STEM & Robotics ERP Mini Set

E20.1 STEM Lessons

The **STEM & Robotics ERP Mini education** set is specially designed for Early Primary school students of ages 7-9. It combines the core subjects of STEM together with Robotics. The set comes in a convenient plastic storage tub that contains a large number of Engino - Qboidz plastic parts along with robotic devices such as controller Mini, DC motor, LED, touch sensor, IR sensor. The extra ENGINO® technical parts allow the construction of 40 complex models that come with theory and experimental activities to cover not only engineering design but also Coding, Mechanics and Science. There are two generations of robotic models doable with this set, simpler ones with the Qboidz parts for the younger children or for the introduction of coding as these feature in E15, and complex ones with the classic ENGINO® parts for more advanced models.

Engino® EDUCATION

7-9

Edition: 10/22

Lesson: Seesaw

Seesaw

Most children playgrounds contain a seesaw. Did you know that this fun and simple game is a perfect example of how a lever works? You can perform the next experiment and find out how a lightweight child can lift a heavier child on the seesaw using the principle of levers!

Discover:

- How does Force generate Moment?
- How can we calculate Moment?

Materials Needed:
- Engino STEM & Robotics Mini.

Procedure:

1. Build the seesaw model.

2. Remove one wheel from one side of the seesaw and observe what happens.

3. Use your finger, on one side only, to restore the balance again. Then move your finger slowly towards the middle, trying different distances from the centre. Can you feel the difference in effort?

4. Leaving only one wheel on the left side of the seesaw, take the remaining wheels from the package and try to find out how many wheels you need to put on the right side in order for the seesaw to balance . On the right, you can see 4 possible cases to try out (**exercise 1**). Balance the seesaw in each one by stacking on wheels connected with pulleys at the positions indicated. The distances from the center for placing the wheels are: 24, 12, 8 and 6 units.

5. Complete **exercises 2, 3 and 4**.

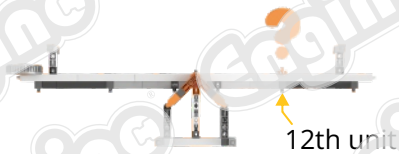
1. Write the number of wheels that are needed to balance the seesaw in each case.

case 1

Wheels needed to balance: ☐

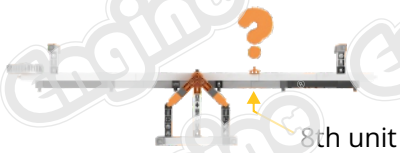
case 2

Wheels needed to balance: ☐

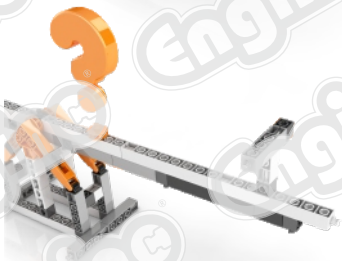


case 3

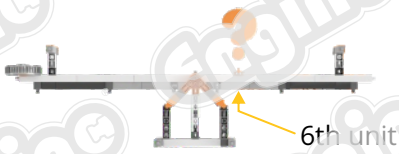
Wheels needed to balance: ☐



case 4



Wheels needed to balance: ☐



2. Let's do some simple math: Multiply the number of wheels with the distance (how many units) from the center, for each side and for each case. What results did you come up with?

case 1 Wheels needed to balance x 24 units = 1 x 24 = 24

case 2 Wheels needed to balance x 12 units = ...

case 3 Wheels needed to balance x 8 units = ...

case 4 Wheels needed to balance x 6 units = ...

3. What conclusion can be extracted from your observations above, about the left and the right side?

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4. With that in mind, how can a lightweight child balance the seesaw when playing with a heavier child?

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