



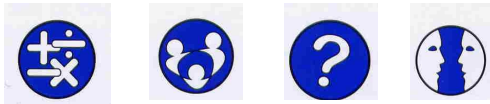
Thank you for booking your **Primary Mathematics** school party at the Egypt Centre. Here is your Teachers' Pack. We have found that the Pack is very useful, as you will have a record of the activities undertaken. It also enables us to structure activities. All activities are designed with key skills in mind and below we indicate the key skill outcomes of each activity.

The Teachers pack contains sheets, which involve 'hands on', activities (such as making a 'mummy'), these are a reminder of the day. Other sheets involve observing certain objects and recording answers. The children will not be expected to work unaided but take part in the activities with the Museum's assistants. Most of our staff who will be working with your pupils are unpaid volunteers and not trained teachers. Please could you therefore ensure that the children are supervised at all times. The volunteers have indicated it is helpful if children are given name badges, however we understand that not all schools are happy to provide name badges therefore we leave to decision to you.

The activities on offer in the upstairs gallery, *The House of Life* are:

## 1. Egyptian Mathematics

Children will examine the way numbers were written in ancient Egypt, learn about unit value rather than place value and complete simple calculations using this base-10 system. Children will be encouraged to look around the gallery and count objects recording the data in ancient Egyptian numerals!



## 2. Egyptian Measuring

The children examine the measuring units used by the ancient Egyptians and decide which ones to apply in order to measure various objects. They will compare ancient measuring units with modern measuring units and recognise the imperfections of the 'non-standard' ancient units. They will be encouraged to work as a team and measure objects in the gallery.



## 3. Mirror images, reflection, co-ordinates, Symmetrical hieroglyphs and repeated patterning

The children are encouraged to look at symmetrical shapes and patterns and draw lines of symmetry. Children are also encouraged to observe symmetrical shapes and repeated patterns in the *House of Death*.



## 4. Senet game

Children are placed in teams to play the ancient board game *senet*. They learn about the rules of *senet* and its place in Egyptian society, developing strategy and team building skills. We have a replica of a *senet* board found in Tutankhamun's tomb with throw sticks instead of traditional dice.



The activities on offer in the downstairs gallery, *The House of Death* are:

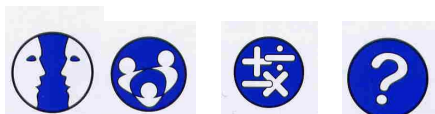
### 5. Mummification and Opening of the Mouth Ceremony

Using a life-size 'dummy mummy' the children learn the art of deluxe mummification! This includes the removal of organs from the body, drying and bandaging the body, along with the ceremony and ritual that was an integral part of the mummification process. Children are encouraged to participate in role-play and use the props provided. Children are encouraged to question whether or not the ancient Egyptian amulets (and other objects) found in the mummy wrappings to protect the dead person should have been taken from the body and displayed in museums around the world! Children will use mapping and estimation skills during this activity.



### 6. Pyramid puzzles and Maths for Mummifiers!

Children are encouraged to explore number patterns, make predictions and develop mathematical strategies to overcome difficulties.



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When you arrive the children are welcomed, handed their clipboards, sheets and pencils and divided into two groups. One group will go into the *House of Death* and one group will go into the *House of Life*. The children go for lunch in a pre-booked area and after lunch swap over so they all have an opportunity to see both galleries. If you are only visiting for half a day then the activities on offer will be limited to two in each gallery.

We charge £2 a head for each child and provide the relevant photocopied sheets, clipboards and pencils for the children to use. If any children do not turn up we charge 50p for the photocopied work pack, which you take away with you. Teachers and children may bring cameras but **we do not allow flash photography** in the museum galleries, due to conservation issues regarding safe light levels. We also have a shop area with 'Egyptian' themed items for sale starting from 30p and offer a 'goody bag' service. Please make cheques payable to *Swansea University*.

We look forward to seeing you and hope you enjoy your time at the Egypt Centre. Please fill in our teacher questionnaire. Any comments on how we can improve our services to you will be gratefully received. Sometimes teachers send us 'thank you' letters and drawings from children that we put in a booklet for other visitors to see. If you would like to send us children's work please can you obtain your head teachers permission for them to go on display.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Wendy Goodridge'.

Wendy Goodridge  
*Assistant curator*

# Important Notice for Teachers

We want to ensure that your visit to the Egypt Centre is happy, safe and rewarding. In order to achieve this we want to explain our roles; what you can expect from us and what we expect from you.

## *The Role of the Egypt Centre*

- All activities are museum led. We will provide trained activity leaders to work with small groups of children. Activity leaders are **not** expected to discipline children. All staff working with your children are fully-enhanced CRB checked.
- We will endeavour to provide as many of the activities chosen by the school in the time available.
- We will provide all materials and equipment needed for each activity, which are safe to use.
- We will provide each child with a clipboard, pencil and work-pack for their use during the visit.
- If required we can provide a safe area for lunch near toilet facilities.
- We provide a gift-shop that caters for school children and is relevant to areas of study.
- We welcome feedback from schools and each school is given a questionnaire to return.

## *The Role of the School*

- The school should try to arrive at the agreed time
- The school will pay a £2 for each child and 50p for any work packs not used due to absence of children.  
(Please make cheques payable to *Swansea University*)
- A member of school staff should supervise each group of children at all times and ensure good behaviour.
- Ensure the equipment and materials that are to be used for subsequent school groups and the public are not being misused.
- Respect other visitors to the museum
- If the school has any concern please report it to a member of staff.

The Egypt Centre wants to ensure that children are protected from harm while in the Museum. In addition to the Museum's responsibilities, we ask that teachers/leaders of groups exercise their own responsibilities.

