**Tilt-Up Geometry - Day 1**

Standards:

[CCSS.MATH.CONTENT.7.G.A.1](http://www.corestandards.org/Math/Content/7/G/A/1/)-3, [CCSS.MATH.CONTENT.7.G.B.4](http://www.corestandards.org/Math/Content/7/G/B/4/)-6

#### Draw construct, and describe geometrical figures and describe the relationships between them.

#### Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Objectives:

Students will create walls on a two-dimensional plot of land in order to raise those walls up and make a complete wall structure for their building.

Introduction:

I will show students pictures of tilt-up construction and share with them the experience I had touring these sites.

Body:

Students are going to build a 10 foot tall warehouse using tilt-up construction with as low of a cost as possible. You will have to rent a crane to tilt your panels into place. Cranes can place up to 4 panels in one day. Cranes come in different sizes based on how large your panels are.

Your construction site:

- 30’ x 30’ footprint

- must have 2-5 panels per side

Cost for the panels:

 -$1500 per day for up to 15’ x 10’ panels

 -$800 per day for up to 10’ x 10’ panels

 -$550 per day for up to 6’ x 10’ panels

Once you have determined the size and number of panels you are going to use, determine the total cost of your build.

Now that you know your panel sizes, you need to construct your panels on-site in a way that they will all fit inside your site footprint. Along the outside of your footprint mark how wide each panel will be and write the number of each panel where it will go. Using grid paper draw and cut out each panel, making sure to label the dimensions of each panel as you go as well as its number. Place these panels inside your footprint so that they are as close as possible to where they need to go.

Assessment: Students are going to construct the panels they need in order to build their warehouse and calculate the total cost of the build.

**Tilt-Up Worksheet - Day 1**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

|  |  |  |  |
| --- | --- | --- | --- |
|  |  |  | You are the construction manager for a 60 foot by 60 foot building. This is the concrete slab for the base of your building. Your building will need to have 10 foot tilt up panels for walls. Use a separate page and the parameters given to place your panels in this place as close to their final location.  |
|  |  |  |
|  |  |  |

Your construction site:

- 60’ x 60’ footprint

- must have 4-10 panels per side

Cost for the crane (a crane can place 4 panels per day):

 Large Crane - $1500 per day for up to 15’ x 10’ panels

 Medium Crane - $800 per day for up to 10’ x 10’ panels

 Small Crane - $550 per day for up to 6’ x 10’ panels

Size of panels for your building \_\_\_\_\_\_\_ x 10’ Number of panels you need \_\_\_\_\_\_\_

Size of crane you need \_\_\_\_\_\_\_\_ Number of days you need the crane \_\_\_\_\_\_\_\_\_\_

Total cost for your crane \_\_\_\_\_\_\_\_

**Tilt-Up Geometry - Day 2**

Standards:

[CCSS.MATH.CONTENT.7.G.B.4](http://www.corestandards.org/Math/Content/7/G/B/4/)-6, CCSS.MATH.CONTENT.7.RPA.3

#### Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.

Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.

Objectives:

Students will use day 1 data to figure out the cost of the Tilt-up. They will determine if it is more cost efficient for the company to build it themselves or to have a subcontractor build it.

Introduction:

I will talk to students about all the pieces that go into building a structure. Then explain to them that a company can subcontract out business if someone else can do it cheaper.

Body:

Students will have to work out the volume of each piece and then determine if it will be cheaper to subcontract the piece out or if it is cheaper to build it themselves.

Pieces: Concrete, Roofing, Cranes, Painting

Concrete: Students will have to figure out how much concrete is in the base and the 4 walls. They then will have to convert that amount from cubic feet to cubic yards.

Roofing: Students will have to figure out the area of the roof and if it will be cheaper for them or the subcontractor to make it.

Cranes: Students will use yesterday’s cost for the cranes or using a subcontractor.

Painting: Students will have to figure out the area of the side panels and then decide if it is cheaper to use a subcontractor.

Assessment: Students will come up with the cheapest option.

**Tilt-Up Worksheet - Day 2**

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Your company is making a Tilt-Up warehouse. Using a 60’ x 60’ base and 10 foot walls, figure out the cheapest cost for your company. Sometimes it will be cheaper for your company to do the task themselves and other times it will be cheaper to hire a subcontractor.

**Company Costs per section**

**Concrete Roofing**

Base Area \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Roof Area \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Side Wall 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Cost $10 per square foot

Side Wall 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Total Cost \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Side Wall 3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Side Wall 4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ **Painting**

Total Concrete Area \_\_\_\_\_\_\_\_\_\_\_\_\_ Side walls area \_\_\_\_\_\_\_\_\_\_\_\_\_

Cost $4 per cubic yard Cost $3 per square foot

Total Cost \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Total Cost \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Cranes**

Total Cost from Page 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Subcontractors**

Mason’s Concrete Pouring - $26,500

Samsong Roofing Incorporated - $32,000

Kapri Roofing and Painting - $38,000

Urban Painting Crew - $8,000

**Best Costs**

When looking at a job, companies like to make money, you will need to find your subtotal and then add 10% profit margin.

Concrete Costs \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Roofing Costs \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Painting Costs \_\_\_\_\_\_\_\_\_\_\_\_\_\_

Crane Costs \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Your Subtotal Costs**  \_\_\_\_\_\_\_\_\_\_\_\_\_\_

10% profit \_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Cost of the Job \_\_\_\_\_\_\_\_\_\_\_\_\_\_**