| **OrientationCompass with solid fill** | **QR audio** |
| --- | --- |

Through the preceding activities, some questions arose regarding the Museum's clay lamp.

1. What was the (social) position of craftsmen in Byzantium? Can we investigate the components of the clay lamp used during the second half of the 4th century AD?

2. Have these products been exported and to where? Can we find similar products in Portugal, Cyprus or elsewhere? Can we trace their route during the Byzantine Empire?

3. Can we compare it with clay products made today? Are there commonalities/differences?

4. Can we make assumptions about the use of these clay products? What tests can we do?

*Discuss the above questions as a whole class*

**How can we answer these questions?**

**Record the results of the discussion**

|  |
| --- |

| *Record the opinions discussed*  *with a short video or sound recording.*  *Call it “1.a Problem and Solutions”* | *QR audio* |
| --- | --- |

| **Conceptualization Questions outline** | **QR audio** |
| --- | --- |

*Discuss as a whole class.*

**How can we see item details?**

*Write down or draw* instruments or devices *we can use*

*to see details of an item*

| Devices / Instruments | Selection |
| --- | --- |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

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| --- |

*Discuss as a whole class about the device or the instrument that can give us the best results and choose it from the table above.*

| *Record the opinions discussed*  *with a short video or sound recording.*  *Call it “1.b Conceptualization”* | *QR audio* |
| --- | --- |

| **Investigation Research with solid fill** | **QR audio** |
| --- | --- |

Use your mobile devices (tablets, mobiles, etc.) and scan the image below.

Watch the video and download the results provided by the device you selected for the clay lamp by pressing the "**Results**" button.

****

***Discuss with the whole class the results of this particular device***

* In the first area of interest, in the middle of the clay pot, what do you notice? What does clay look like under the Optical Microscope?



* In the second area of interest, inside the clay lamp, what do you notice? What does higher magnification reveal? Are there foreign substances? How would you describe them?

| *Discuss and record what the device is doing with a short video or audio recording.*  *Why do we use it and what results does it give us?*  *Call it “1.c Investigation”* | *QR audio* |
| --- | --- |

| **Conclusion Thought outline** | **QR audio** |
| --- | --- |

* **Why do we see three different images for the same point of interest?**

**Can you sort them from smallest to largest magnification?**

*Write down your observations or draw the pictures below with arrows for the points of special interest.*

* **What conclusions can we draw from the two different areas of interest?**

What did you notice about the morphology of the clay in the clay lamp?

Are there any foreign substance residues inside the clay lamp? What do you think might be?

***Write down your observations or draw the pictures below with arrows for the points of special interest.***

| *Record your answers*  *in two different short videos or sound recordings.*  *Call them “1.d Conclusion A”, “1.d Conclusion B”* | | *QR audio* |
| --- | --- | --- |
| **Conceptualization Questions outline** | **QR audio** | | |