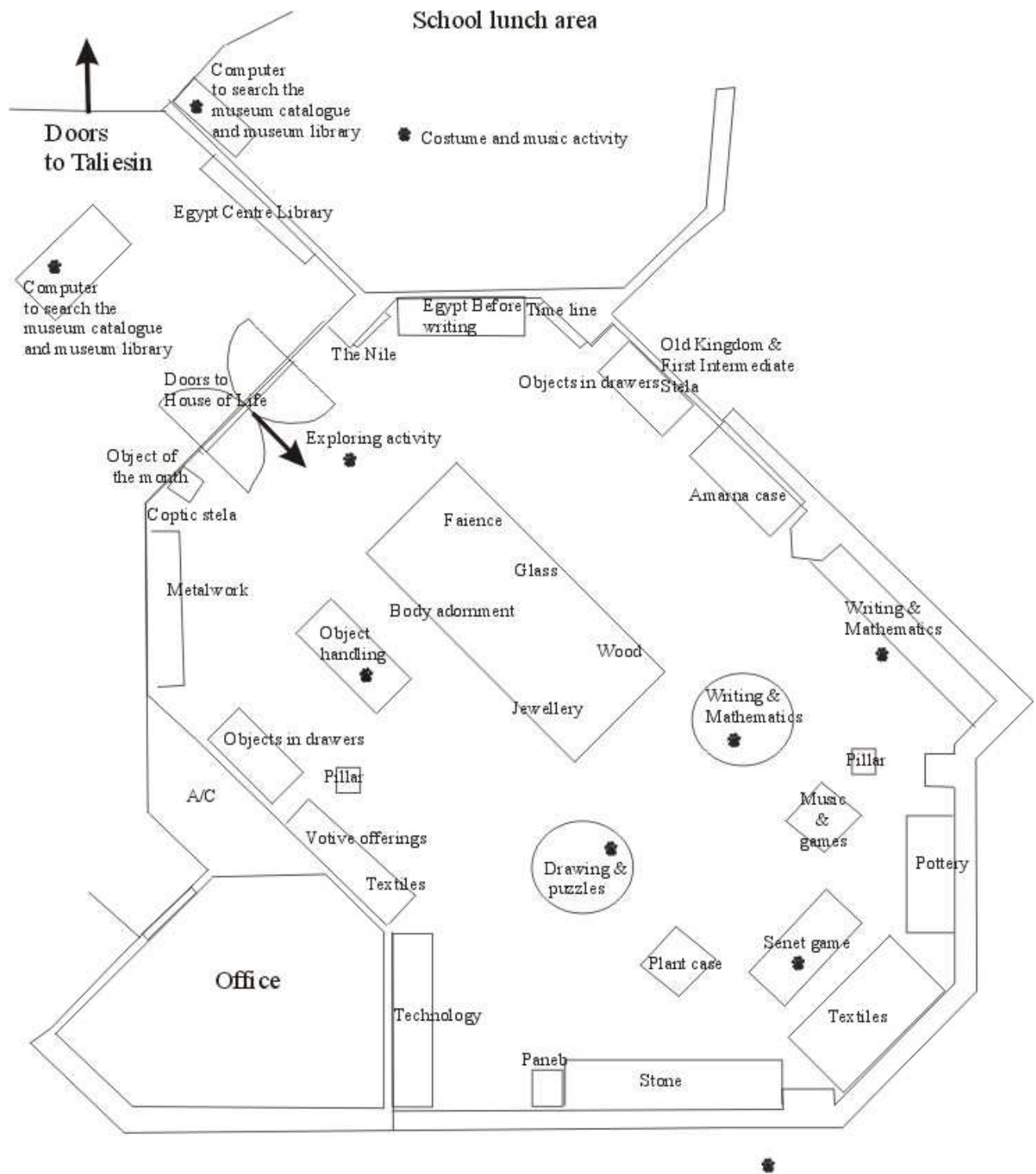
In particular, all leaders/teachers shall:

- Make sure they have adequate staff supervision using the ratios laid down by their institution. This is a suggestion:
  - 0-2 years = 1 adult to 3 children
  - 2-3 years = 1 adult to 4 children
  - 3-7 years = 1 adult to 8 children
  - 7 years + = 2 adults (preferably one of each gender) for up to 20 children/young people, and one additional staff member for every additional 10 children/young people.
  
- Ensure they supervise the children/young people at all times
- In case of an accident, contact a member of Museum staff who will follow Museum procedures
- In the case of a lost child, contact a member of Museum staff who will follow the Museum procedures
- Refrain from having possession of or consuming alcoholic beverages on the Museum premises
- Refrain from either verbally or physically abusing a child/young person
- Ensure adequate insurance cover for the group and leaders
- Ensure that the appropriate group leaders carry any necessary medicine for the children with them at all times, with the permission of the parents/guardian
- Inform their group of behavioural expectations while in the Egypt Centre


The Museum hopes each visitor has an enjoyable and exciting visit. We therefore expect all visitors to display courtesy and respect for others, and for the Museum property, at all times while visiting the Museum.

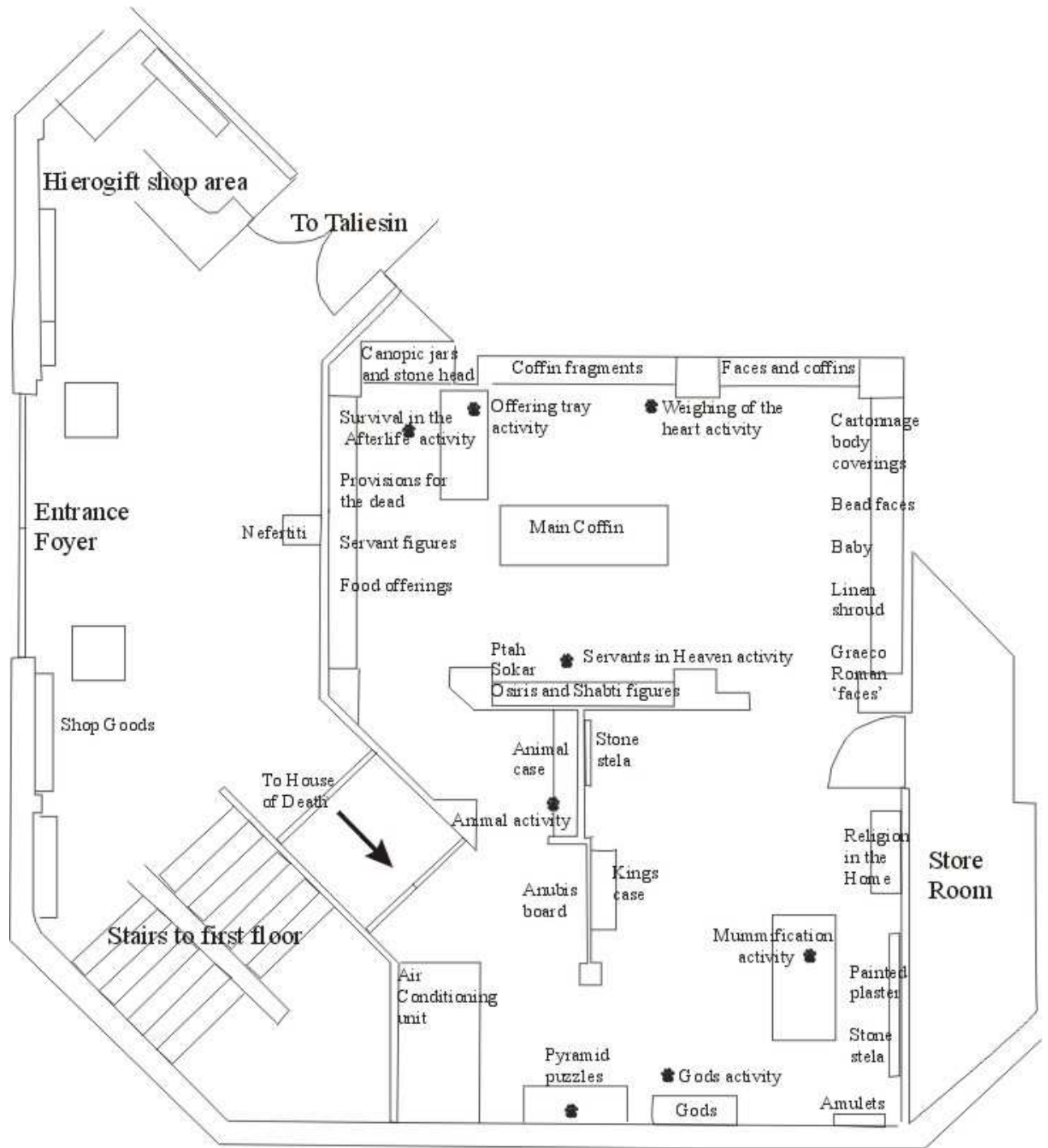
Group leaders should therefore not allow members of their group to:

