

ARTS IMPACT PROJECT BASED LEARNING UNIT PLAN

Visual Arts and STEM Infused PBL Unit

Not Everything is What it Appears to Be

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Grade Level: Fourth – Fifth Grade

Project Idea:

Students will explore optical illusions and how our eyes and brains process what we see. They will look at and then create and present their own optical illusions. Ideas include: Magic eye, how does your eye see (waves, light)? How do HD TV 3D glasses work? Why do the glasses work?

Driving Question:

How can we use optical illusions to trick our eyes and brain?

Unit Summary (Completed at end of project. Use for sharing out public product.)

Students will learn about why optical illusions work and will create and share their own.

Learning Targets and Assessment Criteria

Target: Understands how images are sent to the brain through our eyes.

Criteria: Creates a diagram, discussion, presentation to explain optical illusions.

Target: Creates an optical illusion.

Criteria: Experiments with and uses ideas like parallel lines, curved, and converging lines, gradation, value, diminishing scale, overlapping, etc. to create the illusion of depth.

Target: Understands the optics of color.

Criteria: Creates successful optical illusions using complementary colors that are similar in value.

Target: Collaborates to create a display for a science fair or funhouse.

Criteria: Curates a presentation of successful optical illusions with explanations of brain/eye science.

Vocabulary

Arts:

Color Theory
Complementary Colors

Arts Infused:

3D 2D
Depth

STEM:

Curves
Ocular
Parallel Lines
Perpendicular Lines

21st Century Skills:

Critical Thinking
Growth Mindset
Perseverance

Materials

Resources (Websites, experts, texts)

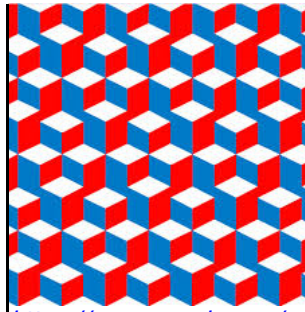
<http://arteascuola.com/2014/11/lines-forming-a-three-dimensional-tree/>
<https://www.pinterest.com/pin/315322411380718777/>
<https://www.pinterest.com/pin/315322411380718777/>
https://menloparkart.files.wordpress.com/2015/03/file_002-4.jpeg?w=652
Surrealist movement with tops, spoke design, etc.

Materials

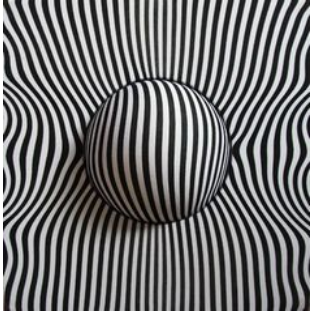
Paper, pens, sharpies, rulers, paint, brushes, graph paper, chalk,
Class assessment worksheet.

Museum Artworks or Performance

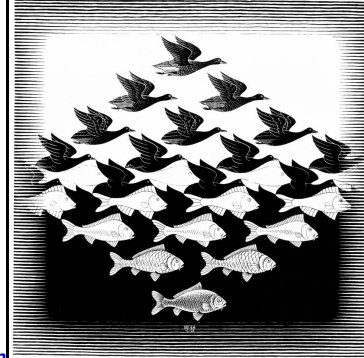
See the artworks on the following pages.



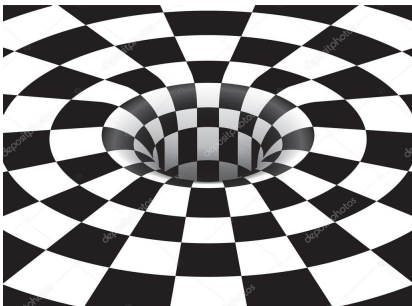
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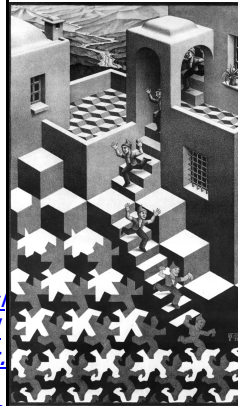
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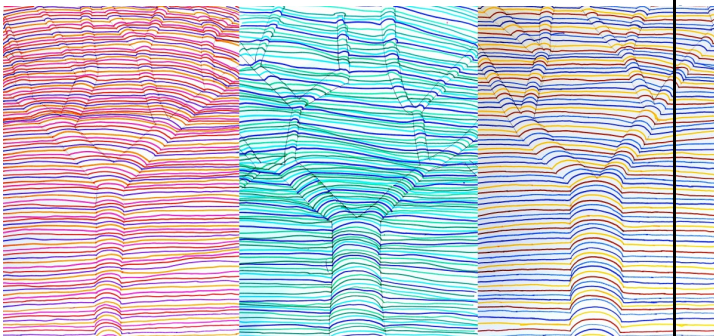
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https://www.google.com/search?q=m+c+escher&source=lnms&tbm=isch&sa=X&ved=0ahUKewi3m-vcj9_VAhVW7mMKHaf-ApAQ_AUICigB&biw=1010&bih=615#imgsrc=cgdDfVMjFdpCM:



