



# TanglIn

**Tangible Programming & Inclusion**

## TanglIn Toolbox Planets in the Solar system

6-12 years old

Astronomy

Science



[www.tangin.eu](http://www.tangin.eu)

 /tanginproject



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## Summary

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Learn that in Solar system planets are displaced in a specific order.

Expected duration: **50 min** (the lesson plan duration is flexible, and teachers can adapt them accordingly to their needs and class duration).

## Learning Outcomes

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At the end of the session, students are expected to:

- Better recognize the names of the planets of the solar system;
- Know the order of the planets:
- Understand mathematical expressions:
- Value STEM areas;
- Develop transversal competencies such as problem-solving, communication and reasoning;
- Develop group work skills, namely, to respect and favor the inclusion of all elements, regardless of gender, culture, etc.

## Links With Curriculum Topics

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Covered Curriculum Topics	
Subject	Topics
<b>Engineering</b>	<b>Science</b> Natural sciences <ul style="list-style-type: none"> <li>• Solar System - Planets names and their relative position</li> </ul>
	<b>Mathematics</b> Geometry <ul style="list-style-type: none"> <li>• Localization and orientation – itineraries</li> </ul>
	<b>Technology</b> Programming <ul style="list-style-type: none"> <li>• Concepts of programming</li> <li>• Programs – Results, errors, and troubleshooting</li> </ul> Robotics <ul style="list-style-type: none"> <li>• Programming objects to solve challenges</li> </ul>



## Notes for Teachers

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The teacher should prepare, in advance, all the materials that are needed and the classroom space according to the activities to be developed.






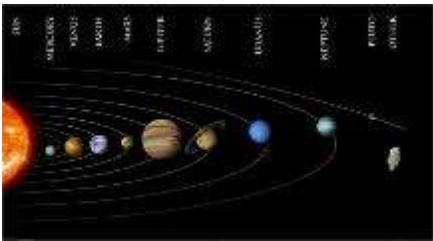
The teams should be as heterogeneous as possible to foster the integration of all students. It's important that clear rules are established in terms of group work. This way, it avoids the most active children assuming the lead and the quitter ones only observing.

To discuss the concept of planets and stars, the solar system and its order (relative position of planets in relation to the sun). The teacher can use several internet resources available - images, videos, etc.






The teacher must circulate through the various groups to support the activities and the dynamics of each one. In the end, it should promote a collective discussion of the main issues focused and the constraints and difficulties experienced.

## Lesson Plan






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Intro	10'	Class	<p>Today's mission is to teach MI-GO that Planets in the Solar system are displaced in particular order against The Sun.</p> <p>Explain to class that there are 8 planets in Solar system, which are rotating around the Sun. They are displaced in particular order and on particular distance from each other</p>	



				
Prep.	30'	Group	<p>Divide the class in groups and every group in two teams.</p> <p>Every team gets the grid and cards of mathematical expressions, and cards by which teams can mark planets they have been on. (4 cards of one colour and 4 cards of another colour, so that every team have its own colour cards.)</p> <p>On one side of the cards there are the mathematical expressions, but on the other side there is a number from 1 to 8, depending on planets displacement order. Every group have one set of these cards.</p> <p>Teams must choose their four cards</p>	
Play	30'	Group	<p>Teams decide, which one will start first. The team starting, takes the mathematical expression which is marked with number 1. Figuring out the expression result and goes to the corresponding planet. (which number corresponds to expressions result.), starting from the sun. To do so, they will need to programme the bot.</p> <p>The teams must programme the robot to reach the correct planet in as less moves as possible, considering that the robot cannot cross a square on which another planet is on (each move corresponds to one point).</p> <p>Note: for each card and play, teams start always from the sun.</p> <p>If successful the team gives the floor to the other team to play their card, until each team reaches its 4 planets.</p>	



				
Play	30'	Group	<p>When each team has reached the 4 planets, they can start over but the team that has started second, will now play first.</p> <p>When planets are traveled for the second time, then teams need to count the total number of moves used both times each one, to conclude which team has made the robot travelling in less moves to get to every planet.</p>	
Sharing	10'	Class	<p>At the end, all groups are sharing their experience and review the planets order together. You can introduce the concept of distance as well.</p>	

## Resources List & Support Material

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### Per each group:

- A robot Kit with drawing capabilities;
- Transparent scenario with a 6x6 grid.
- Cards of mathematical expressions (Annex)
- Results registry papers (Annex)
- Cards with planets and their names (Annex)
- Numbered field
- Cards to register moves made (Annex)