- make any sectarian, racist, sexist or other offensive remarks toward any person or other group
- vandalise Museum property
- leave litter in the Museum/University grounds.




## Egypt Centre First floor plan

 Hands-on activities



## Egypt Centre Ground floor plan

 Hands-on activities

# The Egypt Centre *Hierogift* Shop

## 'GOODIE' BAGS FACILITY

The museum shop is available to use for all visiting parties during their time at the centre. There are many items geared towards school children, and at a very affordable price (items start from 25p!) There should be (time permitting) a chance for your group to visit the shop at some time during the day.

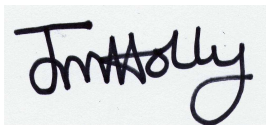
However, the shop is quite small, so we are unable to serve a whole group at the same time. It is recommended that groups use the shop 6 or 7 at a time in order to make it easier for the shop assistants and for the children themselves.

We also offer to make up 'goodie bags' which can be prepared in advance, up to a certain amount of money, ie. £1.50, £2.00, £3.00 etc. This can make the visit easier for schools especially if they are pressed for time.

If you wish to use this facility, please contact me in advance and I can have a selection of items for you to see during the morning session. I can suggest items to put in the bags, both educational and fun. Some examples include; blank papyrus, painted papyrus, bookmarks, pencils, pens, scarab beetles and small statues, necklaces and rings. The bags will be ready before you leave.

If there are any other questions about the shop you wish to ask, then please do not hesitate to contact me here at the Museum.

Many thanks



Jayne Holly  
*Museum Assistant (Gift Shop manager)*  
Tel: 01792 295960  
E-mail [j.m.holly@swansea.ac.uk](mailto:j.m.holly@swansea.ac.uk)



Egypt Centre  
Primary  
Mathematics  
Activity sheets

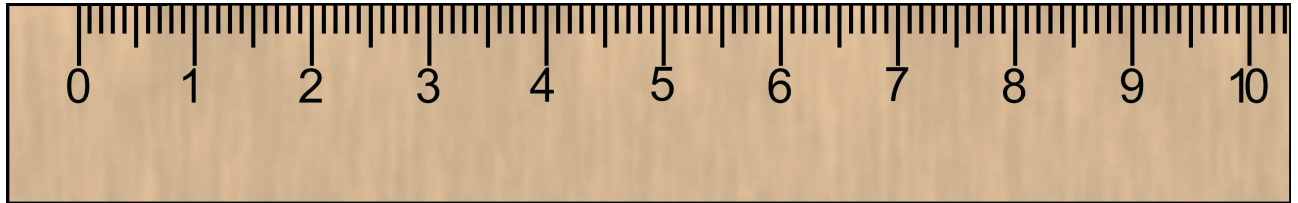
Name.....



# EGYPTIAN MEASURING (Key Stage 2)

## How do we measure things today?

This ruler shows centimetres (cm).

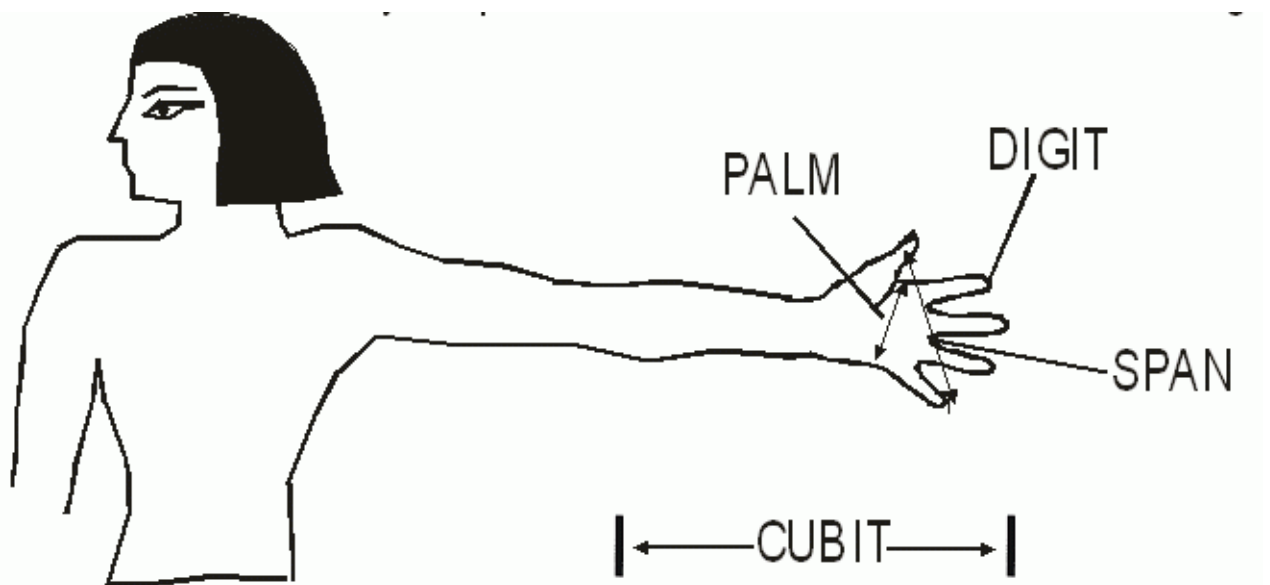


Do you know how many centimetres are in a metre?

