What is the golden ratio? What you need to know and how to use it

canva.com/learn/what-is-the-golden-ratio
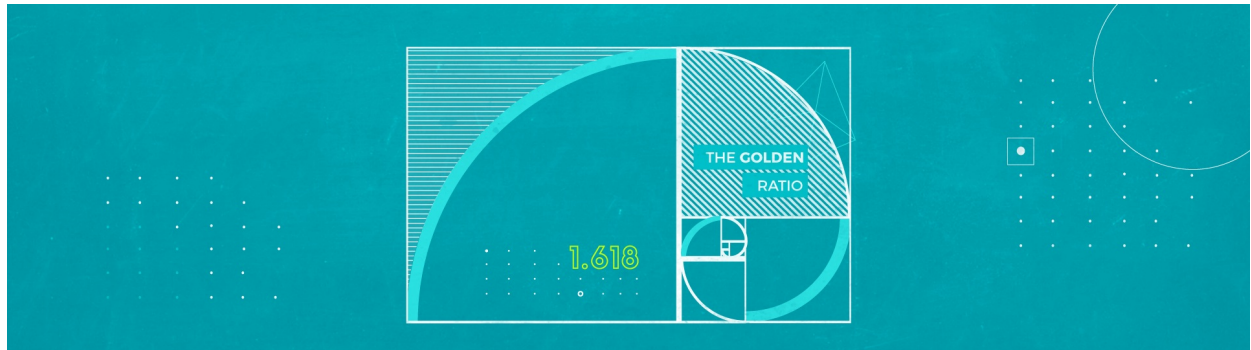
What do the Pyramids of Giza and Da Vinci's Mona Lisa have in common with Twitter and Pepsi? Quick answer: They are all designed using the Golden Ratio.

The Golden Ratio is a mathematical ratio. It is commonly found in nature, and when used in design, it fosters organic and natural looking compositions that are aesthetically pleasing to the eye. But what exactly is the Golden Ratio and how can you use it to improve your own designs?

What is the Golden Ratio?

Putting it as simply as we can (eek!), the Golden Ratio (also known as the Golden Section, Golden Mean, Divine Proportion or Greek letter Phi) exists when a line is divided into two parts and the longer part (a) divided by the smaller part (b) is equal to the sum of (a) + (b) divided by (a), which both equal 1.618.
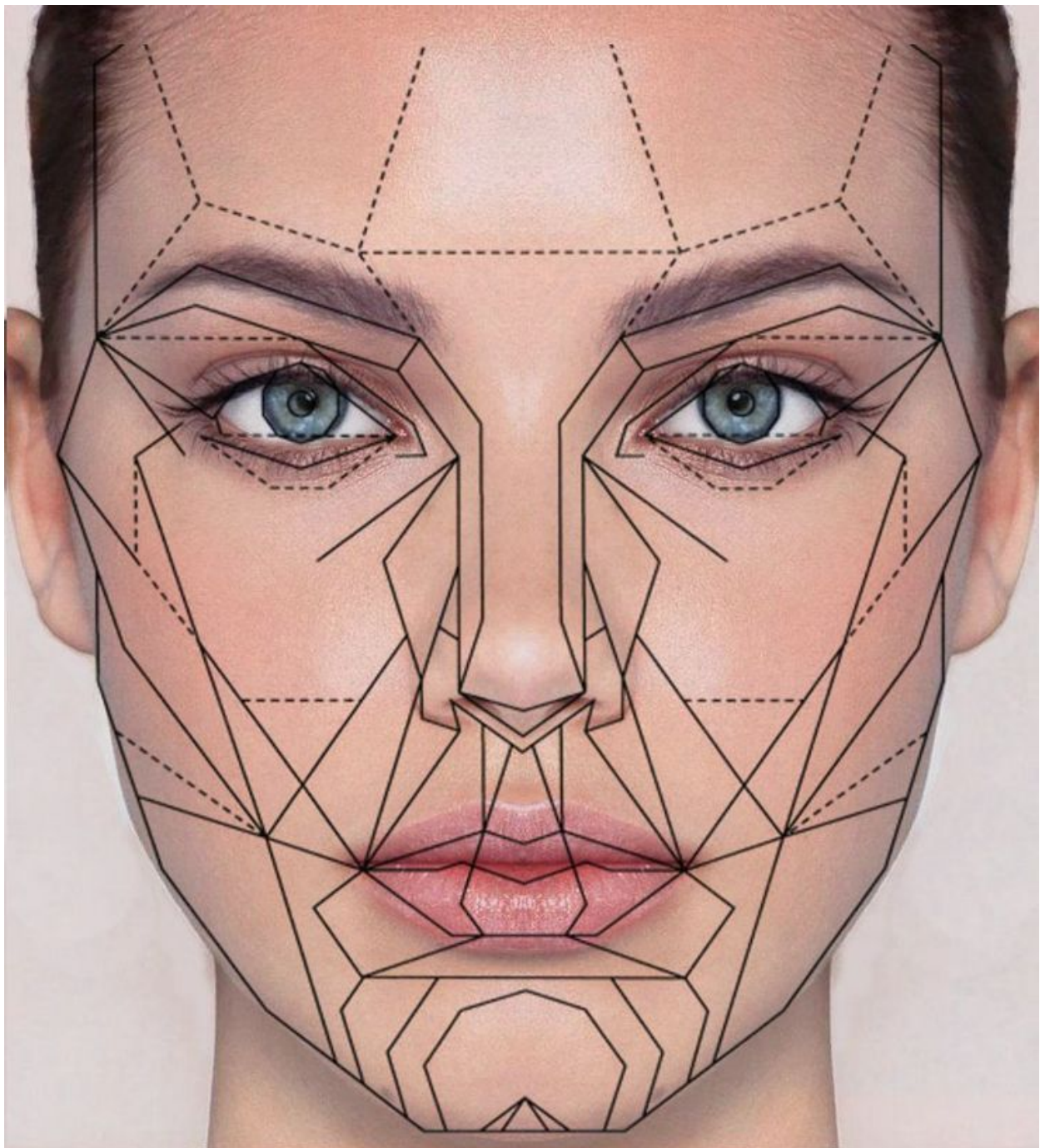
THE **GOLDEN** RATIO

$$\frac{a}{b} = \frac{a+b}{a} = 1.618... = \varphi$$

But don't let all the math get you down. In design, the Golden Ratio boils down to aesthetics — creating and appreciating a sense of beauty through harmony and proportion. When applied to design, the Golden Ratio provides a sense of artistry; an X-factor; a certain *je ne sais quoi.*

This harmony and proportion has been recognized for thousands of centuries: from the Pyramids in Giza to the Parthenon in Athens; from Michelangelo's *The Creation of Adam* on the ceiling of the Sistine Chapel to *Da Vinci's Mona Lisa;* and from the Pepsi logo to the Twitter logo. Our bodies and faces even follow the mathematical ratio:

The Science Forum

In fact, our brains are seemingly hard-wired to prefer objects and images that use the Golden Ratio. It's almost a subconscious attraction and even tiny tweaks that make an image truer to the Golden Ratio have a large impact on our brains.

