Number and Place Value Prior Assessment Question 2:

Q2: I can add and subtract with negative numbers, crossing zero.

NPV 3 : use negative numbers in context, and calculate intervals across zero

Teacher Input:

Recap with the children when negative numbers are used. Why do we need them? How do they work? Create a class number line to ensure the children understand how they are structured. You may also want to include unmarked intervals of decimal amounts.

Then recap Question 2 with the children. Establish where the children's errors in this question may have been. Is it how the question was structured or the strategies the children have used to calculate the answer.

Introduce that often the most common places to see negative amounts are in temperature, money(overdraft) and below ground/sea level.

Some children may still need a number line when calculating. In the input you want to encourage the children to suggest different ways to calculate the answers such as using number lines, counting on/back mentally and using written methods where needed. You may also want to split the children into groups and target the needs with separate inputs.

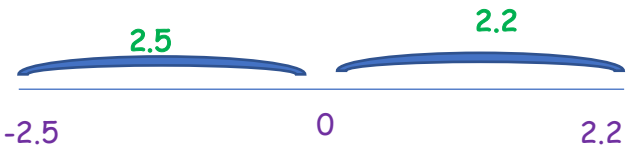
Using a number line: (not many children should need this at year 6).

Use the number line created or give the children individual number lines to help work out the answer. Inform the children that in the winter you recorded the temperature being -3.5 on one morning. By the afternoon the temperature had increased by 7 degrees. Encourage the children to work this out. How do they use the number line to help? You may want to repeat with other amounts such as 5 – 8.4. discuss that the amounts are close so it is easy to count on or back.

Mental methods:

You may want to use a blank number line to show how you are counting on. Again provide amounts where the difference is not large. It is easy for me to count on.

Such as -2.5 + 4.7.

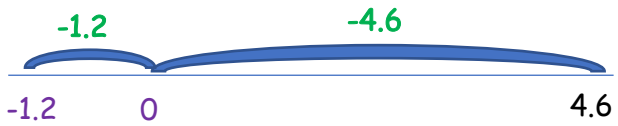


(4.7 – 2.5 = 2.2)

Discuss why although it is an addition sum why you have taken away 2.5 from 4.7.

Model the jump to zero as being 2.5 I know that the difference between -2.5 and 0 is 2.5. I need to get to zero and then work out how much more I have left to add. Model this using a number line and as a sum.

The children should be able to count on or subtract mentally.
Repeat with other amounts such as 4.6 – 5.8 . Encourage the children to understand that this will produce a negative number as the second amount is larger than the first amount.



(Take away the 4.6 to get to zero. There will be 1.2 left as this is the difference between 4.6 and 5.8. so this will be a negative number, -1.2)

5.8- 4.6 = 1.2 (but I know that this will be – 1.2)

Using written methods. Once the children have demonstrated understanding of why we can either count on/back, introduce the children to larger amounts where they may need to apply a written method. Such as:

The temperature in Mongolia is -18.5. In Australia it is 48.2 degrees warmer.

If I take away the 18.5, this will get me to zero. How many more do I need to add to get the answer? I need to work out the difference between 48.2 and 18.5

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  3 7
  4 8 . 2
- 1 8 . 5
  2 9 . 7
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Ensure the children can explain why they are performing a subtraction sum when the amount is added. They may want to show this alongside a number line.

There is also a cross curricular opportunity for all of the activities with geography as the children can research and find out about places in Canada and Mongolia. They can find these places on an atlas and discuss why the temperatures vary. Children could also look for other geographical features such as mountain ranges etc. to see if they have an impact on the temperature. Why?

Practice Activities

Purple Practice: Most suited for children who show little understanding of strategies when calculating with negative numbers .

Task one- using a number line and mental methods.

The children are to use the first sheet of cards to work to the temperature of different places by adding and subtracting amounts, working along the bricks. The children are presented with some decimal amounts towards the end. Encourage the children to begin to use the class number line created. Once the children show understanding here, model mentally working these out using jottings or model your thought process as jumps on a blank number line (as in input).

Task 2 use of written methods.

Once the children demonstrate understanding here, the children can then use the second sheet of cards to begin to think about when the jumps are larger Again the children are presented with trying to find the answers the temperature of different things in Zarah's house. How can they use written methods to help here? Ensure the children understand why they are using a subtraction written method to work out the answers to addition questions.

Green Practice: Most suited for children who made errors in Question 2 of the Prior learning assessment due to the wording and vocabulary used.

The children are presented with 4 word problems. The children are to select the correct information and understand what they are being asked to work out. Once they have done so, encourage the children to select the appropriate calculation. What strategies will they select? Children will need to use mental and written strategies here to help solve the problems. Discuss the choices and encourage the children to use methods discussed in the input.

