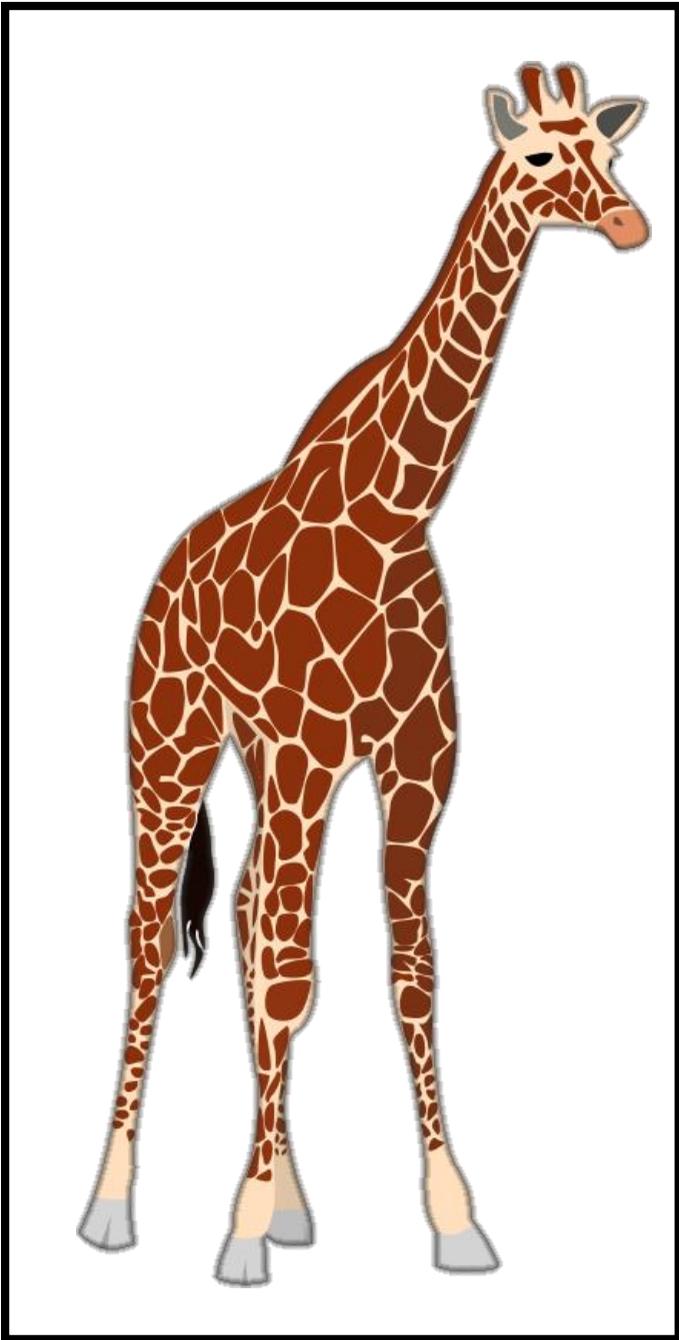


Giraffe shapes: \_\_\_\_\_



# Drawing Giraffes

Visit the giraffes at the Kingdom of the Wild Paddock  
After studying the giraffes, draw your own.



