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STEAME ACADEMY

TEACHING FACILITATION LEARNING & CREATIVITY PLAN (L&C PLAN) - LEVEL 1 SERVICE TEACHERS: Finding science and mathematics in arts of Salvatore Dali

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1. Overview

Title	Finding science and mathematics in arts of Salvatore Dali		
Driving Question or Topic	1. How does Salvador Dalí's use of geometric shapes and patterns in his artwork reflect mathematical concepts such as symmetry ? 2. What relationships can we see between mathematics and art in Dali's works?		
Ages, Grades, ...	primary/middle (13-14)	7 th to 8 th grade	
Duration, Timeline, Activities	5 learning hours	five 45 minute class periods	At least 5
Curriculum Alignment	Science, mathematics, art		
Contributors, Partners			
Abstract - Synopsis	In this interdisciplinary lesson, students delve into the surrealistic masterpieces of Salvador Dalí, uncovering the hidden connections between mathematics, art, and science within his iconic paintings. Through engaging activities and discussions, students explore the mathematical concepts of symmetry and geometric shapes present in Dalí's artworks. Students will try to interpret the distorted perspective present in Dali's works. They will complete hands-on exercises to recreate Dalí's artistic techniques, experimenting with visual illusions and perspective distortions. This will develop their critical thinking skills by analyzing and interpreting Dalí's works through the lens of mathematics and science.		
References, Acknowledgements			

2. STEAME ACADEMY Framework*

Teachers' Cooperation	Activities for the Mathematics Teacher: 1. Research Dalí's artworks to identify mathematical concepts embedded in his work, such as symmetry, geometry, and optical illusions. 2. Develop hands-on activities that demonstrate mathematical principles inspired by Dalí's artworks, such as creating geometric tessellations or exploring perspective and proportion. 3. Prepare mathematical puzzles or challenges related to Dalí's themes or motifs to engage students in problem-solving and critical thinking. 4. Gather mathematical tools and materials needed for activities, such as rulers, protractors, and geometric manipulatives. 5. Collaborate with the art teacher to integrate mathematical concepts seamlessly into art projects inspired by Dalí's techniques.
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STEAME in Life (SiL) Organization	Activities for the Art Teacher: 1. Research Dalí's artistic style, techniques, and visual elements, such as surrealism, symbolism, and metamorphosis. 2. Develop art projects that allow students to explore Dalí's artistic techniques, such as creating surrealist compositions, experimenting with mixed media, or replicating Dalí's iconic motifs. 3. Gather art supplies and materials needed for art activities, such as paints, brushes, canvas, and found objects. 4. Provide examples of Dalí's artwork to inspire students and stimulate their creativity. 5. Collaborate with the mathematics teacher to integrate art and mathematics seamlessly, ensuring that art projects incorporate mathematical concepts in a meaningful way. <i>Meeting with business representatives/Applications in real world</i> <i>Entrepreneurship – STEAME in Life (SiL) Days</i>
Action Plan Formulation	Stage I. Preparatory Phase: - Research Salvador Dalí's life, artworks, and influences in mathematics and art. - Identify key mathematical concepts present in Dalí's works, such as geometry, symmetry, and perspective. - Gather art supplies, mathematical tools, and multimedia resources for hands-on activities and presentations. Stage II. Workshop Structure: a. Introduction to Salvador Dalí: - Present an overview of Dalí's life, artistic style, and contributions to surrealism. - Discuss the integration of mathematics and art in Dalí's works, highlighting key examples. b. Mathematical Exploration: - Engage students in hands-on activities exploring mathematical concepts in Dalí's art, such as tessellations, golden ratio, and perspective. - Facilitate discussions on the mathematical principles behind Dalí's surrealistic imagery. c. Artistic Expression: - Guide students in creating their own surrealistic artworks inspired by Dalí's style, using various mediums and techniques. - Encourage experimentation with symbolism, dream imagery, and visual storytelling. d. Interdisciplinary Connections: - Explore the interdisciplinary connections between mathematics, art, and psychology in Dalí's works. - Facilitate discussions on the role of creativity, imagination, and innovation in art and mathematics. e. Culminating Projects: - Assign students to collaborative projects integrating mathematics and art, such as designing surrealistic landscapes, creating optical illusions, or constructing geometric sculptures. - Provide time for students to work on their projects, incorporating feedback and guidance from facilitators. Stage III. Evaluation and Reflection:

- Assess students' understanding and application of mathematical concepts through project-based assessments, presentations, and written reflections.
 - Encourage students to reflect on their learning experiences, highlighting connections between mathematics and art in Dalí's works.
- Follow-Up Activities:
- Organize a gallery exhibition or virtual showcase of students' artworks and projects, inviting parents, teachers, and the community to attend.
 - Offer resources and suggestions for further exploration of Salvador Dalí's achievements and the integration of mathematics and art in other contexts.