*.*

*Discuss as a whole class.*

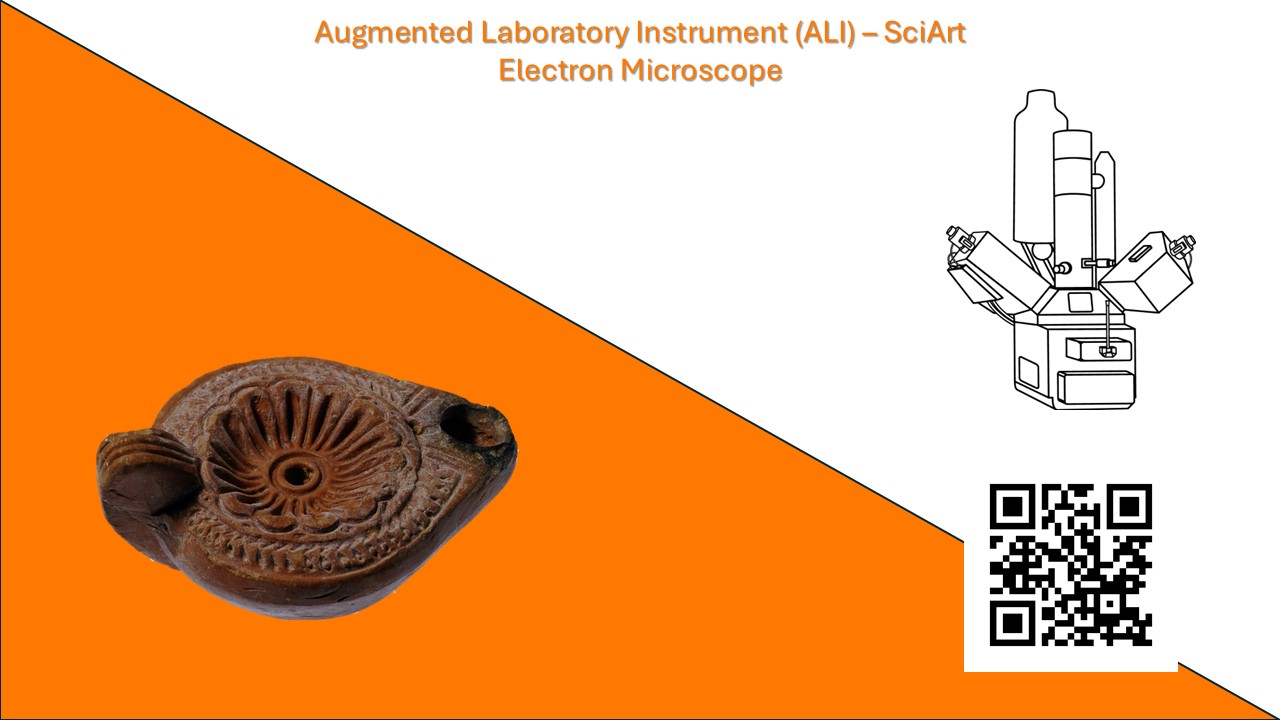
**What do we need to do to get more information**

**about the points of interest?**

| *Record the opinions discussed*  *with a short video or sound recording.*  *Call it “2.b Conceptualization”* | | *QR audio* |
| --- | --- | --- |
| **Investigation Research with solid fill** | **QR audio** | | |

Use your mobile devices (tablets, mobiles, etc.) and scan the image below.

Watch the video and download the results provided by the device for the clay pot by pressing the "**Results**" button.

****

***Discuss with the whole class the results of this particular device***

* In the first area of interest, from the sample we took from the middle of the clay lamp, what do you notice? How would you describe the clay as seen by SEM? Is it uniform or are there various formations? Are the formations the same or different in size?
* In the second area of interest, from the sample we took from the residues / debris inside the clay lamp, what do you notice in the SEM image? How would you describe it? SEM results detect what is the substance?

| *Describe how the device works and for what purpose we use it*  *with a short video or audio recording.*  *Call it “2.c Investigation”* | *QR audio* |
| --- | --- |

| **Conclusion Thought outline** | **QR audio** |
| --- | --- |

* **Of the two different areas of interest depicted with the SEM method, which one do you think has the highest magnification? How can we find it?**
* **Why do we see black and white images?**

* **What do we notice in the images? What might they mean for our subject?**

**Can we draw conclusions about the ingredients in the points of interest (clay and substance residues inside it)?**

| *Record your answers*  *in three different short videos or sound recordings.*  *Name them "2.d Conclusion A", "2.d Conclusion B",*  *"2.d Conclusion C”* | | *QR audio* |
| --- | --- | --- |
| **Conceptualization Questions outline** | **QR audio** | |

