

**The Tower Exercise**

**Student Brief**

* Working as a team, you are expected to erect a tower, gaining maximum profit by building the tallest structure, with the minimum number of bricks, in the shortest time possible.
* The tower can be of any design, but must be self-standing and stable enough to be measured.
* The activity will consist of two phases –

 The Planning and Design Preparation Phase

 The Construction Phase

* As a team you should elect a Project Manager whose role is to ensure the team remains on schedule and that ALL your team members are involved at EVERY stage.

**The Planning and Design Preparation Phase**

* You should ensure you have the following in your box –

 1 x base

100 x 8 stud bricks

 50 x 6 stud bricks

 40 x 4 stud bricks

 Total = 191 bricks

 **\*** In addition you may be given some flat bricks

All components will be treated equally in terms of cost, including the base)

* Study the Incentive Charts and Profit Scales to decide on the optimum profit targets.
* Use the components to experiment with different designs and to arrive at a final structure.
* At the end of this stage, your Project Manager should submit the completed Contract Document to the session leader. Failure to do so may result in penalties or disqualification.
* At the same time, the team should have dismantled their structure in readiness for the Construction Phase. Failure to be prompt will result in penalties or disqualification.

**The Construction Phase**

* At the start of this phase you will have 5 minutes to lay out your bricks in an appropriate method for your planned construction. **No two bricks must be touching each other.** Construction will start promptly after 5 minutes whether your team is ready or not





* During the construction phase, your team will rebuild their tower to the specifications laid down in the Contract Document. It will be free-standing and stable enough to be measured from the second that the team’s Project Manager asks the session leader to stop the clock.
* Further contact with the structure, by any team member, after this point will result in disqualification.
* On completion, the session leader will take the height measurement and ask an appropriate person to verify the number of bricks used in the construction in order to compare the completed structure with the Contract Document. Penalties will be awarded for inaccuracies.

**Hints**

* Read this brief thoroughly and ensure all the team members fully understand the object of this exercise.
* Try many different designs for your structure. Taking into account the ideas of ALL your team members before you decide on the final structure.
* Keep an eye on the time – you won’t have as long as you think, so work efficiently and try not to incur time penalties.
* This exercise is about working as a TEAM, so listen to EVERYONE, and do not just dismiss ideas without trying them out, always be positive –

 “Don’t knock it ‘till you’ve tried it – because it just might work!”



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**The Tower Exercise**

**Contract Document**

**Construction Company Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Project Manager \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**No. of bricks to be used \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Planned Profit \_\_\_\_\_\_\_\_\_\_\_**

**Height in metres \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Planned Profit \_\_\_\_\_\_\_\_\_\_\_**

**Construction time \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Planned Profit \_\_\_\_\_\_\_\_\_\_\_**

**Overall Profit expected \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Sketch of proposed design**



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**The Tower Exercise**

**Incentive Charts**



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**The Tower Exercise**

**Profit Scales**

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| **Height** |
| **2.0 m** | £35,000 (max profit) |
| **1.9 m**  | £31,500 |
| **1.8 m** | £28,000 |
| **1.7 m** | £24,500 |
| **1.6 m** | £21,000 |
| **1.5 m** | £17,500 |
| **1.4 m** | £14,000 |
| **1.3 m** | £10,500 |
| **1.2 m** | £ 7,000 |
| **1.1 m** | £ 3,500 |
| **1.0 m** | Min. height – no profit |
| **Each cm above 1 m = £350** |

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| **Time** |
| **1 minute** | £30,000 (max profit) |
| **2 minutes** | £22,500 |
| **3 minutes** | £15,000 |
| **4 minutes** | £ 7,500 |
| **5 minutes** | No profit |
| **Each second used over 1 minute reduces maximum profit by £125** |

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| **Materials** |
| **100 bricks (up to)** | £50,000 |
| **110 bricks** | £45,000 |
| **120 bricks** | £40,000 |
| **130 bricks** | £35,000 |
| **140 bricks** | £30,000 |
| **150 bricks** | £25,000 |
| **160 bricks** | £20,000 |
| **170 bricks** | £15,000 |
| **180 bricks** | £10,000 |
| **190 bricks** | £ 5,000 |
| **200 bricks** | No profit |
| **Up to 100 bricks achieves maximum profit, but each brick over 100 reduces profit by £500** |



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**Teachers Brief** (Primary version)

Ensure the students follow the student brief and ensure they stay on task. Where some team members are not getting involved, try to focus them. Avoid wherever possible doing the task for them - you are there to advise them and to help them to think for themselves.

Aspects you should take care to emphasise are :-

1. Team work and co-operation
2. Sharing of ideas and activities
3. Delegation of tasks
4. Keeping on schedule

Prior to the event you might want to spend time with the pupils ensuring they will understand the different vocabulary / terminology that will be used on the day, for example,

1. Tender
2. Profit
3. Design
4. Bonus
5. Prototype

**Tower Exercise**

Ensure they have read the instructions and according to the capabilities of your team members assist them in the mathematical exercise to determine their profits.



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**The Tower Exercise** (Primary Version)

**Pupil Brief**

**You are a construction company who has been asked to bid for the contract to build a new Tower.**

**In your teams you must design and build a Tower that is as tall as possible (minimum height is one metre) and uses as few bricks as possible. You must also be able to rebuild the Tower, to your design, as fast as possible.**

**The aim of the exercise is to make as much profit (money) as possible. The attached graphs and tables show how much money you can make.**

**At the end of the design and preparation stage you must have completed your Contract Document and given it to the Session Leader. Any team who does not submit a Contract Document will be disqualified from the timed reconstruction stage.**

**During the timed reconstruction stage you must reproduce the design from your Contract Document as accurately as possible, penalties will be awarded for mistakes.**

**The winners will be the team that makes the most profit at the end of the exercise**