** under development the final elements of the framework*

3. Objectives and Methodologies

Learning Goals and Objectives	1. Understand the artistic style and techniques employed by Salvador Dalí (Students will analyze the elements of symbolism and visual metaphors in his artwork) 2. Explore the interdisciplinary connections between art, mathematics, and science in Dalí's works (Students will identify mathematical and scientific elements depicted in Dalí's paintings and sculptures) 3. Develop critical thinking skills through the interpretation and analysis of Dalí's artwork (Students will try to interpret the meaning of his works). 4. Foster creativity and self-expression through hands-on art activities inspired by Dalí's techniques (Students will create their own artwork inspired by Dalí's style, experimenting with surrealistic imagery, symbolism, and visual storytelling)
Learning Outcomes and expected Results	1. Increased Understanding of Artistic Techniques: - Outcome: Participants will gain a deeper understanding of Salvador Dalí's artistic style, techniques, and visual elements, including surrealism, symbolism, and optical illusions. 2. Recognition of Interdisciplinary Connections: - Outcome: Participants will recognize the interdisciplinary connections between art, mathematics, and psychology in Dalí's works. 3. Enhanced Critical Thinking Skills: - Outcome: Participants will try to interpret and discover the symbolic meaning hidden in Dalí's works. 4. Increased Creativity and Self-Expression: - Outcome: Participants will experiment with techniques used by Dalí. 5. Appreciation of Cultural and Artistic Significance: - Outcome: Participants will learn about the influence Dalí had on contemporary culture and art.
Prior Knowledge and Prerequisites	1. Basic Understanding of Art History: - Learners should have a basic understanding of art history, particularly the Surrealist movement and its key figures, including Salvador Dalí. 2. Familiarity with Salvador Dalí's Artworks: - Learners should be familiar with Salvador Dalí's iconic artworks, such as "The Persistence of Memory," "The Elephants," and "The Dream Caused by the Flight of a Bee Around a Pomegranate a Second Before Awakening." 3. Fundamental Mathematical Concepts: - Participants should be familiar with basic mathematical concepts, especially in the field of geometry. 4. Critical Thinking Skills: - Learners should possess critical thinking skills to analyze and interpret Dalí's artwork, exploring the symbolism, themes, and artistic techniques employed by the artist. 5. Basic Artistic Skills (for Hands-On Activities): - For workshops involving hands-on art activities, learners should have basic artistic skills, such as drawing, painting, and sculpting, to actively participate in creating their own artwork inspired by Dalí's techniques.

Motivation, Methodology, Strategies, Scaffolds	1. Artistic Interpretation Projects: - Assign participants to small groups and task them with selecting a specific Dalí artwork to analyze and interpret. They must research the background, symbolism, and techniques used by Dalí and present their findings in a creative format, such as a visual poster, multimedia presentation, or dramatic performance. 2. Surrealist Collaborative Art Project: - Collaboratively create a surrealistic art installation inspired by Dalí's works. Participants work together to brainstorm ideas, design elements, and construct the installation using a variety of art materials. This project encourages teamwork, creativity, and problem-solving skills. 3. Mathematical Analysis of Dalí's Art: - Participants will try to recognize and name mathematical concepts hidden in Dalí's works. 4. Exhibition Planning and Curation: - Task participants with planning and curating an exhibition showcasing Salvador Dalí's artwork. They must select a theme, choose specific artworks, design the layout, and create interpretive materials such as exhibit labels or audio guides. This project allows participants to engage in real-world museum practices while deepening their understanding of Dalí's work.
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4. Preparation and Means

Preparation, Space Setting, <i>Troubleshooting Tips</i>	The workshop will utilize various spaces including the classroom for presentations and discussions, outdoor areas for observational activities, and a computer lab for digital art creation. Materials will include art supplies such as paints and brushes, mathematical tools like rulers and compasses, and multimedia resources for presentations. Procedures will involve introducing workshop objectives, engaging in activities across different spaces, facilitating collaboration, monitoring progress, and concluding with a reflection session to summarize key learnings. This approach ensures a dynamic and engaging learning environment conducive to exploration and creativity.
Resources, Tools, Material, Attachments, Equipment	- Art supplies: Paints, brushes, canvases, and clay. - Mathematical tools: Rulers, protractors, and graph paper. - Multimedia resources: Computers, projectors, and speakers. - Reference materials: Books, articles, and images of Dalí's artworks. - Safety equipment: Aprons, ventilation, and protective gear.
<i>Health and Safety</i>	

