**TI-Nspire Activity**: *Flatland: A Romance of Many Dimensions*
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**Activity Overview**
*"[The universe] is written in the language of mathematics, and its characters are triangles, circles, and other geometric figures..."* -- Galileo Galilei

*In this document, students are asked questions about their reading of the book Flatland by Edwin Abbott. The handheld skills required are minimal with the exception of the last problem. The students are asked as they progress through the questions to draw some of the characters from the book. This can be easily done with the shapes tool on a geometry page. The students are also asked to begin to think about hyperspace, the fourth dimension. This activity is an extension of a LearningCheck I created for the TI-84/Navigator several years ago.*

**Concepts**
- *Basic Geometric concepts*
- *Literacy Connections to mathematics*
- *Socio-historic lessons that are still relevant today*

**NCTM Standards addressed:**

**Geometry:** Precisely describe, classify, and understand relationships among types of two- and three-dimensional objects using their defining properties.
**Communication:** Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
**Connections:** Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
**Representations:** Use representations to model and interpret physical, social and mathematical phenomena.

**Tennessee State Standards addressed:**

✓ 0606.1.9, 0706.1.9, 0806.1.9 Use age-appropriate books, stories, and videos to convey ideas of mathematics.
GLE 0606.4.1 Understand and use basic properties of triangles, quadrilaterals, and other polygons.
GLE 0806.4.5 Use visualization to describe or identify intersections, cross-sections, and various views of geometric figures.
✓ 0806.4.7 Visualize or describe the cross-section resulting from the intersection of a plane with a 3-dimensional figure.
✓ 0806.4.8 Build, draw, and work with 2- and 3-dimensional figures by means of orthogonal views, projective views, and/or nets.
SPI 0806.4.5 Identify the intersection of two or more geometric figures in the plane.
CLE 3108.1.6 Employ reading and writing to recognize the major themes of mathematical processes, the historical development of mathematics, and the connections between mathematics and the real world.
CLE 3108.1.7 Use technologies appropriately to develop understanding of abstract mathematical ideas, to facilitate problem solving, and to produce accurate and reliable models.
✓ 3108.1.5 Use technology, hands-on activities, and manipulatives to develop the language and the concepts of geometry, including specialized vocabulary.

**Teacher Preparation**

*Assign students to read Flatland, by Edwin A. Abbott. This material has been discussed as well as background information on the author, the book, and the time period in which it was written. This document assesses basic concepts from the book while at the same time reinforcing some basic geometric concepts. The following link might prove useful as you are prepping for this activity as well as a study of Flatland.*
http://www.calormen.com/Flatland/

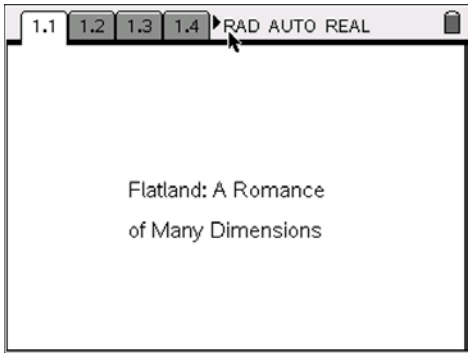
**The Classroom**.

*This document can be assigned as class work or be given as an out of class assignment.*

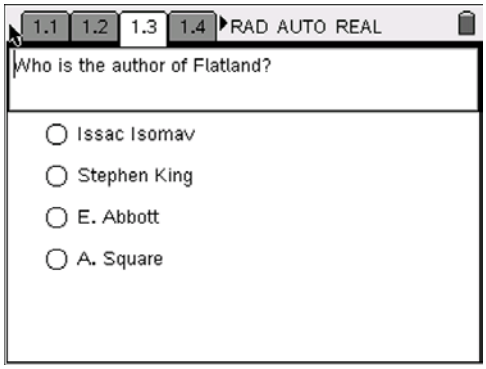
**The Document**

To view the document press: [home] [7]

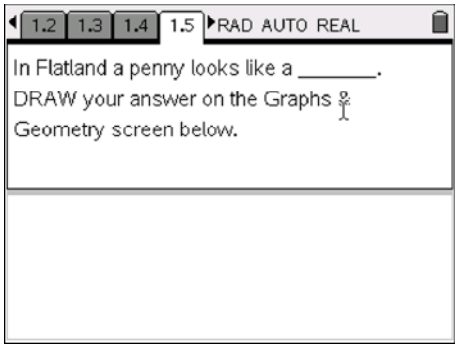
Using the Nav Pad arrows, ◆▲▼, scroll down to the folder containing the document titled "Flatland."




On page 1.3, as well as on subsequent pages, students will be asked multiple choice questions. Be sure that the students understand that they need to arrow down through the choices and then click [enter] to select their answer.

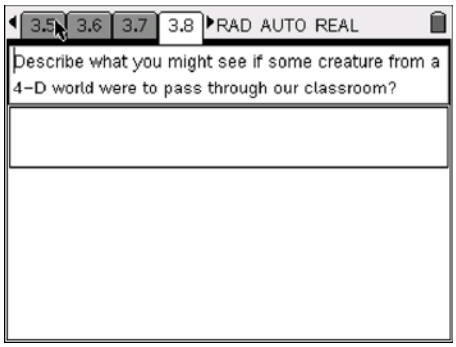


On page 1.5, as well as on subsequent pages, students will be asked to answer a question as well as model their answer with a drawing. The top half of the screen is a Notes page. The bottom half is a Graphs & Geometry page. To draw, they can simply go to (menu) and select shapes and choose what they want to draw.




The second problem is about the social classes. The pages are again half Notes, and half Graphs & Geometry.

The third problem begins with a discussion of Lineland and ends with a discussion of the 4th dimension. Students should be encouraged to investigate this further.




There is an activity on the Activities Exchange website, Activity # 6899, NUMB3RS - Season 2 - "Rampage" – Tesseract. This activity should prove useful as the students further Investigate the 4th dimension and hypercubes.

*Assessment and Evaluation*

After reading Flatland, students should be given the opportunity to do alternative assessments. Here are a few suggestions:

Create a visual or model that shows the world of Flatland. Explain your visual clearly.
Write an essay, with illustrations, that discusses the social culture of Flatland.
Read Sphereland by Dionys Burger. Discuss the extension of the ideas in Flatland to a three dimensional world.
Read Flatterland by Ian Stewart. Discuss the mathematical ideas in this new work.