

#4.1 EARTQUAKES AND BUILDING REACTIONS



Age: 8 – 11 **12 – 15** 16- 18

Experience the earthquakes in animations and reactions of buildings in sequence.



Watch Animation 1 and see the earthquake(s) and reactions of buildings.



Watch Animation 2 and see the earthquake(s) and reactions of buildings.



Watch Animation 3 and see the earthquake(s) and reactions of buildings.



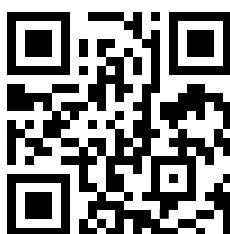
Watch Animation 4 and see the earthquake(s) and reactions of buildings.



To view the Augmented Reality (AR) content associated with this case-study, please download the Zappar App on your mobile device (AppStore/ Google Play) and point it toward this flyer. Enjoy and have fun learning!



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#4.2

HOW DESIGN EARTHQUAKE-RESISTANT BUILDINGS



Age: 8 – 11

12 – 15

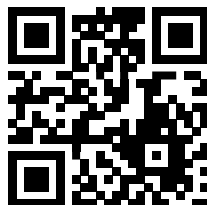
16 – 18

Watch the video carefully and learn how to design earthquake-resistant buildings. You will need to take notes. Grab your paper and pencil.

Click to see the video.



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#4.3 TEST YOUR KNOWLEDGE AND DECIDE!



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It is a challenge! Calculate and select the correct answers.



Column strength is 25 tons. The floor weight is 20 tons. What is the maximum magnitude of the earthquake that this building can resist?



The building at the top (Column strength: 25 tones, floor weight: 30 tones). The building at the bottom (Column strength: 45 tones, floor weight: 30 tones). Which building can resist an earthquake at 8 magnitude?



The floor weight is 20 tons. What must be a column's strength of this building so that this building can resist an earthquake at 10?



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#4.4 DESIGN CHALLENGE



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You're a contractor. That is, you are a person who builds and sells houses. When you build a house, you build and sell houses within the framework of certain legal responsibilities and conditions. You also need to make a profit.

You have a 200 m² plot of land. You will build an apartment building on this land and sell the houses on it. The conditions are as follows when building a house on this land.

Your total budget to build the houses: **1.200.000** EU

3 types of houses can be built to fill this land. You can build houses of 80 m², 100 m² and 120 m². You will build an apartment building with one flat (house) on each floor. The cost and material information you need to consider while building the houses are given in the tables below.

Table 1: Apartment costs and selling price of 1 apartment flat

Apartment	1 Column Cost	1 Floor Cost	Roof Cost	1 Apartment Flat Sale Price
80 m ²	20.000 EU	80.000 EU	40.000 EU	120.000 EU
100 m ²	20.000 EU	100.000 EU	50.000 EU	150.000 EU
120 m ²	20.000 EU	120.000 EU	60.000 EU	180.000 EU

Table 2: Material weight and column strength information to be used in the apartment

Apartment	1 Floor weight	Roof Floor Weight	1 Column Strength
80 m ²	12 Tonnes	6 Tonnes	20 Tones
100 m ²	16 Tonnes	8 tonnes	20 Tones
120 m ²	18 Tonnes	9 Tonnes	20 Tones

The apartment buildings you will build must be resistant to an earthquake of at least **9 NW**.

Under these conditions, calculate the most profitable situation and draw the houses you will design in the SKETCHUP application. Then you will share the house you have drawn and how much profit you will make together with the calculation.

SketchUp Application



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