

Scientific Inquiry: Behind the Scenes of *Bruegel's "The Wedding Dance" Revealed*



LEARNING TARGET

Using the *Bruegel's "The Wedding Dance" Revealed* exhibition, students explore the work of DIA conservation professionals and how they unraveled the mysteries behind Bruegel's famous piece using observation, scientific inquiry, and scientific instruments.

STUDENT OUTCOMES

Students will:

- Activate prior knowledge, ask probing questions, find answers, and reflect
- Understand how science and the processes of inquiry are used in the art world
- Learn how conservation professionals use scientific techniques to answer questions about pieces of art
- Construct a scientific argument using the claim, evidence, reasoning model

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NGSS STATE STANDARD ALIGNMENT:

Dimension 1: Science and Engineering Practices

- Asking questions and defining problems
- Developing and using models
- Analyzing and interpreting data
- Constructing explanations
- Engaging in argument from evidence
- Obtaining, evaluating, and communicating information

21st CENTURY LEARNING SKILLS ALIGNMENT

- Critical thinking
- Collaboration
- Communication
- Information literacy
- Media literacy
- Technology literacy
- Productivity

PRE-VISIT ACTIVITIES:

Accessing Prior Knowledge

Before coming to the museum, teachers can use the Think-Puzzle-Explore thinking routine and accompanying graphic organizer (see link below) to connect to prior knowledge, stimulate curiosity and prepare students for learning about what happens behind the scenes at the DIA. Use the prompt to facilitate a discussion or writing activity using Think-Puzzle-Explore: *How might science be used to take care of art objects?*

Think-Puzzle-Explore graphic organizer: <https://thinkingpathwayz.weebly.com/thinkpuzzleexplore.html>

SELF-GUIDE ACTIVITY

Scientific Inquiry is a guiding process used by scientists every day. In *Bruegel's "The Wedding Dance" Revealed*, students will be able to see how conservation professionals at the DIA used scientific inquiry to investigate a famous work of art. Students will focus on what the conservation professionals were thinking and doing and the results of their scientific inquiries by completing the Claim-Evidence-Reasoning graphic organizers while exploring the exhibit.

Depending on the age of the students and timeframe of the visit, students can complete these Claim-Evidence-Reasoning worksheets individually, in pairs, or in groups. To scaffold the activity, teachers can also decide to give them hints beforehand by having the topics already filled out for the students.

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There are at least four scientific processes that the DIA went through that are detailed in this exhibit.

- Claim-Evidence-Reasoning- Top Panel
- Claim-Evidence-Reasoning- Wood Panels
- Claim-Evidence-Reasoning- Type of Paints
- Claim-Evidence-Reasoning- The Copies

Students can complete a Claim-Evidence-Reasoning graphic organizer for each of the four investigations above. A CER Teacher Guide is linked on this page that teachers can use to divide the students into groups or to scaffold and support student thinking and learning.

VIRTUAL TIP

If you're unable to come into the museum or this special exhibition is no longer on view, consider using the **Scientific Inquiry Slides** linked on this page to help students gain the background knowledge needed to complete the Self-Guide Activity.

POST-VISIT ACTIVITY

Behind closed doors at the DIA real conservation scientists are at work every day! Write a letter to a DIA conservator explaining what you learned and what questions you have about the exhibit or their work. Be sure to include your contact information if you'd like a response!

Conservation Department
Detroit Institute of Arts
5200 Woodward Ave
Detroit MI 48202

Claim, Evidence, Reasoning Chart – Teacher Guide

Bruegel's "The Wedding Dance" Revealed

***This guide is a list of possible answers but does not include ALL possible correct responses.

Question: Why does the top section of the painting look different from the rest of *The Wedding Dance*?

<p>Claim Write a simple statement about what the conservators claimed to uncover about <i>The Wedding Dance</i> regarding the above topic.</p>	<p>The panel was painted and added later by someone else.</p>
<p>Evidence Provide scientific evidence to support the conservators' claim. There can be multiple points of data/evidence, and this can be in the form of a list.</p>	<p>The horizon line looks different through the trees IR results don't show an underdrawing on the top panel The top panel shows a different blue pigment The top panel shows a different cracking panel</p>
<p>Reasoning Use the above evidence to justify why the conservators' evidence logically supports the claim.</p>	<p>The conservators know that the top panel of the wedding drawing was added at a later date for several reasons.</p> <ol style="list-style-type: none"> 1. & 2. First, the underdrawing does not show on the top panel, suggesting that he never intended the top panel to be part of the original painting. 3. Additionally, the pigment is different from the main panel, suggesting it was added later. 4. Finally, the cracking pattern on the top, suggests it was painted much later (with a poorly mixed paint) because it cracked when it dried. Characteristically, Bruegel's work did not crack in this way.