5. Implementation

Instructional Activities, Procedures, Reflections	1. Art Analysis: - Participants individually analyze selected by teacher Dalí's artworks, identifying themes and artistic techniques. - Participants name the geometric figures noticed in Dalí's works and describe their properties. 2. Collaborative Projects: - Participants form small groups to work on collaborative projects, such as creating surrealist artworks or multimedia presentations. - Facilitators provide guidance and support as groups brainstorm ideas, plan, and execute their projects. 3. Classroom Workshops: - Facilitators lead hands-on workshops, including art-making sessions, mathematical explorations of Dalí's patterns, and discussions on psychological themes.
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	- Participants actively engage in activities, experiments, and discussions to deepen their understanding of Dalí's art. Reflections: 1. Peer Critique: - Groups provide constructive feedback to each other, discussing strengths, weaknesses, and areas for improvement in their projects. - Participants try to improve their project based on the tips received. 2. Self-Reflection: - Participants engage in individual reflection, journaling about their learning process, challenges faced, and personal insights gained. - Reflection prompts encourage participants to think critically about connections between Dalí's art and their own experiences. 3. Facilitator Feedback: - Facilitators prompt participants to reflect on their learning journey, highlighting key takeaways and areas for further exploration.
Assessment - Evaluation	1. Artwork Evaluation: - Assessing creativity, technique, and interpretation of Dalí's style and symbolism. 2. Project Presentation: - Evaluating content knowledge, presentation skills, and creativity demonstrated. 3. Reflection and Self-Assessment: - Analyzing critical thinking, ability to make connections, and personal growth shown in reflections and self-assessment.
Presentation - Reporting - Sharing	1. Presentation: - Participants showcase their artwork, projects, and findings through interactive presentations, group discussions, and multimedia displays. - Facilitators guide presentations, encouraging participants to articulate their ideas, insights, and interpretations of Salvador Dalí's works. 2. Reporting: - Participants compile their reflections, analyses, and project outcomes into written reports, digital portfolios, or multimedia presentations. - Facilitators review and provide feedback on reports, highlighting strengths and areas for improvement. 3. Sharing: - Participants share their work with peers, educators, and the broader community through exhibitions, online platforms, or public events. - Facilitators facilitate opportunities for participants to engage in dialogue, receive feedback, and gain recognition for their contributions.
Extensions - Other Information	

In the case of learning through project-based activity

STEAME ACADEMY Prototype/Guide for Learning & Creativity Approach Action Plan Formulation

Major steps in the STEAME learning approach:

STAGE I: Preparation by one or more teachers

1. Formulating initial thoughts on the thematic sectors/areas to be covered
2. Engaging the world of the wider environment / work / business / parents / society / environment/ ethics
3. Target Age Group of Students - Associating with the Official Curriculum - Setting Goals and Objectives
4. Organization of the tasks of the parties involved - Designation of Coordinator - Workplaces etc.

STAGE II: Action Plan Formulation (Steps 1-18)

Preparation (by teachers)

1. Relation to the Real World – Reflection
2. Incentive – Motivation
3. Formulation of a problem (possibly in stages or phases) resulting from the above

Development (by students) – Guidance & Evaluation (in 9-11, by teachers)

4. Background Creation - Search / Gather Information
5. Simplify the issue - Configure the problem with a limited number of requirements
6. Case Making - Designing - identifying materials for building / development / creation
7. Construction - Workflow - Implementation of projects
8. Observation-Experimentation - Initial Conclusions
9. Documentation - Searching Thematic Areas (AI fields) related to the subject under study – Explanation based on Existing Theories and / or Empirical Results
10. Gathering of results / information based on points 7, 8, 9
11. First group presentation by students

Configuration & Results (by students) – Guidance & Evaluation (by teachers)

12. Configure STEAME models to describe / represent / illustrate the results
13. Studying the results in 9 and drawing conclusions, using 12
14. Applications in Everyday Life - Suggestions for Developing 9 (Entrepreneurship - SIL Days)

Review (by teachers)

15. Review the problem and review it under more demanding conditions

Project Completion (by students) – Guidance & Evaluation (by teachers)

16. Repeat steps 5 through 11 with additional or new requirements as formulated in 15
17. Investigation - Case Studies - Expansion - New Theories - Testing New Conclusions
18. Presentation of Conclusions - Communication Tactics.

STAGE III: STEAME ACADEMY Actions and Cooperation in Creative Projects for school students

Title of Project: _____

Brief Description/Outline of Organizational Arrangements / Responsibilities for Action

STAGE	Activities/Steps Teacher 1(T1) Cooperation with T2 and student guidance	Activities /Steps By Students Age Group: ____	Activities /Steps Teacher 2 (T2) Cooperation with T1 and student guidance

A	Preparation of steps 1,2,3		Cooperation in step 3
B	Guidance in step 9	4,5,6,7,8,9,10	Support guidance in step 9
C	Creative Evaluation	11	Creative Evaluation
D	Guidance	12	Guidance
E	Guidance	13 (9+12)	Guidance
F	Organization (SIL) STEAME in Life	14 Meeting with Business representatives	Organization (SIL) STEAME in Life
G	Preparation of step 15		Cooperation in step 15
H	Guidance	16 (repetition 5-11)	Support Guidance
I	Guidance	17	Support Guidance
K	Creative Evaluation	18	Creative Evaluation