

# Lego Analysis

## Analysis of Lego

### Methodology:

In order to investigate LEGO set trends and theme popularity, we used the LEGO data on TidyTuesday provided by Rebrickable.

This dataset contained all the information about officially released LEGO pieces where we focus on theme names, number of parts, colors and release years. The dataset was filtered to exclude sets with missing or zero part counts, as these entries would not contribute meaningfully to part-based analyses.

We first grouped sets by theme to calculate the total number of sets and the median number of parts per theme Figure 1. The top 20 most and least popular themes were identified and visualized using a horizontal bar chart Figure 2 & Figure 3. Each bar's length represents the number of sets per theme and fill color indicates the median number of parts. This allowed us to compare popularity with complexity as measured by part count.

In addition to thematic analysis, we tracked the evolution of LEGO set complexity over time measured by median part count and color diversity. These trends are visualized in Figure 4 & Figure 5, where x-axis shows the year and y-axis showing the corresponding median part or unique colour count. A smooth trend line over the years highlights a general increase in part and colour count reflecting growing set intricacy over time.

Finally, to explore the largest sets ever produced by LEGO, a bar chart Figure 6 was created, where each bar represents a set and is segmented by the proportion of colours used. The bars are filled with the actual hex colours replacing fill in each set, allowing for a really clear visualisation of both the total number of parts and the colour distribution, and provides insights into which colours are most prevalent in large complex builds and highlight some of the design choices behind some of LEGO's most detailed sets.

## **Results:**

**Theme popularity** - based on the number of sets released under each theme.

### **Most Popular LEGO Themes**

1. Technic is the most popular LEGO theme of all time, with over 800 sets released and is popular among those who enjoy engineering-style builds. It's known for its complex mechanical features and realistic designs, attracting older children and adult hobbyists.
2. Star Wars comes in second with almost 800 sets. Thanks to its powerful movie franchise, this theme appeals to both young fans and adult collectors and has remained a top performer for decades.
3. Other top themes include Friends, Ninjago and Basic Set, each with several hundred sets. This shows that LEGO successfully targets a variety of age groups and interests.

### **Least Popular LEGO Themes**

1. Many themes, such as Zooters, X-Men, Wolfpack, and Stranger Things, have only 1 to 3 sets. These were likely experimental or niche product lines that did not gain enough traction to expand.
2. Themes like Sculptures, eLAB, and Miles From Tomorrowland may have targeted specialized audiences, but limited appeal resulted in minimal set releases.
3. Some licensed themes, such as The Powerpuff Girls, Fantastic Beasts, and Avatar: The Last Airbender, may have faced market or licensing challenges, preventing long-term success.

## **Conclusion**

The most successful LEGO themes share common features: strong brand identity, wide audience appeal, and ongoing product development. The least popular themes were often short-lived, targeted at small audiences, or limited by licensing. Understanding these patterns helps LEGO and similar brands plan better product strategies and maximize market impact.

Table 1: Theme ordered by sets with their median parts

theme_name	n_sets	median_parts
Technic	810	64
Star Wars	787	148
Friends	494	87
Ninjago	444	58
Basic Set	439	52
Supplemental	431	12
Gear	409	15
Classic Town	394	66
Town	374	20
Bionicle	357	43
Service Packs	347	16
Books	316	8
Duplo and Explore	239	80
Racers	226	54
City	207	169
Creator	201	59
Creator 3-in-1	193	256
LEGO Brand Store	156	31
Monthly Mini Model Build	148	41
Police	148	98
Basic	138	194
Duplo	138	15
Christmas	135	50
Brickheadz	130	160
Harry Potter	129	263
Bulk Bricks	124	50
Promotional	117	68
Nexo Knights	113	47
Fabuland	105	18
Soccer	100	16