Did you know that the United Kingdom has only used centimetres and meters since 1965? Before this Inches, Feet and Yards were used for over 850 years!

## How did the Egyptians measure things over 3,500 years ago?

The Egyptians used their arms and hands.



There are four measurements that the Egyptians used. Let's take a moment to understand each one as a class.

<b>DIGIT</b>	The width of a finger
<b>PALM</b>	The width of your palm
<b>SPAN</b>	The widest your hand can spread from thumb to little finger
<b>CUBIT</b>	The length from your elbow to the end of your middle finger

**4 digits = 1 palm. 7 palms (or 28 digits) = 1 cubit.**

**We have learnt the different measurements. Now we need to decide which measurement is best to use depending on the length of what we are measuring.**

What could you use to measure a pencil?

How about your leg

How about the height of a chair

Or even your hair

**In pairs have a go at measuring the following. Make sure you write down which measurement you have used. Digit, Palm, Span or Cubit.**

This piece of paper

The height of the Maths case

The length of the room

The width of your clip board

The height of your teacher!

Your favourite object

\_\_\_\_\_

**Why do you think if your teacher measured 10 spans of string and then you did the same, your length of string would be shorter than your teachers?**

\_\_\_\_\_

**Go in two teams and measure the length of the big case with the knotted rope! Are your answers the same?**

**Why?** \_\_\_\_\_

Go in two teams and each make a knotted string using your palm as the measurement!

Make your string 5 palms long. All lay your string on the table and compare them. Are they all the same length?

Why? \_\_\_\_\_  
—



Did you know that the Ancient Egyptians used a knotted rope to measure long distances? Each knot was a cubit apart.

The Egyptians used the Pharaoh's cubit for the knotted rope so that everyone used the same length cubit.



The ROYAL CUBIT = 52.4cm

How long is your cubit in cm? \_\_\_\_\_

Which of these things do you think would have been measured using a knotted rope?

- a) Your foot
- b) A field of corn
- c) A room
- d) A cup
- e) A road
- f) A necklace

Working in pairs measure different objects using all the units of measurement.

OBJECT	UNIT OF MEASURE	MEASUREMENT
	Digit	
	Palm	
	Span	
	Cubit	

# Egyptian Maths

We are going to look at the way the Ancient Egyptians wrote numbers using hieroglyphs over 4,000 years ago.



1

*These are the units 2 is || 3 is |||*

**Can you write the number 6 in the box**



10

*This is a Cattle Hobble*

**Write the number 30 in the box**



100

*This is a Piece of Rope*

**Write the number 400 in the box**



1,000

*This is a Lotus Flower*

**Write the number 2000 in the box**



10,000

*This is a Finger*

**Write the number 30,000 in the box**



100,000

*This is a Tadpole*

**Write the number 200,000 in the box**



1 Million

*This is a God, holding up the sky*

**Write the number 1 million in the box**

**Using Egyptian numbers can you write your age in this box**

The number of your house?

The number of days in the year (365)

This year

The number of students at Swansea University (14,000)

Here are some examples of Egyptian sums

$\begin{array}{r} 28 \\ 44 + \\ \hline \end{array}$	  <hr/>  <hr/>	<p>Add the units first These make 12</p> <p>which is  down, carry </p>
---	----------------------------	--

$\begin{array}{r} 42 \\ 21 - \\ \hline \end{array}$	  <hr/>
---	---------------

Now it is your turn to try

$\begin{array}{r} 13 \\ 8 + \\ \hline \end{array}$	
--	--

$\begin{array}{r} 34 \\ 42 + \\ \hline \end{array}$	
---	--

$\begin{array}{r} 49 \\ 18 - \\ \hline \end{array}$	
---	--

Finally, can you do these Egyptian sums?

  <hr/>	-	  <hr/>	+	  <hr/>	-	  <hr/>	+	  <hr/>

Make up your own Egyptian sum in the box.

**We are now going to find and count some objects in the gallery.  
Remember to write your answers in Egyptian!**

1 Look in the metal-work case, how many axes are there?

2 How many arrow-heads can you find?

3 Look in the faience case, how many shabtis can you find?

4 Look in the Amarna case, how many collars can you find?

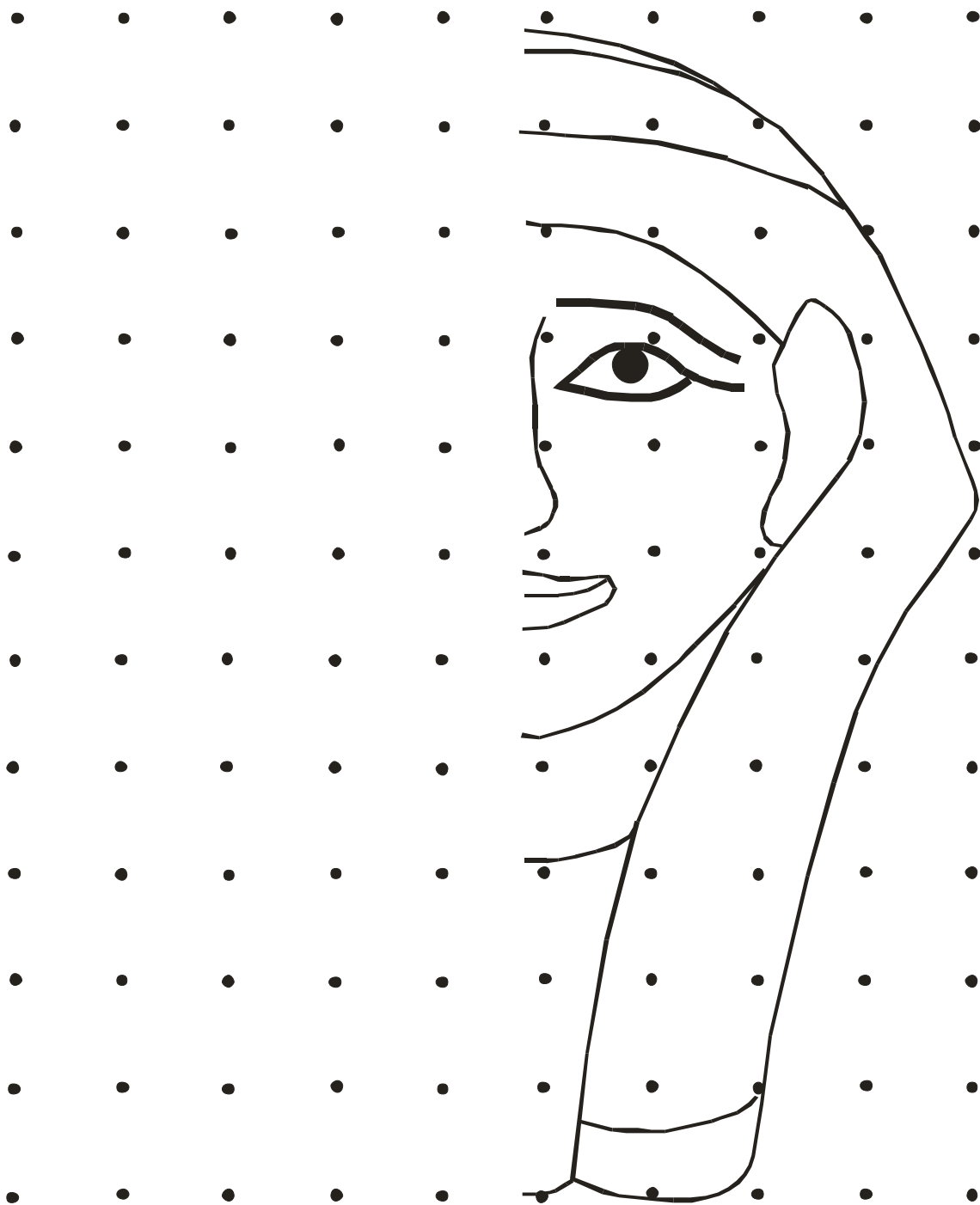
5 How many head-rests can you find?