<http://arteascuola.com/2014/11/lines-forming-a-three-dimensional-tree/>



https://www.google.com/search?q=m+c+escher&source=lnms&tbm=isch&sa=X&ved=0ahUKEwi3m-vcj9_VAhVW7mMKHaf-ApAQ_AUICigB&biw=1010&bih=615#imgdij=9--VzRRQ1vOhgM:&imgrc=1mn-Mo0r1gNycM:



https://www.google.com/search?q=m+c+escher&source=lnms&tbm=isch&sa=X&ved=0ahUKEwi3m-vcj9_VAhVW7mMKHaf-ApAQ_AUICigB&biw=1010&bih=615#imgdij=quVAVWkoxKxGM:M:&imgrc=TES0UqIpMkVIOM:



https://www.google.com/search?q=sidewalk+chalk+illusion+art&tbm=isch&tbo=u&source=univ&sa=X&ved=0ahUKEwjmX_Sgkd_VAhVRzWMMKHerTCTAQsAQIJQ&biw=1010&bih=615#imgc=tDs0zoJHxt7FbM:



<https://www.youtube.com/watch?v=qtmp2lgjr5o>



<https://www.youtube.com/watch?v=s2LrmAThAhk>

Standards to Drive the Inquiry

WA Arts Learning Standards

For the full description of each anchor standard and the grade level performance standards, see:

<http://www.k12.wa.us/Arts/Standards>

Anchor Standard: 1 Generate and conceptualize artistic ideas and work.

Performance Standard (VA:Cr1.1.4): a. Brainstorm multiple approaches to a creative art or design problem.

Anchor Standard 2: Organize and develop artistic ideas and work.

Performance Standard (VA:Cr2.1.4): a. Explore and invent art-making techniques and approaches.

Anchor Standard 3: Refine and complete artistic work.

Performance Standard (VA:Cr3.1.4): a. Revise artwork in progress on the basis of insights gained through peer discussion.

Performance Standard (VA:Cr3.1.5): a. Create artist statements using art vocabulary to describe personal choices in art-making.

Anchor Standard 7: Perceive and analyze artistic work.

Performance Standard (VA:Re7.2.4): a. Analyze components in visual imagery that convey messages.

Math

Common Core State Standards (CCSS) in Math

<http://www.k12.wa.us/CoreStandards/Mathematics/default.aspx>

4.G. Draw and identify lines and angles, and classify shapes by properties of their lines and angles

CCSS Mathematical Practices

MP.4. Model with mathematics.

MP.6. Attend to precision.

Science, Technology, Engineering

Next Generation Science Standards

<http://www.nextgenscience.org/search-standards>

4-PS4. Waves And Their Applications In Technologies For Information Transfer

4-PS4-2. Develop a model to describe that light reflecting from objects and entering the eye allows objects to be seen.

3-5-ETS1-3. Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

Scientific and Engineering Practices

Developing and Using Models

Planning and Carrying Out Investigations

21st Century Skills

<http://www.p21.org/our-work/resources/for-educators>

- Critical Thinking: *Asks clarifying questions; uses evidence to question or explain creative choices; constructs meaning*
- Perseverance: *Persists in adapting ideas to work through challenges*
- Growth Mindset: *Takes risks; embraces alternative possibilities; work develops over time*

Teacher Project Planning

(Questions for teachers.)

1. *What will the entry event be to launch this unit?*

Entry events could include: Magic Eye books, seeing a 3 D chalk art, looking at Escher, watching a 3D movie with and without glasses.

2. *What resources might we need?*

(Experts, fieldtrips, texts, websites, data, equipment, materials)

Exploring optical illusion art and more:

<https://www.pinterest.com/pin/315322411380718777/>

HOW DOES IT WORK?:

A stereogram is an image which, when viewed with two eyes, produces the illusion of depth perception.

They were made popular by the Magic Eye book series in the 1990s.

These versions were made on computers, and use subtle changes in a repeating pattern to combine depth information for both eyes into one single image.

By tricking your eyes into viewing these images a certain way, a three dimensional scene is visible.

Read more: <http://www.dailymail.co.uk/sciencetech/article-3867880/Can-shark-Researchers-reveal-magic-eye-illusions-work-not-hidden-3D-images.html> - ixzz4q2uM9t8u

3. *What is the duration of this unit?*

4 weeks

4. *What will be group work?*

Understand the magic eye and why it works, review works of art and brainstorm ideas of how to recreate them.