MERCURY



VENUS



EARTH



MARS



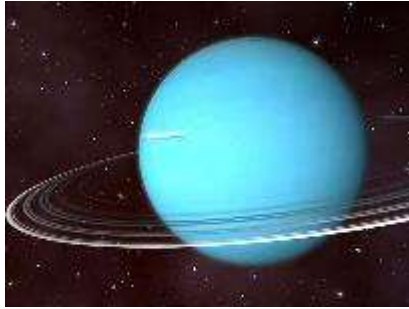
JUPITER



SATURN



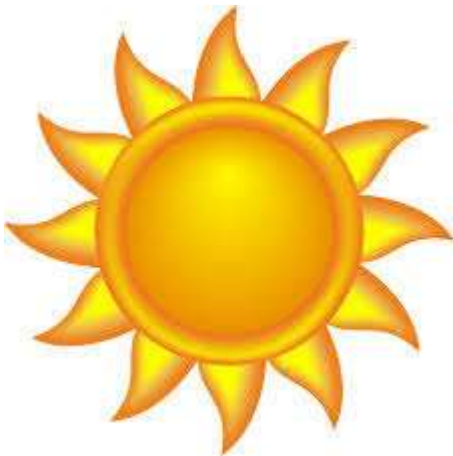
URANUS



NEPTUNE



SUN



1.  
 **$18 - 2 * 8$**

2.  
 **$(12 + 14) : 2$**

3.  
 **$100 - 9 * 10$**

4.  
 **$37 - (14 + 6 * 3)$**

5.  
 **$62 - (18 + 9 * 2)$**

6.  
 **$100 : 2 - 29$**

7.  
 **$(34 + 4) : 2$**

8.  
 **$100 : 2 - 18$**



Registry page.

Page for team making first move.

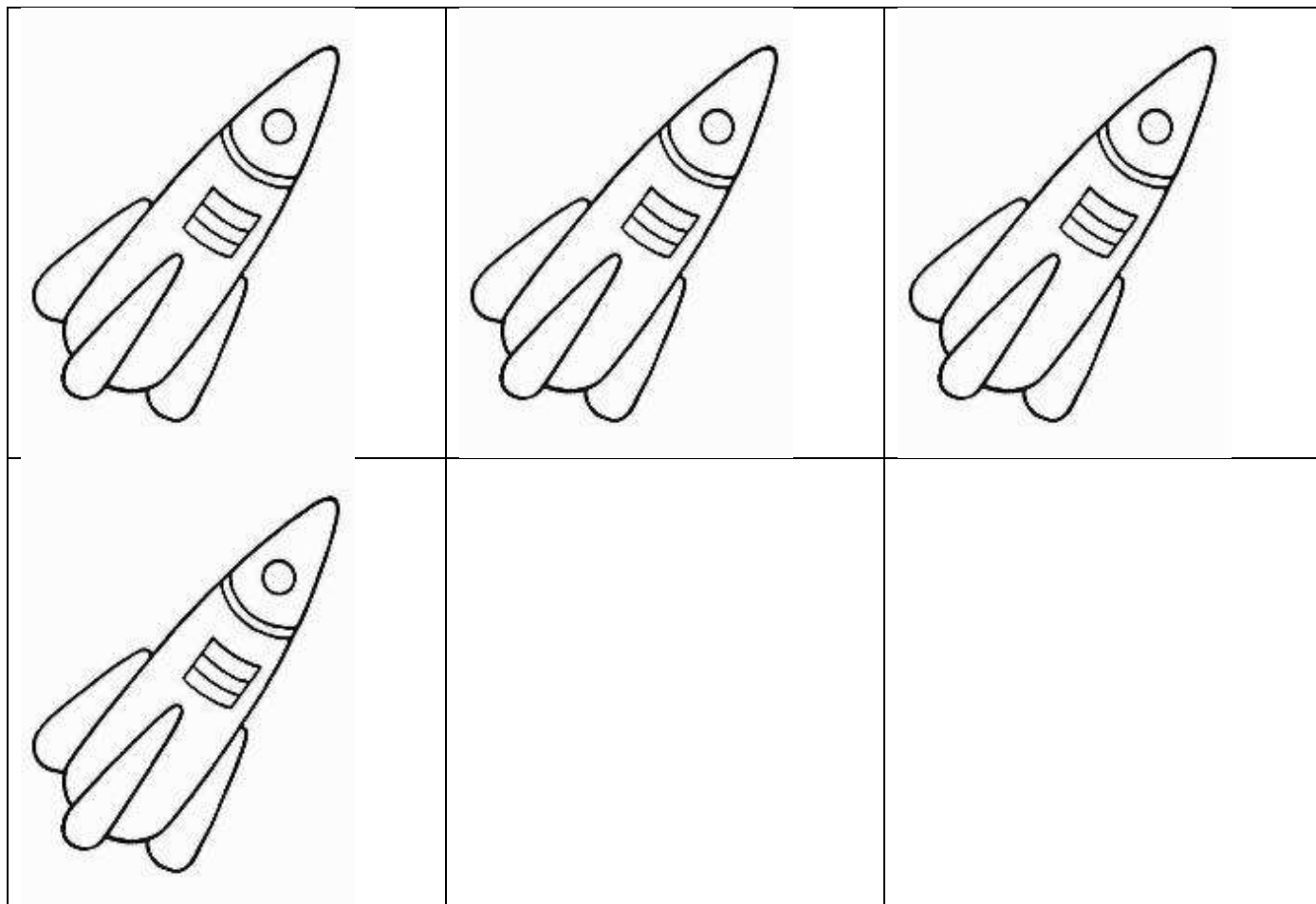
<b>Move name</b>	<b>Count of moves made</b>
Sun – Mercury	
Sun – Earth	
Sun - Jupiter	
Sun – Uranus	

