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

Through the preceding activities, some questions arose regarding the Virgin Mary’s icon of the Museum....

1. Can we observe in greater detail elements of the 14th-century icon of Virgin Mary (eg clothing, facial expressions and posture, etc.)?

2. What were the main components of the materials used in the 14th-century icon of Virgin Mary?

3. Can these materials give us information about the artist's technique or socio-economic status?

4. Can we compare the materials and the technique used for this icon, with those used today for church icons? Are there similarities/differences?

*Discuss the above questions as a whole class*

**How can we answer these questions?**

**Record the results of the discussion**

|  |
| --- |

| *Record the views heard  with a short video or audio recording.  Name it “1.a Problem and Solutions”* | | *QR audio* |
| --- | --- | --- |
| **ConceptualizationQuestions outline** | **QR audio** | | |

*Discuss as a whole class.*

**How can we see the details of the item?**

*Note or draw tools we can use   
to see details of an object*

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

|  |
| --- |

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

| *Record the views heard  with a short video or audio recording.*  *Name it “1.b Conceptualization”* | | *QR audio* |
| --- | --- | --- |
| **ResearchResearch with solid fill** | **QR audio** | |

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

Watch the video and download the results of the device you selected for the icon of Virgin Mary by clicking the **"Results"** button.

****

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

* Can you describe the magnified images you took from the Optical Microscope for each point of interest?

What does the red layer look like?

What does the golden layer look like?

How does the fabric look magnified?

| *Discuss and record the device functions with a short video or audio recording.*  *Why do we use it and what results can we get?  Name it “1.c Research”* | *QR audio* |
| --- | --- |

| **ConclusionThought outline** | **QR audio** |
| --- | --- |

* **Why do we see three different images for the same point of interest? Can you sort them from lowest to highest magnification?**

|  |
| --- |

* **Do you observe anything different in the images of the different points of the object we focused on?**

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

|  |
| --- |

| *Record your answers  in three different short videos or recordings.*  *Name them "1.d Conclusion A", "1.d Conclusion B"* | | *QR audio* |
| --- | --- | --- |
| **ConceptualizationQuestions outline** | **QR audio** | | |

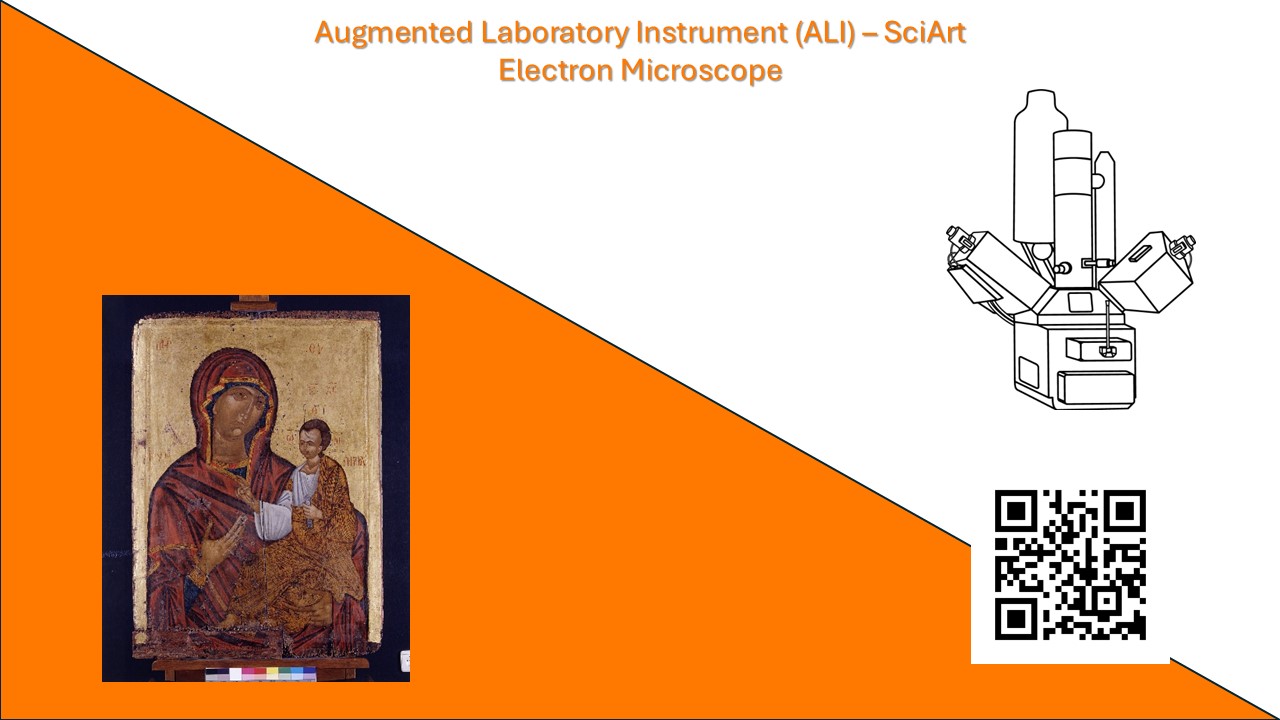
*Discuss as a whole class.*

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

| *Record the views heard  with a short video or audio recording.*  *Name it “2.b Conceptualization”* | | *QR audio* |
| --- | --- | --- |
| **ResearchResearch with solid fill** | **QR audio** | | |

