

#11816

OPTICAL ILLUSIONS: HOW TO CREATE THEM

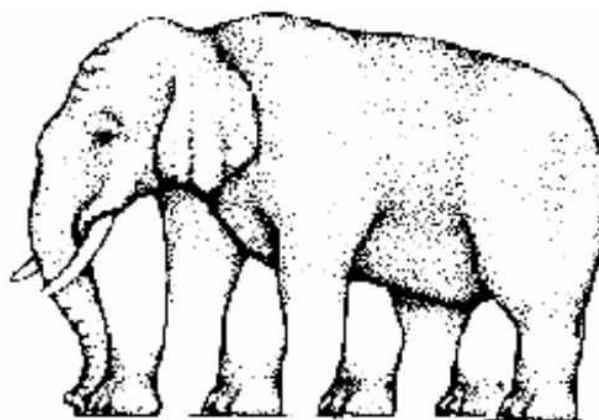
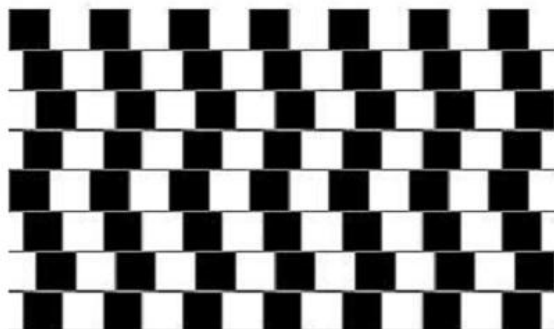
CRYSTAL PRODUCTIONS, 2005

Grade Level: 6–10

24 Minutes

Crystal
Productions

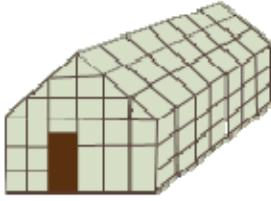
Art Education Resource Materials for
Elementary, Secondary, and College



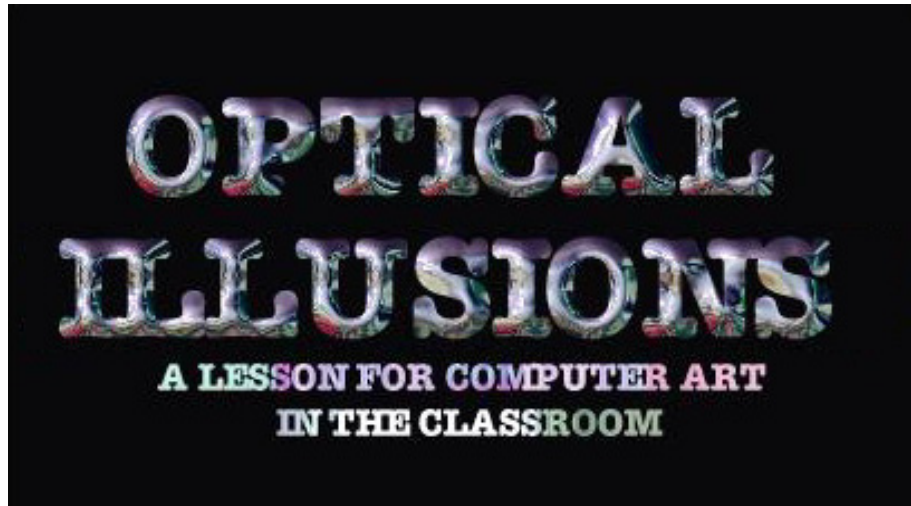
CAPTIONED MEDIA PROGRAM RELATED RESOURCES

[#9042 BILL NYE THE SCIENCE GUY: BROUGHT TO YOU BY THE BRAIN](#)

[#10492 MAGIC FOR YOUNG ADULTS, AGES 10-17: VOLUME ONE](#)



the Greenhouse



Welcome!

