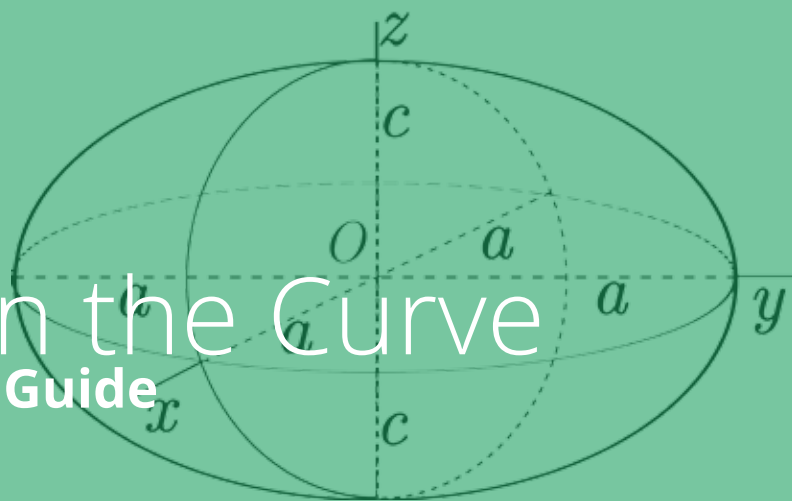
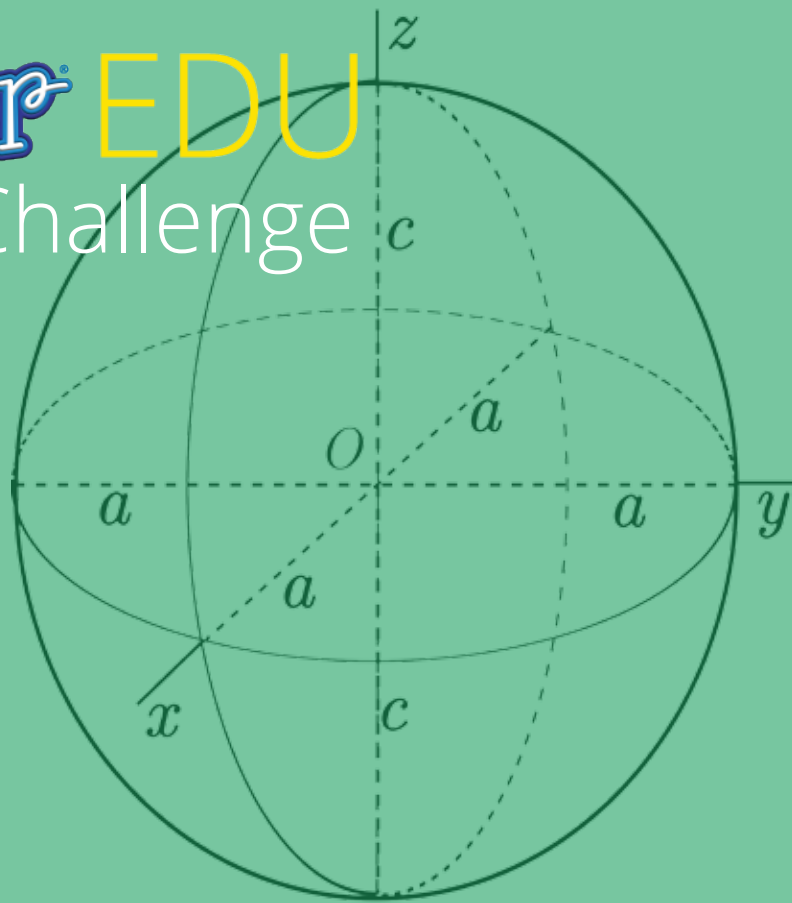


# 3Doodler<sup>®</sup> EDU

## Design Challenge



## Math on the Curve

### Participant's Guide

#### ▣ The Challenge

Explore mathematical equations for spheres and ellipsoids created with the 3Doodler pen and plastic strands.



## ☰ Challenge Organization

📝 Notes

### 📷 Challenge Documentation

Take photos & videos of your process using a camera. Document what to do and what not to do. Share your experience with the online community using #3DoodlerEDU!

Challenges are organized into 50-minute periods so they can fit into a traditional classroom structure, or be combined into a single workshop with breaks in between activities. This Challenge is designed to have participants work in short sprints to quickly explore the concepts.

## 🖥️ Class 1: Plan & Design

🕒 Total Time: 50 min.

### ✍️ Plan & Design (🕒 50 min.)

**Step 1:** Create a sphere and ellipse string compass based on the images in the Challenge Background.

**Step 2:** Determine the maximum size of the circle and ellipse on an 8.5" x 11" piece of graph paper.

**Step 3:** Determine the number of circles and ellipses needed to create your volumes.

**Step 4:** Draw a diagram for reference and provide the calculations for your circle and ellipse shapes.

**Step 5:** Determine an even spacing scheme for your shapes.

**Step 6:** Test your sphere and ellipse string compass with graph paper and a pencil. Make any adjustments required.

**Step 7:** Test out your sphere and ellipse string compass with your 3Doodler pen. (Note: do not build your volume yet, that will come in the next class.)

Lined area for taking notes, consisting of horizontal dashed lines.



## 🔗 More Information:

For more information on ellipse formulas in action, please visit:

- <http://www.mathopenref.com/coordgeneralellipse.html>

For more information on circles in action, please visit:

- <http://www.mathopenref.com/coordbasiccircle.html>

For more information on finding the loci of an ellipse, please visit:

- <http://www.mathopenref.com/constellipsefoci.html>

## 🖼️ Images:

Cover Page: <https://goo.gl/ET4552>

Fig. 1: [https://upload.wikimedia.org/wikipedia/commons/e/e8/Globe\\_Lights.jpg](https://upload.wikimedia.org/wikipedia/commons/e/e8/Globe_Lights.jpg)

Fig. 2: <http://www.sew4home.com/sites/default/files/1693-Circle-Compass.png>

Fig. 3: <http://britton.disted.camosun.bc.ca/ellipse.gif>