

# Digital & Print resource

## Key Information Sheet

TEACH  
to  
DREAM

### Teacher Information

Design, Engineer and Build resources have been created to help middle school students engage with STEM/STEAM. Students use their scientific/engineering), technological, mathematical skills to help problem solve and create an end product. They are then able to use their artistic skills to help create a design/ look that will appeal to their targeted audience.

#### Items needed to successfully run each challenge:

The resources used are readily available in most classrooms or can be purchased at a local shop. You can negotiate with your students about additional materials or take one out if you don't have access to it (tell the students the company is currently out of supply ☺)

|           |                        |        |
|-----------|------------------------|--------|
| Tape      | Glue                   | Paper  |
| Cardboard | Popsticks/craft sticks | Straws |
| Cups      | Scissors               | String |

#### Time frame required:

These projects can run for as little or as long as you like depending on your lesson requirements. It generally would take a minimum of 30minutes to complete. You can extend the students thinking and ask them to re evaluate and improve if you have significantly longer time. On the students sheet they are asked to circle the time frame they have been given to complete the task.

On this student sheet it also has a space for the maximum model size. You can set this depending on the size or paper/ cardboard and space you have to display the end products.

#### Restrictions:

To make it more realist the students are required to work within boundaries. They have a set budget of either \$100 or \$1,000 (allowing you to cater for all learning levels). The students can then either keep a tally of their expenses using the table or coupons provided. You may also decide to 'fine' your students for unsafe practices (ie going into another construction zone - another group's work area, not using equipment properly etc).

#### Links to other curriculum areas:

- Geography
- Health (group work/ social skills)
- English

PDF  
and  
Google  
Slides

# Students work to design a model of a new Classroom

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## Design, Engineer & Build!

### CLASSROOM DESIGN

Working with numbers up to 100

**The Scenario:** Your teacher would like to change the layout of the classroom. They have been given a budget to help create a modern and new learning environment.



**The challenge:** To design and create a model of a classroom that you and your fellow students will enjoy working in. It needs to include:

- 25 sitting areas (chairs, couches, cushions etc)
- Tables/ working areas
- Area for electronics (computers etc)
- A quiet zone



What other features could you include?  
How will you make your design stand out?

Your Budget: \$100

Material costs:

| Material                 | Cost                   |
|--------------------------|------------------------|
| Straws                   | \$1 each               |
| Tape                     | \$1 per 5cm (2 inches) |
| Glue                     | \$1 per 10 mins        |
| Cardboard                | \$15 per sheet         |
| Paper                    | \$10 per sheet         |
| Pop sticks/ craft sticks | \$1 each               |
| Cups                     | \$2 each               |
| Other                    |                        |

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### Design, Engineer & Build!

### CLASSROOM DESIGN

Working with numbers up to 1,000

Your teacher would like to change the layout of the classroom. They have been given a budget to help create a modern and new learning environment.

The challenge: To design and create a model of a classroom that you and your fellow students will enjoy working in. It needs to include:

- 25 sitting areas (chairs, couches, cushions etc)
- Tables/ working areas
- Area for electronics (computers etc)
- A quiet zone

What other features could you include?  
How will you make your design stand out?

Your Budget: \$1,000

Material costs:

| Material                 | Cost                   |
|--------------------------|------------------------|
| Straws                   | \$1 each               |
| Tape                     | \$1 per 5cm (2 inches) |
| Glue                     | \$1 per 10 mins        |
| Cardboard                | \$15 per sheet         |
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| Pop sticks/ craft sticks | \$1 each               |
| Cups                     | \$2 each               |
| Other                    |                        |

PDF  
and  
Google  
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# 4 Levels of Differentiation

## Cater for all students with \$100 & \$1,000 budgets and construction

**Design, Engineer & Build!**

**CLASSROOM DESIGN**

Working with numbers up to 100



**Design, Engineer & Build!**

**CLASSROOM DESIGN**

Working with numbers up to 100  
\* Construction Worker Costs included



**Design, Engineer & Build!**

**CLASSROOM DESIGN**

Working with numbers up to 1,000

**The Scenario:** Your teacher would like to change the layout of the classroom. They have been given a budget to help create a modern and new learning environment.

Design and create a model of a classroom that all your fellow students will enjoy working in. Your design needs to include:




- Sitting areas (chairs, couches, cushions etc)
- Tables/ working areas
- Area for electronics (computers etc)
- A quiet zone

What other features could you include?  
How will you make your design stand out?

**Your Budget: \$1,000**

**Material costs:**

| Material | Cost |
|----------|------|
|          |      |

**Design, Engineer & Build!**

**CLASSROOM DESIGN**

Working with numbers up to 1,000  
\* Construction Worker Costs included

**The Scenario:** Your teacher would like to change the layout of the classroom. They have been given a budget to help create a modern and new learning environment.

**The challenge:** You and your friend have been given a budget to design and create a model of a classroom that all your fellow students will enjoy working in. It needs to include:





- 25 sitting areas (chairs, couches, cushions etc)
- Tables/ working areas
- Area for electronics (computers etc)
- A quiet zone

What other features could you include?  
How will you make your design stand out?