The following activities are designed to be taught independently as well as together for a more comprehensive understanding of Optical Illusions. I hope they meet with the needs of any teacher who is interested finding new ways to integrate disciplines within curriculum lesson plans. All of these activities are taught by Visual Arts teachers Judith Keenan and Susan Petrarca to the general population of students at West Warwick High School. We see these students as the future generation of art appreciators.

The "student outcomes" of this lesson are as follows:

- Students will become familiar with the history of Illusion in the arts and how it has influenced the way artist create images today.**
- Students will realize how math and art are integrated when creating visual images.**
- Students will acquire an appreciation for how 2D patterns and color association affect their visual perception**
- Students will acquire tech skills on the computer that will enable them to create basic designs in a draw program.**

Lucille Mota-Costa , Fine Arts Coordinator - West Warwick Public Schools

ride0686@ride.ri.net

Activity one

an interactive discussion between teacher and students. As a class you define Optical Illusion and learn about the history of Op Art.

Activity two

students explore and identify illusions by classification.

Activity three

students create Op Art patterns and designs using tessellations.

Activity four

an introduction to color theory. Students add color to their patterns and or designs.

Student Art

samples of student work.

ACTIVITY-ONE

Introduce students to a general history of Op Art through the ages.

Suggested topics:

How illusion is used in cultural designs: Advertising, textile, fashion, and interior design etc.

How illusion has been used through the ages in realism and abstraction: from the invention of perspective in the 14 hundreds to twentieth century artists such as Albers and Escher.

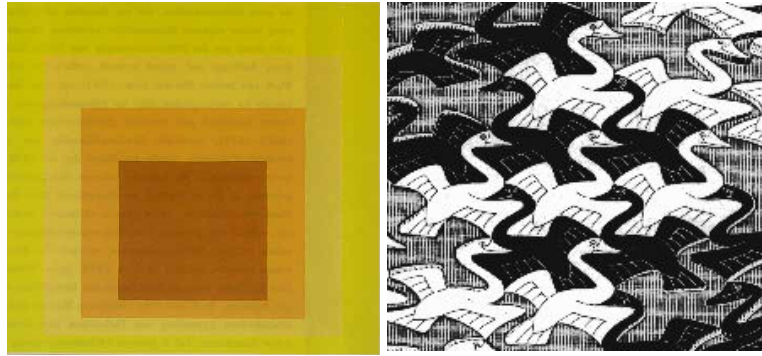
How Josef Albers has influenced the last three generations of advertising and marketing based on his color theory studies.

How Escher incorporates geometry into works that fascinate and delight everyone who discovers them.

Suggested Method:

I split students into groups of four or five. On each table where the groups sit I give out resource books on the topic. They are asked to come up with a definition of Optical Illusion and five examples of what they collectively think are illusions. In twenty minutes they select a spokesperson from the group and that person makes their presentation. Each group presents and the class votes on the best definition and we live with that for the remainder of the lesson. All the above suggested topics get covered with this approach except the students initiate the interest by sighting their examples. Getting the books is not as difficult as it seems. Most local libraries let you take out five or six books on a topic and the school library has several general survey books. The www is also a great source. We've been known to put one group on the computer during this activity.

Suggested Artists
Josef Albers M.C. Escher



Victor Vasarely Guiseppi Arcimboldo



ACTIVITY-TWO

Suggested Topic:

Sight and discuss with students examples of the seven basic kinds of illusions

Suggested Method

Split students into groups of five. Distribute a variety of samples of the basic types of illusions to each group. Allow students time to discuss and evaluate what they are seeing and have each group make a presentation as to what classifications their samples fall under.

Height-Width Illusion- an upright line segment appears longer nearby equal horizontal line segments.

Illusion of Interrupted Extent- The distance between the portions of an interrupted line or figure appears to shrink.

Illusion of Contour- An open or empty figure appears to have greater area or capacity than an equal closed or filled figure.

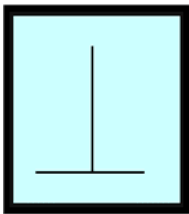
Equivocal Illusion- The drawing of a three dimensional object appears to have two or more interpretations.

