

Geometers Sketchpad Lesson
The Circumcenter of a Triangle

Technology Education Lab
TLAB

I. **Lesson: Construction of the Circumcenter of a Triangle**

II. **Duration: 1 Period**

III. **Goal:**

Geometric constructions are essential in the production of Technical Drawings which are precise, abstract representations of things. This lesson is part of a set of lessons in which students involved in a CAD based Technical Drawing course, would use both CAD and GSP skills to produce and revise mathematical concepts when producing geometrical constructions. The CAD base drawings are real world applications of the geometrical concepts learned.

IV. **Objectives:**

- a. To define and review the following terms: circumcenter, bisector, circumscribed
- b. To plot the necessary points to draw the circumcenter of a triangle using GSP
- c. To plot the necessary points to draw the perpendicular bisectors of the sides of the triangle using GSP
- d. Transfer these new concepts into a CAD drawing, given the specific dimensions to a triangle.

V. **NYS Standards Connection**

Engineering Design: Students will use *mathematical* analysis, *scientific* inquiry, and *engineering design*, as appropriate, to pose questions, seek answers and develop solutions.

Key Idea: Computers, as tools for design, modeling, information processing, communication, and system control, have greatly increased human productivity and knowledge.

Key Idea: Information technology is used to retrieve, process, and communicate information and as a tool to enhance learning.

Mathematics: Students will understand mathematics and become mathematically confident by *communicating* and reasoning mathematically, *by applying mathematics in real-world settings*, and by solving problems through the integrated study of number systems, *geometry*, algebra, data analysis, probability, and trigonometry.

Key Idea: Students use mathematical modeling/multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships

VI. Constructivistic Approach

a. Engaging Process – Identifying the Problem

Students are presented with the necessary tools to be able to produce drawings using both, GSP and CAD.

b. Exploration - Setting goals and identifying the criteria

At this stage the students define and identify key terms to produce the geometric constructions. (Worksheet #1)

c. Explanations

Students produce sketches of the possible solution to the geometric construction. They may use compass and color pencils to communicate their thoughts.

d. Elaboration

Students would produce their geometric construction using GSP.

e. Evaluation – The Product

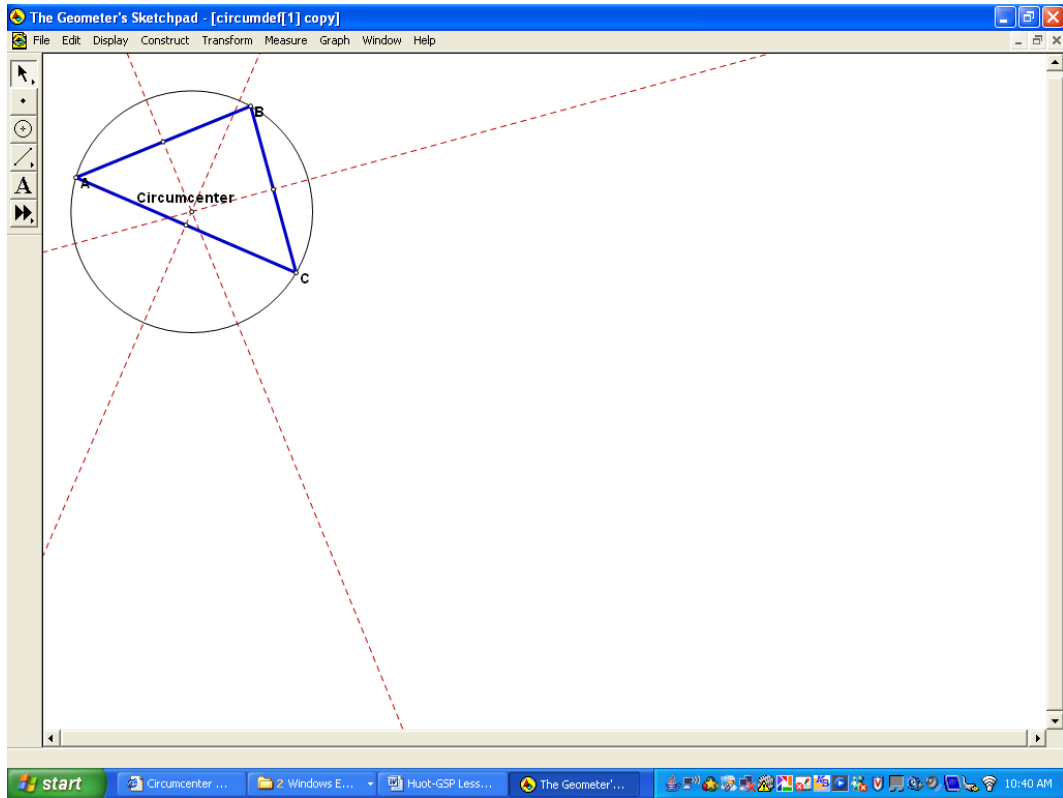
Assesses students' knowledge or skills, and allows students to assess their own learning.

Students would hand in two drawings (under all the constraints and imitations imposed by a CAD based technical drawing) of the geometric construction.

VII. Materials

GSP program
CAD program
Compass
Color pencils
Paper

The Model



Worksheet # 1

Circumcenter:

Perpendicular bisector:

Circumscribed:

Vertices:

Segment:

Extra points if you illustrate each definition.

VII. Rubric

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- 1. Worksheet
Answer all the questions 15 pts
- 2. Sketches
Sketches are complete 15 pts
- 3. GSP Model 30 pts

Category	Score	Description
No Response	0	Work not attempted or the work is incorrect.
Minimal	1-8	Response demonstrates only a minimal understanding of the concept.
Partial	9-16	Response contains evidence of an understanding of the concept.
Satisfactory	17-22	Response demonstrates a clear understanding of the concept.
Excellent	23-30	Response show complete understanding of the concept.

- 4. CAD Model 30 pts
- 5. Class work 10 pts