

PROPOSING HOW ART COULD BE USED TO EDUCATE SCIENCE

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Abstract

The paper examines theories and examples between art and science, showing where they are similar, and how art and design can be used to educate and inform scientific data. Due to how vast both fields are in terms of specializations, theories, and practices, I aim to do so by focusing on and comparing theories of physics, mainly those related to Isaac Newton, and art and design's color theories, showing how they are similar, and then proposing how art could be a bridge between science and the learner, how knowledge could be delivered as an experience.

Keywords: Art, Design, Science, Color, Physics, Theories, Knowledge, Experience

Proposing How Art Could Be Used to Educate Science

While I'm a design student with a year left for his bachelors, I have been studying and practicing art and design for more than a decade. I am interested in topics of science but sometimes am not capable of comprehending certain subjects, which is why I have been looking for ways where my practices can help make science more digestible for the general public.

Although science and art have numerous specializations and theories, this paper will only examine laws of physics, mostly related to Isaac Newton, and theories of color, one of the many bridges between art and science, and where art and science could meet.

Sir Isaac Newton (25/12/1642 - 20/3/1726-27) was an important physicist, whose many discoveries included the enigmatic force, gravity. Gravity soon became the foundation for physicists that succeeded him, one of them was Albert Einstein, the proponent of the theory of General Relativity. General Relativity is a theory that examined how gravity affected space-time and refined the concept of gravity into how it is commonly understood today (Tillman et al., 2022). Many studies of physics continue to rely on Newton's foundations (Maranzani, 2020).