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

Watch the video and download the results given by the device for the icon of Virgin Mary by clicking the **"Results"** button.

****

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

* In the first point of interest, the sample taken from the elbow of the Virgin Mary, what do you observe in the SEM image? What does the red layer look like? Can you measure its thickness? How are pigment grains visualized?
* In the second point of interest, the sample taken from the golden background of the Virgin Mary’s icon, what do you observe in the SEM image? What does the golden layer look like? Can you measure its thickness?
* In the third point of interest, the sample taken from the textile fibers of the worn area in the bottom left corner of the icon, what do you observe in the SEM image? What do textile fibers look like with SEM? What material are the textile fibers made of?

| *Describe how the device works and what we use it for with a short video or audio recording.*  *Name it “1.c Research”* | | *QR audio* |
| --- | --- | --- |
| **ConclusionThought outline** | **QR audio** | | |

* **Which one of the three different points of interest, scanned with the SEM method, has the highest magnification? How can we find it?**
* **Why do we get black and white images?**
* **Comparing the SEM image of the fabric and the data from the table, what do you conclude about the material of the fabric?**
* **What do we observe in the images? Can we make inferences about the ingredients in the points of interest (red color, gold, and fabric fibers)?**

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

*Discuss as a whole class.*

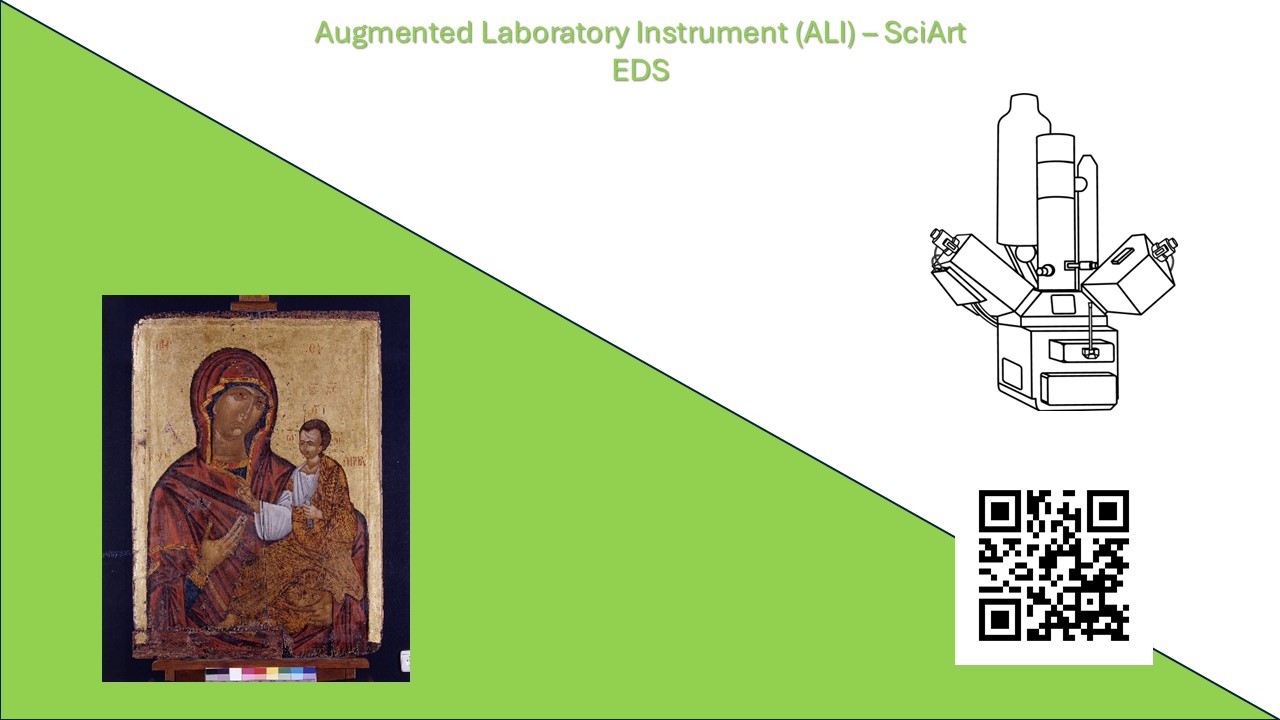
**What do we need to do to find the components   
of the points of interest of the object we are studying?**

**What should we recognize?**

| *Record the views heard  with a short video or audio recording.*  *Name it “1.b Conceptualization”* | | *QR audio* |
| --- | --- | --- |
| **ResearchResearch with solid fill** | **QR audio** | | |

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

Watch the video and download the results of the method for the icon of Virgin Mary by clicking the **"Results"** button.