The Golden Ratio can be applied to shapes too. Take a square and multiply one side of by 1.618 and you get a rectangle of harmonious proportions:
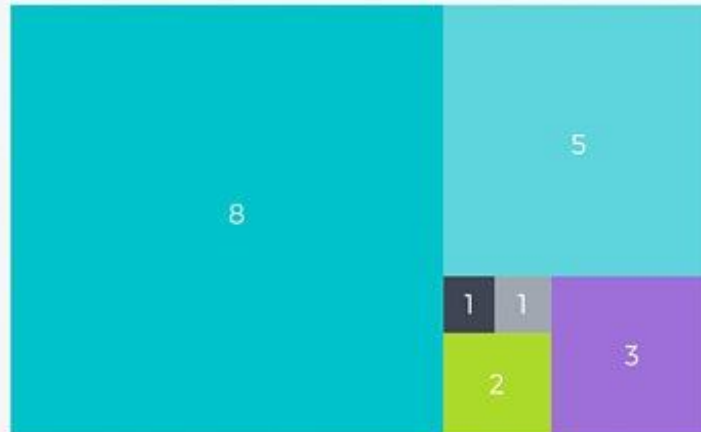
THE **GOLDEN** RATIO

x = 1
y = 1

x = 1.618
y = 1
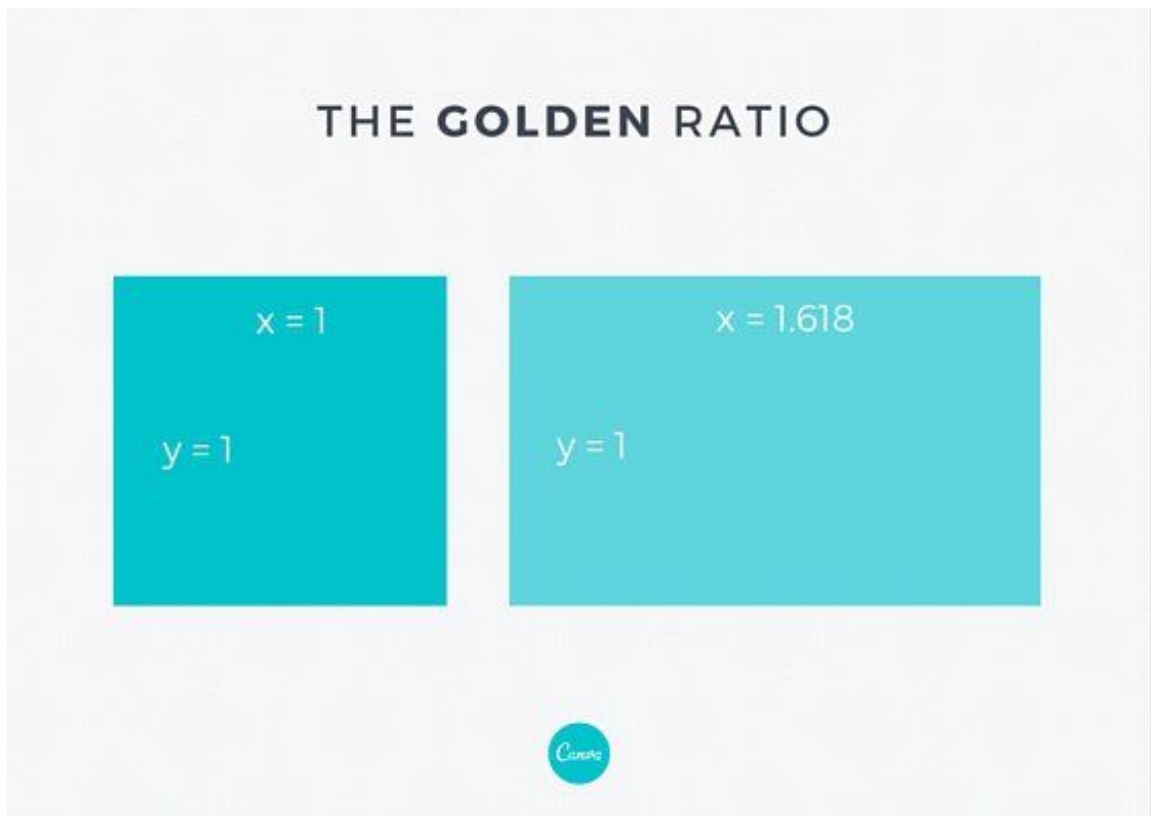
Now, if you lay the square over the rectangle the two shapes will give you the Golden Ratio:

THE **GOLDEN** RATIO

x = 1
y = 1

x = 1.618
y = 1

THE GOLDEN RATIO

If you keep applying the Golden Ratio formula to the new rectangle on the far right of the image above, you will eventually get this diagram with progressively smaller squares:

THE **GOLDEN** RATIO

Whoa! Need a break? Hold on, just a few mindbogglers to go.

If you take our Golden Ratio diagram, above, and draw an arch in each square, from one corner to the opposite corner, you will draw the first curve of the Golden Spiral (or Fibonacci Sequence) – a series in which the pattern of each number is the sum of the previous two numbers. Starting at zero, the sequence is: 0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144… and so on.

By adding the arch in each square, you'll end up with the diagram of the Golden Spiral:

THE **GOLDEN** RATIO
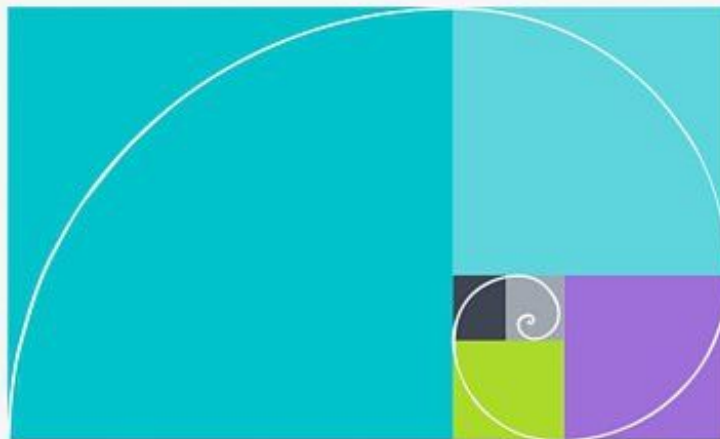
You'll find this beautiful creature throughout nature's forms – ferns, flowers, sea shells, even hurricanes – which perhaps why we find it so visually appealing. Because it is, indeed, nature at its finest.

natureandwisdom.wordpress.com

Now, go one step further and trace a circle within each square – then you'll have circles that follow the 1:1.618 ratio and are in balanced proportion to each other.