Figure 1: *The story of Newton and the Apple.*

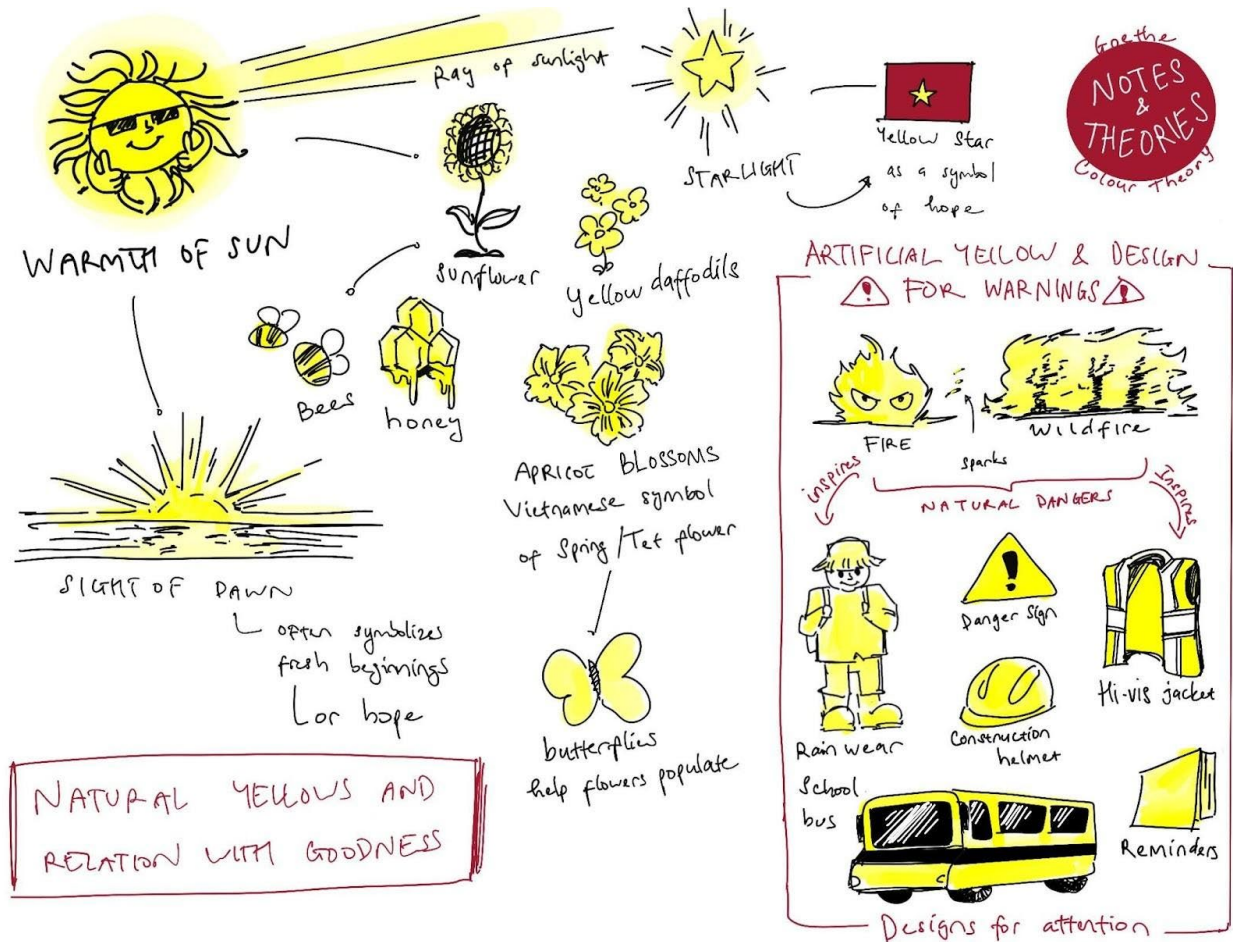


Note. Comic about the story of an apple falling on Newton's head. Created by Hoang Do. Used with permission.

Newton also studied light, devised a Theory of Colors, and deduced that white sunlight was composed of different colors (Gencer, 2020). However, artists and designers have studied the mechanics of colors from another figure, Wolfgang von Goethe.

German artist Wolfgang von Goethe (28/8/1749 - 22/3/1832) once said "Colors are light's suffering and joy", and published a treatise called *Theory of Colors* (1810), wherein colors were proposed to be perceived more subjectively based on the relationship between colors, and the psychological and emotional states of the beholder. For instance, Goethe proposed that yellow was associated with good, serenity, and brightness, and blue with shadows, coldness, calm, and stillness (Popova, 2021).

Figure 3: My digitized observations and theories whilst studying Goethe's theory.



Note. In case the figure is in black and white, the objects observed are yellow, and thus appear light gray. Created by Hoang Do. Used with permission.

Figure 4: *Flowers in vase (left) and Van Gogh in field (right). Oil on canvas.*



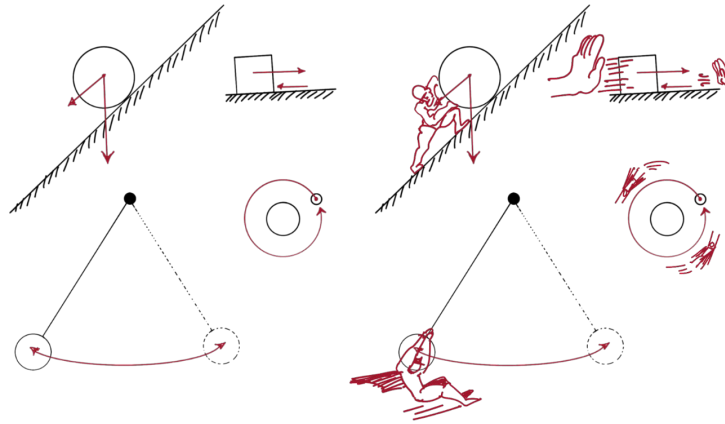
Note. I applied Goethe's color theory while painting these, where I used yellow and blue to convey light and darkness, as well as emotional states, not to capture reality, but to convey experience. In case the figure is in black and white, the lighter areas of the paintings were colors mixed with yellow, and darker areas were colors mixed with blue. Created by Hoang Do. Used with permission.

