

# Geometric Drawing Stencils



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Welcome to Geometric Drawing Stencils!

Geometric Drawing Stencils is an accessible set of manipulatives and 3D printable files that students who are blind or low vision can use to draw tactile geometric shapes and algebraic and trigonometric functions. The manipulatives are comprised of 18 heavy-gauge geometric stencils for drawing circles, ellipses, parallelograms, trapezoids, triangles, and more. Six drawing strips with inch and centimeter marks also are included; these allow students to draw line segments and polygons with exact-length measurements. All geometric stencils and drawing strips are backed with micro-suction tape so that they stick to the working surface while students are drawing. That frees up students' hands for other tasks such as measuring.

Among the 3D printable files are 14 stencils for drawing graphs of quadratic, radical, exponential, logarithmic, and trigonometric functions. You can download the files and print out the stencils with a 3D printer as needed as students' progress in their math study.

Unlike commercially available stencils, the components of Geometric Drawing Stencils are accessible to students who are blind or low vision. Use of micro-suction tape, tactile marks, enlarged sizes, and great durability, all features are designed to enable the students to independently draw tactile shapes and functions.

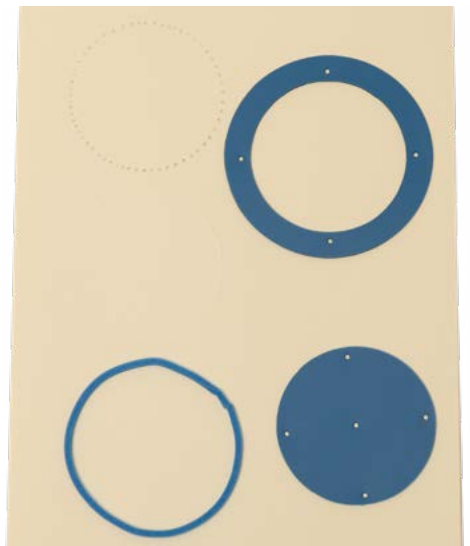
## Follow this guide to get started with Geometric Drawing Stencils

1. Peel off the thin protective films on the back side of the drawing strips and geometric stencils to reveal the micro suction side. If you stick a piece of heavy-duty shipping tape along an edge or at a corner of this protective film, it will be easier to peel it off (see Figure 1). The micro suction side of the tape prevents the strips and stencils from slipping while drawing and can be used over and over. Do not remove the tape from the plastic side of the strips and stencils, as this side of the tape is intended to adhere to the plastic permanently.



**Figure 1:** Peel off the thin protective film using a piece of shipping tape.

2. To draw a geometric shape, press the corresponding geometric stencil onto a piece of braille paper, graph sheet, or plastic film. For each shape, there is an inner stencil and a corresponding outer stencil. The inner stencils are designed for students to draw shapes by surrounding the stencils with sticky strips, such as those in Graph Benders (APH catalog number: 1-03400-00). The outer stencils allow students to draw shapes by tracing along the inside edge using a stylus. Tactile markings for midpoints, centers, and degrees have been included on the geometric stencils to make



**Figure 2:** Inner and outer stencils for circle and three tactile circles drawn using the stencils.

the stencils accessible to blind students. Figure 2 shows the inner and outer stencils for the circle and a few sample drawings.

3. The drawing strips include both inch and centimeter marks. These pieces allow students to draw line segments or polygons according to specific measurements. For example, students can create a coordinate system by sticking two strips onto a piece of braille paper with them perpendicular to each other and then drawing the x and y axes with one-centimeter-long unit marks using a stylus.
4. To store and organize the drawing strips and geometric stencils, stick them to the plastic file folders included in the kit. This will prevent them from sticking to each other.
5. No need to worry if the micro suction tape on the backs of the drawing strips and geometric stencils loses its sticking power over time. Students can wash Geometric Drawing Stencils manipulatives with water to remove dust and other debris and make them sticky again.
6. In addition to the drawing strips and geometric stencils are 14 3D printable files of stencils for drawing commonly used algebraic and trigonometric functions and a normal curve. You can download these files free of charge from the product's Shop site, and then print them using a 3D printer. All the function graphs are designed to have a coordinate unit of half an inch, which aligns well with some popular APH graph sheets. To prevent these stencils from slipping while drawing, you can back them with similar micro-suction tape or other non-slip materials such as the rubber dots included in APH's Graph Benders.

We hope you and your students enjoy Geometric Drawing Stencils!

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## **Geometric Drawing Stencils**

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