

# Digital & Print resource

## Key Information Sheet

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to  
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### 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 Buildings for the Sky!

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## Design, Engineer & Build!

### SKY CITY

Working with numbers up to 100

**The Scenario:** Our current cities are getting crowded and the cost of land is increasing. One company has decided to solve this problem by building up – in the sky. You have been employed to help develop some new ideas/ concepts.



**The challenge:** To design and create a model of a city in the sky. You will need to include at least 2 buildings and show how they will be connected. Will you include bridges, travelators, sky roads or something else?



What features will the sky city have? How will the buildings cater for the needs of the community (homes, schools, hospitals etc)?

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!

### CITY Worksheet

Complete the set amount  
(circle the time allocated)



of resources, no excessive use  
bigger than

allowed on the construction  
group's construction sites (do  
ss)  
safety procedures

general weather  
on the buildings)  
need to be strong  
(mins)

appealing to buyers?  
to ensure your design

the support of

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# 4 Levels of Differentiation

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

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Working with numbers up to 100

**The Scenario:** Our current cities are getting crowded and the cost of land is increasing. One company has decided to solve this problem by building up – in the sky. You have been employed to help develop some new ideas/ concepts.




Design and create a model of a city in the sky. You will need to include at least 2 buildings and show how they will be connected. Will you include bridges, travelators, sky roads or anything else?

What features will the sky city have? How will the buildings cater for the needs of the community (homes, schools, hospitals etc)?

**Your Budget: \$100**

**Material costs:**

Material	Cost
	\$1 each

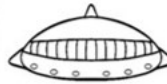


**Design, Engineer & Build!**

**SKY CITY**

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

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**The challenge:** To design and create a model of a city in the sky. You will need to include at least 2 buildings and show how they will be connected. Will you include bridges, travelators, sky roads or anything else? What features will the sky city have? How will the buildings cater for the needs of the community (homes, schools, hospitals etc)?

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

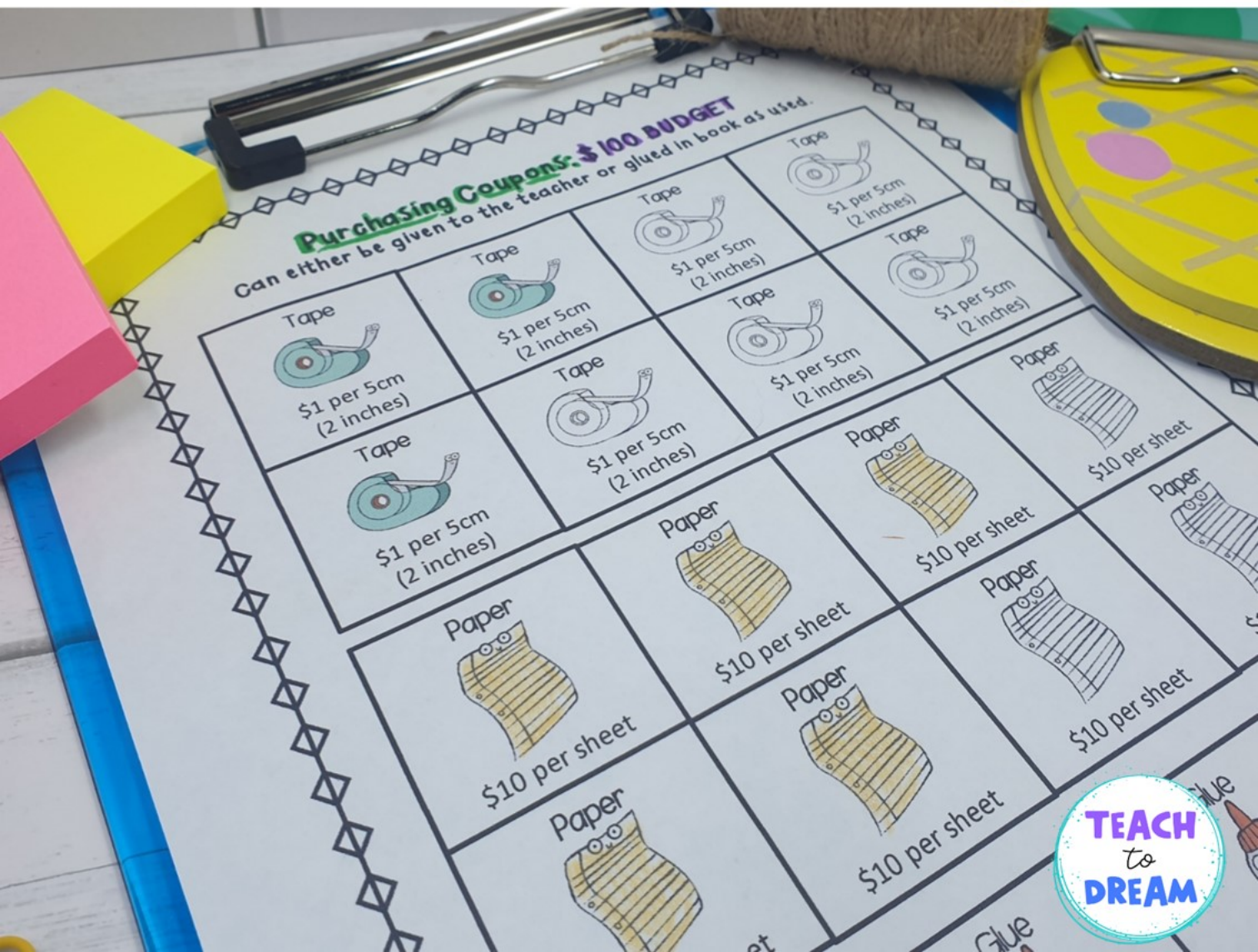
**Material / Construction Worker Costs:**