6 Look in the jewellery case, how many necklaces can you find?

7 How many marbles can you see in the games case?

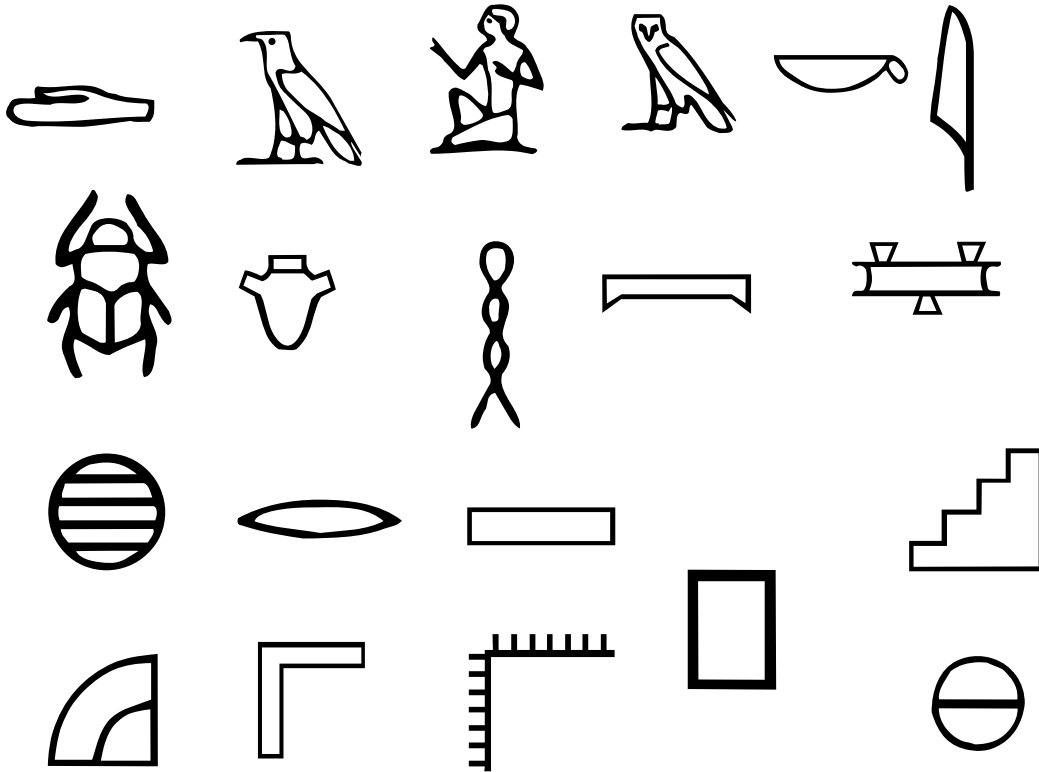
8 What else can you count?.....

# Egyptian Symmetry



Use the dots to help you draw the other half.

# Symmetrical Hieroglyphs



Look at the hieroglyph shapes to see how many lines of symmetry you can find and draw the symmetry lines on each shape. Mark your answers in the boxes below.