How many legs does the giraffe have? \_\_\_\_\_

What shape are a giraffe's ears? \_\_\_\_\_

How many spots did you draw on your giraffe? \_\_\_\_\_

\_\_\_\_\_

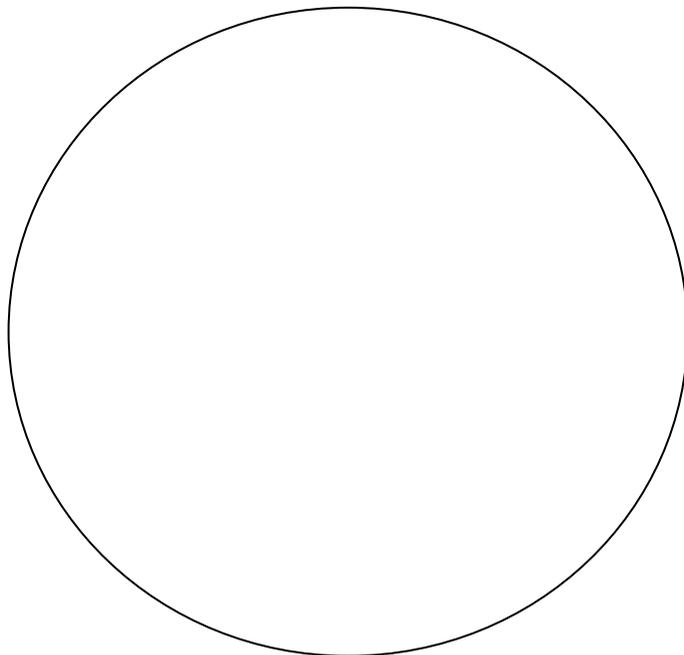
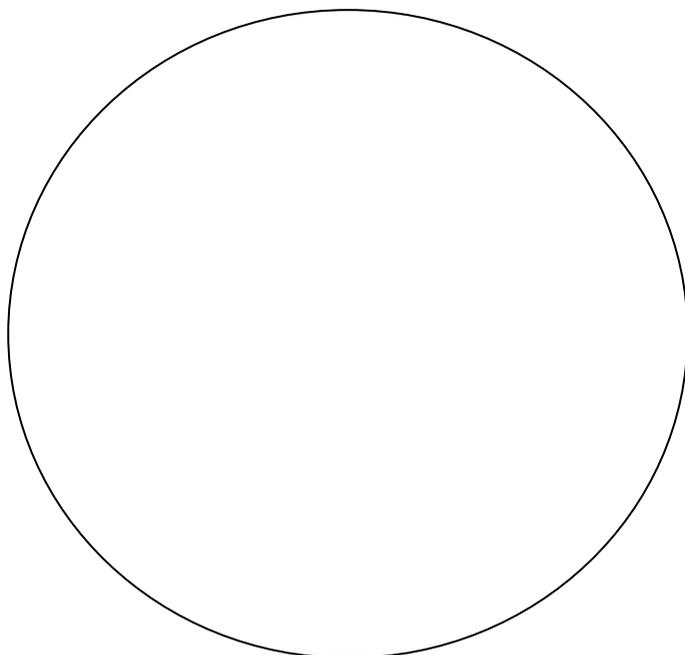
\_\_\_\_\_

### Scales, snakes, and fins

Visit the Worlds Apart exhibit.

Select two animal with scales (lizards, snakes, and fish).

Draw the pattern of the scales into the space provides



Animal is a: \_\_\_\_\_

Describe the shape of the scales:

\_\_\_\_\_  
\_\_\_\_\_

What is this type of pattern called?

\_\_\_\_\_

Animal is a: \_\_\_\_\_

Describe the shape of the scales:

\_\_\_\_\_  
\_\_\_\_\_

What is this type of pattern called?

\_\_\_\_\_

### Compare the two animals

Which animal has larger scales: \_\_\_\_\_

Which animal is larger: \_\_\_\_\_



# Feed an Elephant!

After you have fed the Elephants answer the following questions:

1. What did you feed the elephants?
  
2. Colchester Zoo has 4 elephants. How many were at the feed?
  
3. Do you remember her/their names?
  
- 4 Estimate how many visitors attended the feed:\_\_\_\_\_

If each visitor fed the elephants twice,  
how many pieces of food did the elephants get?

5. Estimate how long the elephant trunk is:\_\_\_\_\_
- Were both elephant trunks the same length?

6. Estimate how tall the elephants are:\_\_\_\_\_
- How did you make this estimate?

\_\_\_\_\_



\_\_\_\_\_

## Feed a Giraffe!

After you have fed the giraffe answer the following questions:

1. What did you feed the giraffe?
2. How many giraffe were at the feed?
3. Approximately how many people attend the feed?
4. Assuming that each person fed the giraffe 1 piece of food and that the food was evenly split between any giraffe at the feed, how many pieces of food did each giraffe receive?
5. Estimate how long the giraffe tongue is: \_\_\_\_\_  
Describe the appearance of the giraffe tongue.
6. Estimate how tall the giraffe are, \_\_\_\_\_  
How did you make this estimate?

# Orangutan Maths

Visit the Orangutan Forest

Can you calculate the answers to these maths questions

1. At the start of the orangutan tunnel into the organutans, estimate how long the tunnel is from the start at the glass doors to the bottom of the ramp on the other end.

2. Measure the length of your step with a ruler.

3. Walk the length of the tunnel.

How many steps did it take? \_\_\_\_\_

How long was the tunnel? \_\_\_\_\_

4. How close was your estimate? \_\_\_\_\_

5. How many organutans can you see?

6. Rajang, the older orangutan, was born in 1968. How old he? \_\_\_\_\_

7. How much older than you is he? \_\_\_\_\_

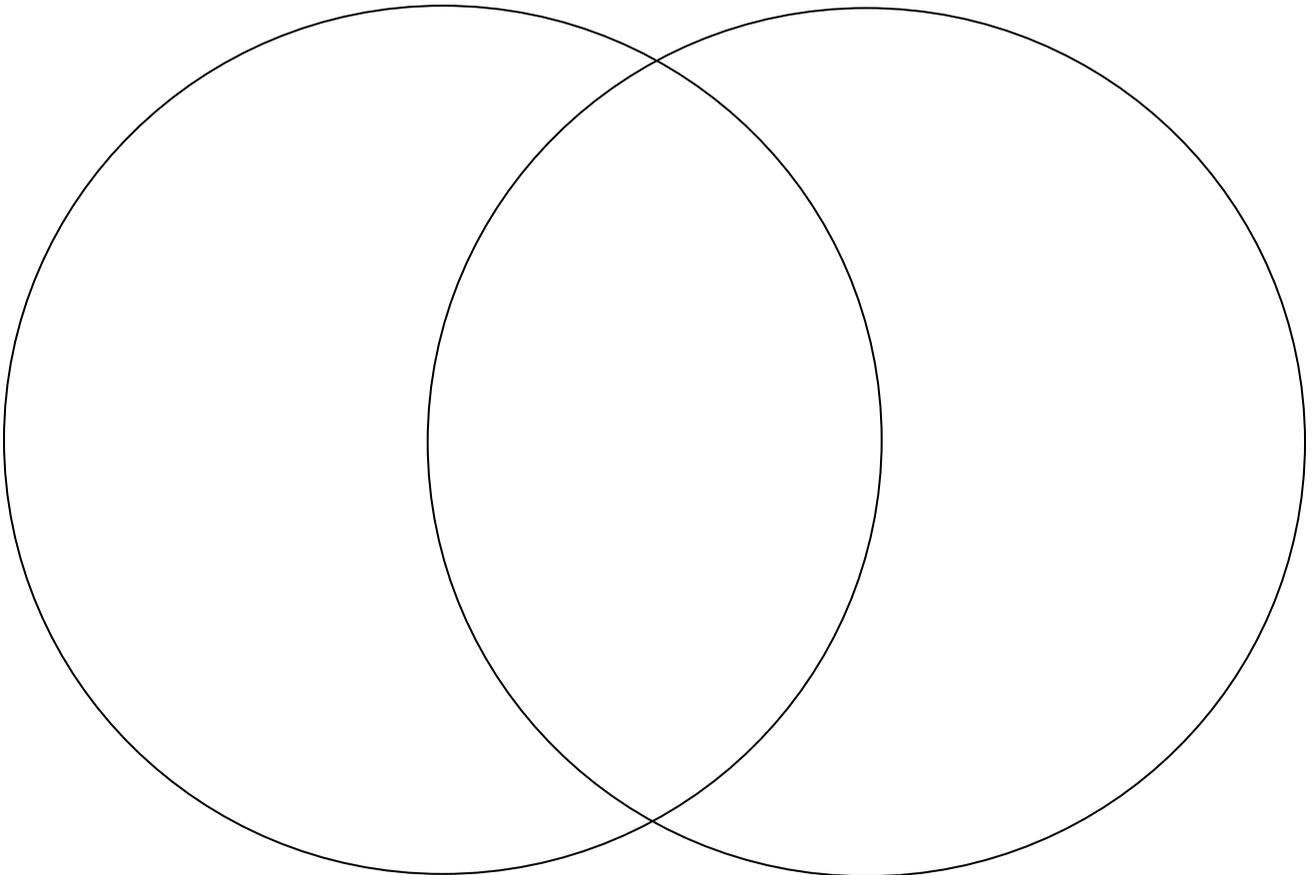
8. Tiga, the younger orangutan, was born in 2001. How old is he?

