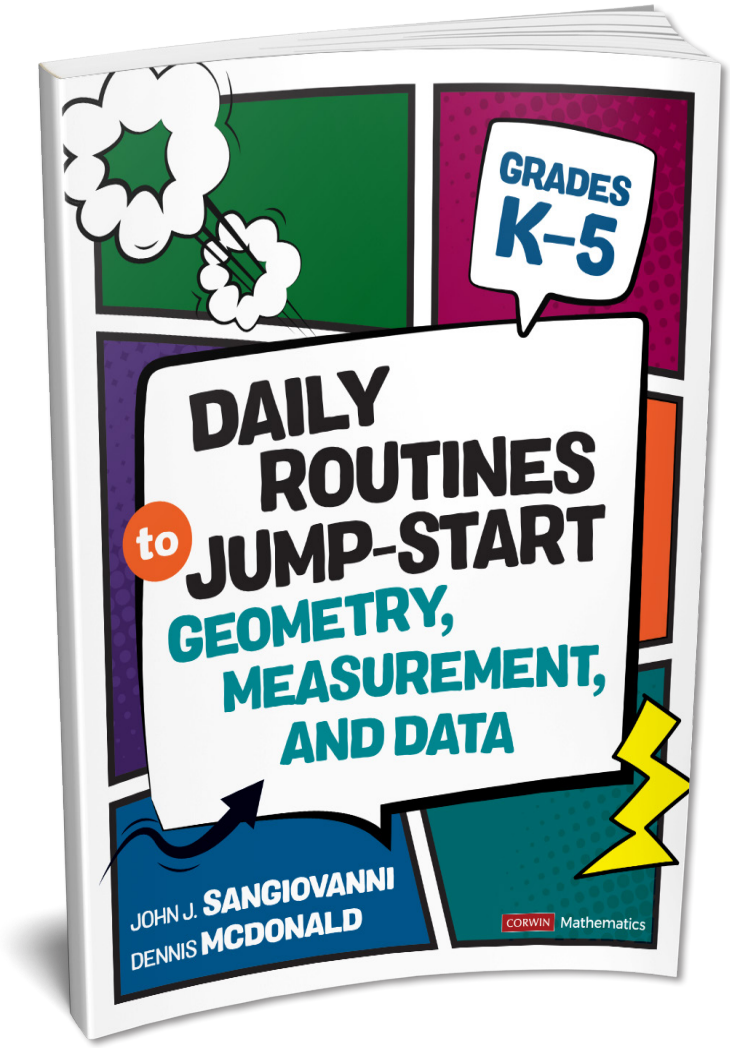

Thank you

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Please enjoy this complimentary excerpt from Daily Routines to Jump-Start Geometry, Measurement, and Data, Grades K-5.

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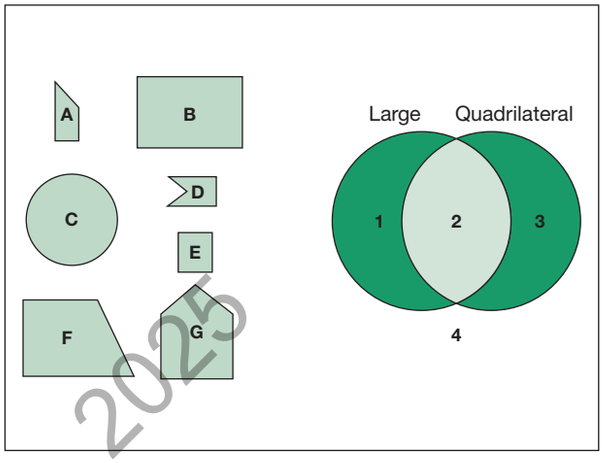
ROUTINE 3 VENNS

