| | |
|---|---|
| Mokytojo vardas, pavardė | Viktorija Šamrina |
| Kvalifikacinė kategorija | Vyr.mokytoja |
| Klasė, kurioje vyks pamoka | 10 mt |
| Mokinių skaičius | |
| Spec. poreikių mokinių skaičius | |
| Pamokos tema | Skritulio išpjovos ir nuopjovos ploto skaičiavimas. |
| Pamokos uždavinys | Atlikti skritulio išpjovos, nuopjovos ploto ir lanko ilgio apskaičiavimus naudojant picą. |
| Diferencijavimas ir individualizavimas | Kiekvienas mokinys nagrinės asmeninį picos gabaliuką ir naudojantis savo matavimais atliks individualius skaičiavimus. |

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# SCIENTIX LESSON PLAN

## Title

The measurement and calculation of circle sector's, segment's area and perimeter using pre-ordered pizza.

## Author(s)

Viktorija Šamrina

## Abstract

This lesson is devoted to apply formulas of circle segment's, sector's area, perimeter measurement and calculation using pre-ordered pizzas.

## Keywords

*Mathematics, Economics, lesson plan, drill and practice, curriculum implementation.*

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## Summary table

| | |
|---|---|
| *Subject* | *Mathematics and Economics* |
| *Topic(s) within the subject* | *The circle sector and segment areas measurement and calculation.*<br>*My own budget.* |
| *Key real-life topic* | *Food waste and circle geometry* |
| *Age of students* | 15-17 |
| *Preparation time* | 1 lesson: 1.5 hour<br>2 lesson: 2 hours |
| *Teaching time* | 1 lesson: 45 min<br>2 lesson: 45 min |
| *Online teaching material* | *GooglePlay; AppStore;(for proctator and ruler apps), local pizzas online shop addresses.* |
| *Offline teaching material* | *Textbook, ruler, Cell phone, proctator, formula sheet, answers card, calculator, pizza.* |

## Integration into the curriculum

The measurement and calculation of circle sector's, segment's area and perimeter is a part of Lithuanian national curriculum of Mathematics. My own budget and percentage calculation is a part of Lithuanian national curriculum of Economics.

## Aim of the lesson

*By the end of the 1st lesson students should be able to choose economically optimal pizzas delivery and successfully repeat formulas of circle sector's, segment's area, perimeter and percentage counting.*

*By the end of 2nd lesson students should be able to use formulas of circle sector's, segment's area, perimeter in real world practice situations.*

## Outcome of the lesson

After these lessons, students will be able to critically consider their online purchase, find the necessary tools online, and apply mathematical formulas to solve a real world problem.

## Trends

STEM Learning: Increased focus on Science, Technology, Engineering, Mathematics subjects in the curriculum.

## 21st century skills

This lesson plan helps teacher to increase student's 21st century skills as critical thinking – they should understand, how to do measurements of real world subject, make conclusions of their calculations, count the sum of the pre-order, collaboration – they must collegially decide which online pizza delivery would be optimally for their needs, choose, who will be responsible for money and payments.

## Activities

*Describe here in detail all the activities during the lesson and the time they require. Remember, that your lesson plan needs to correspond to real-world problems in STEM education.*

| Name of activity | Procedure | Time |
|---|---|---|
| | Lesson 1 | |
| **Real world problems in STEM education** | Students are facing the problem of waste: if we don't eat the crust of the pizza, we throw our money in trash. The pizza is circle, the crust of each sector is the area of it's segment. Calculating area of segment we could calculate the waste percentage. | 10 min |
| **Compilation of formulas** | Students should make their own formula list to make sure they be able to calculate the circle segment's, sector's area and perimeter. | 15 min |
| **Group discussion** | Student are expected to discuss what online pizza delivery shop to choose, what pizza they would prefer to order individually in groups of 4. Students also need to choose the responsible for money person, who will keep all the finances and make the order. | 10 min |
| **Apps research** | Students are introducing the Mathematical Apps, which will be necessary for measurements. Students should download the App, which is fitting their cell phone and make sure, they understand the App operating principle. | 10 min |
| | Lesson 2 | |
| **Organizing lesson resources** | The student responsible for money should organize pizza delivery by the beginning of the lesson 2. Students need to sort their pizzas and receive the answers card from teacher. | 5 min |
| **Measurements** | Students are using their Cell phones with added Apps or proctators and rulers to measure elements of circle. | 10 min |
| **Calculations** | Students need to fill the answer card with calculation results, using their formula lists, or if the student is with special needs, teacher can leave the formulas in answer list. | 20 min |
| **Feedback** | Students have time to leave feedback for this lesson | 5 min |
| **Eating pizza** | Students can eat their pizza. | 5 min |