****

***Study in your group and then discuss with the whole class   
the results of this particular method***

* In the first point of interest, the cross-section taken from the red color layer sample, what do you observe in the EDS spectrum? What elements does it consist of?
* In the second point of interest, the cross-section taken from the gold layer sample, what do you observe in the EDS spectrum? What elements does it consist of?
* In the third point of interest, the cross-section taken from the fabric fibers sample in the worn area in the bottom left corner of the icon, what do you observe in the EDS spectrum? What elements does cotton consist of, as it is an organic material?

Look for materials containing the elements found in our artifact in the source given to you below (QR) and record possible materials that our artifact consists of.

**QR link to the database**

***Discuss with your class the results of your investigation from the database.***

| **Name** | **Chemical type** | **Image** |
| --- | --- | --- |
| Cinnabar | HgS |  |
| Corderoitis | Hg3S2Cl2 |  |
| Hematite | Fe2O3 |  |

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

List the materials in which the elements found in our sample in the table below.

| **Points of interest** | **Chemical Compounds** |
| --- | --- |
| The red color on the elbow of the Virgin Mary |  |
| Golden background on the icon of the Virgin Mary |  |
| Textile fibers in the bottom left corner of the Virgin Mary’s icon |  |

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

*Discuss as a whole class.*

**Is the evidence found in more than one material?   
If so, is there any difference between the materials you can observe in the database?**

**What do you notice different and what should we identify   
to limit the materials?**

| *Record the views heard  with a short video or audio recording.*  *Name it “4.b Conceptualization”* | | *QR audio* |
| --- | --- | --- |
| **ResearchResearch with solid fill** | **QR audio** | | |

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

Watch the video and download the results of the method for the image of the Virgin by clicking the **"Results"** button.

****

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

* In the first point of interest, the sample of the red paint layer, what do you observe in the FTIR spectrum? Does it deliver results?
* In the second point of interest, the sample of the gold layer, what do you observe in the FTIR spectrum? Does it deliver results?
* In the third point of interest, the sample of the textile fibers of the worn area in the bottom left corner of the icon, what do you observe in the FTIR spectrum? What type of fiber is cotton textile?

| *Discuss and record how the method works  with a short video or audio recording. What results did we get?*  *Name it “4.c Research”* | | *QR audio* |
| --- | --- | --- |
| **ConclusionThought outline** | **QR audio** | | |

* **Does the FTIR method yield results for all materials? If not, record in the table below the materials for which it did not yield results.**

|  |
| --- |
|  |

* **Which compound was identified in the textile by FTIR?**

|  |
| --- |

| *Record your answers  in a short video or audio recording.*  *Explain how you got there.*  *Name them "4.d Conclusion"* | | *QR audio* |
| --- | --- | --- |
| **ConceptualizationQuestions outline** | **QR audio** | | |