Horizontal	Vertical	Diagonal	2 or more	None

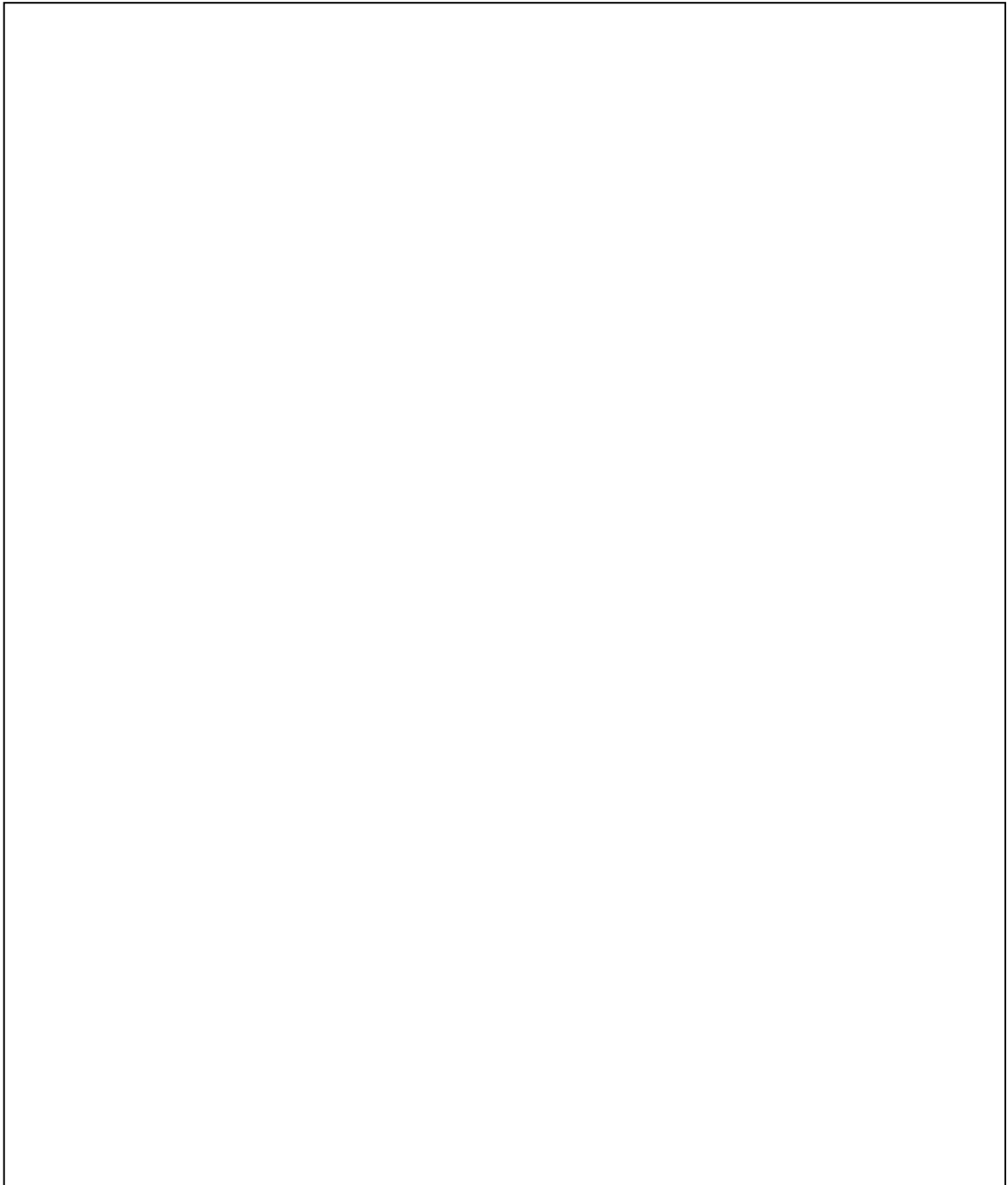


# Egyptian Symmetry

Look around the *House of Death* and see how many symmetrical objects and patterns you can find.

In the *House of Death* I found \_\_\_\_\_ symmetrical objects and patterns

Draw your favourite

A large, empty rectangular box with a thin black border, intended for drawing a favorite symmetrical object or pattern.

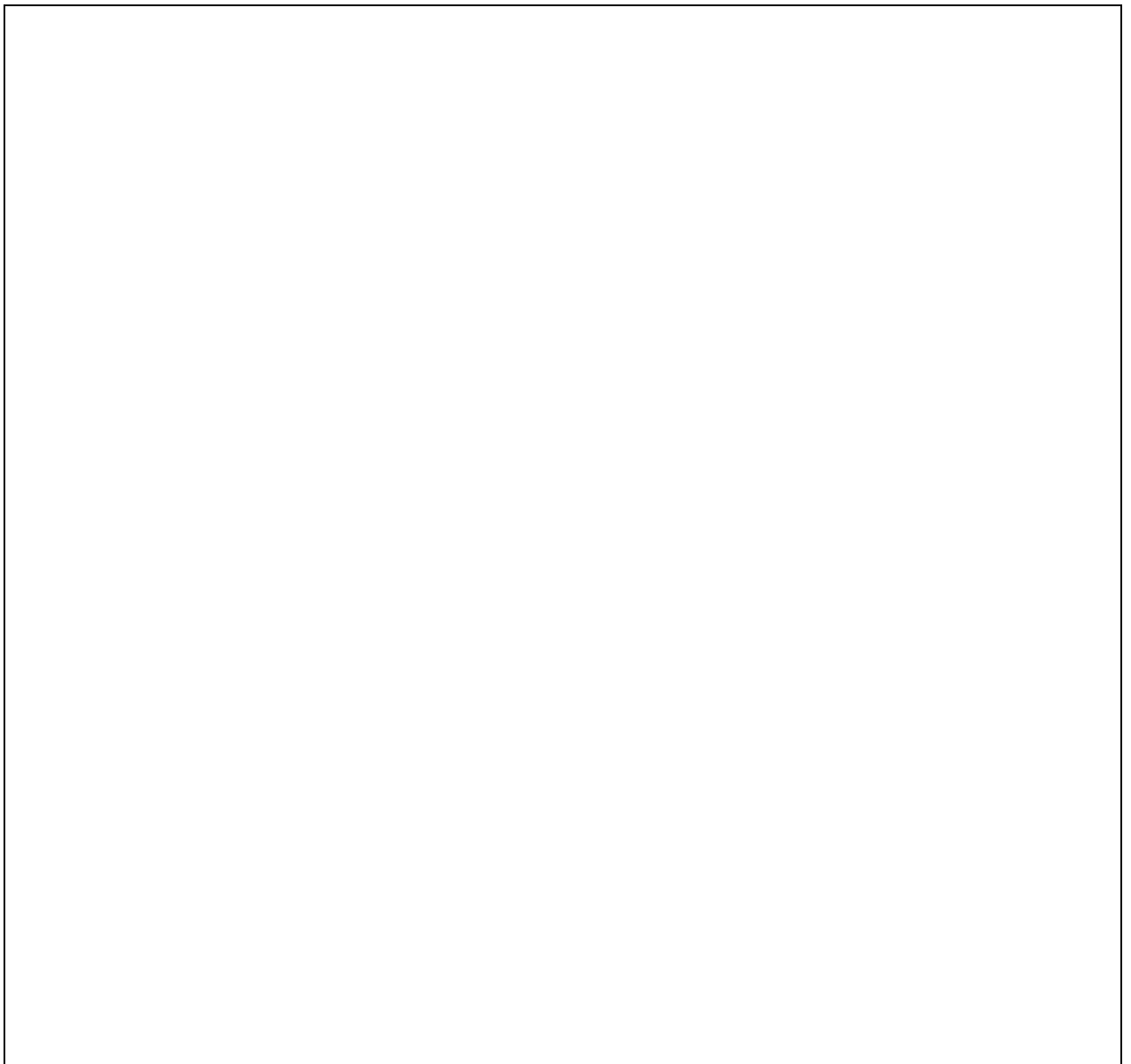
# Repeated patterns

Look carefully at the objects in the museum and find patterns that are repeated. Some are of flowers and plants and some are of different shapes.

