# Return of the Mummy

## Lesson Plan

### Learning objectives

**strands 2–5**
- Life processes are supported by the organisation of cells into tissues, organs, and body systems.

**strand 1 (HSW)**
- Use scientific ideas and models to explain phenomena and develop them creatively to generate and test theories.
- Critically analyse and evaluate evidence from observations and experiments.

### PLTS
- Independent enquirers: support conclusions, using reasoned arguments and evidence.
- Creative thinkers: ask questions to extend their thinking, connect their own and others’ ideas and experiences in inventive ways, and question their own and others’ assumptions.

### APP
- AF1 – Thinking scientifically
- AF3 – Communicating and collaborating in science
- AF4 – Using investigative approaches
- AF5 – Working critically with evidence

### Starter

- **Making Mummies**
  Use a concept cartoon (Activity sheet 1) to illicit discussion amongst the students about preserving bodies.

- **Decay or No Decay**
  Student groups are issued a pack of playing cards, to link the factors for decay with the methods used by Egyptians to mummify.

### Differentiation

**Help**
- Lead the discussions, and ask questions to prompt answers.

**Extension**
- Students work in small groups and feedback to the class. They should be encouraged to use scientific vocabulary, and clearly identify the life processes involved.

### Resources
- Activity sheet 1
- Activity sheet 2

### Main

Students investigate the preservation techniques used in ancient Egypt.

- **Practical – investigating ancient Egyptians’ preservation techniques**
  Students plan an investigation by selecting a range of preservation techniques. They observe how each technique affects the decay process.
  - Analyze the results. Use a film to help realise how ancient Egyptians used the techniques.
  - Optional – create a class poster that will bring together the different findings for each technique.

### Differentiation

**Help**
- Select the techniques. Teacher will decide whether all groups carry out the same technique or each has a different technique.
- Provide help with designing a results table for the observations.

**Extension**
- Allow the students greater freedom to design their method for the various techniques. Reduce the help given to design the results table.
- Ask students to justify their success criteria.

### Resources
- Teacher and Technician Notes
- Activity sheet 3
- Film clip [http://www.youtube.com/watch?gl=GB&hl=en-GB&v=-MQ5dL9cQX0](http://www.youtube.com/watch?gl=GB&hl=en-GB&v=-MQ5dL9cQX0)
- Optional poster-making materials.
# Return of the Mummy

## LESSON PLAN

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<tr>
<th>Plenary</th>
<th>Differentiation</th>
<th>Resources</th>
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<tbody>
<tr>
<td><strong>Pyramid of knowledge</strong>  Students use Activity Sheet 4 to build a pyramid of knowledge summarising what they have learnt.</td>
<td><strong>Help</strong>  • Give students key words to help them fill in the pyramids. Key words will depend on the development of ideas during the lesson. <strong>Extension</strong>  • Link to current ideas around preservation, such as food preservation.</td>
<td><strong>Teacher and Technician Notes</strong>  • Activity sheet 4</td>
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## Homework

**Activity sheet 5** provides several possible causes of death for Tutankhamen. Students use the Internet or library to research which of these is the most probable cause of death, using modern scientific evidence. The students then write an explanation of their findings.

## Learning outcomes

**Level 3**
- Plan an investigation, with assistance.
- Follow a method.
- Make simple observations.
- Name the relevant life processes.

**Level 4**
- Select an appropriate approach for the investigation.
- Make a series of observations.
- Vary one factor while keeping others the same.
- Communicate conclusions using appropriate scientific language.
- Describe some processes and phenomena related to organisms.

**Level 5**
- Select and use methods to obtain data systematically.
- Analyse findings to draw scientific conclusions that are consistent with the evidence.
- Communicate conclusions using scientific and mathematical conventions and terminology.
- Describe some processes and phenomena related to organisms.

**Level 6**
- Identify an appropriate approach in investigatory work.
- Select and use methods to collect suitable data.
- Analyse findings to draw conclusions consistent with the evidence and use scientific knowledge and understanding to explain them.
- Communicate qualitative and quantitative data effectively.
- Describe some processes and phenomena related to organisms.