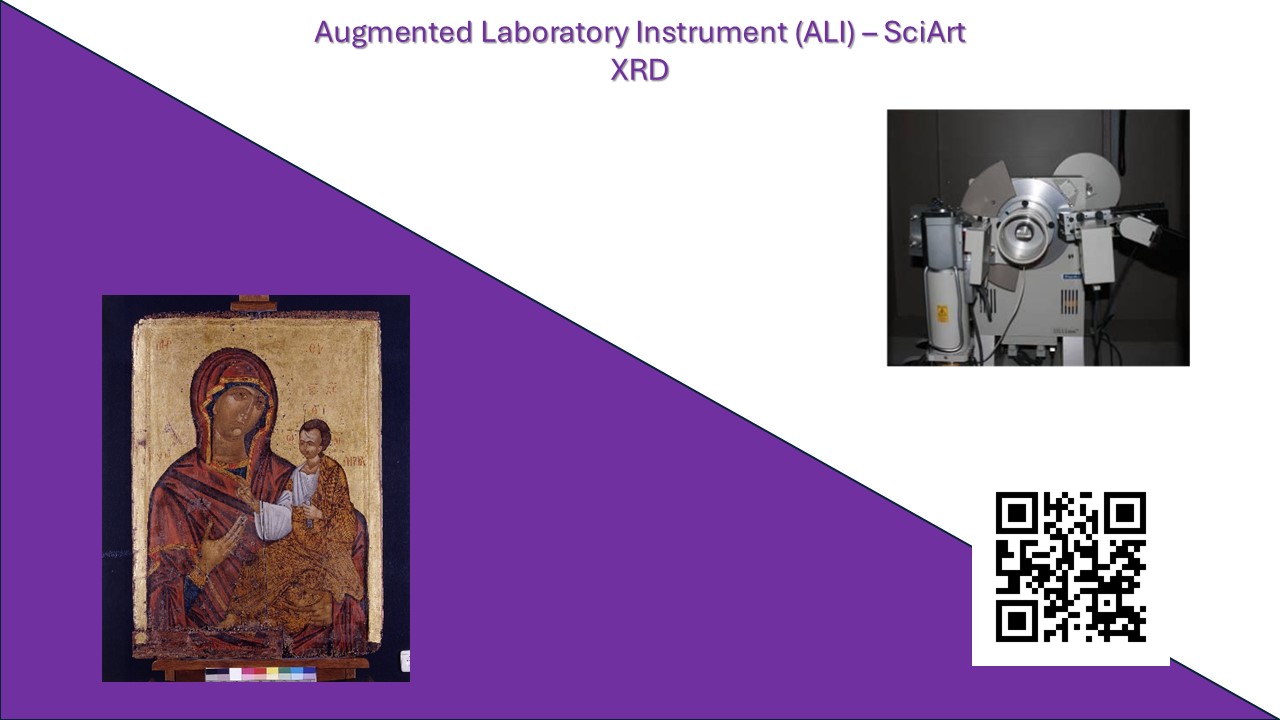
*Discuss as a whole class.*

**What can the inability to determine a chemical compound with the FTIR method mean for some materials?**

| *Record the views heard  with a short video or audio recording.*  *Name it “5.b Conceptualization”* | | *QR audio* |
| --- | --- | --- |
| **ResearchResearch with solid fill** | **QR audio** | | |

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

Watch the video and download the results of the method for the icon of the Virgin by clicking the **"Results"** button.

****

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

| *Discuss and record how the method works  with a short video or audio recording.*  *What results did we get?*  *Name it “4.c Research”* | | *QR audio* |
| --- | --- | --- |
| **ConclusionThought outline** | **QR audio** | | |

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

| **Points of interest** | **Chemical Compounds** |
| --- | --- |
| Red paint color on the elbow of the Virgin Mary |  |
| Golden background on the icon of the Virgin Mary |  |
| Cloth in the bottom left corner of the Virgin Mary’s icon |  |

| *Record your answers  in a short video or audio recording.*  *Explain how you got there.*  *Name them "4.d Conclusion"* | *QR audio* |
| --- | --- |

**Back to the initial questions…**

1. Can we observe in greater detail elements of the 14th-century icon of Virgin Mary (eg clothing, facial expressions and posture, etc.)?

2. What were the main components of the materials used in the 14th-century icon of Virgin Mary?

3. Can these materials give us information about the artist's technique or socio-economic status?

4. Can we compare the materials and the technique used for this icon, with those used today for church icons? Are there similarities/differences?

| **ConceptualizationQuestions outline** | **QR audio** |
| --- | --- |

*Discuss as a whole class.*

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

*Please provide questions that you can ask an AI engine. The answers it gives you, combined with the results you already have, will help address the initial questions.*

|  |
| --- |

| *Record the questions you will ask in ChatGPT  with a short video or audio recording.*  *Name it “6.b Conceptualization”* | *QR audio* |
| --- | --- |
| **ResearchResearch with solid fill** | **QR audio** |

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

| **Question** | **Main ChatGpt Answer Points** |
| --- | --- |
| What materials and pigments are used for church icons today? |  |
| In which geographical areas do we find the mineral cinnabar? |  |
| What is the difference between artificial and mineral cinnabar? |  |
|  |  |
|  |  |
|  |  |

*Discuss as a whole class the answers   
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;*  *Name it “4.c Research”* | | *QR audio* |
| --- | --- | --- |
| **ConclusionThought outline** | **QR audio** | | |

*Record the answers to the initial research questions.*

| **1. Can we observe in greater detail elements of the 14th-century icon of Virgin Mary (eg clothing, facial expressions and posture, etc.)?** |
| --- |
|  |
| **2. What were the main components of the materials used in the 14th-century icon of Virgin Mary?** |
|  |
| **3. Can these materials give us information about the artist's technique or socio-economic status?** |
|  |
| **4. Can we compare the materials and the technique used for this icon, with those used today for church icons? Are there similarities/differences?** |
|  |

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

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

**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.*