THE **GOLDEN** RATIO

So now we've got squares, rectangles and circles that all follow the Golden Ratio and

sprinkle the magic (number) on your design.

Done with the explanations?

5 Ways to Apply the Golden Ratio to your Designs

Now that you've been beaten over the head with the theory behind the Golden Ratio, let's get down to figuring out how it can be used to improve your designs.

You can apply the Golden Ratio to many compositional elements of your design, including layout, spacing, content, images and forms.

01. Layout – Set Your Dimensions With The Golden Ratio

Consider the Golden Ratio a useful guideline for determining dimensions of layout. One very simple way to apply the Golden Ratio is to set your dimensions to 1:1.618.

For example, take your typical 960-pixel width layout and divide it by 1.618. You'll get 594, which will be the height of the layout.

Now, break that layout into two columns using the Golden Ratio and voila! Working within these two shapes your layout will abide by the harmonious proportions of the Golden Ratio.

The two column layout is well suited to web design and you'll see much online content in this format. National Geographic has certainly adopted the layout and uses it for a clean, easy-to-read, well organized website. It provides readers with a website that has a natural sense of order, balance and hierarchy.
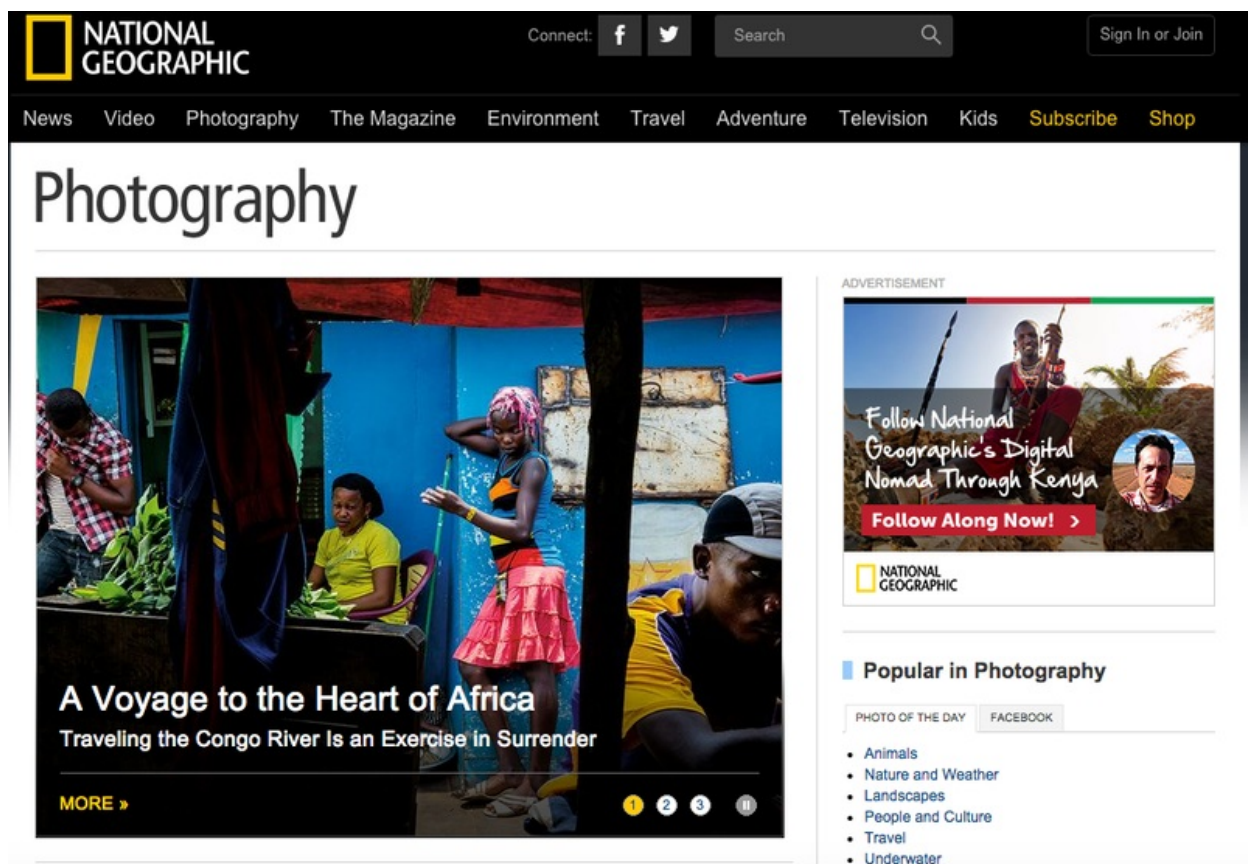
National Geographic website

## 02. Spacing – Layout with the Golden Ratio Diagram

Spacing is an all-important element of any design, be it the use of negative or positive space, and it can often make or break the final result. Determining the spacing of elements can be a rather time-consuming affair; instead, start with the Golden Ratio diagram and let the squares guide where you place each element. This will ensure your spacing and proportions are calculated, rather than 'instinctual', as any minor tweaks towards achieving the Golden Ratio can make all the difference.

