



Lesson Plan

SOLAR SYSTEM



Subject: Science, Mathematics

Grade: 4th – 6th grade.

Lesson duration: 120 min

Lesson topic: Solar system planet distances and size

Message: There are 8 planets in the solar system, they are celestial bodies of different sizes that orbit the Sun and are at different distances from the Sun. The scale shows the relationship between two quantities – the distance on the map and the distance in nature.

Objective: Make an outdoor model of the solar system, which shows the distances of the planets from the Sun, using a scale of 1 cm = 10 million km, and to develop cooperation skills.

Materials Needed: asphalt chalk, tape measure (5 meters), calculator, string for creating planets (replacing a compass)

Skills: cooperation skills, spatial thinking, application of mathematical calculations in life, information search and analysis.

Planned activities:

- Research about the Solar System – in digital information sources, 4th grade textbook, encyclopedias and other visual materials.
- Planet preparation – calculate the size of the planet in centimeters and record it in a table.
- Scale calculation – calculate what the sizes of the Sun and planets will be in an outdoor model, taking into account the scale of 1 cm = 10 million km, at what distances the planets will be from the Sun.
- Create an interactive model in the schoolyard and compare the distances of the planets from the Sun.

Expected outcome: Working in a group and made a model of the Solar System according to a certain scale. Compare the sizes of the planets of the Solar System – Mercury, Venus, Mars, Jupiter, Saturn, Uranus, Neptune and the distance from the Earth.



	Lesson Flow – Specific Activities and Tasks
Introduction	<p>Let's watch the educational video: https://www.youtube.com/watch?v=MK5E_7hOi-k</p> <p>The Solar System and the location of the planets in our galaxy. Students are asked the question: If you were an astronaut, which planet would you like to travel to and why?</p>
Review of Prior Knowledge	<ol style="list-style-type: none"> 1. Create a mind map that shows everything students remember about the planets from primary school. Use worksheet "Planets In Our Solar System" and write planets. 2. The teacher explains that Earth is not too close to the Sun so it doesn't burn, and not too far so it doesn't freeze. 3. Students add to their mind map with information about the Solar System from various sources (textbook, encyclopedias, internet).
Comprehension	<ol style="list-style-type: none"> 1. The teacher asks the question: What is needed to answer the question: How far are the planets from the Sun? 2. Students create a mind map (idea web) about how this could be determined – what needs to be done to find out the approximate distances from the Sun. They generate ideas on how to create a Solar System model outdoors. 3. Students are divided into groups. 4. They get acquainted with the collaboration SLA (rules) and role distribution. Use SLA worksheet: Role Distribution for Group Work. 5. The teacher assigns each group one planet that they will have to draw in the outdoor model. Draw one planet card to find out which planet the group is writing about. 6. Each group searches for information about their assigned planet and prepares a presentation – including interesting facts, size, color and composition of the planet.
Creating a Prototype	<p>Each group:</p> <ol style="list-style-type: none"> 1. Makes a drawing (model plan) on a sheet – showing where each planet will be located and the position of the group's planet in relation to the Sun (how far it is). 2. Creates a table summarizing information about all the planets in the Solar System. 3. Records and converts the planets' diameters into centimeters (1 mm = 1000 km). 4. Records and converts the planets' distance from the Sun (1 cm = 10 million km). 5. Thinks about the visual design of their group's planet. <p>Convert and record all measurements in centimeters so that on the asphalt, the distances of each planet relative to the Sun are accurate.</p> <p>Use worksheet "Solar System Model Scale Calculation" to calculate the dimensions.</p>
Creating the model – Solar system	<ol style="list-style-type: none"> 1. Using scale and measuring tape, students mark distances between the planets on the asphalt with chalk – each group creates their own planet, measuring its position relative to the Sun. 2. Draw the planets in their respective sizes (cm) – use chalk and draw circular lines with string. 3. Students discuss how accurate the drawing is and make corrections if necessary. 4. Students color the planets according to their actual colors.
Reflection	<ol style="list-style-type: none"> 1. What went well when working with the group? 2. What was difficult? 3. What can we do differently next time to improve collaboration? <p>Write the results on the board and agree together on the "3 golden rules" for the next activity.</p>