ABOUT THE ROUTINE

John Venn was a 19th-century, English logician who is remembered for inventing Venn diagrams (Klaxoon, n.d.). In the 150 or so years since their creation, Venn diagrams have become a staple of teaching and learning. They are exceptional tools for concept attainment in math as well as most any other content. These diagrams frame how topics or data points are related, helping individuals develop strength with comparing and contrasting, which contributes to improved reasoning and analyzing. In this routine, Venn diagrams are leveraged for brief bursts of practice with geometry though they can be applied to most any topic in math from place value concepts (e.g., numbers with a 2 in them and numbers with a 5 in them) to multiples (e.g., multiples of 4 and multiples of 6) (SanGiovanni et al., 2024). In this example, the shapes are sorted by their size and number of sides. Shape A would go in section 3 because it is a small quadrilateral. Shape F would go in section 2 because it is large and it is a quadrilateral. Shape C is a large circle placing it in section 1. Section 4 is reserved for shapes that don't match either category.

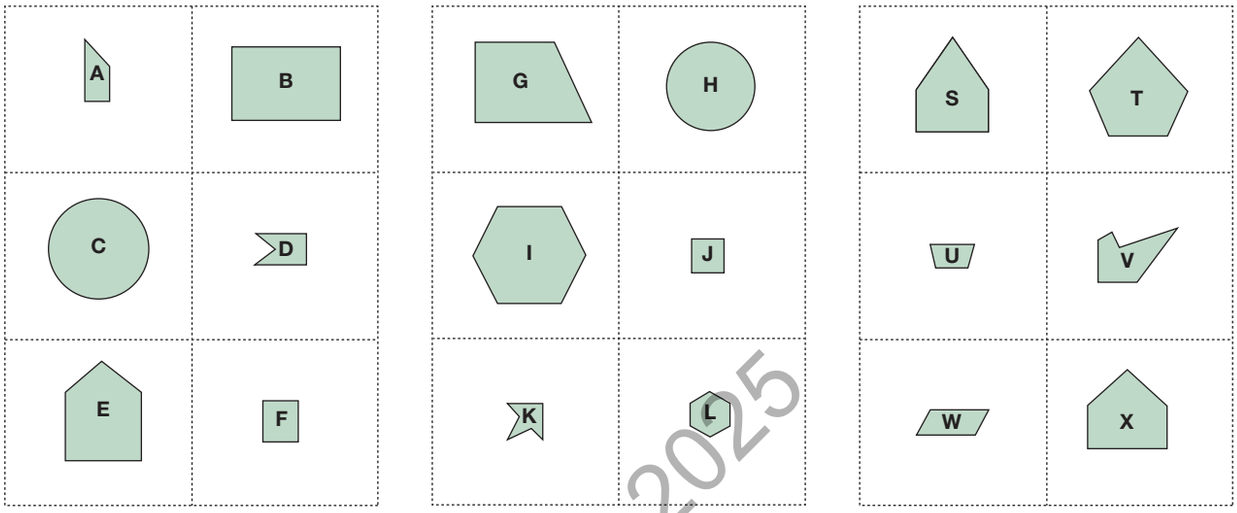


Before doing this routine, or any routine for that matter, you need to first teach the concept. In this example, that would be defining attributes. The shapes categories and shapes most likely align with third-grade content (or later). In younger grades, the categories might be large and square or small and triangle. In either case, students would learn about what those attributes are. They would understand features of shapes and should distinguish between defining attributes (e.g., number of sides) and nondefining attributes (e.g., size). Your lessons might even mirror the routine or vice versa. To do this, you might provide physical models of the shapes or have students build them with AngLegs, toothpicks and marshmallows, or something else. Sorting circles are large, folding plastic circles that come in red, yellow, and blue. They are perfect for creating physical representations of Venn diagrams and could be a nice way to establish a given topic while also informally teaching this routine.