Plus, if you're dealing with several elements, you can layer several Golden Ratio diagrams in order to continue consistent proportions throughout your design.
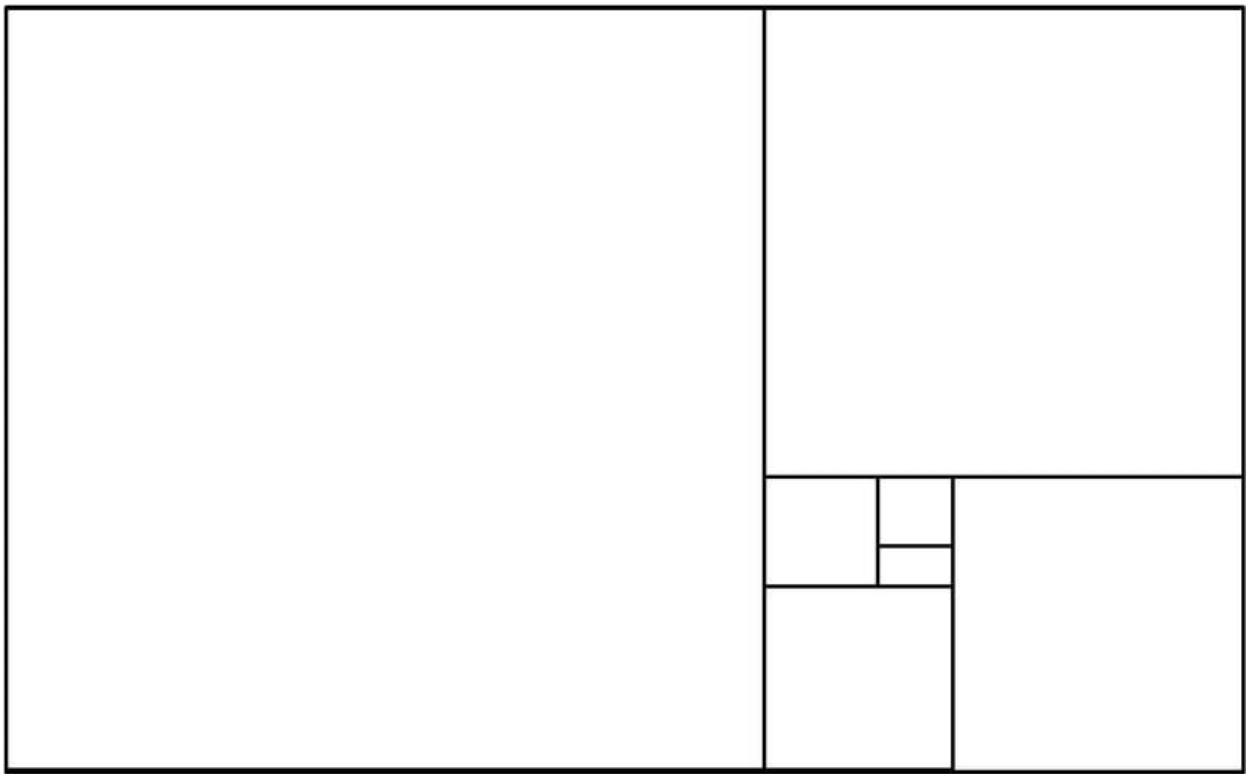
Design studio [Moodley](#) developed a brand identity for the performing arts festival Bregenzer Festspiele that included a logo, logotype and collage design applied to programs, playbills and outdoor campaigns. The playbill features photographic and illustrative collages and a rippled logo with plenty of unprinted space. The Golden Ratio is used to determine the size of and placement of each element to ensure a well-proportioned cover.
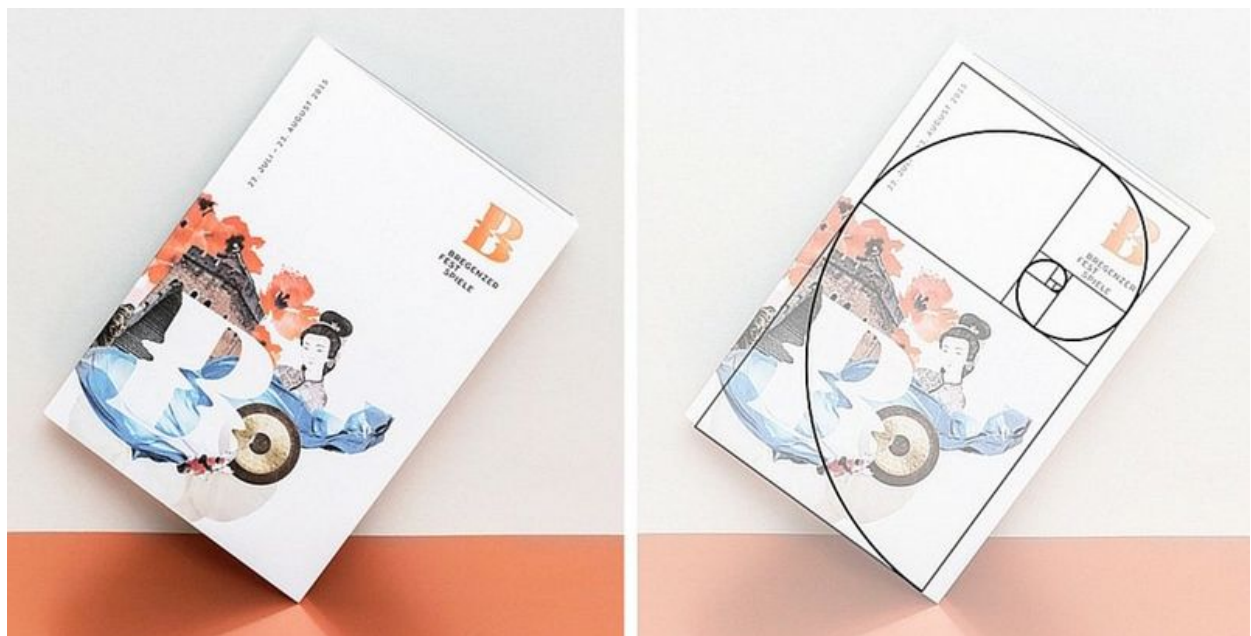
Bregenzer Festspiele by Moody

Singapore-based design agency [Lemon Graphic](#) created a visual identity for Terkaya Wealth Management. Here, the three design elements of the business card – the small eagle, the text and the large eagle – all fit into a different section of the Golden Ratio.

Plus, lay a Golden Ratio over the small eagle and it also fits within the proportions.
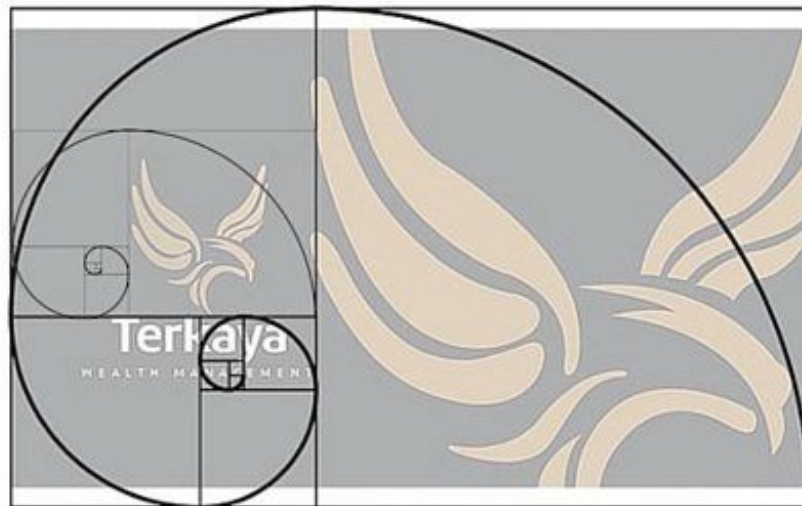
Terkaya by Lemon Graphic