*Discuss as a whole class.*

**What do we need to do to find the ingredients**

**of the areas of interest of the subject we are studying?**

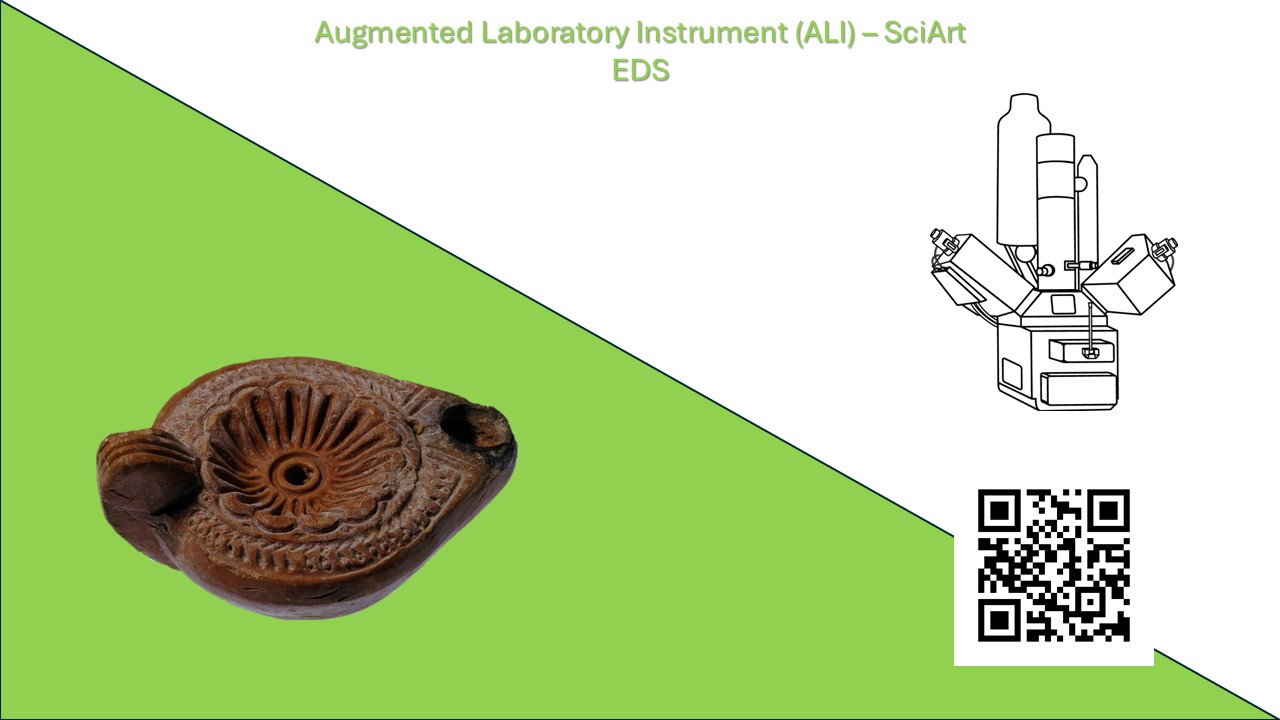
**What should we recognize?**

| *Record the opinions discussed*  *with a short video or sound recording.*  *Call it “3.b Conceptualization”* | *QR audio* |
| --- | --- |

| **Investigation Research with solid fill** | **QR audio** |
| --- | --- |

Use your mobile devices (tablets, mobiles, etc.) and scan the image below.

Watch the video and download the results provided by the device for the clay lamp by pressing the "Results" button.

****

***Study in your group and then discuss as a whole class***

***the results of the particular method***

* In the first region of interest, from the sample we took from the clay in the middle of the clay lamp, what do you notice in the EDS spectrum? What elements are detected?
* In the second area of interest, from the sample we took from the residues inside the lamp, what do you observe in the EDS spectrum? What elements does the foreign substance consist of?