\_\_\_\_\_

Chooses 6 animals at Colchester Zoo. Read the signs at the animal's enclosure to learn what they eat and record the information in the chart.

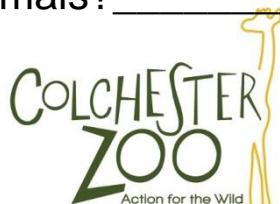
Name of Animal	Herbivore (plant eater)	Carnivore (meat eater)	Omnivore (eats both)

Fill in the Venn Diagram to show this information



Which group has the most animals? \_\_\_\_\_

Which group has the least animals? \_\_\_\_\_



Visit the Kingdom of the Wild Paddock (the mixed African animal paddock).  
See how many of these adaptations you can discover.

1) An average Zebra has up to 50 stripes.  
\_\_\_\_\_ zebras were seen in the paddock today.

How many stripes were in the paddock?

2) Look closely at the ostrich. How many toes do they have? Check the track for a hint. \_\_\_\_\_ toes.  
\_\_\_\_\_ ostriches were in the paddock today.



How many ostrich toes were in the paddock?  
(remember how many legs they have!)

3) Giraffes have very long necks. However, they have just 7 bones in their neck, which the same number of neck bones humans have!

There were \_\_\_\_\_ giraffes in the paddock today.  
How many giraffe neck bones were in the paddock?

4) The crowned cranes have very pretty yellow crowns of feathers. There were \_\_\_\_\_ cranes in the paddock.  
If each crown has an average of 24 feathers, how many yellow feather were in the paddock?

5) Greater kudu are the large, brown antelopes. They have two very large ears to listen for predators. How many kudu are in the paddock \_\_\_\_\_ . How many ears?

6) White rhinos have one big horn and a smaller one. Rhino horns are made out of keratin, the same material in human fingernails.

How many rhinos were in the paddock today? \_\_\_\_\_  
How many big horns?

\_\_\_\_\_  
Total estimated stripes

\_\_\_\_\_  
Ostrich toes

\_\_\_\_\_  
Giraffe neck bones

\_\_\_\_\_  
Yellow Feathers

\_\_\_\_\_  
Kudu ears

\_\_\_\_\_  
Big rhino horns

# Endangered Maths

KS2, KS3

Reason mathematically, problem solving

Visit the Wilds of Asia exhibit and the surrounding area (hornbills, red pandas, etc.). Can you solve these maths problems?

1) Red pandas eat 1.5kg of leaves, and 4kg of bamboo shoots every day. Red pandas are threatened by habitat loss, since their bamboo forests are cut down, they don't have food.

How many red pandas did you see? \_\_\_\_\_

How much bamboo do they eat every day?

\_\_\_\_\_ kg  
leaves  
\_\_\_\_\_ kg  
shoots

2) Rhinoceros hornbills are threatened by habitat loss, and hunting for their feathers. Their tail feathers are turned into elaborate headdresses and decoration.

How many tail feathers does one hornbill have? \_\_\_\_\_

If a headdress requires 400 tail feathers, how many birds would be killed to make it?

\_\_\_\_\_  
Hornbills  
needs for  
one  
headdress

3) There are an estimated 70,000 pileated gibbons in the wild. However, due to habitat loss and poaching, their population is estimated to decline 50% by 2015.

How many will be in the wild in 2015?

How many gibbons did you see? \_\_\_\_\_

If the zoo population declined by 50% how many pileated gibbons would there be?

How many pileated gibbons did you see?

\_\_\_\_\_  
Zoo gibbon  
population

4) Burmese pythons grow to be 7 metres long. They are threatened by poaching for food and for their skin. A unprocessed skin sells for £5 a meter. A processed snake skin bag sells for £5,000 (requires 3m of skin)

How many Burmese pythons did you see? \_\_\_\_\_

How much would their skin be worth if sold illegally?

£\_\_\_\_\_  
unprocessed  
skin  
£\_\_\_\_\_  
processed  
skin

5) Philippine sailfin lizards are threatened by habitat loss and capture for the pet trade. Captured wild lizards can sell for £500.

How many sail fin lizards do you see: \_\_\_\_\_

How much would they sell for on the black market?

£\_\_\_\_\_  
black-market  
price for sail  
fin lizards

# Endangered Maths 2

KS2, KS3

Reason mathematically, problem solving

Visit the Wilds of Asia exhibit and the surrounding area (hornbills, red pandas, etc.). Can you solve these maths problems?