Page for team making second move

<b>Move name</b>	<b>Count of moves made</b>
Sun – Venus	
Sun – Mars	
Sun – Saturn	
Sun - Neptune	

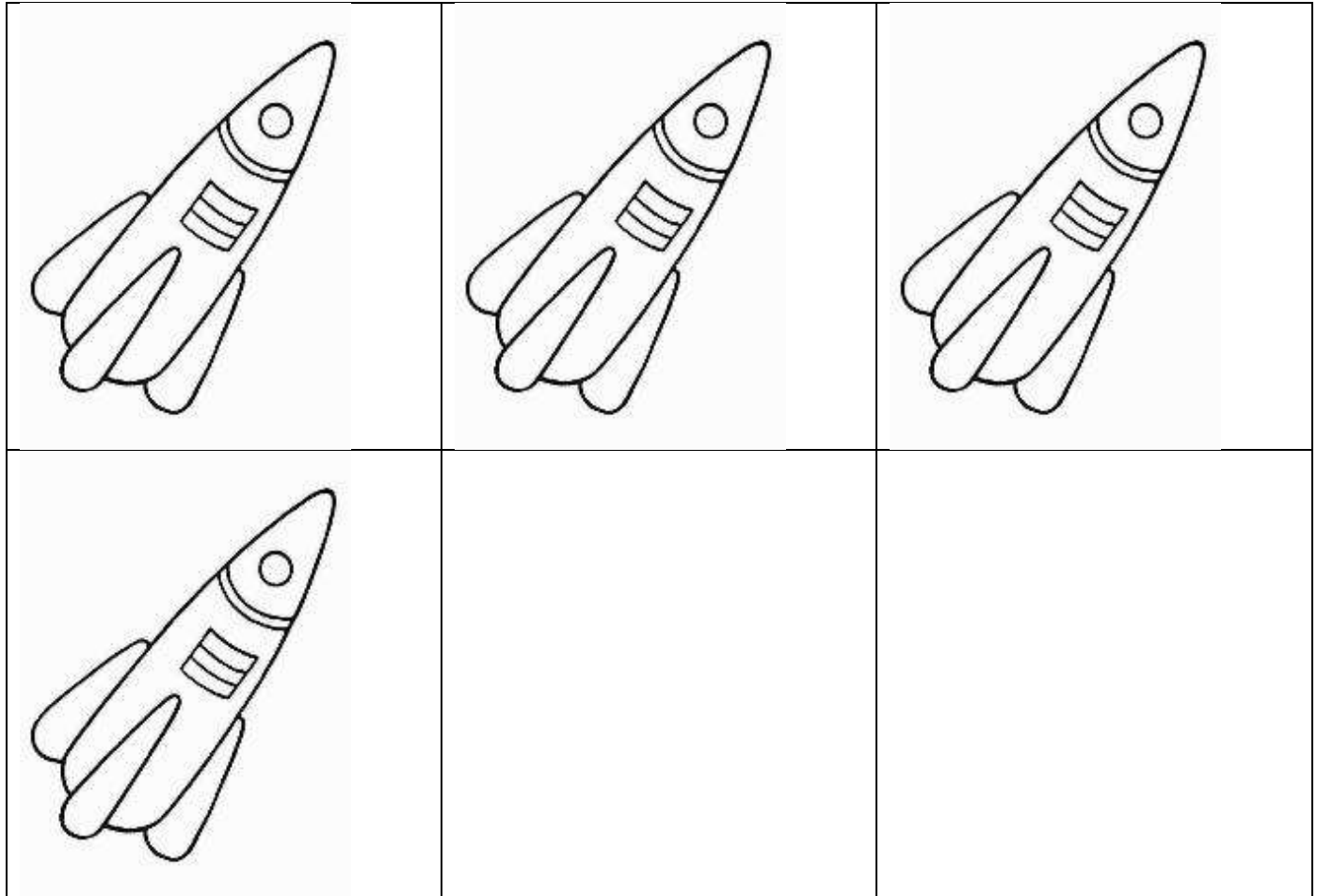
Moves registry page.

For exemple blue color.



Moves registry page.

For exemple red color.



Numbering of grid and planets displacement

6	7	18	19 URANUS	30	31
5 MARS	8	17	20	29	32 NEPTUNE
4	9	16	21 SATURN	28	33
3	10 EARTH	15	22	27	34
2 MERCURY	11	14	23	26 JUPITER	35
1 SUN	12	13 VENUS	24	25	36