03. Content – Trace the Golden Spiral

The Golden Spiral can be used as a guide to determine the placement of content. Our eye is naturally drawn to the center of the spiral, which is where it will look for details, so focus your design on the center of the spiral and place areas of visual interest within the spiral.
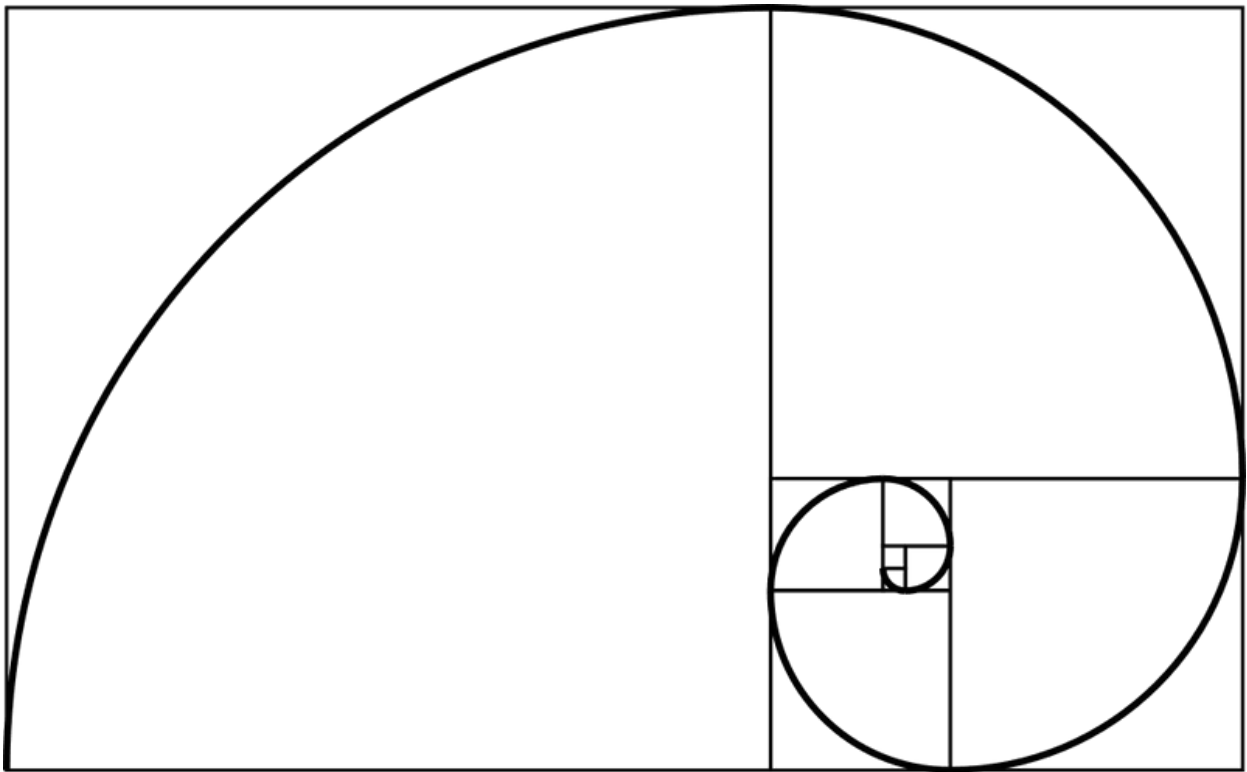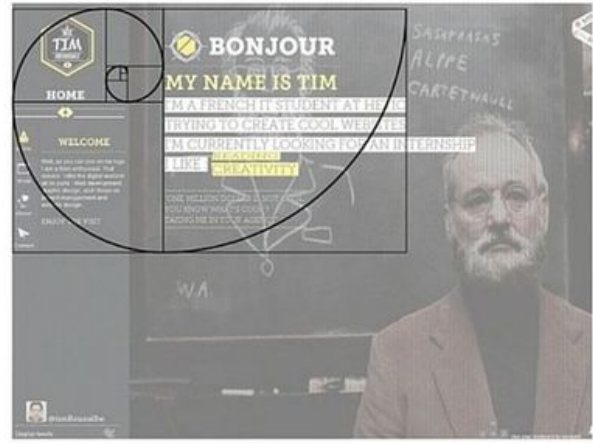
Take another look at the National Geographic website and you'll notice there is a second, smaller logo towards the center of the spiral. It's a great place to double-up on brand images because our eye is naturally drawn here. Subliminal? Perhaps. The Golden Ratio can do that.
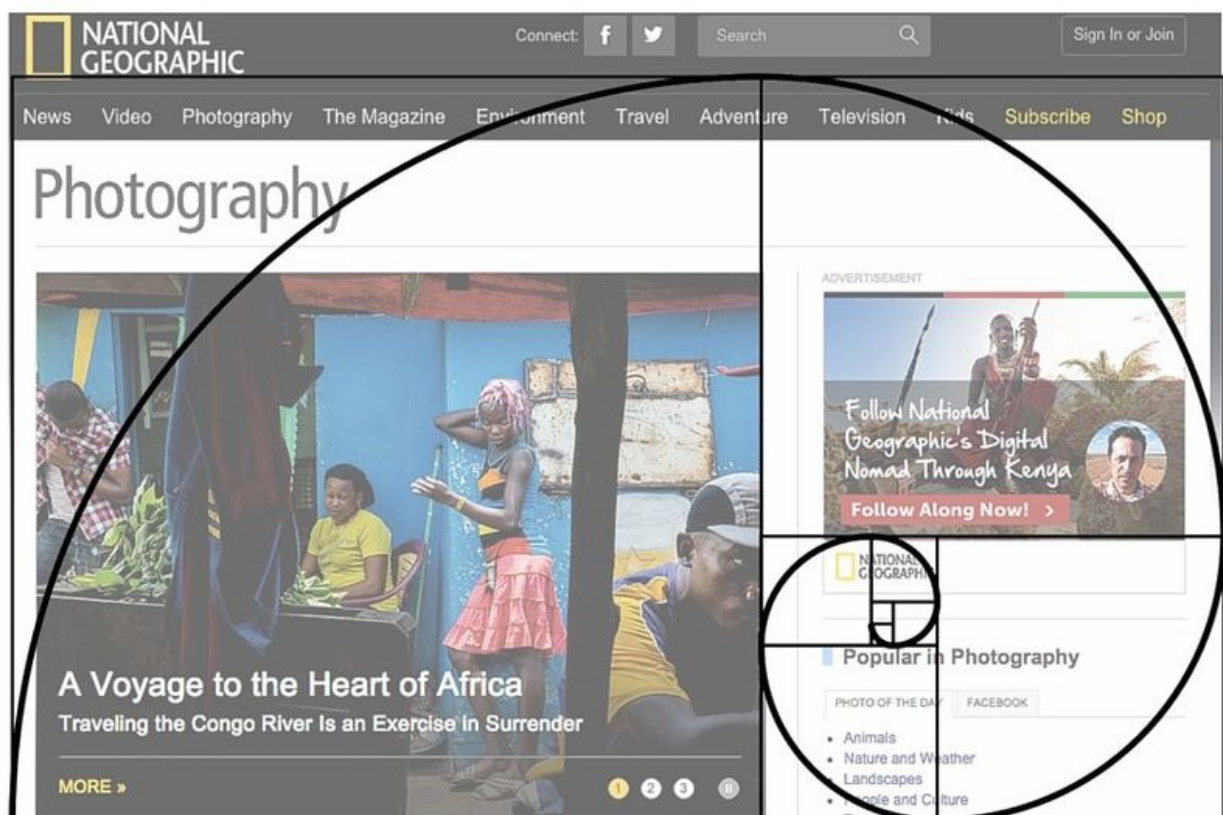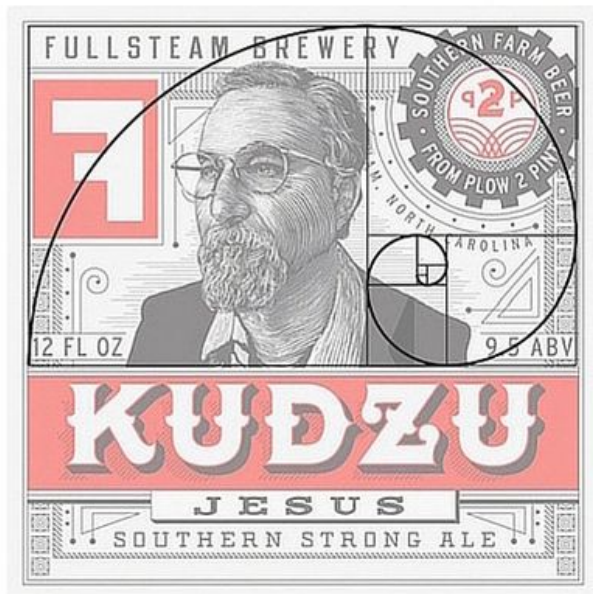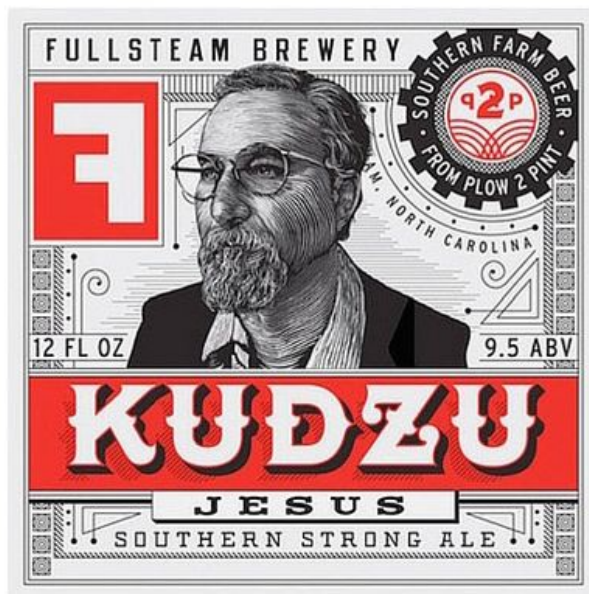