1) Elephants are killed for their tusks. People carve the tusks into trinkets, jewellery and decoration. Illegal ivory (tusks) are sold for £100 per cm of ivory.

How many elephants did you see? \_\_\_\_\_

Estimate the length of their tusks: \_\_\_\_\_

How much would their tusks be worth?

£ \_\_\_\_\_  
worth of  
ivory

2) Crowned cranes are threatened by habitat loss as the wetlands they live in are converted to farm land. In 2004 their population was 50,000. It is estimate to decline 60% by 2020.

How many cranes will be left?

How many crowned cranes did you see? \_\_\_\_\_

If the zoo population declined 60% how many would be left at the zoo?

\_\_\_\_\_ Wild crane  
population

\_\_\_\_\_ Zoo crane  
population

3) Rhinos are threatened due to poaching for their horns. One large horn weighs 3kg. Their smaller horn weighs 0.5kg. How many rhinos do you see? \_\_\_\_\_

How much do all the rhino's horns weigh?

\_\_\_\_\_ kg  
of rhino  
horn

4) People grind up rhino horn to use in traditional medicine. Rhino horn is made out of the same material as your hair and fingernails, it does not work. People pay a lot of money for rhino horn. 1 kg of rhino horn is worth up to £60,000. How much would the zoo's rhino horn be worth on the black market?

£ \_\_\_\_\_  
worth of  
rhino horn

5) There are a lot of reticulated giraffes. However, their population has declined and continues to decline in certain parts of their range. The main reason for their decline is habitat loss. In the wild, when looking for food, giraffes require large areas of land, up to 650km<sup>2</sup> per giraffe.

How many giraffes do you see? \_\_\_\_\_

In the wild, how much protected land would the giraffes need in order to find food?

\_\_\_\_\_ km<sup>2</sup>

# Worlds Apart Maths

KS2, KS3

Reason mathematically, problem solving

Visit the Worlds Apart Exhibit (next to the main café Penguini's).

See how many of these adaptations you can discover.

Green anacondas jaws separate into 4 parts, so they can open their mouth extra wide.

How many green anacondas did you see? \_\_\_\_\_

How many jaw parts are there?

\_\_\_\_\_  
Green  
anaconda  
jaw parts

Green anacondas are one of the biggest snakes in the world with a maximum size of at least 8 metres! How many green anacondas did you see? \_\_\_\_\_

Assuming they all grew to maximum size, how long would all their length totalled together be?

\_\_\_\_\_  
Metres of  
green  
anacondas

An average Komodo dragon is 2.5metres long. Estimate the length of the largest komodo dragon baby:

\_\_\_\_\_cm long.

How much more does that baby Komodo dragon need to grow to be full sized?

\_\_\_\_\_  
Komodo  
dragon  
grows an  
addition  
\_\_\_\_\_cm

Each piranha has a different numbers of teeth because they constantly loose them and grow new ones. On average, they have a minimum of 20 teeth.

How many piranha's in the tank? \_\_\_\_\_

What is the minimum number of piranha teeth?

\_\_\_\_\_  
Piranha  
teeth

Sloths are either two-toed, or three toed. The Colchester Zoo sloths are \_\_\_\_\_-toed.

How many sloths did you see today? \_\_\_\_\_

What is the total number of sloth toes?

(remember how many legs they have!)

\_\_\_\_\_  
Sloth toes

Sloths move an average speed of 0.5m per hour. Estimate the width of the outdoor Worlds Apart corridor (between the glass enclosure walls).

How wide is the corridor \_\_\_\_\_m.

How long would it take a sloth to climb from one side all the way to the other side (assuming it's moving at average speed)?

\_\_\_\_\_  
Hours for  
the sloth to  
cross the  
corridor

**Snack Time!**

Visit two of Colchester Zoo's Food Outlets (see a map for locations).

Please remember to be polite and stay out of the way of paying customers.

Read the menu sign at both outlets and select the items for one meal. Record the cost for each item and your total cost. Calculate what your change from a £50 note would be.