| *Discuss and document how the method works*  *with a short video or audio recording.*  *What results did it give us?*  *What else did we have to do?*  *Call it “3.c Investigation”* | *QR audio* |
| --- | --- |

| **Conclusion Thought outline** | **QR audio** |
| --- | --- |

* **In the first area of interest, what conclusions do you draw about clay from the results you obtained? What elements does it consist of?**
* **In the second area of interest, inside the clay lamp, what kind of substance was found?**

| *Record your answers*  *in a short video or sound recording.*  *Explain how you got there.*  *Call them "3.d Conclusion"* | | *QR audio* |
| --- | --- | --- |
| **Conceptualization Questions outline** | **QR audio** | | |

*Discuss as a whole class.*

**What do we need to do to get more information about the points of interest?**

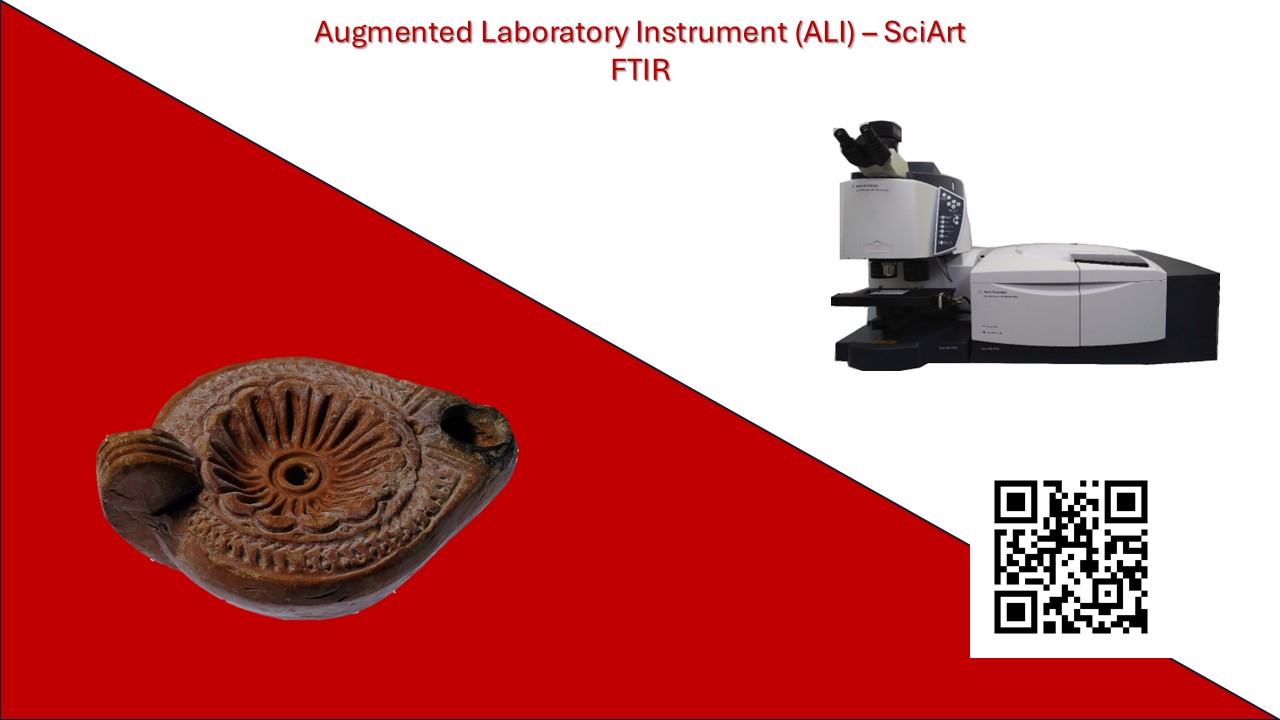
**Can we use the FTIR method to see what additional information it can give us?**

| *Record the opinions discussed*  *with a short video or sound recording.*  *Call it “4.b Conceptualization”* | *QR audio* |
| --- | --- |

| **Investigation Research with solid fill** | **QR audio** |
| --- | --- |

Use your mobile devices (tablets, mobiles, etc.) and scan the image below.