Figure 1: Theme by parts

### All time most popular lego themes with median parts

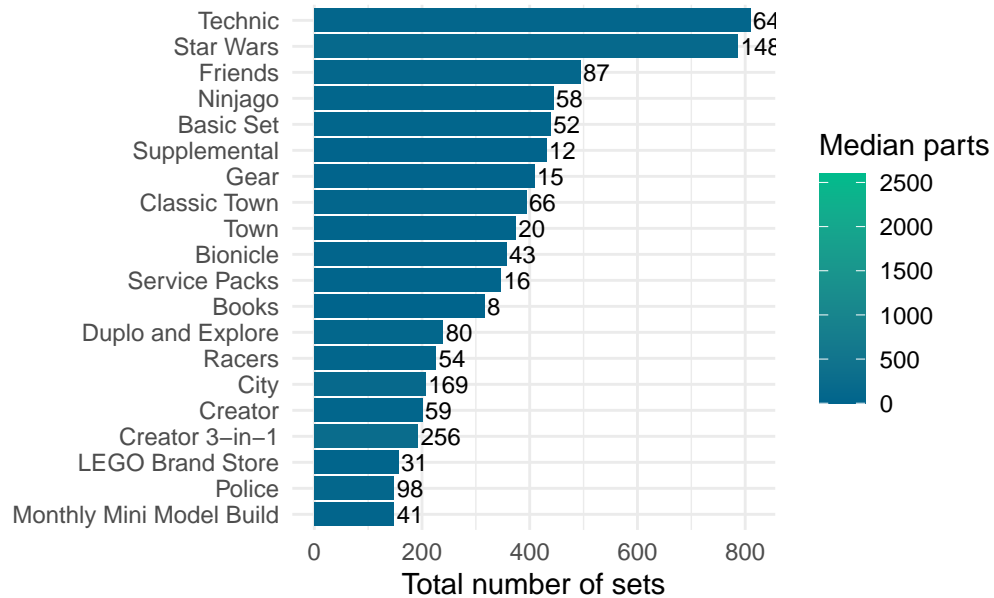


Figure 2: Most popular themes

### All time least popular lego themes with median parts

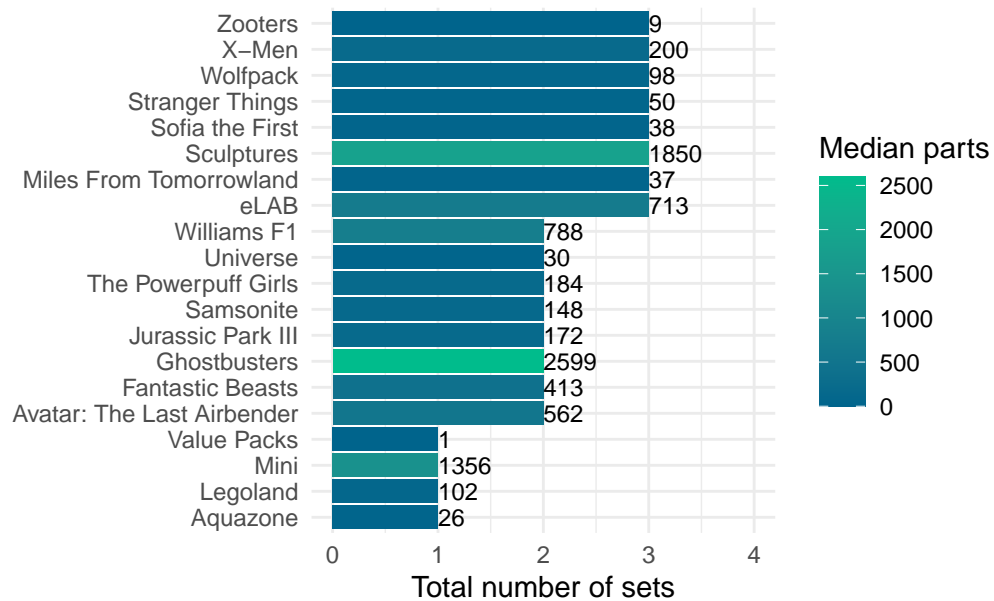


Figure 3: Least popular themes

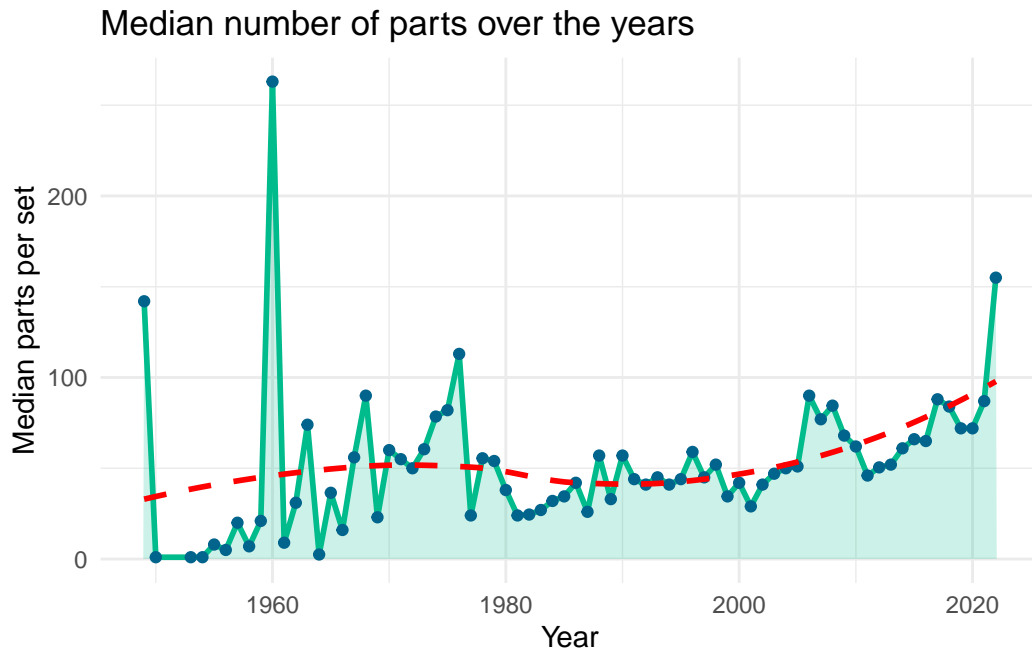


Figure 4: Median parts by year

### Analysis: Complexity of LEGO Sets Over the Years

#### 1. Early Years (1950s – early 1960s):

The chart shows a large spike in the 1950s, likely due to an outlier set with many parts. Aside from this, most sets had a low median part count, suggesting simple designs.

#### 2. Growth Phase (1960s – late 1970s):

There was a clear upward trend in the median number of parts per set. This indicates that LEGO sets became more complex over time, possibly due to increased design innovation and consumer interest in more detailed builds.

#### 3. Stabilization Period (1980s – 2020s):

After peaking in the late 1970s, the median number of parts stabilized around 40–60 parts per set. Despite some fluctuations, no significant long-term increase is observed.

#### 4. Recent Years (2000s – 2020s):

Complexity remained steady, with occasional dips and rises. This suggests LEGO has balanced its product line with both simple and advanced sets.

## Conclusion

LEGO sets became more complex up to the late 1970s. Since then, the median complexity has plateaued, likely due to diversification of set sizes to meet the needs of different age groups and skill levels.

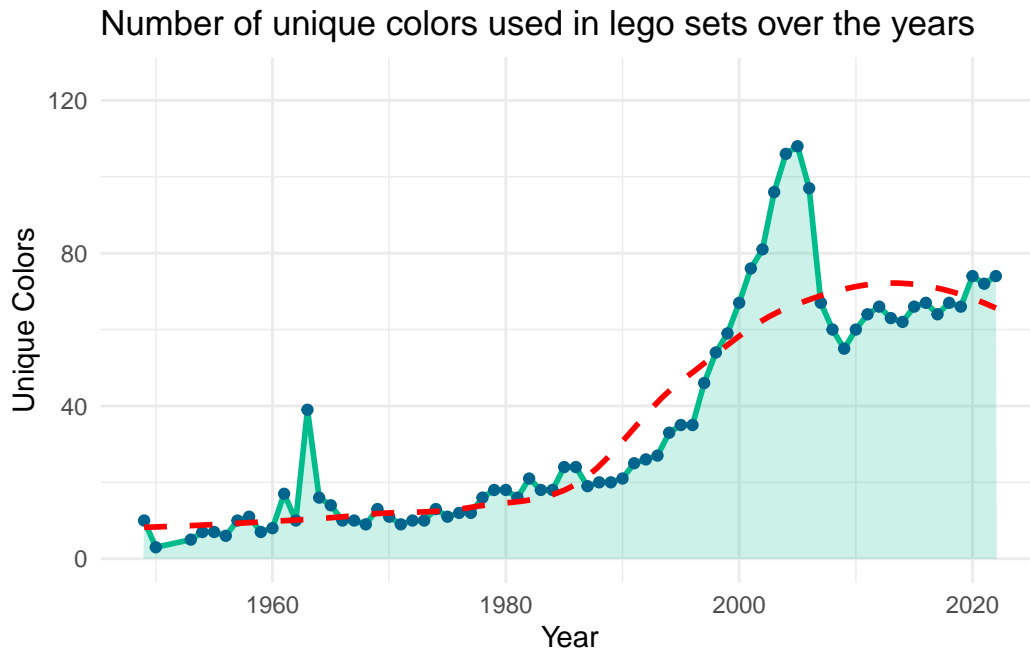


Figure 5: Unique colour count by year

## Analysis: Diversity of Colors in LEGO Over the Years

### 1. Color Diversity Has Increased Significantly Over Time:

In the early years (1950s–1980s), the number of unique colors remained low and stable, generally below 30. A sharp increase in color variety began around the mid-1990s, peaking around 2005 with over 100 unique colors. This rise reflects LEGO's expansion into more diverse and creative themes, such as Star Wars, Friends, and Ninjago.

### 2. Modern LEGO Sets Offer a Wider Visual Palette:

Since 2000, the trend has stabilized but remains at a much higher level of color diversity than earlier decades. The sustained use of 60–80 unique colors in recent years suggests a commitment to more visually rich and customizable sets, appealing to both children and adult collectors.

### 3. Color Complexity Supports Build Complexity :

The increase in median parts per set (as seen in earlier graphs) correlates with increased color variety. More colors allow for greater detail, theme accuracy, and differentiation of components, which enhances both aesthetic and functional complexity.

### 4. Design and Brand Evolution

The introduction of licensed sets (e.g., Harry Potter, Marvel) demands specific color palettes, further driving color diversity. Customization and modular building trends also push LEGO to expand its available color options for builders.

## Conclusion

The growing number of unique colors used in LEGO sets is a strong indicator of increased design sophistication and build complexity. Color diversity not only enhances the visual experience, but also plays a critical role in enabling LEGO's modern design capabilities and supporting more engaging, realistic, and intricate builds.

Top 20 lego sets by # parts and colour proportion

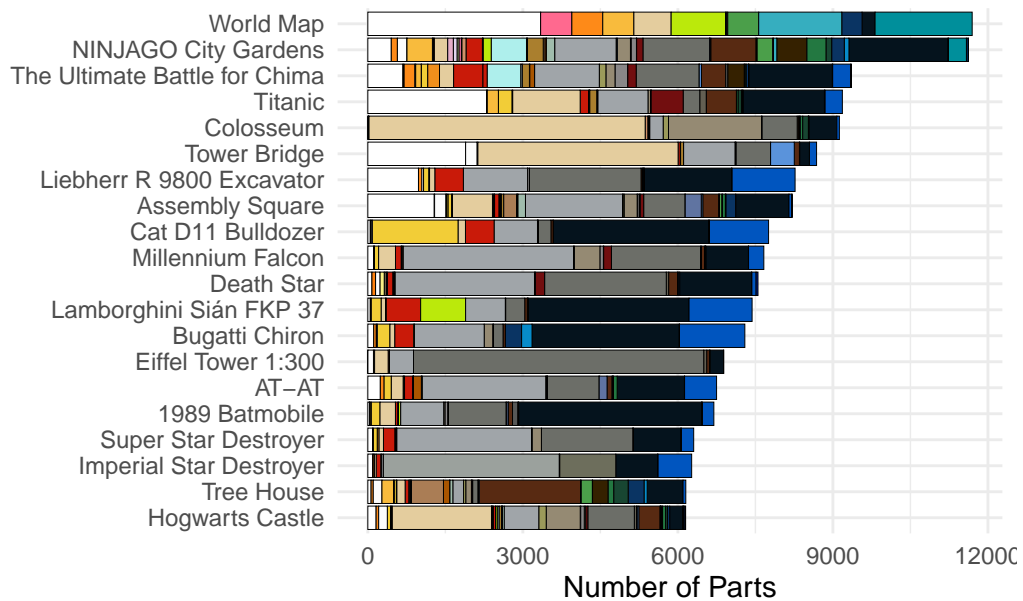


Figure 6: Top 20 sets by part count with color proportion

## **Analysis: LEGO Sets with the Most Parts and Color Proportions**

### **1. Sets with the Highest Number of Parts:**

World Map is the LEGO set with the most parts, exceeding 11,000 pieces. Its design focuses heavily on tile placement and color detail. NINJAGO City Gardens and The Ultimate Battle for Chima also rank highly, each containing around 5,500 to 6,000 pieces, showcasing advanced structural and decorative elements. Other large sets include Titanic, Colosseum, and Tower Bridge, each with over 9,000 pieces, reflecting highly detailed architectural builds.

### **2. Color Proportions and Variety:**

Sets like World Map and Tree House show high color diversity, using dozens of different shades to depict natural or geographic details. In contrast, Liebherr R 9800 Excavator, Bugatti Chiron, and Lamborghini Sián use a more concentrated color palette, focused on realism and technical detail (e.g., grey, black, yellow, blue). Star Wars sets like the Millennium Falcon, Death Star, and Imperial Star Destroyer are dominated by grey tones, consistent with their on-screen designs.

### **3. Function vs. Aesthetic Balance:**

Some sets prioritize aesthetic variety (e.g., World Map, Tree House) and thus have many colors but simpler build structures. Others focus on mechanical or architectural complexity (e.g., AT-AT, Excavator), using fewer colors but highly technical builds with intricate mechanisms.

## **Conclusion**

The number of parts in a LEGO set often correlates with either extensive design detail (e.g., maps, buildings) or technical function (e.g., vehicles, machinery). Color proportions reveal the thematic purpose of each set—some aim for vibrant storytelling, while others reflect precision and realism. Together, these sets showcase LEGO’s versatility across both form and function.