First food outlet visited: \_\_\_\_\_

	Menu Item Chosen	Cost
Appetiser / Snack		
Main Meal		
Dessert		
Drink		
Total Cost		£
Change from £50.00		£

Second food outlet visited: \_\_\_\_\_

	Menu Item Chosen	Cost
Appetiser / Snack		
Main Meal		
Dessert		
Drink		
Total Cost		£
Change from £50.00		£

If I had £50.00 to spend on food, I would go to the \_\_\_\_\_  
Outlet, because \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Counting Animal Classification - Page 1

Find five examples of each type of animal.  
Record the number of individual animals you observe of each type.  
The first one has been done as an example.

## Mammals

Animals with fur



Species (types of animal)	Lion				
Number of individual animals	3				

With 5 species (types) of mammals there was a total of: \_\_\_\_\_ individual animals

## Birds

Animals with feathers



Species (types of animal)					
Number of individual animals					

With 5 species (types) of birds there was a total of: \_\_\_\_\_ individual animals

## Fish

Live in water and breathe through gills



Species (types of animal)					
Number of individual animals					

With 5 species (types) of fish there was a total of: \_\_\_\_\_ individual animals

The most numerous type of animal I observed was the: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

# Counting Animal Classification - Page 2

Find five examples of each type of animal.  
Record the number of individual animals you observe of each type.

## Amphibians

Animals with soft, wet skin (often life in land and water)



Species (types of animal)	Lion				
Number of individual animals	3				

With 5 species (types) of amphibians there was a total of: \_\_\_\_\_ individual animals

## Reptiles

Animals with scaly, leathery skin

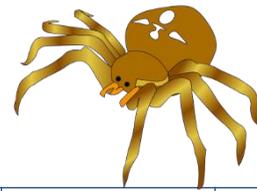


Species (types of animal)					
Number of individual animals					

With 5 species (types) of birds there was a total of: \_\_\_\_\_ individual animals

## Invertebrates

Animals without bones (e.g. seastars, insects, spiders, etc.)



Species (types of animal)					
Number of individual animals					

With 5 species (types) of invertebrates there was a total of: \_\_\_\_\_ individual animals

The most numerous type of animal I observed was the: \_\_\_\_\_

# Zoo Enclosures

Estimating measurements, perimeter calculations, problem solving

Select any small animal at Colchester Zoo (not elephants, giraffe, etc.)

Study its enclosure and make notes.

Which animal are you studying: \_\_\_\_\_

What is the approximate area of the animals' enclosure: \_\_\_\_\_m<sup>2</sup>

The approximate perimeter of the enclosure: \_\_m x \_\_m x \_\_m x \_\_m

How many animals are in the enclosure: \_\_\_\_\_

Do the animals have any obvious special equipment needs (e.g. climbing frames, pools of water, nest boxes, etc.): \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Imagine you have been asked to designed a new enclosure for this animal with an area of 40m<sup>2</sup>.

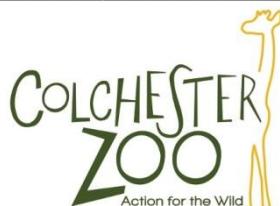
Given the number of animals in the current enclosure and their current space, how many animals would be able to comfortable fit into an enclosure that is 40m<sup>2</sup>: \_\_\_\_\_animals

Design and draw two possible enclosures (either on the back or on separate graph paper). Be sure to include measurements and any other special features which need to be included.

The enclosure does not need to be a regular shape (but if you make it irregular it will make your calculations harder!).

Which of your two enclosures do you think would be best suited for the animal you chose? Explain: \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_



# Observing Animal Behaviour

Type of animal observed: \_\_\_\_\_

Observe an animal for 10 minutes.

Make a check mark each time it does one of the following:

Walks/Runs	Eats	Drinks	Lies Down
Sleeps	Yawns	Looks at people	Plays

After observing, make a graph showing the animals behavior.

Make sure you label the axes and have an appropriate scale.



Which behavior was most frequent: \_\_\_\_\_

# Giraffe Watcher

Draw a map of the Zoo's giraffe paddock on the back of this sheet.

Divide the map into grids (as shown below)

Show landmarks like their pool, fences, and buildings.

If the giraffes are indoors, select one of the other paddock animals.

1	2	3	4
5	6	7	8

Pick a giraffe to observe at the Zoo. Look at the signs nearby to identify the name of your giraffe: \_\_\_\_\_

Every minute for 5 minutes, record which grid the giraffe is in.