What will each individual student do?

What kinds of line qualities can we use to create different effects? (hand shape with spikes, curves) (pop and op art) – depth illusion, motion illusion.

5. *What will the formative assessments/moments for reflection be?*

(Journal entries, plans, outlines, rough drafts, sketches, turn and talk, physical brainstorm, idea mapping, diagramming)

Rough sketches, brainstorming, multiple design ideas.

6. *What will the summative assessment/ public product be?*

(Performance, exhibition, publication, public presentation, website, instillation)

Group created presentation for Science Fair/fun house that is filled with op/brain illusions. Individually created works of art.

Facilitating Student Understanding of the Problem

(Questions to guide student inquiry.)

1. *What do we know about this problem before we begin?*
2. *What do we need to learn in order to solve it?*
3. *Where will we look for resources?*
4. *Who is our audience? Who will be helped by our solution?*
5. *How will we share our solution?*
6. *How will we assess our own learning?*

PBL Unit Outline of Inquiry

(Begin each step with a question. Follow that with a brief description of what students do to address the question.)

1. What is an optical illusion?

- The students will research and discover that an optical illusion is a “brain illusion”.
- Students will view and discuss different types of optical illusions.
- Students explain their understanding of optical illusions (e.g. read and respond, create a graphic organizer, or share what they discovered doing a close reading of an article.)
- Students could read and respond, could create a graphic organizer or do close reading of an article.

Student reflection and assessment: React and respond to optical illusions shown to them. Creates a diagram, discussion, presentation to explain optical illusions.

2. How are our eyes and brain connected?

- The students will research and begin to understand warm and cool colors, bending lines, and the effort of the brain to make sense of the message the eyes are sending.
- The students will experiment with media to create depth in thumbnail (small designs) – trying different ways to make our eyes see 3D.
- The students take a gallery walk, observing and discussing how they created optical illusions.

☑ Student reflection and assessment: Experiments with and uses ideas like parallel lines, curved, and converging lines, gradation, value, diminishing scale, overlapping, etc. to create the illusion of depth. Creates successful optical illusions using complementary colors that are similar in value.

3. How many ways can we create illusion thru lines, shading, depth, scale, perspective, color, media, technology?

- Students will experiment with lines and shadows, color, and media, to create optical illusion artworks.
- Students will use Math concepts and practices to create optical illusions. (for example: straight lines, rulers, angles, multiplication)
- To share their discoveries and artwork, the students begin to collect ideas for display at a schoolwide science fair or other school-wide event.

☑ Student reflection and assessment: Curates a presentation of successful optical illusions with explanations of brain/eye science.

Public Product/Sharing

Who is our audience?

Fellow students, teachers, parents, library, science center

Begin with a question, followed by the description of the culminating event that shares the learning from the PBL unit.

How many ways can we create illusion thru lines, color, media, and shading to deceive the eye/brain to see depth, scale, perspective?

Students create a section for the Science Fair where they show their illusions and explain why they work.

ARTS IMPACT LESSON PLAN Visual Arts and STEM Infused PBL Unit

Fourth – Fifth Grade: *Not Everything is What it Appears to Be*

CLASS ASSESSMENT WORKSHEET

The following assessment checklist can be used along with other assessment tools teachers and students.

| Disciplines | VISUAL ARTS/ MATH/ SCIENCE | VISUAL ARTS/ MATH/SCIENCE | VISUAL ARTS/MATH/ SCIENCE | VISUAL ARTS/ 21 ST CENTURY SKILLS | Total 4 |
|--------------|---|--|--|--|------------|
| Concept | Optical illusion, Eye/Brain | Depth | Color, Depth | Collaboration | |
| Criteria | Creates a diagram, discussion, presentation to explain optical illusions. | Experiments with and uses ideas like parallel lines, curved, and converging lines, gradation, value, diminishing scale, overlapping, etc. to create the illusion of depth. | Creates successful optical illusions using complementary colors that are similar in value. | Curates a presentation of successful optical illusions with explanations of brain/eye science. | |
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| Total | | | | | |
| Percentage | | | | | |

What was effective in the unit? Why?

What do I want to consider for the next time I teach this unit?

What were the strongest connections between arts discipline and STEM?

Teacher: _____ Date: _____

Dear Family:

We are engaged in a visual arts and STEM-infused project based learning unit in which we are trying to solve this challenge:

Driving Question:

How can we use optical illusions to trick our eyes and brain?

- We asked, "What is an optical illusion?"
- We discovered that these are actually "brain illusions."
- We created the illusion of depth using color and lines.
- We created a presentation about optical illusions highlighting our own optical illusion artworks.

At home, you could extend the learning by looking for more op art optical illusions and thinking about the connection between our brain and eyes.