Hint:

In the *House of Life* you will find lots of repeated patterns in the beaded collards. In the *House of Death* you will find repeated patterns on the coffin fragments.

Draw a repeated pattern that can be used for a necklace design or design a repeated pattern for a coffin!



## Senet (The Passing Game)

The game dates from the 4<sup>th</sup> millennium BC to the 3<sup>rd</sup> century AD. It died out, like much of ancient Egyptian culture, with the Christian era. The earliest known examples of senet boards come from 1<sup>st</sup> Dynasty tombs at Abu Rawasch though it probably dates to the Predynastic times. There are over 120 games known in museums throughout the world.

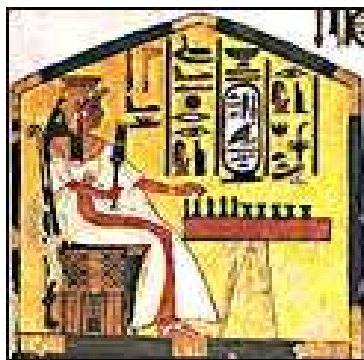
Senet may well have been a game played in everyday life, for fun. However, it also seems to have had a religious meaning, regarding funerals and Hathoric rites connected with funerals. Often games of senet were placed in tombs. Tutankhamun, for example had 4 games in the tomb with him.

*Coffin Text* spell 405 states that senet is a means of the dead communicating with the living. In 1019 the mobility of the deceased in the necropolis is compared to a god travelling across a senet board.

The game of senet was connected with obtaining the afterlife. On several tombs from the 6<sup>th</sup> Dynasty onwards the deceased is shown playing against no visible opponent. They may be playing against the powers of the beyond. The game is referred to in Chapter 17 of the *Book of the Dead*. From 19<sup>th</sup> Dynasty scenes of senet playing often incorporated into text of *Book of the Dead* 17. The beginning may be translated as : *Spell for going forth by day, assuming whatever form one will, playing senet, sitting in a pavilion, going forth as a living soul....* Illustrations associated with *Book of the Dead* 17 sometimes show the deceased playing senet. Piccione believes that senet was played in or near the tomb in a pavilion. There are graffiti senet boards in tombs, presumably for games played by the living. At Beni Hasan there is a graffiti senet board near a depiction of a game painted on a tomb wall. Piccione suggests that the game allowed the living to contact the dead.

From the 20<sup>th</sup> Dynasty the game of senet was described on sets of papyri describing the journey through the underworld called 'The Great Game Text'. Such an example is P. Turin 1.775. It has been suggested that living people played senet to achieve unity with the sun god before they died. 'The Great Game Text' mentions boards in which all the squares are decorated.

The 30 squares of the senet board are also associated with the lunar month. It is usually agreed that the squares had metaphoric meaning associated with the afterlife. We cannot be certain but the following suggestions are usually given: the counters may represent the *ba* travelling between heaven and earth.



Queen Nefertari playing senet

Many boards do not have decorated squares. Boards of the Old and Middle Kingdom sometimes had numbers but from the New Kingdom onwards certain squares were decorated with religious symbols. These were not always the same on every board.

On some Old and Middle Kingdom boards each player had seven pieces but by the New Kingdom each player had five pieces. In the earlier games you would start on the House of Rebirth.



This is the House of rebirth. Sometimes there is frog on this square since frogs are to do with birth.



The House of happiness or House of Rejuvenation.



The House of water or the waters of chaos. One of the game texts says of square 27: "I seize his gamepieces so that he might drown together with his gamepieces. I throw him into the water." People who failed to achieve the afterlife would be drowned in the waters of the netherworld.



The House of the three truths.



The House of Re-Atum.

(Some versions have Isis and Nepythys instead of two seated men).

The replica of the board in Tutankhamun's tomb has the standard funerary offering on it showing it was made for the tomb. Such formula are often put on boards from the 18<sup>th</sup> Dynasty onwards.

It seems that one of the rules used to be that if you landed on the last three squares you would have to throw the right number to exit- a 3 for the third square, a 2 for the second square and a 1 for the last square.

### **Bibliography**

Decker, Wolfgang, 1992. *Sports and Games of Ancient Egypt*, Cairo, The American University in Cairo Press, 124-131.

Kendall Timothy, 1978. *Passing Through the Netherworld : The Meaning and Play of Senet, an Ancient Egyptian Funerary Game*, Belmont, The Kirk Game Company

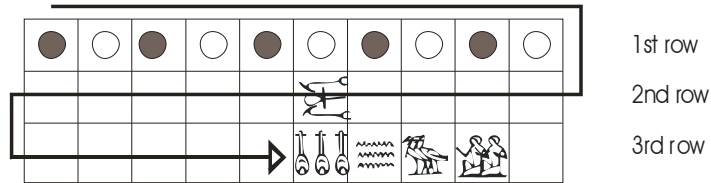
Piccione, Peter, 2001. *Gaming with the Gods: The game of Senet and ancient Egyptian Religious Beliefs*. Leiden, Brill.

Tyldesley, Joyce, 2007. *Egyptian Games and Sports*, Princes Risborough, Shire Publications, 11-14.

# Senet

We do not know exactly how senet was played. This is a possible way.

Starting position  
with direction  
of play.



Throw the die to move. Each role of the die moves only one piece. The aim is to be the first player to play all her/his pieces off 3rd row.

Before any player can play a piece off the board all players must be off the 1st row.

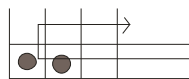
A player can 'capture' an opponent's piece by landing on it. In this case the captured piece is placed from where the 'victor' started.

A throw of '2' or '3' ends a player's turn and is the last move for that turn.

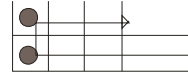
Strategy: A throw of '2' may be useful to protect pieces (see A below), a throw of '3' to advance a 'wall' (see B below).

A. Protected Pieces: Two pieces of the same colour in the line are deemed to protect each other and neither can be 'captured'

Examples:



direction  
of play



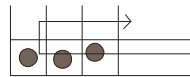
direction  
of play

B. Normally pieces can jump over each other, but not if you build a 'wall'.

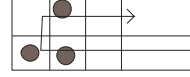
A Wall: Three pieces of the same colour in a line are a 'wall'.

In this situation opponents pieces cannot pass until the wall is disbanded. If a player has no piece that can move forward he or she must move a piece backwards.

Examples:



direction  
of play





direction  
of play

'Protected Squares': Any piece on one of these squares cannot be captured. Strategy: It is good to leave pieces here as long as you can, and you can use them as safe areas to start to build a wall on.

