



## Number Visuals Grades 6-12

### Introduction

This activity invites students to investigate a really interesting representation of numbers, created by Stephen Von Worley that fascinates children and adults alike and gives students an important opportunity to understand numbers and to think visually about them. We now know that when students think of math visually as well as with numbers and symbols they are crossing the brain, using different pathways, and that has been found to increase the power of math learning. This activity is a perfect way to encourage brain crossing and deep understanding. When we first saw this representation of numbers we were intrigued and when we looked further we saw that the representations of the numbers highlight their composition really nicely. Both teachers and students who have seen this visual have loved it and wanted to spend time with it. It is engaging for students of all ages and achievement levels.

### Agenda

Activity	Time	Description/Prompt	Materials
Explore	20 min	<ol style="list-style-type: none"> <li>1. Write the number above each representation.</li> <li>2. What do you see?</li> <li>3. Use colors to show patterns.</li> </ol>	<ul style="list-style-type: none"> <li>• Paper</li> <li>• Pencil/pen</li> <li>• Colored pencils/markers</li> <li>• Number Visual handout, page 4</li> <li>• Number Visual activity</li> </ul>
Discuss	20 min	Invite students to share any patterns or other interesting observations	

### Activity

We started by asking students what they see. The classroom soon started buzzing with students noticing that “all the circles are prime”, and that number pictures show factors. Some students studied patterns across the number visuals and others studied patterns within an individual visual.

Give students time to study the pattern and think creatively. Have spare sheets available in case they want to explore a new pattern with different colors. If a student is stuck and having trouble encourage them to ask questions of other students and the patterns they are finding. Don't show students any patterns. Let all of their discoveries be their own. Celebrate everything they find and



honor the different directions their creative thinking takes them. This is a good time to remind students to share their thinking, even if they are not sure if it is accurate. Many mathematical discoveries have been made following the beginning ideas of others.

Some students may question the patterns in some of the representations. Encourage them to share how they might change a number visual. Ask them to justify/defend their thinking.

This is a great activity for color-coding, as students can use color to show the factors. Some students will see that the primes are all in diagonals on the table but one is interrupted by the number 25, are they curious about this?

Have students sit in groups to conduct their investigations, so that they can talk and compare notes. We think it is fine for students to work on a pattern on their own or with others.

When students had explored patterns for a while, we invited them to present their ideas to each other.

**Extensions:**

- Draw the numbers 36 and 37.
- Create your own visualization for the numbers 1 – 20



## Number Visuals Activity

1. Write the number that each visual represents on your number visuals handout.
2. What do you see in the number visuals? Do you notice anything interesting about the way numbers are shown? Share your findings with your group members and discuss them together.
3. Look for interesting patterns. You may find it useful to use colors to highlight them. Describe some of your findings and share with your group members.