While different practices and mediums have relied on different theoretical foundations and artistic movements, Goethe's Color Theory has helped artists and designers decide what color to choose to turn an objective landscape to a subjective emotionally charged painting (Figure 4), or what color a furniture or item of fashion should have, or what color a fictional character should wear. Goethe's theory mainly taught artists and designers to convey meaning with colors.

As shown, art has theoretical foundations similar to science that are applied in practice and live in methodology. From my experiences and practices, I have speculated about how practices of art and design could educate science.

I chose these topics to talk about because physics was my worst enemy in high-school, and I only managed to pass by doodling relentlessly on textbooks. Not only were the books filled with difficult concepts, but boring illustrations as well. However, seeing those graphs in my own ways made it easier, because I was relating challenging ideas with experiences and topics that I was excited for (Figure 5).

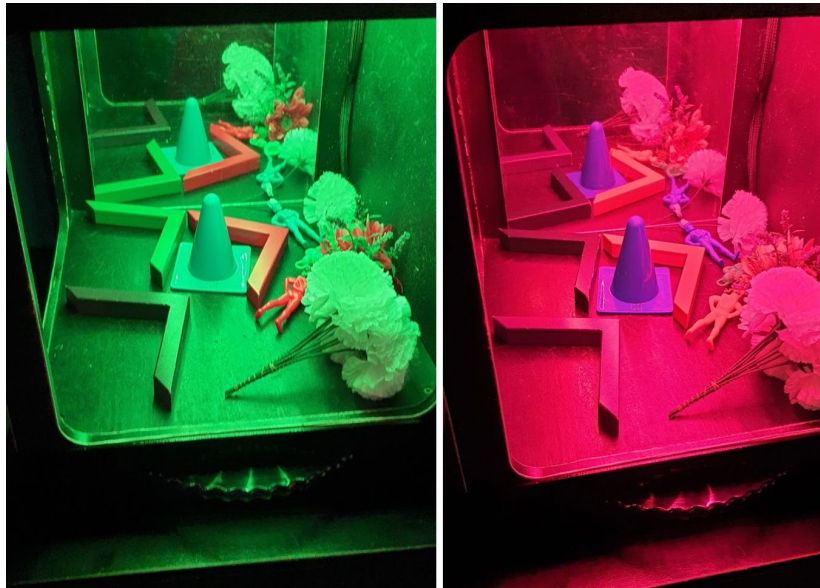
Figure 5: Representation of my highschool physics textbook.



Note. Textbook illustrations turned into comics. Created by Hoang Do. Used with permission.

Based on these personal experiences, I have concluded that art should be used to make scientific data more appealing and comprehensible. Newton's or Einstein's complicated theories could be made comprehensible even for children if it was portrayed in a gallery or exhibit, science fairs and science museums, such as those in Vancouver's Science World (Figure 6).

Figure 6: Science World's interactive attraction that shows how color is reflected off of objects.



Note. In case the figure is in black and white: The box is green, but certain objects appear red (left), and while the box is red, certain objects appear blue (right).

While Newton analyzed how colors work objectively, Goethe's research proposed how they could be interpreted subjectively based on personal experiences. From this, I propose that ordinary people can engage with intellectually challenging knowledge of science through a methodically designed artistic experience acting as the bridge in between, for instance, science attractions such as figure 6 deliver science to the people using experiences and interactivity. Even children could enjoy these complicated theories through these experiences, from cartoons, movies, or toys to attractions, etc. Understanding the light spectrum could be made easier if one could play with a prism and see how light splits into different colors, and passing high school physics might be easier with colorful comical graphs.

In closing, art is a methodical and thoughtful practice, and could also be used as a bridge between levels of intelligence. Art and design could simultaneously use theoretical foundations and practical applications to give the public comprehensive access to advancements and knowledge of science, where instead of simply to inform, knowledge is experienced in artistic and creative ways.

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