As you can see, the routine doesn't use physical models. Instead, there are images of shapes. You can get these from the downloadable content in this book, make them on index cards, or sketch them on the board. And remember that there are even more shape cards from the Sorts routine (Routine #2). You might also be wondering about the number of shapes to provide. There isn't an exact answer. You want to provide enough to stir

online resources All routines can be downloaded for your use at **https://companion.corwin.com/courses/jumpstartroutines-geometry**

thinking and discussion but not so many that your students are overwhelmed. Five to eight seems like a good number but you may find that you need to start with fewer. You may want to provide 10 or so and that's fine too. If you do increase the number, it is probably a good idea for students to do as many as they can in the shorter amount of time that a routine offers rather than all of the shapes.



Regardless of how you create the shapes or the number of shapes you use it is important that the shapes are labeled. As mentioned in other routines, labeling or lettering the shapes that students sort is really helpful. In this case, lettering supports discussion as new vocabulary develops. For example, every student can recognize shape D whereas the notion of a pentagon may still be forming. Also, if you or they are comparing two pentagons, it's much better to talk about shape D and shape S or pentagon D and pentagon G instead of "this one" and "that one." Labeling the sections of the Venn are equally important. The numbered sections are easy to identify whereas the left, right, or center may be problematic especially when more categories (see Variation E) are introduced.

HOW THIS ROUTINE HELPS

This routine deepens understanding of geometry by providing opportunities for students to

- analyze shapes based on their attributes;
- distinguish between defining and nondefining attributes;
- classify shapes by their attributes;
- identify relationships between shapes with similar attributes;
- reinforce geometry vocabulary (MP6);
- strengthen reasoning skills for application and problem-solving (MP1);
- collaborate, discuss, and debate with classmates; and
- create shapes that match attributes of other shapes.

WHAT TO DO

1. Pose a Venn diagram to your students.
2. Have them think about a shape that would go in any of the sections (numbered locations) of the diagram. Optional: Have them create an example that would go in a certain section of the diagram.
3. Pose a collection of shapes.
4. Have students independently determine where to place the shapes in the Venn diagram. Optional: Let them record their ideas in their journal, sticky note, or personal dry erase board.
5. Have partners discuss and justify their solutions.
6. Bring the class together to discuss solutions as a whole class. Record solutions as students share their ideas. Be ready to ask questions like the following:
   - » How did you know ___ went in that section of the diagram?
   - » How is shape ____ similar to shape ____? Does that mean they both should be in the same section?
   - » How can two shapes have something in common but go in different sections of the diagram?
   - » How did you know that shape ___ didn't belong in that section?
7. Optional: Introduce one last new shape and ask the whole group to determine where it would be placed in the diagram.

SOMETHING TO THINK ABOUT: FORMATIVE ASSESSMENT

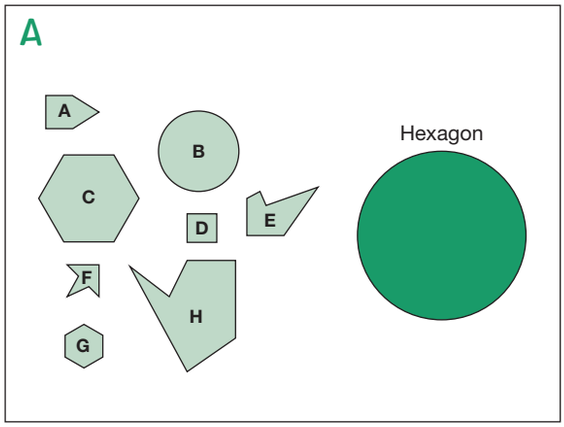
There are different techniques for formative assessment (Fennell et al., 2017) that pay big dividends during your daily instruction. While not a technique per se, routines *are* a great opportunity for formatively assessing your students' understanding of skills and concepts. By listening to their ideas, you see into their thinking. You're able to ask follow-up questions that enable you to probe more deeply into reasoning and insights. You can pose questions that help you see if they understand a concept in a narrow, singular way or if they have generalized a concept and can both transfer and apply it to new examples or situations. Routines aren't a time for grades. They're a time for engagement and discussion. Don't feel like you must hear every student's partner conversation to do this well. Position yourself to listen to certain students that you want to know more about. Ask questions of the whole group during the debrief and be sure that certain students have a chance to talk. Use what you hear to help you decide if something needs to be retaught or simply practiced more.

