

DRAFT

Building “low rise” villages

A new building company has acquired some land and are hoping to build a Village. At the moment they are exploring different options for their community. They would like to have a mixture of types of houses, including, low rise, medium rise and some skyscrapers. You have been employed to manage the engineers and their rate of work.

They are very creative and have asked if you can determine the height of the buildings using a “random generator” so that the streets and towns in the community won’t look the same.

This sequence explores concepts linked to developing Additive Strategies. The following are components of the ACARA – Numeracy Progressions (Australian Curriculum and Assessment Authority)

AS-1 Emergent strategies

- combines two groups of objects and attempts to find the total

AS-2 Perceptual strategies

- counts items that can be perceived by ones to find the total of two groups with one-to-one matching of number words and objects
- builds and subtracts numbers by using objects or fingers
- makes combinations to form numbers up to 10

AS-4 Counting on (by ones)

- treats a number word as a completed count when solving problems
- uses a strategy of count-up-from to calculate addition

AS-5 Counting back (by ones)

- uses count-down-from for subtraction tasks
- uses count-down-to to calculate
- finds the difference between two numbers less than 20

AS-6 Flexible strategies with combinations to 10

- uses a range of non-count-by-one strategies when adding or subtracting two or more numbers
- uses part-whole construction of number to partition a whole number into parts
- applies inverse relationship of addition and subtraction



Build low rise villages

Roll and Build

- Roll a “dot” dice
- Match to a numeral dice
- Write the numeral
- Build the tower

Building “medium rise” villages

Roll, Roll and Total

Addition Towers

- Roll 2 dice
- Write the numerals, build the towers (different colors)
- Join the towers, count the total and write the sum in third column
- Repeat

Roll	Roll	Sum
4	3	7



Building small villages

Difference Towers

- Roll 2 dice
- Write the numerals, build the towers (different colors)
- Stand the towers next to each other and find the difference, The difference tower is the height of the building allowed.
- Write the height of the tower in the third column
- Repeat

Roll	Roll	Difference
4	3	1

Building skyscrapers

Your aim is to build at 30 story building (engineer)

- Roll 1 dice
- Collect the number of unifix
- Roll again, collect unifix and add the floors to your skyscraper (use 10 of the same color unifix and then change the “building color”)
- Repeat until your building exceeds 30 stories

Roll	Tower height	
	0	
0+4	4	
4+3	7	
7+2	11	
11+4	15	

Demolishing skyscrapers



The owners are not convinced that they need as many skyscrapers. Can you help out , by determining the rate of demolition for the crew they have employed to remove the skyscrapers.

Your aim is to demolish at 30 story building (demolition crew)

- Start with a 30 story building
- Roll 1 dice
- Snap off the “number of floors”.
- Write the height of the new building
- Repeat until your building reaches the ground (or below ground). (Talk about basement....)
- Repeat until your building exceeds 30 stories

Roll	Tower Height
	30
30-2	28
28-3	25
25-6	19

Build and demolish Skyscrapers

The have run into some conflict with the engineers and demotion crew. are trying to avios conflict and have employed you to manage the outcome.

You aim is to see if the “engineer” or “demolishers” win their contract for the village.

For the engineer to be successful, the skyscraper will reach 30 stories high.

For the demolisher to win, the skyscraper will be ground level (or below ground!)

The engineer team make a start and have a 15 story building ready to go. However, the demolition crew have heard that they might have missed the contract. The owner was unhappy with the dispute, decided that the outcome would be determined using your “random generator” procedure.

You will need to use a token (+ for engineers, and – for demolishers) and a dice to determine the number of stories to be built (addition) or demolished (subtraction). Let’s see who wins the contract!

Roll	Tower height
	15
15 +4	19
19-2	17
17-1	16
16-3	13
13+5	18

Changing the activity:



The following are some ideas of how to alter the activity to further develop students additive strategies and skills.

- Change the total build
- To focus on “teen” numbers use a dice with the numbers 1,1,2,2,3,3
- Change the type of manipulative
 - use Cuisenaire rods, swapping for orange each time the building exceeds 10)
- Collect data in relation to the “number of rolls” to reach 30.
 - Possible questions to explore:
 - Is the number of rolls to reach 30 always the same?
 - What would be the most (maximum) number of rolls to reach 30?
 - What is the minimum (least) number of rolls to reach 30?
 - What is the “median” number of rolls for our group, class?
 - What was the mode for our group, class?
 - How might this change over time?
 - What is the chance of having the maximum number of rolls?