**Your Budget: \$1,000**

**Material / cost:**

| Material | Cost |
|----------|------|
|          |      |

# Group Planning Sheets

**Design, Engineer & Build!**  
**CLASSROOM DESIGN**  
Student Worksheet

My Budget: \$100 or \$1,000 (circle the set amount)  
My Timeframe: 30 60 90 minutes (circle the set amount)  
Co-workers (Team Members): \_\_\_\_\_

**Restrictions:**

- Remember you must use a range of resources, of one material.
- The finished product must not be bigger than:  
Height: \_\_\_\_\_  
Length: \_\_\_\_\_  
Width: \_\_\_\_\_

**Safety:**

- Only a maximum of 4 co-workers are allowed on the construction site (your work area).
- You need to stay away from other group's construction sites (do not interfere with their building process).
- Use all materials with the correct safety procedures.

**Quality Control:**

- Your classroom needs to allow students a safe, comfortable and productive learning area.
- There needs to be sufficient space to store materials and allow students to walk around safely.

**Design:**

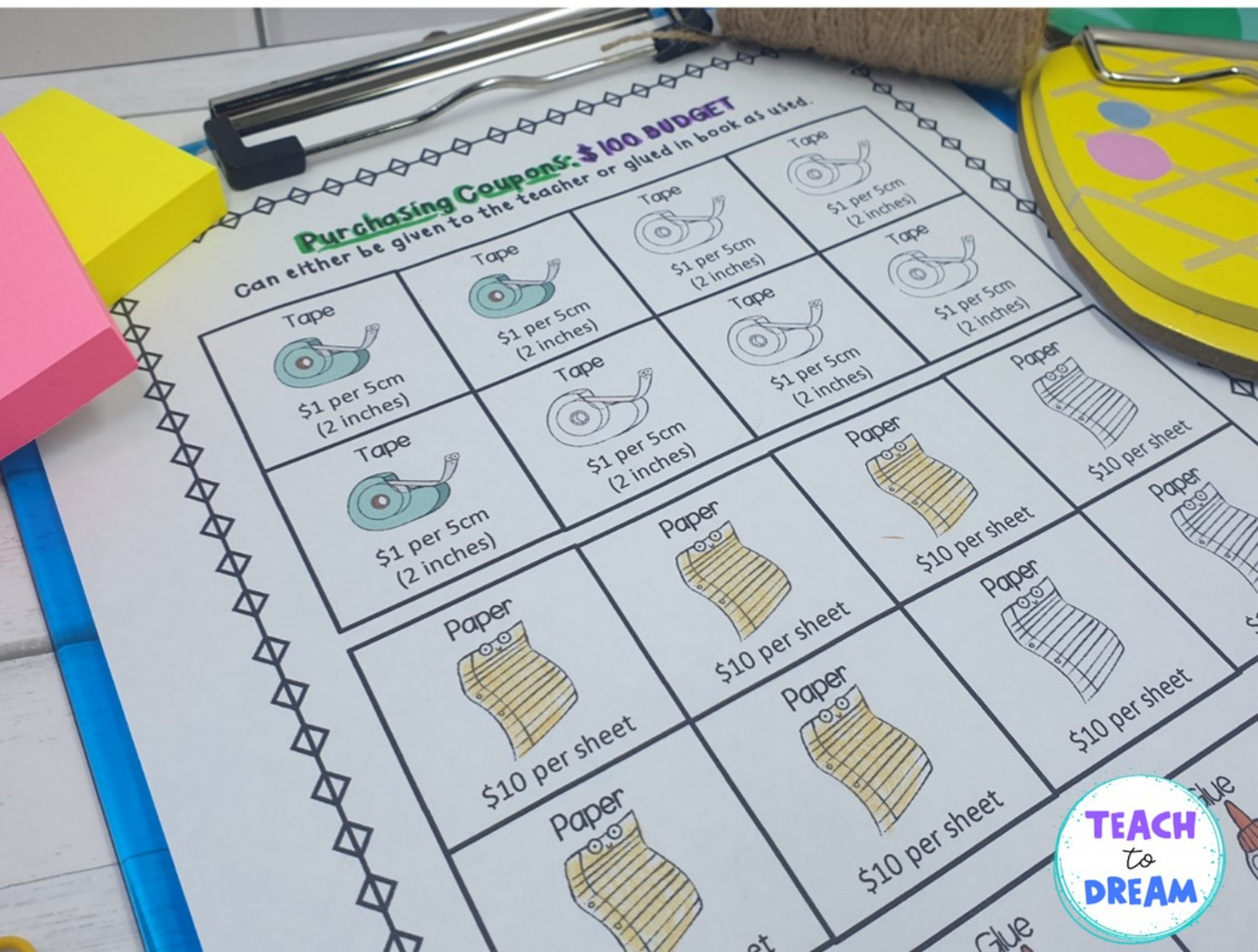
- How will you cater for different learning styles/ needs?
- What materials and processes will you use to ensure your design is sturdy?
- What special features and art will you include in your room to