National Geographic website

This website by and for graphic designer Tim Roussilhe looks quite content-dense but is very well organized according to the Golden Ratio and Golden Spiral, which focuses on the text in the upper left section of the website. Your eye begins in the top-center with "Bonjour

My Name is Tim." It then travels past the description of what Tim does, on to the menu buttons, hits the logo in the top-left corner, before coming to rest in negative space, having absorbed all the details it needs.

Bonjour My Name is Tim

Content most obviously becomes denser as the spiral progresses in this visual identity for Saastamoisen säätiö. The size of each letter is reduced as is the spacing between each letter as the eye gets closer to the spiral. The letters don't necessarily read in order but there is enough repetition that it will become familiar.

Saastamoisen säätiö

Helms Workshop designed this branding for Fullsteam Brewery and used the Golden Ratio and Golden Spiral for layout and content. Various elements of the design fit within separate squares and the eye is drawn past the main character, to the stamp, the ABV, and place of manufacture. Helms Workshop's intention for Fullsteam was create a "brand narrative around a semi-fictitious steampunk plantation-owner from a distant name…" The Golden Spiral helps tell the narrative on the label as we pick up detail about both him and the brand.

Fullsteam Brewery by Helms Workshop

04. Images – Golden Ratio (or Rule of Thirds)

Composition is important for any image, whether it's to convey important information or to create an aesthetically pleasing photograph. The Golden Ratio can help create a composition that will draw the eyes to the important elements of the photo. Using the Golden Ratio, you split the picture into three unequal sections then use the lines and intersections to compose the picture.

The ratio is 1: 0.618: 1 – so the width of the first and third vertical columns will be 1, and the width of the center vertical column will be 0.618. Likewise, with the horizontal rows: the height of the first and third horizontal rows will be 1, and the width of the center row will be 0.618. Now use those lines and intersections to draw the viewer's eye and focus attention. It also creates tension and adds interest and energy to composition.
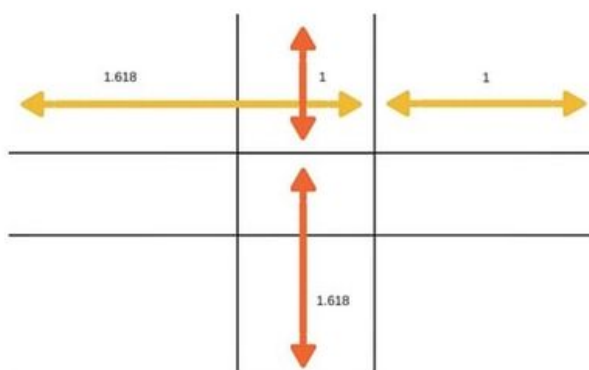
Another (and slightly simplified) way to crop images via the Golden Ratio is to use the Rule of Thirds. It is not as precise as the Golden Ratio but it will get you pretty close. For the Rule of Thirds, set up all vertical and horizontal lines to 1:1:1 so that all spaces are equal and even. Align important elements of the image around the central rectangle ideally at its four corners.

This cover for Complex magazine, featuring Solange Knowles, uses the Golden Ratio to determine the proportion of positive and negative space. The top of Solange's nose and (almost) her forehead reach the top horizontal line; while her nose and eye fall on the two vertical lines around the center rectangle.