**Level 7**
- Plan investigation by synthesising information from a range of sources and identifying key factors in complex contexts.
- Select and use methods to obtain reliable data, including making systematic observations with precision, using a range of apparatus.
- Analyse findings to draw conclusions consistent with the evidence and use scientific knowledge and understanding to explain these conclusions.
- Describe a wide range of processes and phenomena related to organisms.
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Students discuss their ideas about how the ancient Egyptians were able to preserve bodies. This should lead into ideas about the factors affecting decay. Students consider the conditions needed for the life processes of microbes that bring about decay.

They then plan and carry out an investigation to find out if the Egyptians’ techniques were effective at preventing decay.

### Equipment required per group:

**Starter**
- **Activity sheet 1** (one per group or projection image)
- **Activity sheet 2** (one per group, photocopied onto card and cut into a deck of playing cards)

**Main**
- **Activity sheet 3**
- **Practical**
  - Petri dishes (6–8 per group)
  - tape
  - waterproof marker pens or labels
  - slices of apple or bread (6–8 per group)
  - vinegar
  - oils
  - salt
  - incubator/fridge
  - muslin cloth to wrap the apple/bread

### Health and Safety notes:
- Students must not eat the bread or apple.
- Petri dishes must not be opened when making observations.
- Dispose of used Petri dishes in a biohazard bag.

**Starter**

1. **Making mummies** Use **Activity sheet 1**, a concept cartoon, to illicit discussion amongst the students about preserving bodies.

2. **Decay or no decay** Issue each group a pack of playing cards constructed from **Activity sheet 2**. They deal the cards out one at a time in their groups and decide whether the keyword on the card is important for the process of decay. Ask students to suggest reasons why the factor might be important or not.

**Main**

**Practical – Investigating ancient Egyptian preservation techniques**

Students work in small groups to plan an investigation. Using pieces of bread or apple to model the body, they will plan a series of experiments that aim to preserve (prevent decay) the tissue. Alternatively they could be prepared in advance by a technician. Students should link each technique to the conditions needed by all life forms for survival (moisture, food, suitable temperature, and air). In each case slightly dampen the bread before the test (except for drying). Below are some suggested tests:
Drying - the bread or apple should be sealed in a Petri dish with no moisture.
Salting - the bread or apple should be completely coated in salt in the Petri dish.
Oil - oil should be rubbed over the surface or the tissue should sit in a small quantity of oil inside the Petri dish (vegetable oil is suitable).
Alcohol - as for oil, but using ethanol.
Bandaging - cut small strips of muslin and cover the tissue in at least one layer of the muslin. Tie the bandage with a little string to secure.
Temperature - place the samples in an incubator at about 30 °C. Alternatively the tissue could be cooled in a fridge.
Control - this should decay; the best conditions are room temperature and damp.

Students work through the questions on Activity sheet 3. This could be completed in a following lesson.

Answers
1. See students’ work.
2. Reasons should link to Egyptian techniques of conditions for preventing decay.
3. Provide the conditions needed for decay, that is, room temperature and moisture, with no preservative. This will allow the process of decay.
4. Sample size should be the same and each method carried out for the same length of time.
5. Look for signs of decay, for example, mould appearing. Observations could be a written description, a drawing, or both.
6. See students’ work.
7. Success criteria could include clear appearance of mould or not, differences between different techniques, experiment conducted fairly, worked well as a group.

A week later students will make and record their observations and answer the questions.

Answers
1. Decay should occur in control, moist, warm conditions, and may occur in the bandages. Decay should not occur in oil, alcohol, salting, or drying.
2. Alcohol, drying, and salting all remove water so microbes cannot cause decay. Oil removes air so the microbes cannot cause decay. All others allow the conditions needed for the microbes to carry out life processes.
3. They knew the conditions needed for decay (or to preserve) but they did not know about microbes, or the life processes involved.
4. See students’ work.
5. Experiment should be repeated to improve reproducibility and repeatability.
6. The model probably didn’t contain enough moisture and was not animal tissue. Could improve by using more moist tissue.