VENNS (VARIATIONS): WRITING IT DOWN

For the most part, routines are intended to be mental exercises. But some routines benefit from scaffolds like graphic organizers (I Would Say, Routine #16). Some routines are more effective if manipulatives are provided. And some, like this one, need to be supplemented with a piece of paper, math journal, sticky note, or an individual dry erase board. The reason for this is that students need to remember where they placed a shape in the diagram. As they move from one shape to another, they might forget where they placed a previous shape. Ultimately, this slows the routine and increases the likelihood for frustration and disengagement. You can even have students create their own rendering of the diagrams if you like. This will work with any of the following variations as well.

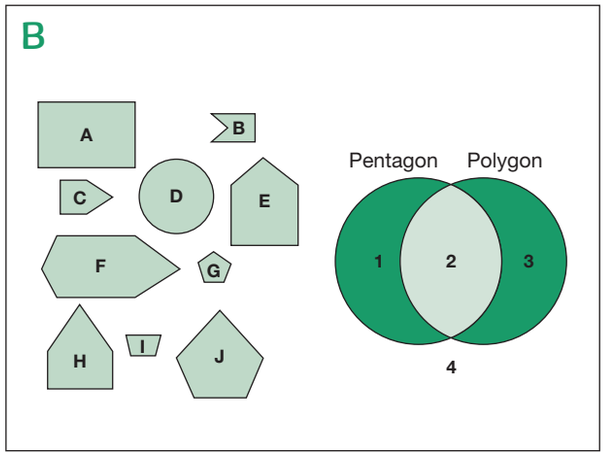
Variation A: Single Category

You can have a single circle Venn diagram as shown in this opening variation. Shapes that match the category, like C, E, F, G, and H, go inside the circle while the others do not. It's a good place to begin for students first working with either the concept of sorting or Venn diagrams for that matter. It's also good for introducing the numbering of sections used in this routine. Remember, as described in Part 1, you must take time to teach the process of a routine before it becomes an efficient, brief practice experience. In the case of this routine, you have to teach them how to use the numbered sections in the diagram. For most students, that will take just a few moments. But for some, it will take a little time to understand how the letters and numbers work. Using this variation can simplify the process, making it clear. To do this, sort with a single circle like you see here. After the sort is complete, put a number on the inside (1) and a number on the outside (2). Talk about how the shapes are either "ones" or "twos." Then, simply present a new shape and ask students what number or numbered space it goes with. Their answers will tell you how well they understand and what you might need to do next.



Variation B: Named Polygons and Impossible Situations

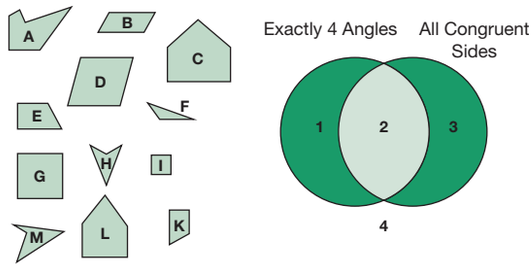
Learning the names of special polygons is one thing. Recognizing them in a regular configuration is another. Recognizing them in *any* configuration is a whole other thing. The latter typically presents the greatest challenge to students as they rely on a certain image of a polygon rather than the number of sides. Take this variation for example. Shape G is a regular pentagon that most students will recognize quickly. Shapes H and J have some visual similarities and are likely to be identified by many students. Shape B, however, is unlikely to be the shape you imagine when you think of a pentagon. It's also the shape that your students are most likely to look past when identifying pentagons in this example. There is also one other noteworthy feature in this example and that is sometimes a section of a Venn diagram cannot contain any examples. Here, section 1 could never have a shape because every pentagon is a polygon. This was designed with intention. You may create a similar situation that you don't intend. That's OK! If it happens, simply ask students why or why not a certain case is true. Have them explain and justify their thinking like we just did with pentagons and polygons. And if you notice that you made categories that create a situation like this don't point it out right away. Wait! Give them a chance to discover and question it. If they don't, then ask them if a certain space could ever be filled. But don't feel obligated to turn it into a mini lesson. Give it a moment for discussion and move on.