Complex Magazine

Jason Mildren designed this cover for Pilot magazine and it works with the Rule of Thirds. There is interest at the corners of the center rectangle, while that center, for the most part is empty. The model's eye falls exactly on one corner and is piercing at the audience.
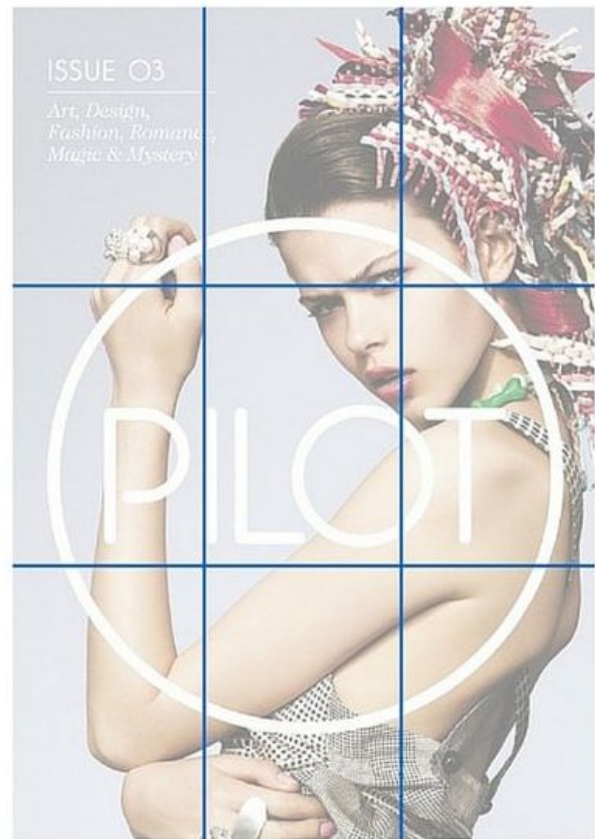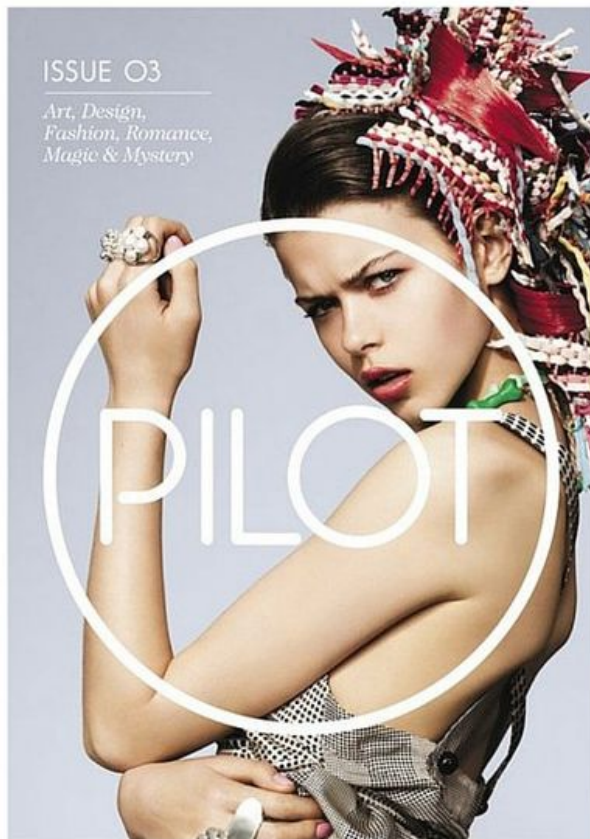
Pilot Magazine by Jason Mildren

This cover of Feld magazine uses the Golden Ratio cropping to center the eye of the model on the cover. It works well because he is off center and the side of his face almost aligned with the left vertical guide.
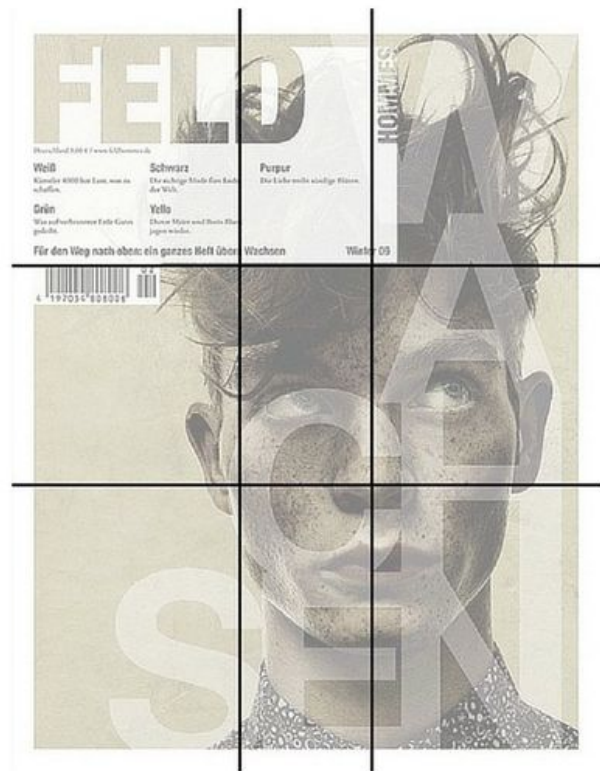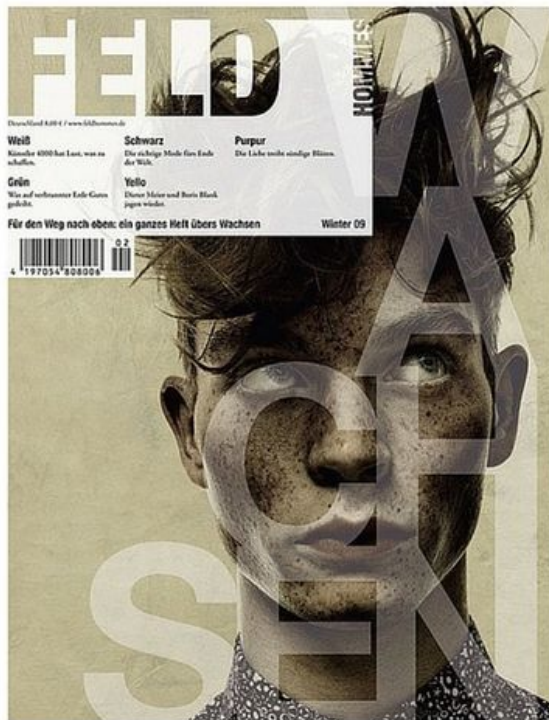
Feld Magazine