Plenary
Using Activity sheet 4 students summarise their findings by completing the pyramid. They should discuss at least three techniques, one for each side of the pyramid.
Making Mummies

Look at the picture below. Ancient Egyptians are discussing different ways to preserve the bodies of their Pharaohs.

Discussion

Discuss the ideas in the image. Which ideas do you think best explain how mummifying the body helps to preserve it?
## Decay or no decay

Cut out the cards below and issue a pack of cards to each group. Deal the cards out one at a time. In groups decide whether the key word on the card is important for the process of decay or not.

<table>
<thead>
<tr>
<th>Temperature</th>
<th>Dirt</th>
<th>Bacteria</th>
<th>Smells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Light</td>
<td>Carbon dioxide</td>
<td>Dark</td>
<td>Air</td>
</tr>
<tr>
<td>Chemicals</td>
<td>Movement</td>
<td>Moisture</td>
<td>Animals</td>
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</tbody>
</table>
Investigating ancient Egyptian preservation techniques

The Egyptians used a number of techniques to help preserve the bodies of their Pharaohs. The aim of this investigation is to find out how effective these techniques were, and to be able to explain why they might work.

Planning the investigation

In this investigation you will use pieces of apple or bread to represent the body of a pharaoh. The apple or bread is to be used as a scientific model for the real body. This model can then be treated in a number of ways to investigate the Egyptian preservation techniques.

Selecting the techniques

The different techniques used by the ancient Egyptians include:

- drying
- salting
- oils
- alcohol
- bandaging
- temperature

Discuss your selection and planned method in your group and with your teacher.

Planning for success

In your groups discuss the following points, and write down your answers.

1. Which preservation techniques will you investigate?
2. Why have you made these selections?
3. What will your control be in the investigation? Explain why.
4. How will you make the investigation fair and repeatable?
5. What observations will you make and how will you record these observations?
6. Design a table or system for recording your observations.
7. Suggest three success criteria for this investigation.
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**ACTIVITY SHEET 3**

**Method**

For each investigation:

- Cut an equal-sized section of apple or bread approximately 4 cm × 4 cm.
- Place the section into a clean Petri dish.
- Treat the section using one of the preservation techniques.
- Label the dish with your group name, the technique, and the date.
- Attach the lid to the dish using tape, but ensure that the plate is not sealed all the way round, allowing air in.
- Leave for one or two weeks.
- Make your observations.

![Petri dish diagram](image)

**Analysing your findings**

Once you have recorded your results, consider the following points in your groups.

1. List the preservation techniques where decay occurred and where decay didn’t occur.
2. For each technique, explain why it preserves the body or not. Link your explanation for each technique to your knowledge about the process of decay and life processes.
3. What do you think the Egyptians knew about the causes of decay, and what information were they missing?
4. Did your results fulfil your success criteria?
5. How reliable were your results, and how could you have improved your experimental design to make them more reliable?
6. How accurately did your model mimic the preservation techniques of the Egyptians? Could you improve the model?
Egyptian pyramid of knowledge

1. In the central pyramid write the **names** of the techniques you have investigated.
2. In the next layer out write a **description** of how the Egyptians used this technique to preserve bodies.
3. In the outer layer write an **explanation** of how the technique worked to preserve bodies.
The death of King Tut

Below are a set of ideas suggested by scientists to explain how Tutankhamun died. Research all of these ideas using the Internet or library. Explain what was the most probable cause of his death, and why the other ideas are less likely.

Some say he was murdered by a blow to the head.

Because his parents were closely related he may have inherited either Wilson-Turner syndrome or sickle-cell anaemia.

A DNA analysis suggests that he may have been suffering from malaria.

A CT scan in 2005 showed evidence of a badly broken leg, which may have become infected.

He may have been suffering from epilepsy, which could have caused a fatal fall.

How did Tutankhamun die?

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