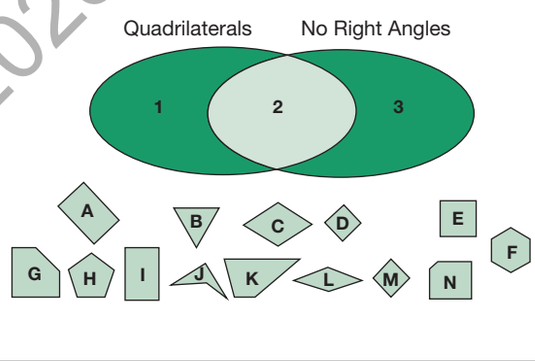
Variation C: Quadrilateral Attributes

Learning and remembering the hierarchy of quadrilaterals or the different types of triangles can be quite a challenge. An obvious first step is to teach the attributes of different quadrilaterals. To do that, you want students to build examples, talk about them, compare them with other quadrilaterals, and so on. You don't want them to memorize the names and definitions of the different quadrilaterals, but you will need to explicitly teach them. Yet for your students to retain this information well, they will need to practice it again and again. This variation of the routine gives you an idea how you might do that. The categories here are foundational. They are a good place to start. From there, you can begin to prompt defining attributes of quadrilaterals like the one in C2. As you do this, add the special name with it. After a bit, you can begin to remove the "definition" and leave only the name. For example, you might have a category of two sets of parallel sides with "parallelogram" written in parenthesis below or beside it. After time, only the word *parallelogram* would be offered.

C1



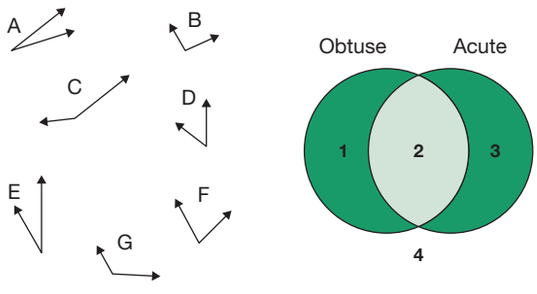
C2



Variation D: Angles

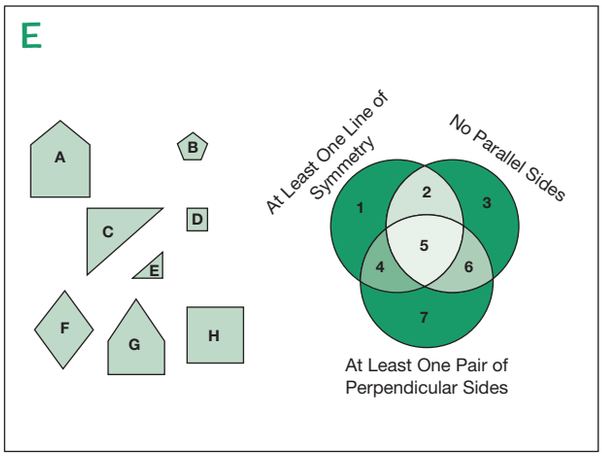
You have read throughout this work how you can create variations of routines to practice all sorts of content within geometry, measurement, and data. This variation of Venns is a good example of how you can do this. Here, the topic is angles, which likely appears in your fourth- or fifth-grade curriculum. You can draw a few angles on your board, create them on index cards, or print some from the downloadable content. Whatever you do, remember that you want angles to open from both left to right and from right to left. You want to make sure that you orient or rotate them in a variety of ways. Be sure that the rays vary in length from angle to angle. In short, make sure that your students aren't fooled or don't rely on a certain configuration of angles to name them. And know that your categories can be more than straight, right, acute, or obtuse. You might include a category like "angles found in squares" instead of "right" or something similar.

