


Fermi problems

Name of the object and creator	Fermi problems Natalija Jurlina, math teacher at Lovre pl.Matačića Elementary school				
Recommended ages	10-12				
Thematic areas combined (STEAM)	Sciences	Technology	Engineering	Arts	Mathematics
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Materials needed	<ul style="list-style-type: none"> • coins of various sizes • paper template • a pen for each student • a ruler • calculator • a sliding scale 				
Outline of the steps	<ol style="list-style-type: none"> 1. Introduce Enrico Fermi and his work to students. Solving mathematical problems for which we will never know the exact solution 2. Students stack the coins and measure the height 3. Students solve the problem computationally 3. Students compare solutions 				
References	(1) https://www.nobelprize.org/prizes/physics/1938/fermi/biographical/				

STEP BY STEP: How to solve the Fermi problem

Step 1: Measurement (one coin)

Estimated time: 5 min

Take a coin and measure its thickness.



Step 2: Measurement (more coins)

Estimated time: 5 min

Stack more coins and measure the height.



Step 3: 1st calculating

Estimated time: 10

Find information about the height of the Zagreb Cathedral after the earthquake in Zagreb 2020. Calculate the number and value of coins needed to make the stacked coins reach the size of the Cathedral.

$$105 \text{ m} = 105\,000 \text{ mm}$$

$$105\,000 : 2 = 52\,500$$

$$52\,500 \cdot 0.2 = 10\,500 \text{ €}$$



Step 4: 2nd calculating

Estimated time: 10

Find information about the height of St. Bavo's Cathedral in Belgium. Calculate the number and value of coins needed to make the stacked coins reach the size of the Cathedral.

$$89 \text{ m} = 89\,000 \text{ mm}$$

$$89\,000 : 2 = 44\,500$$

$$44\,500 \cdot 0.2 = 8\,900 \text{ €}$$



Step 5: 3rd calculating

Estimated time: 10

Find information about the height of the temple of Saint Alexander Nevsky in Bulgaria. Calculate the number and value of coins needed to make the stacked coins reach the size of the temple.

$$53 \text{ m} = 53\,000 \text{ mm}$$

$$53\,000 : 2 = 26\,500$$

$$26\,500 \cdot 0.2 = 5\,300 \text{ €}$$

 Step 6: 4th calculating

Estimated time: 15

Estimate the number and value of coins needed to reach the height of a building of your choice in your city.

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