



The conference **SERBIA** „Visuality & Mathematics – Experimental Education of Mathematics through Visual Arts, Sciences and Playful Activities”

Name of the teacher:	Anica Trickovic
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Theme of the lesson/tool:	Angles
Place in curriculum: (type of school, grade)	5th grade elementary school
Age of the students/pupils:	11 years
Title of the lesson/tool:	Angle-a-trons (angle models made of paper)

Description of the lesson or educational tool			
Time	Exercises, matters, parts of the lesson	Methods and forms of student activities	Developable competencies
15 min	<p>In the introduction of the class, ask students are there any angles in the rectangular piece of paper.</p> <p>What about irregular piece of paper?</p> <p>With one fold we can turn it into 180° angle-a-tron. Every student should make angle-a-tron of 180°. Then, they make 90° angle by folding it on the half, then 45°, then 22.5°, and so on...</p> <p>We can get angle of 60° by</p>	individual work	<p>Making use of aids and tools such as</p> <ul style="list-style-type: none"> • knowing the existence and properties of various tools and aids for mathematical activity, and their range and limitations; • being able to

	<p>folding 180° on three equal parts, then by folding it into half we get angles of 30°, 15° and so on...</p> <p>We can add them together.</p> <p>We can put two angles of 60° together to get 120° angle-a-tron.</p> <p>We can get angle of 135° by addition ($90^\circ + 45^\circ$) or by subtraction ($180^\circ - 45^\circ$).</p> <p>Students check the angles with their protractors after they make the models.</p>		reflectively use such aids and tools
25 min	<p>The students are divided into four groups. Every student draws a picture, using just one ruler and angle-a-trons which they made. If they have time, they can color the drawings. Students can help each other.</p>	<p>Students are divided into four groups :</p> <ul style="list-style-type: none"> • Group 1: Use an angle-a-tron of 90° • Group 2: Use an angle-a-tron of 90° and 45° • Group 3: Use an angle-a-tron of 60° • Group 4: Use an angle-a-tron of 120° 	
5 min	<p>Every group chooses the best drawing which will be displayed on the classroom wall.</p>	exhibition	

Summary

I got inspiration for this class from a video on Khan Academy called "[Angle-a-trons](#)". I remembered when I was a student that my teacher showed us how to make angle-a-trons. We usually don't carry around a protractor, so this can be useful to the students because they can make their own angle models. In the same time, students can see the size of the most used angles 180° , 90° , 45° , 22.5° ; ..., 60° , 30° , 15° , ...

I think that they will especially like the drawing activity using rulers and angle-a-trons

made of paper.

Supplements

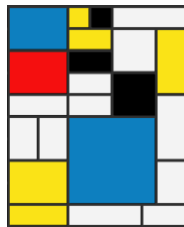
Used materials:

For this class we need several papers for every student (for making angle-a-trons), markers, protractor for measuring angles, rulers, paper A4 for drawing, crayons for coloring the pictures.

Photos:

Tasks for group work:

Group 1:



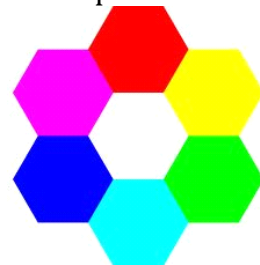
Group 2:



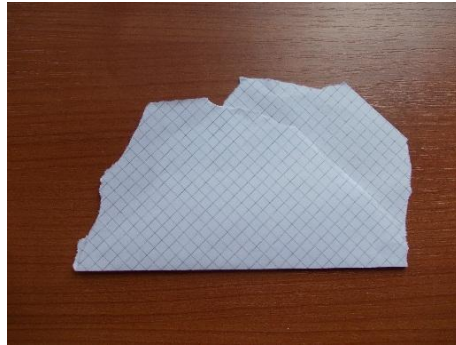
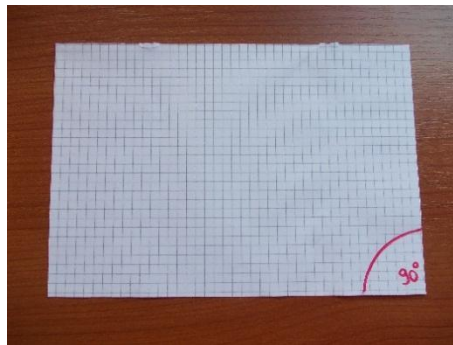
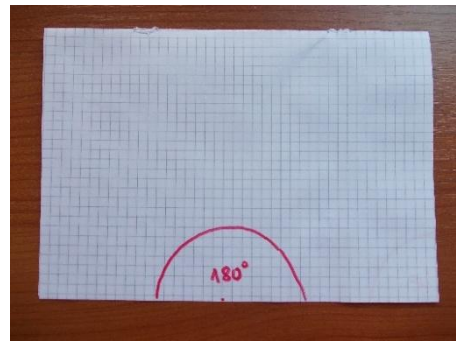
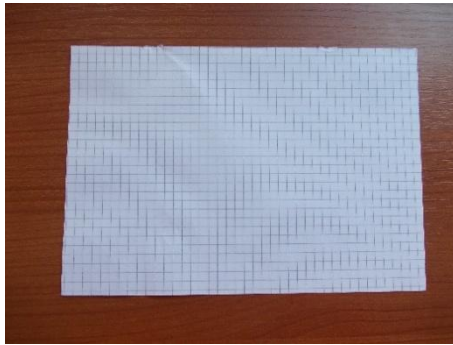
Group 3:



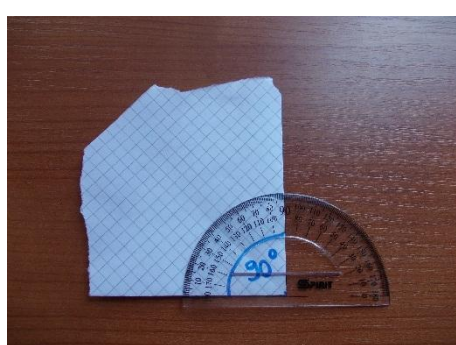
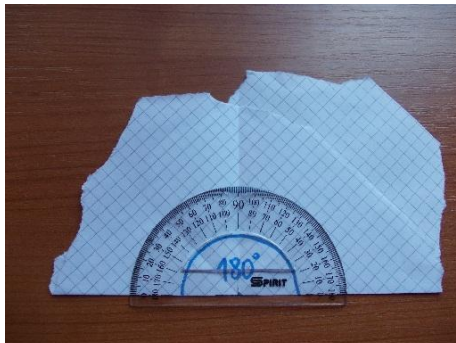
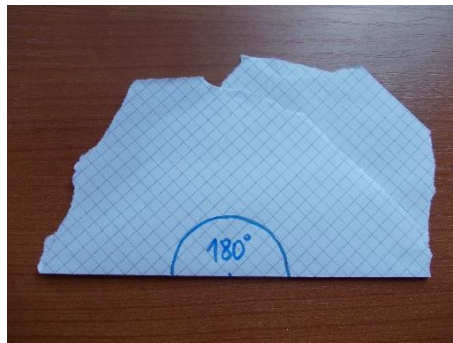
Group 4:

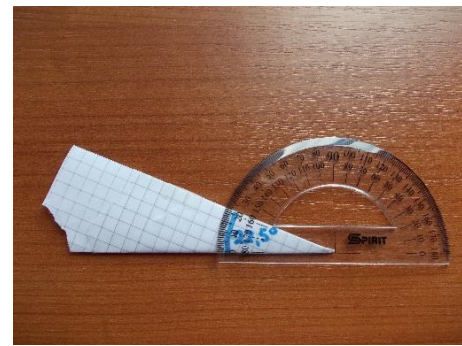
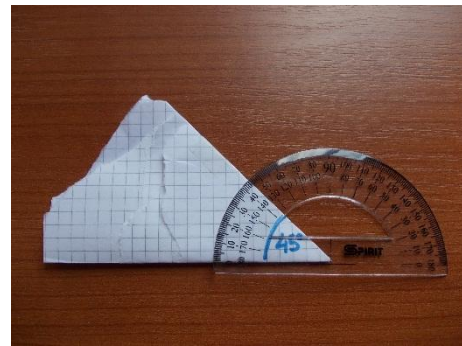
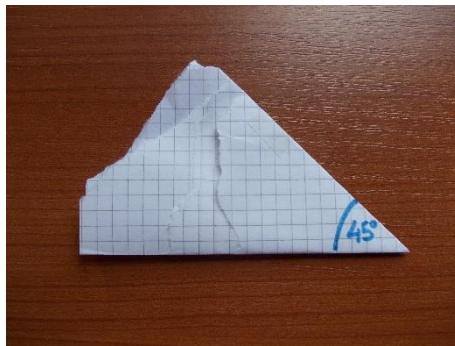


Pictures of the angle-a-trons:

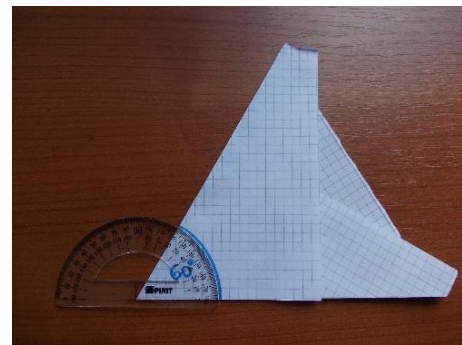
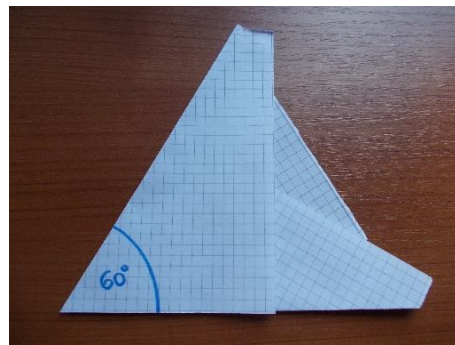
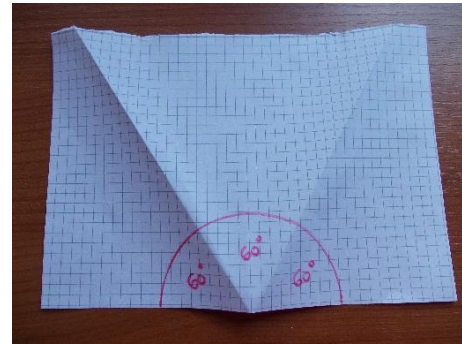
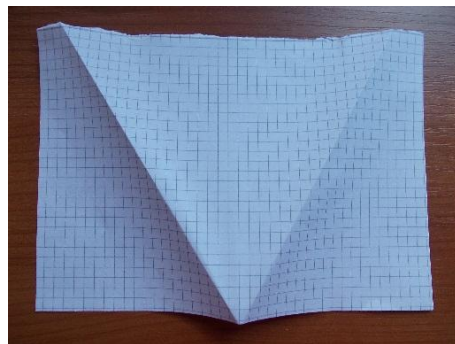


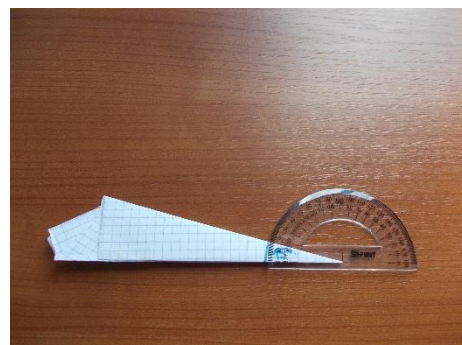
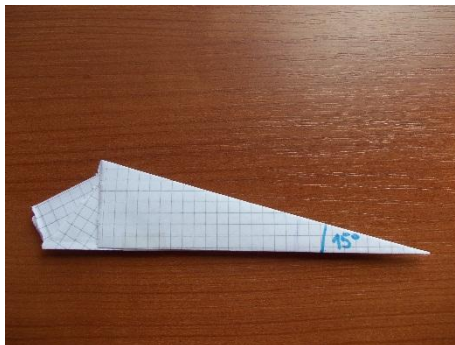
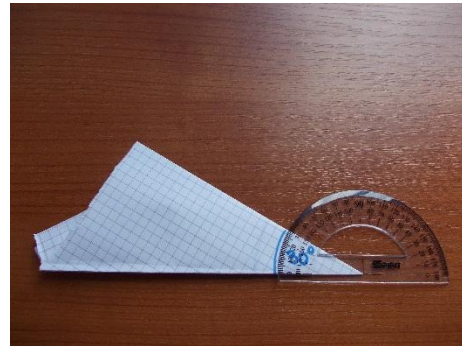
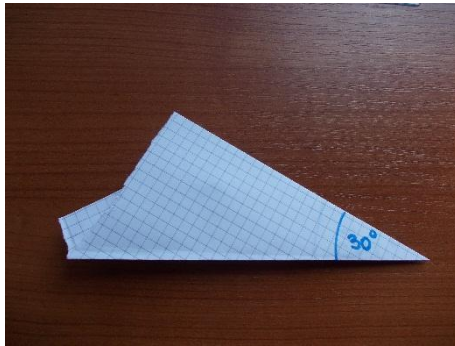
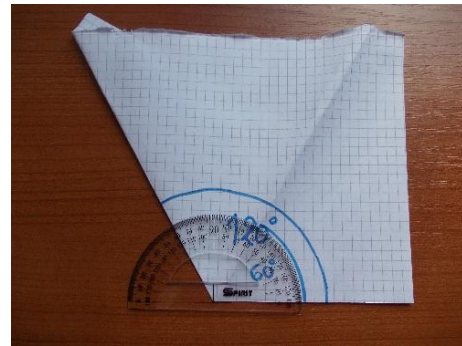
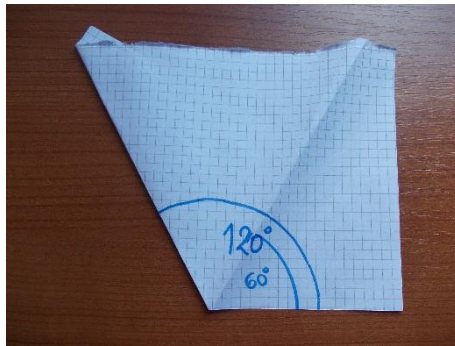
Angles 180° , 90° , 45° , 22.5°





Angles 60° , 120° , 30° , 15°





Angle 135°