D



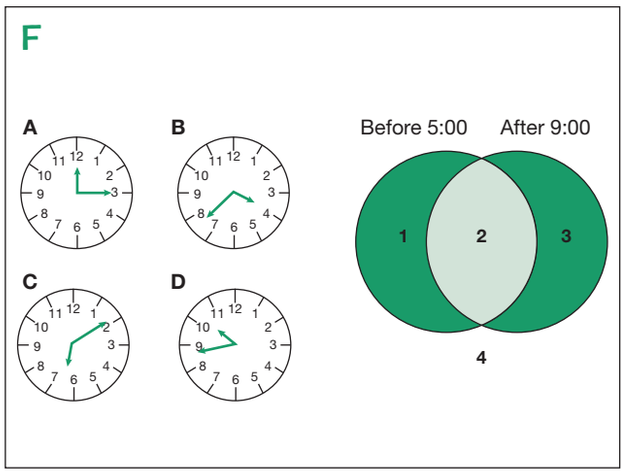
Variation E: Three Categories

"There's a glitch in the matrix." That might have been your reaction the first time you were exposed to a triple Venn diagram as a student, preservice teacher, or just right now! At first, it may seem overwhelming. There is a lot going on with the seven spaces within the diagram. So, when you introduce a triple Venn, give students time to examine it without sorting anything. Have them simply observe, discuss, and ask questions. Ensure that they understand it, and to do this you might need to include categories so that they can more easily describe what's happening. You might also begin with very basic categories, even nondefining attributes like color or size. Working with a triple Venn may seem like a tall task but it really isn't. And working with it gives your students opportunity to deepen their understanding of the content you present while also enhancing their critical thinking and reasoning skills. Here are two answers, in case this is your first time with a triple Venn diagram. Shape G is a pentagon and it has one line of symmetry and at least one set of perpendicular sides so it would go into section 4. Figure F is a rhombus that fits into section 1 with at least one line of symmetry.



Variation F: Time to Sort

This routine, among many others, can be modified to practice other important topics in geometry, measurement, data, and more. This example shows how Venns could be used to practice time. Here you see four clocks. Students must determine what time the clock is showing and then compare that to categories of "Before 5:00" and "After 9:00." As you know, A (12:15) and B (~3:38) would fit in section 1. Clock D (~10:43) would fit in section 3 and Clock C (~6:09) doesn't fit in either place so it would go with 4 outside of the Venn. You could change the sorting categories for time to other things like the number of minutes shown, such as no minutes past the hour or o'clock (e.g., 6:00), time to the 5 minutes (e.g., 3:35), or 15 minutes past the hour (e.g., 7:15). With time, you could mingle digital and analog clocks. And remember, just because a Venn diagram has an overlap (section 2) it doesn't mean something will fit inside. This is a good conversation to have with students. There is no time that is before 5:00 and after 9:00 unless we're talking about A.M. and P.M., which isn't referenced in this example.



Variation G: Surprise Sorts

This variation of the routine thrives on student creativity and an element of the unknown. First, have students create a shape on sticky notes, white boards, or something similar. You can limit their creations to polygons, a certain set of shapes (e.g., triangles and quadrilaterals) or you can tell them to make anything they like. A nice alternate is to provide each student with a set of shape cards from this routine or Sorts (Routine #2) in which they would pull a single shape at random. Regardless of your approach, once students have a shape, ask them to compare their shape with some nearby classmates. Have them identify similarities and differences. Share out as a class if you like. Then, reveal categories for the Venn and give students time to think about which section their shape would fall into. Have them confirm their placement with a partner and then share solutions. You can have them put their shape on the Venn or if you have a large enough diagram displayed you can have them get up and stand by the section of the Venn where their shape belongs.