Watch the video and download the results provided by the device for the clay lamp by pressing the "Results" button.

****

***Discuss in the whole class the results of this particular method***

* In the first area of interest, what information do we get from the FTIR spectrum about the material of the clay lamp?
* In the second area of interest, what is the foreign substance detected by the FTIR method inside the clay lamp?

| *Discuss and record how the FTIR method works*  *with a short video or sound recording.*  *What results did it give us?*  *Call it “4.c Investigation”* | | *QR audio* |
| --- | --- | --- |
| **Conclusion Thought outline** | **QR audio** | | |

* **Can you summarize the results of the FTIR method in the table below for the two points of interest?**

| **Points of interest** | **Material – Substance** |
| --- | --- |
| Oil clay lamp |  |
| Foreign substance residue inside the clay lamp |  |

| *Record your answers*  *in a short video or sound recording.*  *Explain how you got there.*  *Name them “4.d Conclusion”* | | *QR audio* |
| --- | --- | --- |
| **Conceptualization Questions outline** | **QR audio** | | |

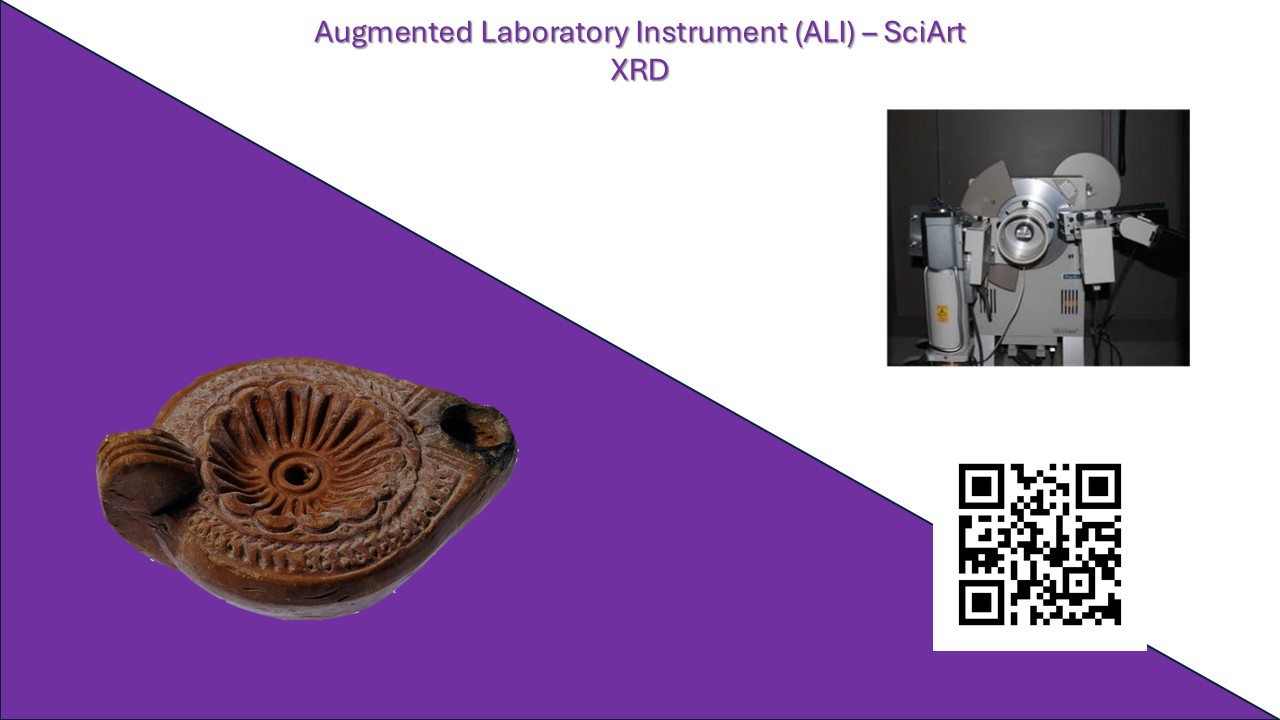
*Discuss as a whole class.*

**What would the XRD method show differently for the two points of interest?**

| *Record the opinions discussed*  *with a short video or sound recording.*  *Call it “5.b Conceptualization”* | | *QR audio* |
| --- | --- | --- |
| **Investigation Research with solid fill** | **QR audio** | | |

Use your mobile devices (tablets, mobiles, etc.) and scan the image below.

