Activity: Exploring wheels as geometric objects

Subject/s: Mathematics

Focus:

- Exploring and manipulating the properties of 2D and 3D objects using 3D and dynamic geometry software.

Age Range: 11-14	**Time:** 90 minutes (or 45 mins for each software)

Prior Learning:

- Some knowledge of 3D terms – X, Y & Z axes, etc.

Lesson Objectives:

- Students will be able to create and modify a variety of 2D and 3D objects in a software system by entering measurements.
- Students will create wheels by combining cylinders, circles, cones, etc.
- Students will scale and rotate objects in multiple dimensions by inputting X, Y & Z values.

Resources:	**Vocabulary:**
Computers with Geogebra classic installed and/or access to the internet to use TinkerCad. (Chrome browser recommended)	2D, 3D, CAD, plane, dynamic geometry, cone, cylinder, extrude, rotate, translate

Activities:

- Ensure students have access to Geogebra or web access to use TinkerCad.
- Explain that 3D design programs are based on core ideas of geometry and measurement
- Discuss how complex objects can be made or constructed from simpler objects (primitives) e.g. *What basic shapes might make up wheel?*
- Have the students use the guides for Geogebra and TinkerCad to create wheels. (This could be over two shorter lessons)
- Have students 'publish' their designs for use in presentations, etc.

Assessment opportunities:

Discussion, application of ideas in project, presentations made using screen-shots they have taken

Extension ideas:

- Explore creating animations or other objects using the skills learned.