Student Worksheet:

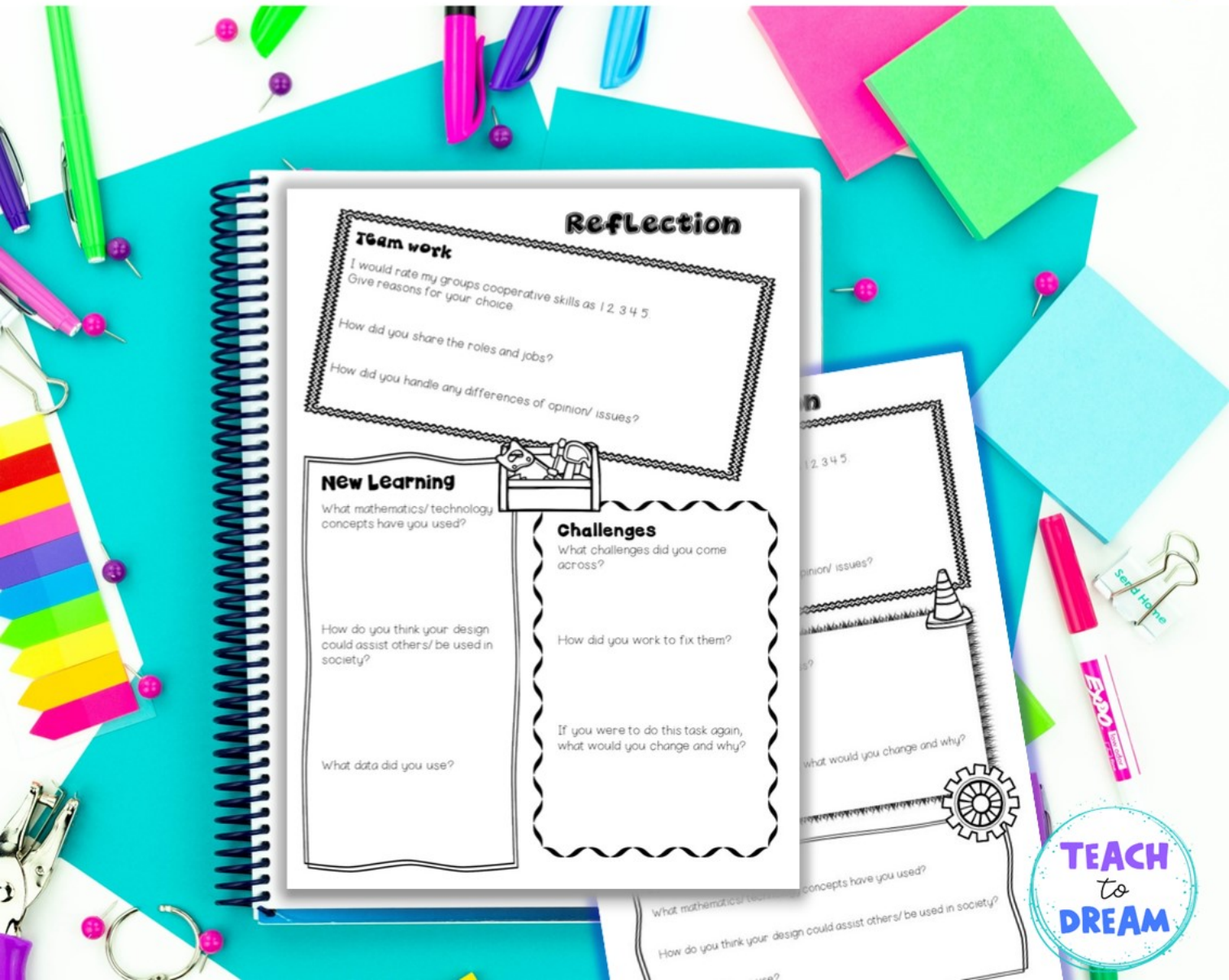
| Material | Individual Cost | Quantity | Total Cost |
|----------|-----------------|----------|------------|
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# Have students work within a set budget



# Encourage groups to Reflect on their learning



## Reflection

### Team work

I would rate my groups cooperative skills as 1 2 3 4 5  
Give reasons for your choice

How did you share the roles and jobs?

How did you handle any differences of opinion/ issues?

### New Learning

What mathematics/ technology concepts have you used?

How do you think your design could assist others/ be used in society?

What data did you use?

### Challenges

What challenges did you come across?

How did you work to fix them?

If you were to do this task again, what would you change and why?

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# Quick & Easy Assessment

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## CLASSROOM DESIGN 😊

|                      |     |
|----------------------|-----|
| On task learning     | /5  |
| Working out          | /5  |
| Correct calculations | /5  |
| Team work            | /5  |
|                      | /20 |

## CLASSROOM DESIGN 😊

|                      |     |
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## CLASSROOM DESIGN 😊

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|                      | /20 |

# Interested in More Middle School STEM?



## MIDDLE SCHOOL STEM BUNDLE



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