Worksheet: Solar System Model Scale Calculation

Name _____

Solar System Model Scale Calculation


Planet	Distance from the Sun (million km)	Scale on outdoor plane 1:1,000,000	Scale on worksheet 1:100 000000
Merkury	58		
Venus	108		
Earth	150		
Mars	228		
Jupiter	778		
Saturn	1427		
Uranus	2871		
Neptune	4498		

Formula (on outdoor plane) = planet's distance from the Sun \div 10

Formula (on worksheet) = planet's distance from the Sun \div 100 (round the result)




Planet cards




Mercury

Distance to the Sun	: 57,9 milj. km
Average Temperature	: 430°C
Diameter	: 4.880 km
Flight Around the Sun	: 88 days
Rotation on its Axis	: 59 days




Venus

Distance to the Sun	: 108,2 milj. km
Average Temperature	: 480°C
Diameter	: 12 104 km
Flight Around the Sun	: 255 days
Rotation on its Axis	: 243 days



Jupiter

Distance to the Sun	: 778,3 milj. km
Average Temperature	: -130°C
Diameter	: 142.800 km
Flight Around the Sun	: 11 years 314 days
Rotation on its Axis	: 9,9 hours



Saturn

Distance to the Sun	: 1.427 milj. km
Average Temperature	: -185°C
Diameter	: 116 460 km
Flight Around the Sun	: 29 years 167 days
Rotation on its Axis	: 10,7 hours





Earth

Distance to the Sun : 149,6 milj. km
Average Temperature : 15°C
Diameter : 12.756 km
Flight Around the Sun : 365 days 6 hours
Rotation on its Axis : 23 hours 56 min



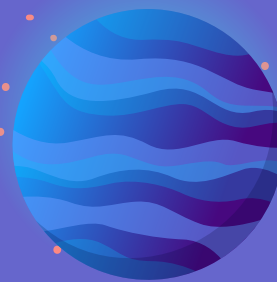
Mars

Distance to the Sun : 227,9 milj. km
Average Temperature : -50°C
Diameter : 6.787 km
Flight Around the Sun : 687 days
Rotation on its Axis : 24 hours 37 min



Uranus

Distance to the Sun : 2.870 milj. km
Average Temperature : -200°C
Diameter : 50 724 km
Flight Around the Sun : 84 years
Rotation on its Axis : 17,2 hours

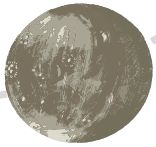
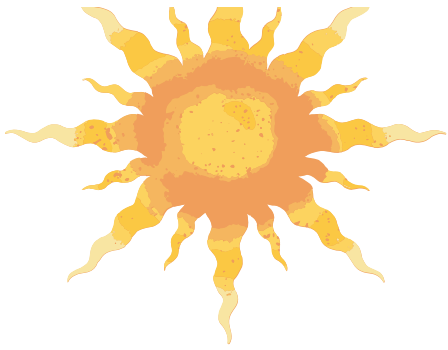


Neptune

Distance to the Sun : 4.497 milj. km
Average Temperature : -214°C
Diameter : 49 100 km
Flight Around the Sun : 165 years
Rotation on its Axis : 16,1 hours



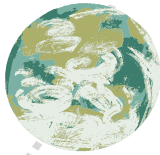
Worksheet "Planets In Our Solar System"



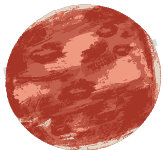
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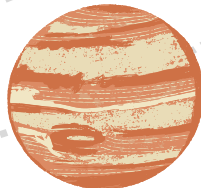
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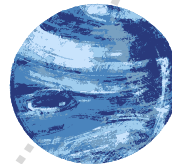
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5



6



7



8

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____
- 6 _____
- 7 _____
- 8 _____

SLA worksheet

Role Distribution for Group Work

Role	Responsibility	Name
Calculator / Computation Specialist	Performs calculations, checks the accuracy of results, and helps the group justify solutions.	
Timekeeper	Plans the work pace, monitors time, and helps the group meet deadlines.	
Artist / Visualizer	Responsible for the visual presentation of the work, including diagrams, illustrations, and overall clarity.	
Measurer	Takes measurements, checks data accuracy, and records results.	