## Assessment

*Assessment of student's work is included in 2nd lesson answers card. Tasks Nr.1, 2, 3, 9, 10 are worth for 1 point, tasks Nr. 4, 5, 6, 7, 8, 11 are worth for 2 points and tasks Nr. 12, 13 are worth for 3 points, then teacher counts total score and divide it by 23. This is the conversion in 10 points system.*

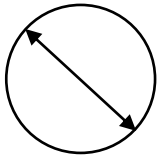
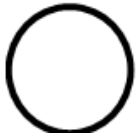
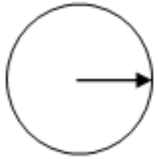
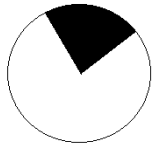
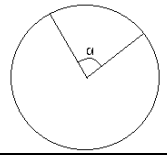
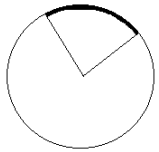
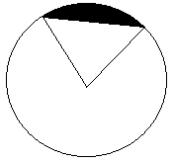
## Student feedback

*Student's feedback is included in 2nd lesson answers card, where they need to answer 3 questions:*

| |
|---|
| 1. Did you like this activity? |
| 2. What part of this activity would be useful for you in real life? |
| 3. What part of the lesson would you change? |

## About Scientix

Scientix, the community for Science education in Europe, promotes and supports a Europe-wide collaboration among STEM (Science, Technology, Engineering and Mathematics) teachers, education researchers, policymakers and other STEM education professionals. If you need more information, check the Scientix portal, or contact either the Scientix National Contact Point or Scientix Ambassadors in your country.

| Student: | | | | | Teacher: | | |
|---|---|---|---|---|---|---|---|
| Element of measure or calculation | Picture | Result | Points(only for teacher) | Element of measure or calculation | Picture | Result | Points(only for teacher) |
| **1.The diameter of pizza** |  | d = | | **5.The pizza perimeter** |  | C = | |
| **2.The ray of pizza** |  | r = | | **6.Area of sector** |  | $S_{sector}$= | |
| **3.The central angle** |   | α = | | **7.Perimeter of sector** |  | $C_{sector}$= | |
| **4.The pizza area** |  | S = | | **8.Area of segment** |  | $S_{segment}$= | |
| **Calculations of waste:** | | | | | | | |
| **9. Pizza price** | A = | | | **12. Waste calculation** | $W = \frac{A \cdot S_{crust}}{S} =$ | | |
| **10. Number of segments** | N = | | | | | | |
| **11. Area of pizza's crust** | $S_{crust} = S_{segment} \cdot N =$ | | | **13. Percentage of waste** | $X\% = \frac{W \cdot 100\%}{A} =$ | | |

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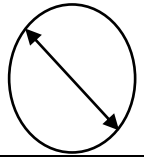
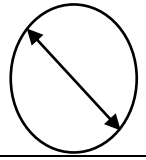
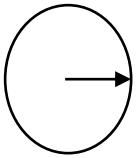
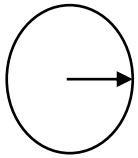
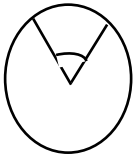
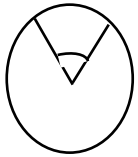
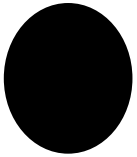
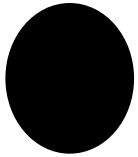
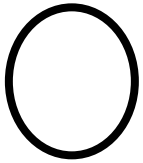
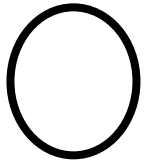
| Students feedback: | |
|---|---|
| 1. Did you like this activity? | |
| 2. What part of this activity would be useful for you in real life? | |
| 3. What part of the lesson would you change? | |
| **Total score:** | |

| Atlikite reikalingus matavimus liniuote ir matlankiu | | | Atlikite reikalingus matavimus liniuote ir matlankiu | | |
|---|---|---|---|---|---|
| Picos skersmuo |  | d = | Picos skersmuo |  | d = |
| Picos spindulys |  | r = | Picos spindulys |  | r = |
| Vieno iš gabaliukų išpjovos centrinis kampas |  | α = | Vieno iš gabaliukų išpjovos centrinis kampas |  | α = |
| Visos picos plotas |  | S = | Visos picos plotas |  | S = |
| Visos picos apskritimo ilgis |  | C = | Visos picos apskritimo ilgis |  | C = |
| Vieno gabaliuko plotas (išpjovos plotas) |  | $S_{išpjovos}$ | Vieno gabaliuko plotas (išpjovos plotas) |  | $S_{išpjovos}$ |
| Vieno gabaliuko lanko ilgis (išpjovos lanko ilgis) |  | $C_{išpjovos}$ | Vieno gabaliuko lanko ilgis (išpjovos lanko ilgis) |  | $C_{išpjovos}$ |