Claim, Evidence, Reasoning Chart – Teacher Guide

Bruegel's "The Wedding Dance" Revealed

Question: What do we know about the material *The Wedding Dance* was painted on, and how it was constructed?

<p>Claim Write a simple statement about what the conservators claimed to uncover about <i>The Wedding Dance</i> regarding the above topic.</p>	<p><i>The Wedding Dance</i> was painted on wood made of multiple panels (vs canvas, or one single wooden piece).</p>
<p>Evidence Provide scientific evidence to support the conservators' claim. There can be multiple points of data/evidence, and this can be in the form of a list.</p>	<ol style="list-style-type: none">1. Observations show joints that connect the wooden panels2. X-ray shows breaks and dowels in between the panels
<p>Reasoning Use the above evidence to justify why the conservators' evidence logically supports the claim.</p>	<ol style="list-style-type: none">1. Bruegel painted <i>The Wedding Dance</i> on 4 panels of wood, opposed to one panel or canvas stretched across a frame.2. Close visual inspection reveals joints that serve as connection points between the panels. Additionally, the x-ray images showed the breaks between the 4 panels as well as the dowels that hold them together.

Claim, Evidence, Reasoning Chart – Teacher Guide

Question: What are the origins of the pigments that Bruegel used? Hint: consider geography and materials!

<p>Claim Write a simple statement about what the conservators claimed to uncover about <i>The Wedding Dance</i> regarding the above topic.</p>	<ol style="list-style-type: none"> 1. <i>Two different red pigments were used, one being quite rare.</i> 2. <i>Faded brown pigments were once blue and degraded over time.</i>
<p>Evidence Provide scientific evidence to support the conservators' claim. There can be multiple points of data/evidence, and this can be in the form of a list.</p>	<ol style="list-style-type: none"> 1. <i>Vis-NIR fiber optics spectrometer found that the red pigments from Nucheztli cochineal insect indigenous to the Americas.</i> 2. <i>XRF examination of the brown areas showed that they were painted with smalt (of cobalt glass).</i>
<p>Reasoning: Use the above evidence to justify why the conservators' evidence logically supports the claim.</p>	<ol style="list-style-type: none"> 1. <i>Testing of the red parts of the painting showed that there were two reds used. One of the red pigments was quite rare, composed of cleaned, dried and ground up cochineal insects imported from the Americas.</i> 2. <i>Faded brown pigments were tested and revealed to be made of smalt. Smalt is created from cobalt glass, and the hue of blue color depends on the size of the grind of the cobalt. This suggests that at one time, the Wedding Dance had much more vibrant blues where the browns are.</i>

Claim, Evidence, Reasoning Chart – Teacher Guide

Question: What can copies of *The Wedding Dance* tell us?

<p>Claim</p> <p>Write a simple statement about what the conservators claimed to uncover about <i>The Wedding Dance</i> regarding the above topic.</p>	<p><i>Comparing The Wedding Dance to the Antwerp copy and others provides evidence to what The Wedding Dance looked like and how it was made.</i></p>
<p>Evidence</p> <p>Provide scientific evidence to support the conservators' claim. There can be multiple points of data/evidence, and this can be in the form of a list.</p>	<ol style="list-style-type: none"> 1. <i>Visually, the underdrawing is coming through slightly in some places, like faces.</i> 2. <i>In other copies, there are color differences, like more vibrant blues, suggesting that the original pigments have faded over time somewhat.</i> 3. <i>The Antwerp copy showed some face detail that's may also have faded away</i>
<p>Reasoning</p> <p>Use the above evidence to justify why the conservators' evidence logically supports the claim.</p>	<p><i>Conservators learned about Bruegel's work from comparing The Wedding Dance and copies. They've learned about some face detail that may have originally existed in The Wedding Dance, since it existed to be copied- suggesting that Bruegel wanted some of those to be seen. In contrast, some of the face details in the copy cannot be seen but can be seen in the DIA version because some of the painting has faded over the years, and now Bruegel's underdrawing can be seen through the pigments.</i></p>