And overall, the layout of the cover follows the Golden Ration and Golden Spiral. Content is concentrated within the spiral and it becomes more detailed towards the center of the spiral.
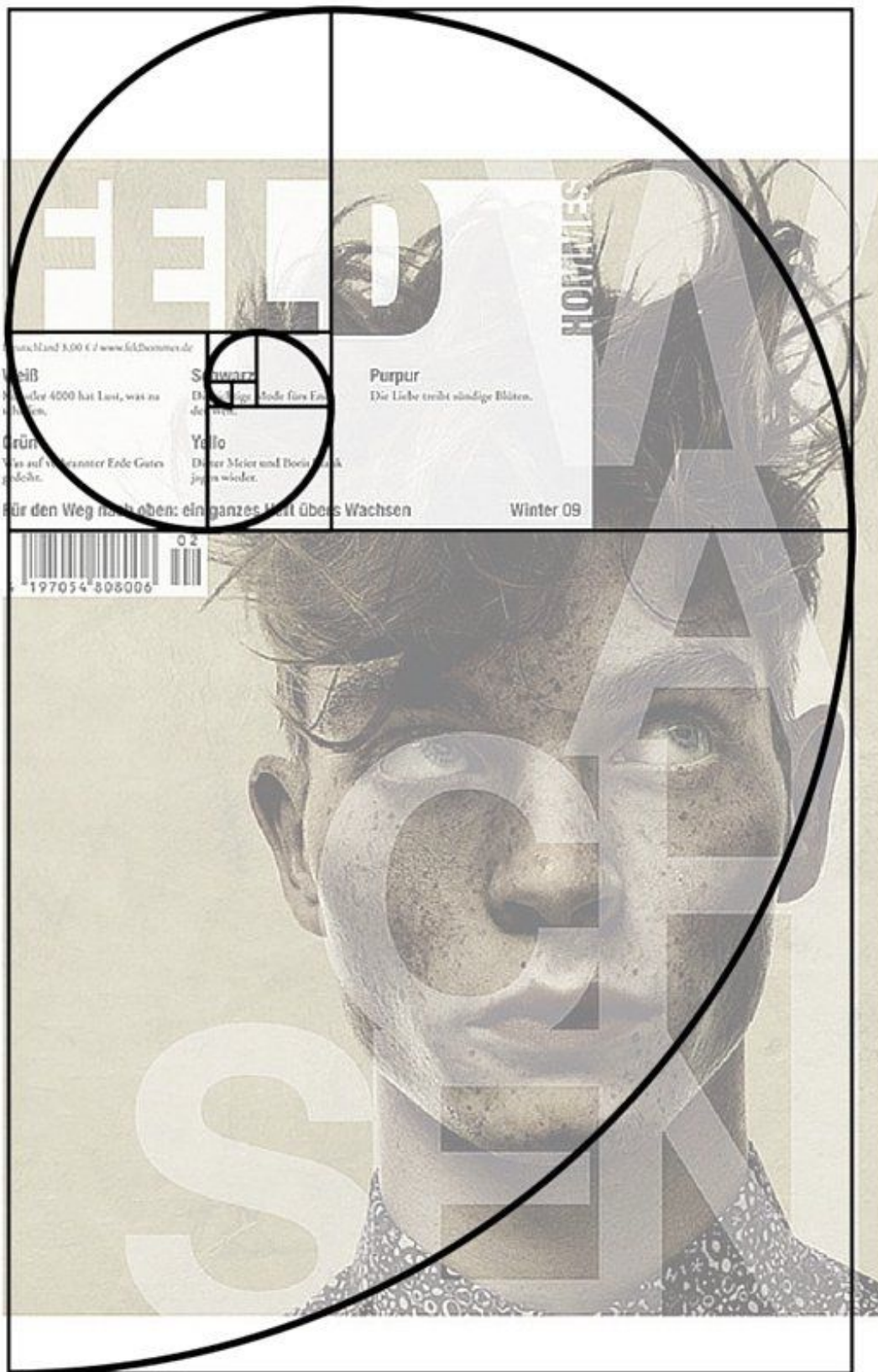
Feld Magazine
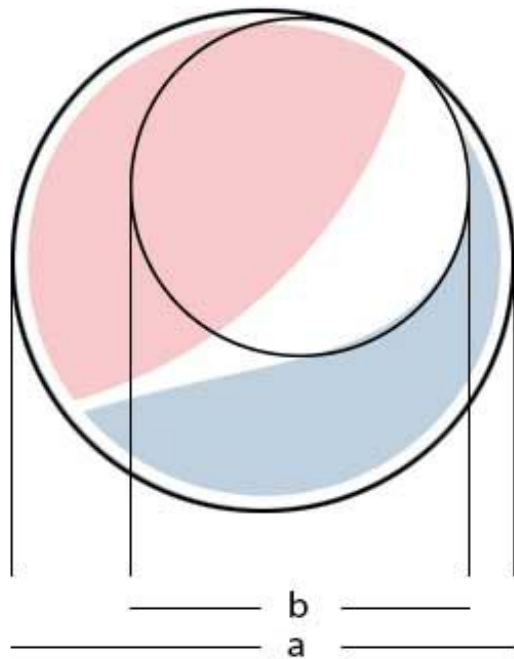
05. Forms – Golden Circles

Just like the Golden Ratio can be harnessed to create squares and rectangles that are in harmonious proportion to each other, it can also be applied to create circles. A perfect circle in each square of the diagram will follow the 1:1.618 ratio with the circle in the adjacent square.


Using the Golden Circles will create not only harmony and proportion, but also consistency throughout form. Let's go back to Pepsi and Twitter here.

The Pepsi logo is based on two intersecting circles that follow the Golden Ratio. While the smaller circle is not readily evident in the final iteration is does form the basis of the white slice through the center of the logo.

The Twitter logo uses geometry and is heavily based on perfect circles. There is a minor lack of precision when aligning it with the Golden Ratio but for the most part the Twitter logo seemingly uses Golden Circles for balance, order and harmony.
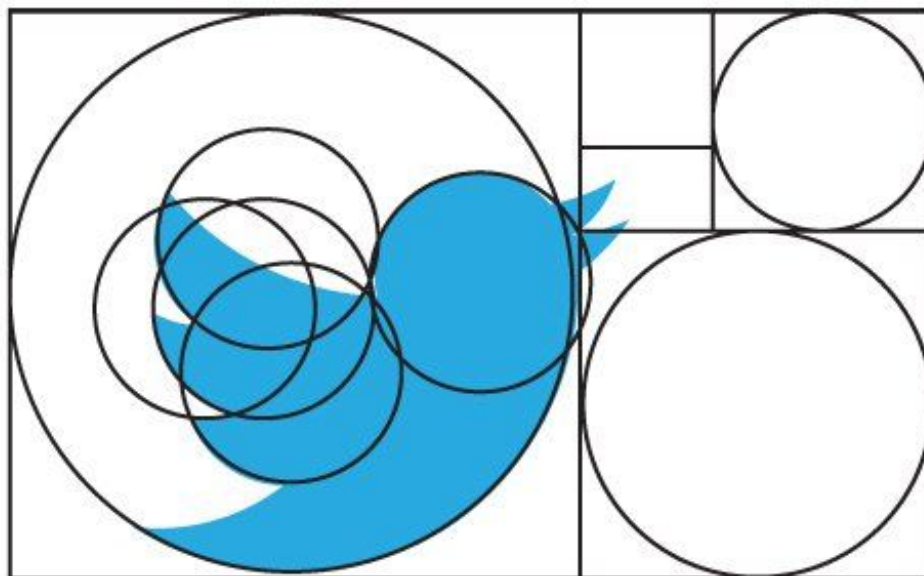
You can use various elements of the Golden Ratio to design better. The tweaks may be subtle, but that might be all it takes to go from good design to great design, especially in the eyes of the beholder.

As György Dóczi writes in *The Power of Limits,* "The power of the golden section to create harmony arises from its unique capacity to unite different parts of a whole so that each preserves its own identity and yet blends into the greater pattern of a single whole