Protected Squares



'Water Trap': If a player has only one piece that can be moved and that piece lands on this square  that piece goes back to the  Square. If this place is occupied the 'water trapped' piece goes back to the first available square on the row.

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# Mummification

The ancient Egyptians mummified their dead in order to attempt to preserve the body. The body was taken to a tent where it was washed in a natron solution (sodium carbonate and sodium bicarbonate) to cleanse it before mummification.

The Egyptians realised that the body was better preserved if the internal organs were removed. The brain was removed through the nose by a long hook! An incision was made in the left side of the body and the internal organs removed; these were washed and dried. They were placed in special canopic jars kept near the body, or in later times put back inside the body in parcels. Natron was piled on top of the body to dry out the body. After 40 days the body cavity was packed with bags of clean natron along with bandages and sweet smelling spices to plump the body out and give it a better shape! The whole body was then coated in resin and wrapped in resin soaked bandages. Amulets were wrapped among the layers to give the body further protection. Bandaging the mummy took 15 days before it was ready to be placed in its coffin.

**Now it is your turn to make a mummy!**

# Place the amulets on THE MUMMY

Different amulets were placed on different parts of the body.

1. **Wedjet Eye:** Protected mummy from evil and healed wounds.

*Forehead, throat, stomach*

2. **Ankh:** Symbol of 'life.' *Chest, feet*

3. **Djed Pillar:** Back bone of Osiris, means 'stable or enduring.'

*Throat, chest, stomach*

4. **Cat:** Goddess Bastet. *Feet*

5. **Hawk:** Horus. *Chest, stomach*

6. **Scarab beetle:** Dung beetle rolling ball of dung God Khepre rolling sun across the sky each day, symbol of new life and resurrection.

*Collarbone, chest, stomach*

7. **Sons of Horus:** Same as canopic jarheads to protect the organs. *2 facing pairs, chest or stomach below winged scarab.*

8. **Uraeus serpent:** Cobra Goddess, worn on King's crown to strike enemies of Egypt, also a symbol of re-birth shedding skin.

*Forehead, neckline, chest, stomach.*

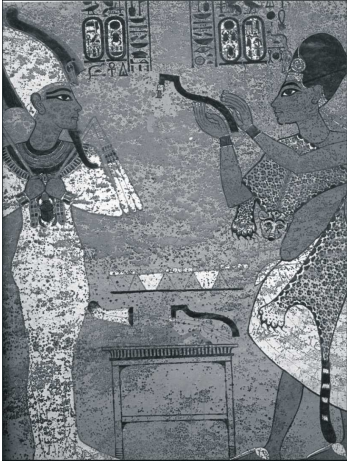
9. **Papyrus Sceptre:** Green vegetation symbolised new life and youth.

*Forehead, throat, chest, stomach*

10. **Heart:** Most essential organ, seat of intelligence all feelings/actions/memory. *Neck, left breast, chest.*

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# The Opening of the Mouth Ceremony

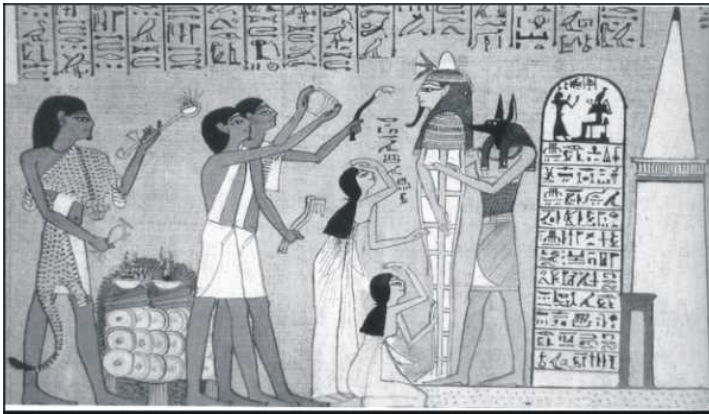


This picture shows Aye, dressed in a leopard skin, performing the ceremony of the 'Opening of the Mouth' before the mummy of Tutankhamun.

The son and heir of the dead person, or the **Sem-priest**, usually performed this ritual.

The ceremony was performed so that the mummy's senses were restored so it might eat, speak, see, smell and hear again. This was also practised on statues and figures of the dead.

The tool in Aye's hand is an adze, usually used by carpenters to carve wood. This touched the mummy's mouth and eye's, while spells were chanted to regain the senses.



The Opening of the Mouth was an elaborate ritual involving:

**Purification** - Holy water is poured from vases

**Incense** - The *Sem*-Priest holds an incense burner

**Anointing with oils**

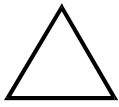
**Chanting spells** from the *Book of the Dead* while female mourners wail before the mummy.

**Pointing objects** at the mummy - The adze. Sometimes the right leg of an ox was used.

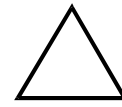
Act out the Opening of the Mouth Ceremony. Remember all the parts of the ritual. The mummy is now ready to be placed in its coffin. New Kingdom depictions show the mummy placed upright in a patch of clean sand at the entrance to the tomb.

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# Pyramid Puzzles



The pyramids were built with a square base with the apex directly above the centre of the base.

Using multi-link blocks make a pyramid with a base of 9 blocks square.

How many blocks high is it?.....

How many blocks did you use?.....

If your bottom layer has 49 blocks how many blocks high would your pyramid be?.....

How many blocks altogether?.....

Round this to the nearest 10.....

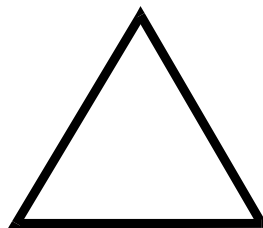
Round this to the nearest 100.....

When you have made your pyramid count:

the number of corners.....

the number of edges.....

The number of faces.....



# Maths for Mummifiers!

A baby crocodile is 8cm long and if the daddy crocodile is 5 time longer how long is the daddy crocodile?.....

The chief embalmer charges 3 bag of onions for a baby crocodile and 7 bags of onions for an adult crocodile. If he has an order to mummify 4 baby crocodiles and 5 adult crocodile how many onions did he earn?  
.....

Round your answer to the nearest 10.....



Look at the mummified crocodile in the Animal case.

You are the chief embalmer and you need to get bandage ready for mummification.

The crocodile is 12 cubits long and 3 cubits wide at its widest part. You want to wrap the crocodile with at least 7 layers of bandage and the bandage you are using is 1 cubit wide.

What do you estimate is the maximum amount of bandage you need?  
.....

Round this to the nearest hundred.....

Show your workings out: