

**TI-Nspire Activity:** *Area of Triangles*

By: Jean McKenny

**Activity Overview**

*This is a discovery activity. Students will discover by checking the area of several triangles having different shapes that because the altitudes are the same the areas are the same. MaTilda (a little spider) helps the students. She and her family members live on the railroad tracks which are, of course, parallel. MaTilda weaves triangular webs to help feed her parents and her children Tina, MatTI, DotTI, and TIm.*

**Concepts**

*The area of a triangle is  $\frac{1}{2}$  times the base times the height (altitude). Different shaped triangles will have the same area if the base and the altitude are the same.*

**Teacher Preparation**

*The teacher should download the spider.tns file from the activity exchange and transfer it to each student handheld.*

**The Classroom.**

*The teacher should let each student work through the activity. Directions for using the hand held are included in the activity so students should be able to work through it on their own.*

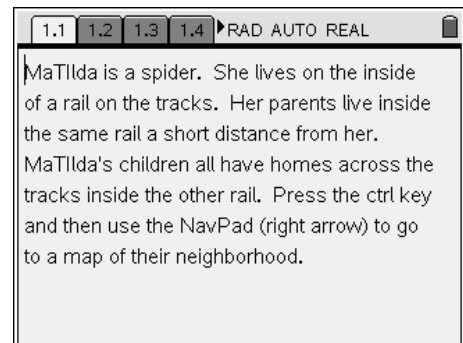
*The activity uses the TI-Nspire notes and graphs and geometry applications.*

*The students only need to press the home key, select, #2 my documents, and choose spider as the document. Students should work individually until they have finished by answering the questions posed to them on the blank notes page (1.9) provided for them. The students are asked to save the completed document.*

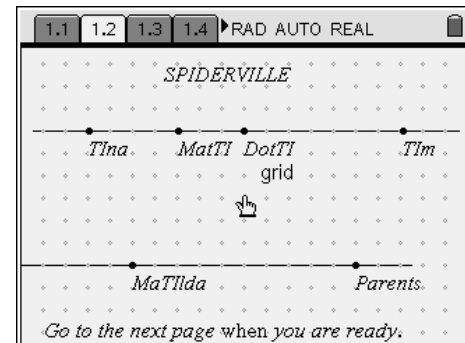
*The teacher could use collect from class to see what they have written on page 1.9 or the teacher could ask the students to write with paper and pencil what they discovered. After saving the completed document, it would be appropriate for teachers and the students to discuss what each student discovered. This provides an opportunity for student discourse and/or student presentations. If the teacher has a TI- Nspire Navigator system the activity could use that system for classroom interaction.*

**The Document**

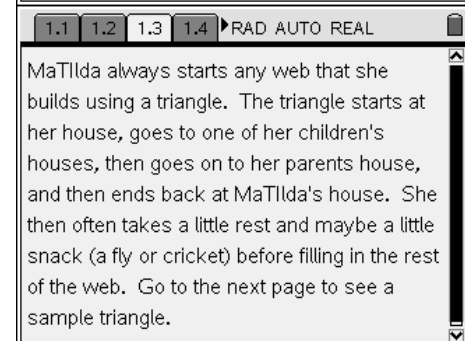
This page (1.1) sets the stage for the activity.



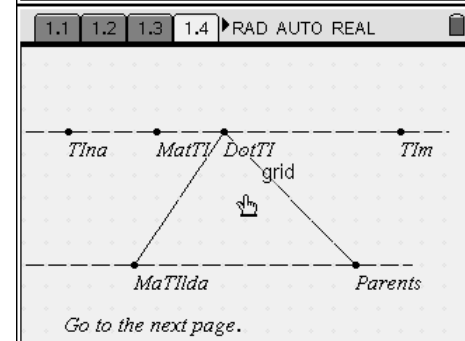
This page (1.2) shows a map of Spiderville.



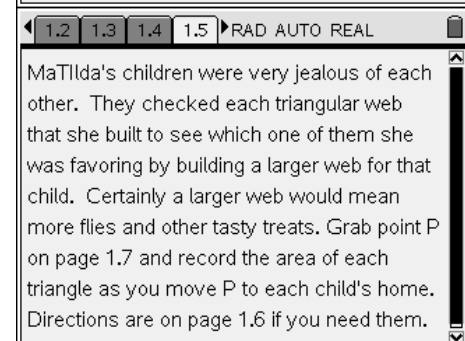
This page (1.3) describes MaTilda's typical web start.



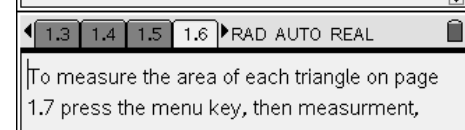
This page (1.4) illustrates an example of the beginning of a web to DotTI's house.



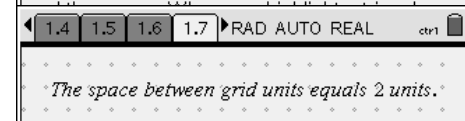
This page (1.5) sets the stage for the continuation of the activity and gives activity directions.



This page (1.6) is handheld directions for students needing them.

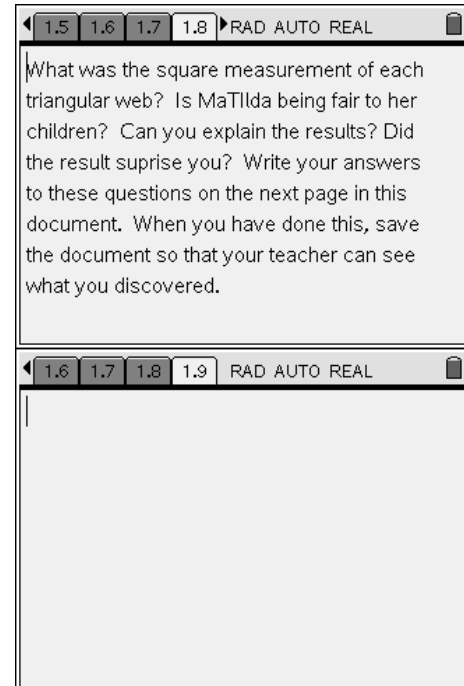


This page (1.7) is where students measure the area of each triangle. Students will move point P to each child's home. When a triangle is formed they will measure the area of it. They will need to escape the "measuring area" environment before moving P



again to form the next triangle.

This page (1.8) asks students what they found and gives directions for how to answer the questions on the next page in the document. If the teacher prefers students could be asked to write the answers to these questions on a piece of paper and hand it in to the teacher.



This page (1.9) is for the students to record findings if the teacher wishes to have the students respond on the handheld.

### **Assessment and Evaluation**

*The teacher should read each students answer page, either from the handheld or in written form. In answers the students should connect the formula for the area of a triangle with the triangles measured. The students should conclude that the reason the areas are all the same is that the base of each triangle (the distance from MaTilda's house to her parents' house) is always the same (20 units). Also, the altitude (height) of each triangle (12 units) will always be the same (the distance between the tracks). The way that the activity is written the area of each triangle measured will be 120 square units. A scale of two units between the grid dots was deliberately chosen to cause students to have to think more about the difference between linear units and square units.*

### **Extension**

*Students tend to think that if one measure of geometric shapes (area) is equal, that other measures (perimeter) will also be equal. A possible extension is to have students measure the perimeter of each triangle and compare those lengths. Which child is MaTilda spending more on, if you consider the amount of "silk" (perimeter of each initial triangle) that she has to produce to build each web as currency? The answers for perimeter are Tina's triangle about 59.5 units, MatTI's triangle about 52.6 units, DotTI's triangle about 51.2 units and for TI'm's triangle about 57.1 units. It would seem that she is favoring Tina! These answers will vary slightly depending on how closely the students place point P on the point indicating each child's house. Possibly some students will see that the shorter perimeters are for the triangles closest to an isosceles triangle and the longest perimeters are those on the extremes with the altitude "outside" of the triangle.*