Describe what your giraffe is doing.

**Grid**

**Time**

**Number**

**Observations**

Time	Grid Number	Observations

Which grid was the giraffe in most frequently? \_\_\_\_\_

Calculate the percentage of time it was in that grid: \_\_\_\_\_

Why do you think the giraffe spent the most time there?

---



---



# Map Maths

Collect a Colchester Zoo map from the Guest Services building.

The zoo map does not include a scale.

Determine the scale by measuring an identifiable building near the entrance.

Identifiable buildings include: Southern Kitchen, Guest Services Building, or Penguini's (the main café).

Selected identifiable building: \_\_\_\_\_

Buildings' length on map, measured with string/ruler: \_\_\_\_\_ cm

Buildings' real length, measured with footsteps: \_\_\_\_\_ footsteps

Map scale: \_\_\_\_\_ cm: \_\_\_\_\_ footsteps

Measure the distance between locations on the map (using a piece of string to curve along the paths then measure the string compared to a ruler).

Distance from tiger enclosure to warty pig enclosure: \_\_\_\_\_ cm

Length of the outdoor elephant enclosure (along the middle): \_\_\_\_\_ cm

Distance from lion enclosure to mangeby monkey enclosure: \_\_\_\_\_ cm

Based on your scale, estimate how many footsteps will there be:

Distance from tiger enclosure to warty pig enclosure: \_\_\_\_\_ footsteps

Length of the outdoor elephant enclosure (along the middle): \_\_\_\_\_ footsteps

Distance from lion enclosure to mangeby monkey enclosure: \_\_\_\_\_ footsteps

Now walk the actual distance recording the number of footsteps:

Distance from tiger enclosure to warty pig enclosure: \_\_\_\_\_ footsteps

Length of the outdoor elephant enclosure (along the middle): \_\_\_\_\_ footsteps

Distance from lion enclosure to mangeby monkey enclosure: \_\_\_\_\_ footsteps

How accurate was your estimated scale? \_\_\_\_\_



# At the Zoo Ideas: Meerkat Maths

Reason mathematically, problem solving

Visit the meerkats.

Meerkats are mainly insectivores, but they also eat other types of meat and some vegetation. Your job is to calculate how much it costs to feed each meerkats and how much it costs to feed the entire meerkat mob.

Assume, for your calculations, that a baby meerkats eats half the amount of food that an adult meerkats eats.

How many adult meerkats are in the mob: \_\_\_\_\_

How many baby meerkats are in the mob: \_\_\_\_\_

Total number of meerkats in the mob: \_\_\_\_\_

Fill in the table below with your feeding calculations

Daily diet /adult meerkat	Cost / kg or per item	Cost / week /meerkats adult	Cost/ week /baby meerkat	Cost / week / mob
10g mealworms	£15.00 per kilo			
2 Egg (raw or cooked)	20p each			
20 g grapes	£1 per 100g			
1 Herring (fish)	£1.20 for 12			
1 Chick	40p each			
1 Mouse	60p each			
100 crickets	£30 per 1000 crickets			
<b>Total weekly costs to feed the entire mob:</b>				



# Wage Calculations

There are over 300 staff members employed at Colchester Zoo in summer. These staff are employed across 12 different departments. One department (Umphafa) are staff that work in South Africa at the Umphafa Nature Reserve, so they will not be included in these calculations.

The average daily cost of staff wages is £15,000. As you walk around Colchester Zoo, observe the staff and record which department you think they work in. After you have observed a number of staff jobs, estimate the total number of staff in each department and use this to calculate the estimated wages and departmental wages.

Staff Department	Number of Staff Observed	Estimated number of Staff in Department	Estimate appropriate wage for job role	Estimate total daily wage cost for department
Zoo Keepers				
Catering				
Retail				
Play Area				
Grounds				
Gardens				
Maintenance / Development				
Guest Services				
Office Based Staff Departments (you don't need to keep track of how many you observe)				
Communication (Marketing)	Not applicable	8 staff		
Education	Not applicable	5 staff		
HR and Accounts	Not applicable	4 staff		
			<b>TOTAL</b>	<b>£15,000</b>



**Teaching suggestion:** this activity requires careful observation, diagrams, notes and estimates as well as mathematical calculation. It can work well as a group task. The initial data could be collected during a zoo visit, but the final calculations could be completed back at school.