Material	Cost
Straws	

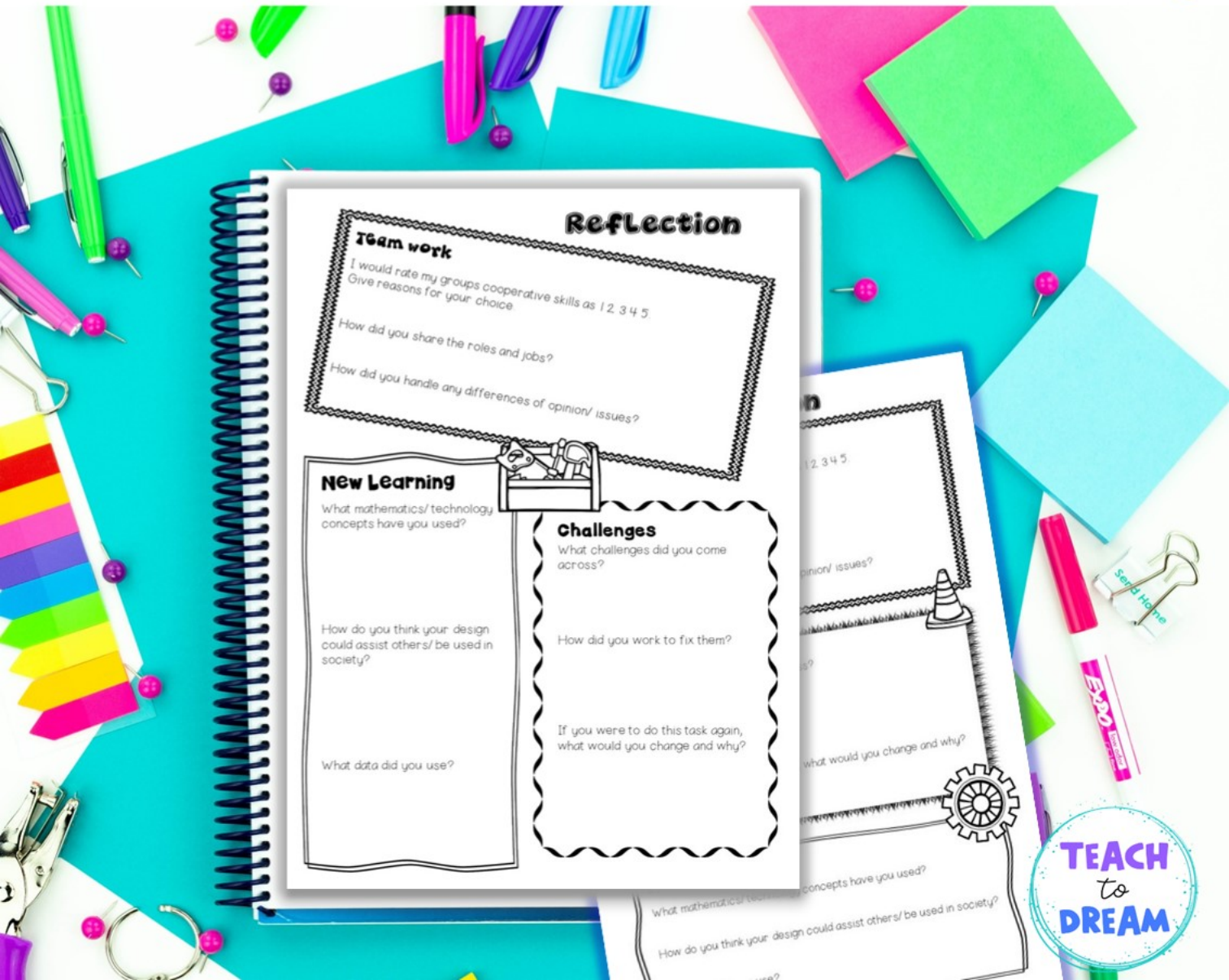




# Have students work within a set budget



# 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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**SKY CITY** 


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

**SKY CITY** 


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

**SKY CITY** 

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

**SKY CITY** 

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

**SKY CITY** 

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

**SKY CITY** 

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