Illusion of Depth- Line or figures are distorted as the result of a point, line, or figure appearing to be behind or in front of another.

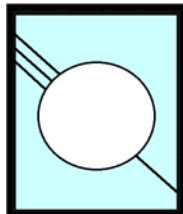
Illusion of Contrast- Surrounding lines of figures cause other lines or figures to appear to have distorted dimensions or shapes.

Non- Classified Illusions- An optical illusion that does not fall into one or more of the above categories.

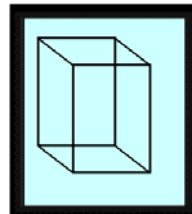
Now that you have learned the seven basic kinds of illusions, look below for examples.



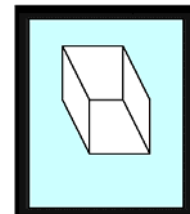
**Height-Width
Illusion**



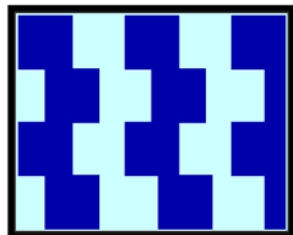
**Illusion of
Interrupted Extent**



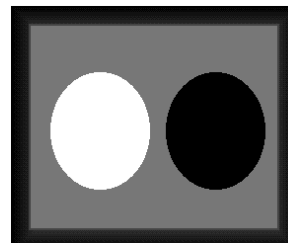
Equivocal Illusion



Illusion of Depth



Illusion of Contrast



Illusion of Contour

ACTIVITY-THREE

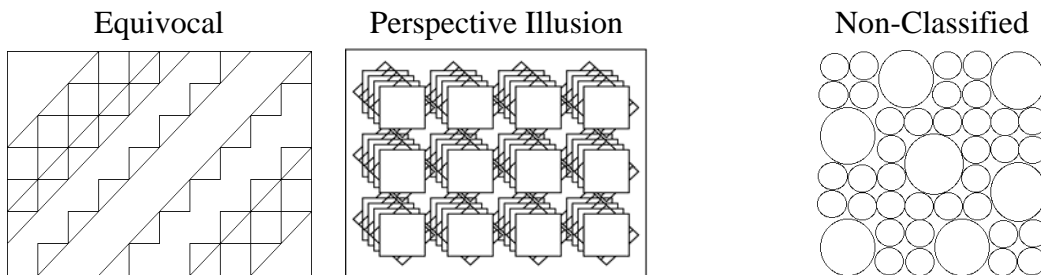
Suggested Topic: black and white computer drawings.

Have students create an Op Art design on computer using a polygon as a template for a 2D tessellation. As students work with the software they appreciate how geometry is used to create patterns that can result in great illusions. The students create these patterns using draw tools along with duplication and rotation on the main menu of any draw program. These were made on a draw program in a word processor.

Suggested Method:

- Define and demonstrate several ways of creating polygon templates
- Have students work in groups of five and experiment with creating a variety of polygon shapes
- Require at least four different tessellation ideas on graph paper from each student before they select a preferred design
- Have students define the kind of illusion they have created with their design
- Have students transfer the preferred design on computer using any basic computer draw program.

Below are three samples of student Op Art designs created from this activity.



Note: Sometimes a student has a good design but s/he can't defend it with the information they have been given. Often I let them select the design for their color project because I can foresee it being very effective in color.

ACTIVITY-FOUR

Suggested Topic: Color Theory

If you still have the energy to teach one more level of optical illusion (after the tessellation activity) this project though challenging is enjoyed by the students. They see how math sets and ratios are used to create color illusions. I give them two activities in the form of a handout and they select the first or second activity. They then go right to the computer call up their black and white study and translate it into color using flood fill, and the color palette. If students can and want to change it they are more than welcome to try.

Suggested Method:

I give the students the assignment below on paper and have them work out their own color study. Color progressions can go anyway they want on their design up/down, across, spiral in, spiral out. After you complete a count of 4 you just repeat or in many cases the kids will want to mix up to 12 values (I let them if I think they understand the concept)

Students need to label and number their colors or they will remix to much and drive themselves crazy. (which might be fun.)

Remind them to not forget their illusion and select the right areas to insure the color enhances their drawing and does not change it completely unless of course they want that.

First choice

Select from the following Sets of Complements

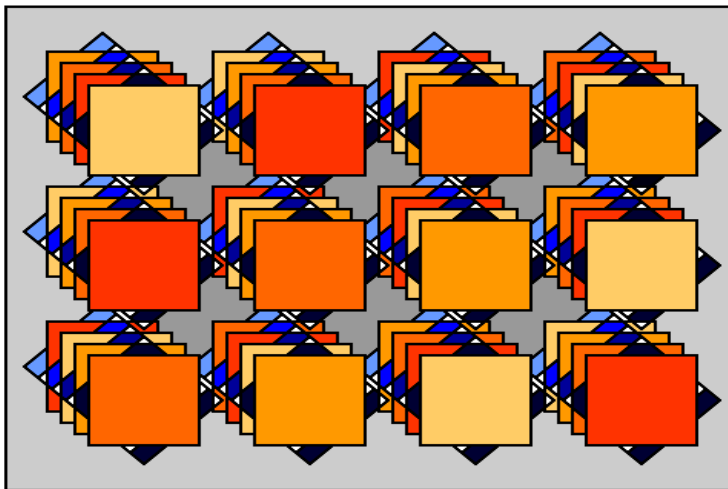
Blue-Orange

Red-Green

Yellow-Violet

Divide your design into the Selected sets of colors and create a value change of at least 4 values for each color by either tinting - shading - toning your colors in a progression.

Below is an example of Monica Baker's work based on this color study



Second Choice

Select from the following Intermediate Complements (One part Primary, One part Secondary)

RedOrange-GreenBlue

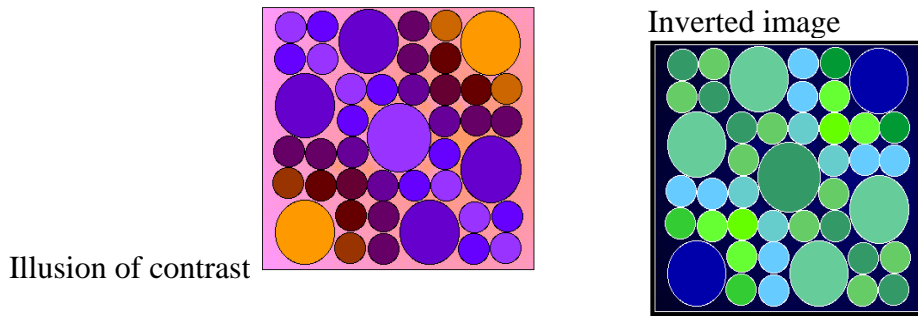
BlueViolet-OrangeYellow

YellowGreen-VioletRed

Divide your design into one selected set of colors and add ratios of the complement to create at least 4 value changes

For example if you picked the set BlueViolet-OrangeYellow add portions of Blue Violet to Orange Yellow. Continue to add more and more of this color until you get at least four value changes. Map out your picture so you place emphasis on an area of the design.

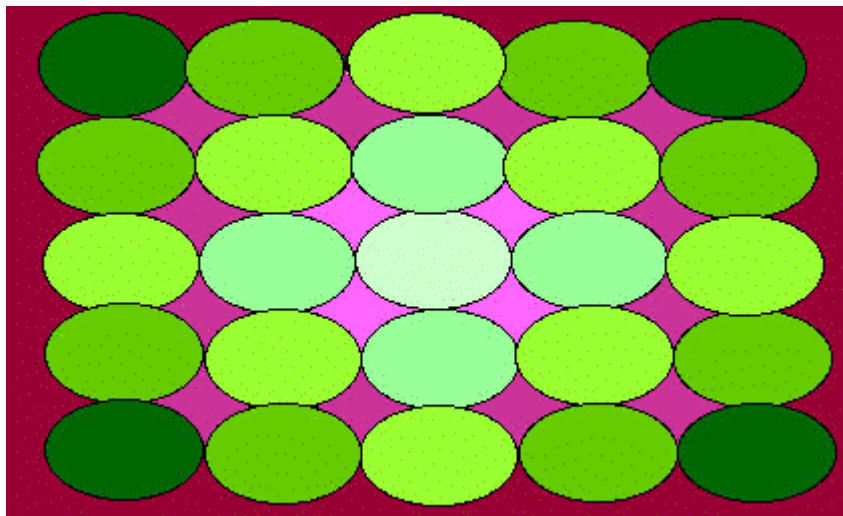
Below is an example of a student work based on this color study With some obvious deviation...We liked it!



Note: Inverted features on paint programs really show students the theory of color negatives(complements)

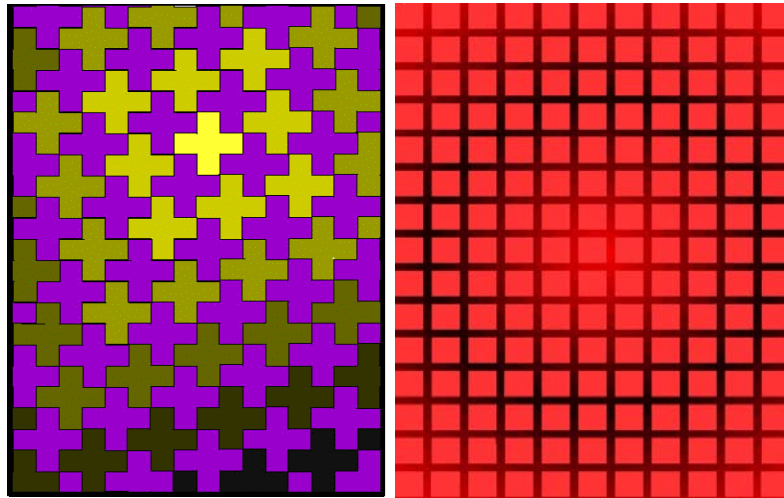
More student samples.

All done on a very simple draw program taken from a word processor.



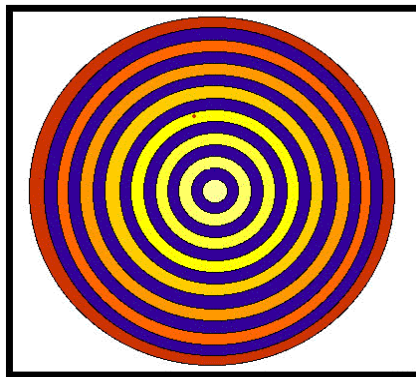
Danny Paiva (grade 9)

This Illusion of contrast is a simple but successful solution to both the tessalation activity and the color theory activity. Some students saw the diamond like shapes as positive space as they worked to center.



Erin (grade 9) Joe (Grade 10)

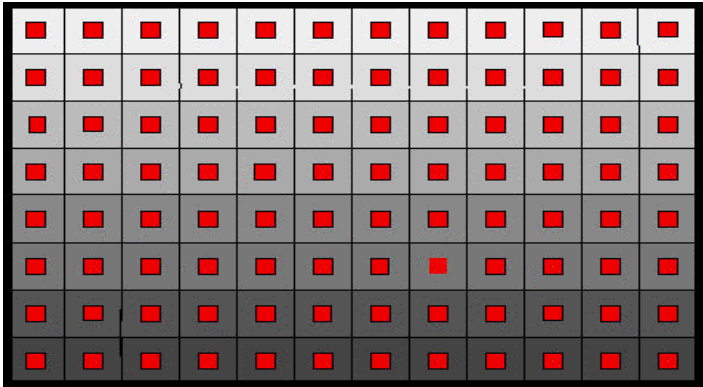
These illusions are done with tessellations using gradients to achieve the value change needed to keep their illusion classification and still do the color theory exercise. Erin classified her's as an equivocal illusion because positive and negative space jumps around as you go from the middle to the ends of the work. Also we noticed how the color violet appears to be lighter or darker depending on the area of the picture you are looking at. This is illusion through color association. Joe's is a tessellation that has a great negative after image in all the intersecting areas of the picture around the squares. Notice how his picture swells towards the viewer in the center. This is based on the theory that cool colors recede and warm colors appear to come towards the viewer



