

Frame It in Gold

Student Resource

Name: _____

Overview

This resource supports students in engaging the RLC Presents: Art + Science video, [In the Lab: Frame It in Gold](#). Complete the activities using the worksheets below to investigate physical properties as they relate to frame construction and gilding. Use the vocabulary you learn in station one to complete the additional stations.

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**Your teacher may provide additional prompts to explore the collection and respond creatively.*



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“SEE, THINK, WONDER”

Extremely thin layers of gold, or gold leaf, are used to gild frames. Look at the image or video of a gold leaf and complete the chart below. Sentence starters are provided to help you get started.

What do you see when looking at the gold? <i>I see...</i> <i>I notice ...</i>	What do you think about when looking at the gold? <i>I think... because I see ...</i> <i>Seeing... makes me think ...</i>	What questions do you have while looking at the gold? <i>Seeing ... makes me wonder...</i> <i>I wonder why ...</i>

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INITIAL MODEL/EXPLANATION

Initial Student Model/Explanation

Frames are used in the museum both to protect and to enhance the look of a work of art. Gilding is a process that applies very thin sheets of gold, called gold leaf, to a surface. There are a variety of techniques used to gild. The technique conservator Christopher Brooks used in the video to gild frames in the museum is hundreds of years old and is called water gilding. Water gilding works best on surfaces that are porous.

Which type of material do you think would be the best to create a frame that is gilded?

Circle or check mark your answer.

Wood

Metal

Stone

Why do you think this material would work best?

Explain your answer in words, pictures, or a combination of both.

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STUDENT INQUIRY STATIONS

Frame It in Gold

Complete the activities below to explore the physical properties of matter as you learn about frame construction and gilding. You will use the learning from one station to help you with others.

Station 1: Vocabulary Dominoes

Using the vocabulary dominoes provided, match the term to the correct definition. The correct definition for a term will be on a different domino. The dominoes will create a shape when they have been correctly matched. As you add to the group, you may need to reposition the dominoes. Record the correct definition for each term in the chart below.

Term	Definition
Gilding	
Matter	
Physical Property	
Chemical Property	

Pore	
Permeable	
Mass	
Hardness	

What shape did the dominoes make?

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Station 2: Physical Properties

Using the items provided at the station, complete the physical properties chart for each material. Your group must complete at least four of the six columns. As a group, choose one more physical property to identify. Place the name of the property at the top of the column and record the result for each material.

Table 1: Physical Properties

Material	Physical Properties					
	Color <i>Describe the color</i>	Shape <i>Describe the shape</i>	Length <i>Measure the length in centimeters with a ruler</i>	Hardness <i>Describe the materials: soft, flexible, firm, hard, etc</i>	Texture <i>Describe the texture: rough, smooth, lumpy wrinkly, etc</i>	Mass <i>Use a balance to measure the mass in grams.</i>
Fabric						
Metal						
Plastic						
Wood						
Sponge						
Stone						

Station 3: Exploring Porosity and Permeability

Using the items at the station, you will be exploring porosity and permeability (see [vocabulary](#)).

1. Examine each object with your eyes or a magnifying glass and decide if you think it has pores and if it is permeable. Record your thoughts in the table below. Remember to explain why you think what you do.

Table 2: Pores and Permeability

Material	Does it have pores? Why do you think this?	Do you think it is permeable? Why do you think this?
Fabric		
Metal		
Plastic		
Wood		
Sponge		
Stone		

2. Record the mass of each material in grams and record it in the “Mass before soaking” column in the table below.
**If you measured the mass in [Station 2](#), in Table 3 you can record the same mass you recorded in Table 1.*
3. Soak the materials in a beaker of water for 2 minutes.
4. Remove each material from the water and try to remove extra water into the empty beaker so it is not dripping when you try to measure the mass.
5. Measure the mass of each material in grams and record it in the “Mass after soaking” column in the table below.
6. Calculate the mass of water absorbed in each material

$$\text{Mass after soaking} - \text{Mass before soaking} = \text{Mass of water absorbed}$$

Table 3: Mass

Material	Mass before soaking (grams)	Mass after soaking (grams)	Mass of water absorbed (grams) (Mass of water absorbed = Mass after - Mass before)
Fabric			
Metal			
Plastic			
Wood			
Sponge			
Stone			

- Do you think the mass of water absorbed by any of the materials would be different if it soaked in the water longer than 2 minutes? Explain which material(s) you think would change and why.

7. Use your initial observations and mass data to make conclusions about the porosity and permeability of each material. Record your thoughts in the table below. Remember to explain why you think what you do.

Material	Does it have pores? Why do you think this?	Do you think it is permeable? Why do you think this?
Fabric		
Metal		
Plastic		
Wood		
Sponge		
Stone		

8. Put the materials in front of you (fabric, metal, plastic, sponge, wood, stone) in order starting with the material with the least pores to the one with the most pores. Record this ranking alongside your notes in the “Does it have pores?” column chart above using the numbers 1-6, with 1 having the least pores.

- Why did you place them in this order?

9. Put the materials (fabric, metal, plastic, sponge, wood, stone) in order in front of you from least permeable to most permeable. Record this ranking alongside your notes in the “Do you think it’s permeable?” column of the chart above using the numbers 1-6, with 1 being the least permeable.

- Why did you place them in this order?

10. Based on what you learned in your experiment, how do you think the physical properties of porosity and permeability relate to one another?

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FINAL MODEL/EXPLANATION

Final Model/Explanation

Frames are used in the museum both to protect and to enhance the look of a work of art. Gilding is a process that applies very thin sheets of gold, called gold leaf, to a surface. There are a variety of techniques used to gild. The technique used in the video to gild frames in the museum is hundreds of years old and is called water gilding. Water gilding works best on surfaces that are porous.

Revise your model on page 3 or create a new model below after you have completed the inquiry stations.

<p>Which type of material do you think would be the best to use to create a frame that is gilded? <i>Circle or check mark your answer.</i></p> <p>Wood Metal Stone</p>
<p>Why do you think this material would work best? Explain your answer in words, pictures, or a combination of both. Be sure to include details you learned from the inquiry stations.</p>

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REFLECTING ON MY LEARNING

Choose one question from each column and respond to it in the box below.

What was the most challenging part of today's learning? Be sure to explain.	What activity did you like the best? Why?	How can you apply what you learned today in the real world?	Write two questions you still have after completing today's learning.
What did you do today that helped you learn best? Be sure to explain.	Which activity did you like the least? Why?	What does today's learning help you understand better?	