### Visit the Amur Tiger enclosure

This enclosure was built in 2003 and is home to our two Amur tigers, Igor and Anoushka, The tiger facility has two main enclosures (on each side of the tunnel). They can be connected together to make one large enclosure that both tigers share. The tigers have a large amount of space as well as swimming facilities with a pools and a stream.

This enclosure was built using labour from employed zoo staff, so you do not need to consider labour costs in your calculations.

**Your task is to estimate the total cost of materials for this enclosure based on the following approximate cost information.**

Make sure you take detailed notes about what you observe at the enclosure as well as your estimates about lengths, heights, etc. Show your work in all final calculations.

Item	Cost	Item	Cost
Thicker upright beams	£45 / item	Concrete base for fence	£10 per fence post
Thinner upright beams	£30 / item	Wooded boards for tunnel	£3 each
Enclosure mesh	£20 per m <sup>2</sup>	Metal tiger tunnel	£1000 each
Electric wire holder	£3 each	Concrete base for stream/pool	£10/m <sup>2</sup>
Clumps of bamboo (inside and along fence)	£4 each	Door from cat tunnels	£600 each
Metal reinforcement for fence	£10 / m	Visitor fence (to keep visitors away from mesh)	£ 8 /m
Paint	£3 / L (covers approximately 10 m <sup>2</sup> )	Windows (in tunnel and viewing area)	£25 each
Benches	£80 each	Educational sign/ entrance sign	£145 each

**Aquarium Maths**

1. Look at the cylindrical aquarium.

Calculate it's circumference by walking around the aquarium and counting your footsteps.

The aquarium has a circumference of: \_\_\_\_\_

2. What is the aquarium's radius? \_\_\_\_\_

3. Estimate how tall the aquarium is: \_\_\_\_\_

4. What is the volume of the aquarium? \_\_\_\_\_

$\text{cm}^3$  ( $V = \pi r^2 h$ ) (assume the entire aquarium is water)

5. What is the volume in litres? \_\_\_\_\_ ( $1^3 = .001$ )

6. How many fish do you see? \_\_\_\_\_ fish

7. What is the average (mean) length of the fish? \_\_\_\_\_ cm

8. Assuming that each fish requires a minimum of 10 liters of water per 10 cm of fish, how many fish could be in the tank? \_\_\_\_\_

9. What is the maximum number of fish that could be added to the tank? (assume the entire volume is water and any new fish are the average length) \_\_\_\_\_ new fish

## Rhino Herd Probability Management

**Background:** When zoos and other institutions breed animals, they need to plan for where the young will go when they have reached sexual maturity and most are moved away from their parents and opposite sex siblings.

For some species, females are easier to place than males. These are species where one dominant male breeds with a number of females. If extra males are in these groups, the males fight. Males of these species needs to be kept alone in these enclosures.

With white rhinos, there is one dominant male and a herd of females. Females reach sexual maturity at the age of 6-7 and males reach sexual maturity at the age of 10-12.

Rhino gestation (pregnancy) can last for up to 16 months.

Rhinos in captivity can live for ~40-50 years, and can breed up to ages ~30.

There are methods of 'birth control' for female rhinos if they are living with a male relative to prevent inbreeding.

Answer the questions on the following page to complete this activity.

# Rhino Herd Probability Management Continued

How many rhinos are at Colchester Zoo: \_\_\_\_\_

How many are female: \_\_\_\_\_

How many are male: \_\_\_\_\_

What are their ages? (look at enclosure signs or attend feeds to find out)

\_\_\_\_\_

If the younger female rhinos have a calf (baby rhino) approximately ever four years, in 20 years, approximately how many rhinos could there be? \_\_\_\_\_

Calculate the probability that all those young are female (who could stay with the herd):

Calculate the probability that half the calves will be male and half female:

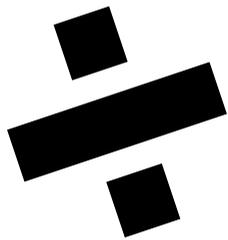
How would you manage this rhino population, to ensure the group has appropriate social structure, is breeding at a young age to contribute to this threatened species, and prevent potential inbreeding? \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(Use the back of the page if you need more space to show any calculations)



We hope you enjoyed your trip to



Learning about  
**Maths**