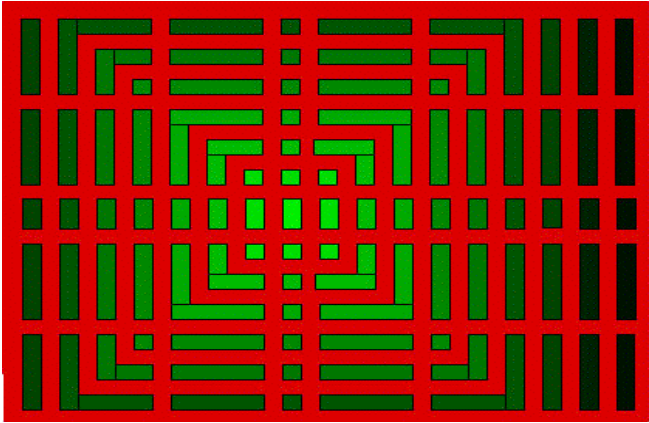
Krystle Coutu

Krystle went with this design. She stumbled on it as she worked on tessellation ideas (we decided it would work fine). Krystle classified this illusion as none classified or perspective illusion because it had an appearance of depth. Look at the center circle in this progression for 10 seconds then transfer your eye over to the empty side of the page. You should easily see a negative after image.

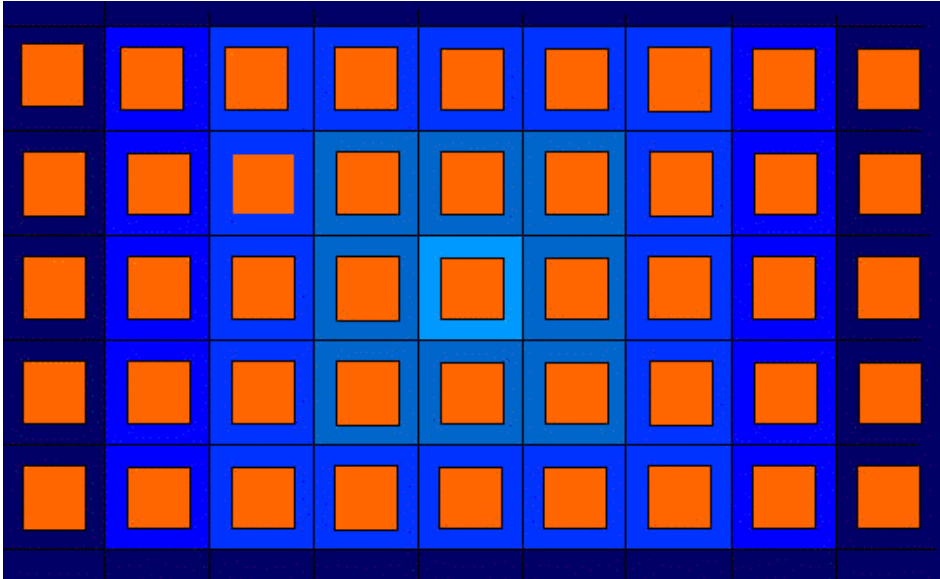
More Student work



Student unknown



Liam Hearne



Stephanie Petreccia

The Greenhouse is a project of the National Science Foundation Center for Graphics and Scientific Visualization