Watch the video and download the results provided by the device for the clay lamp by pressing the "Results" button.

****

*Discuss in the whole class the results of this particular method*

* In the first area of interest, from the clay sample, based on the XRD pattern, which material is confirmed?
* In the second region of interest, from the residue inside the lamp, based on the XRD pattern, which substance is confirmed?

| *Discuss and record how the method works*  *with a short video or sound recording.*  *What results did it give us?*  *Call it “5.c Investigation”* | *QR audio* |
| --- | --- |

| **Conclusion Thought outline** | **QR audio** |
| --- | --- |

* **Record the material/chemical compound you identified using the XRD method.**

| **Points of Interest** | **Material - substance** |
| --- | --- |
| Oil clay lamp |  |
| Foreign substance residue inside the clay lamp |  |

| *Record your answers*  *in a short video or sound recording.*  *Explain how you got there.*  *Name them “5.d Conclusion”* | *QR audio* |
| --- | --- |

**Back to the original questions……**

1. What was the (social) position of craftsmen in Byzantium? Can we investigate the components of the clay lamp used during the second half of the 4th century AD?

2. Have these products been exported and to where? Can we find similar products in Portugal, Cyprus or elsewhere? Can we trace their route during the Byzantine Empire?

3. Can we compare it with clay products made today? Are there commonalities/differences?

4. Can we make assumptions about the use of these clay products? What tests can we do?

| **Conceptualization Questions outline** | **QR audio** |
| --- | --- |

*Discuss as a whole class.*

**How can we use the conclusions we have drawn from archaeometric methods to answer the original questions?**

*Write questions you can ask an AI machine,*

*so with the answers it will give you and the results you already have*

*to answer the initial questions*

|  |
| --- |

| *List the questions you will ask in ChatGPT*  *with a short video or sound recording.*  *Call it “6.b Conceptualization”* | *QR audio* |
| --- | --- |
| **Investigation Research with solid fill** | **QR audio** |

Use ChatGPT to collect information about the above questions. Record the information you need to answer the questions.

| **Question** | **Key Points in ChatGpt’s Answer** |
| --- | --- |
| What is made of clay? |  |
| Since when is clay used in pottery? |  |
|  |  |
|  |  |
|  |  |

*Discuss the answers as a whole class*

*to the specific questions you asked in ChatGPT.*

| *Note the main points of the answers for each question.*  *Did it help you find the answer? How;*  *Call it “6.c Investigation”* | | *QR audio* |
| --- | --- | --- |
| **Conclusion Thought outline** | **QR audio** | | |

*Record the answers to the initial inquiry questions.*

| **1. What was the (social) position of craftsmen in Byzantium? Can we investigate the components of the clay lamp used during the second half of the 4th century AD?** |
| --- |
|  |
| **2. Have these products been exported and to where? Can we find similar products in Portugal, Cyprus or elsewhere? Can we trace their route during the Byzantine Empire?** |
|  |
| **3. Can we compare it with clay products made today? Are there commonalities/differences?** |
|  |
| **4. Can we make assumptions about the use of these clay products? What tests can we do?** |
|  |

|  | *QR audio* |
| --- | --- |

**Create a video of your answer to each question**

**in the form of an interview.**

**One or the other of you will ask the question**

**and one or the other will answer!!!**

*Name the videos "Final Answer 1", "Final Answer 2", etc.*