Yellow Practice Most suited for children who demonstrate a good understanding in Question 2 of the prior assessment and have strategies to add and subtract with negative numbers.

For this activity the children are presented with a line graph and a table of information regarding the temperature in Mongolia. The children are asked to complete the table and the line graph which provides the opportunity to use skills such as understanding the scale used on the line graph and accurately reading and plotting the amounts. The children are also presented with the challenge of working out the different

temperatures from the statements they are provided with. Encourage the children to suggest starting points to work out the missing amounts.

Key questions:

What information do we have? Which is most useful? Where would be a good starting point? How do you know that this temperature is correct? Can you prove it to me? Do you need to work out another month before you can work out this month? What strategies are you using to add this amount? How do you know whether to add or subtract the amount? Why are the words warmer and cooler used?

Mastery

For the mastery task the children are presented with number sequences. The sequences get progressively trickier. The children are required to cross zero when writing the correct sequence of numbers this encourages them to think about adding and subtracting the same amount repeatedly. Some children may need support in working out the answers to e and f. Encourage the children to suggest finding halfway between 150 and -250.These questions require the children to find the difference between two amounts so some children may need support here, they may also need further guidance with question f.

Answers:

Purple:

Task 1:

Finland -10	Russia -7	New Zealand 20
Norway – 2.5	Greenland – 9.75	

Task 2:

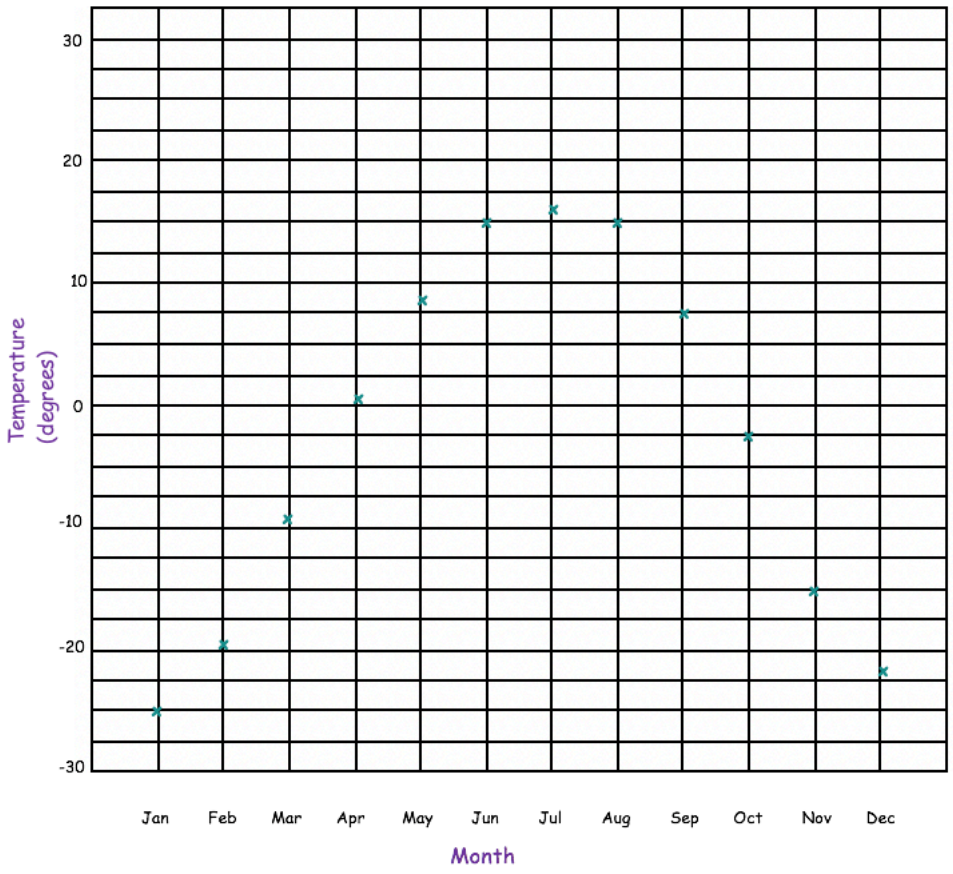
Body temp: 36°c	Hairdryer 45.3°c	Kettle 100 °c
Chocolate 32°c	Slushie machine -3.8°C	

Green:

1) 23°C
2) 1.15m
3) 1.4m or -1.4m
4) 43.3°C

Yellow:

Month	Temperature
January	-25 degrees
February	-20 degrees
March	- 9 degrees
April	0 degrees
May	8 degrees
June	15 degrees
July	16 degrees
August	15 degrees
September	7.5 degrees
October	-2.5 degrees
November	-15 degrees
December	-22 degrees



Mastery:

a) -15, -32, -49
b) -195, -105 – 60
c) 2.5, -2.5, -7.5
d) -7.75, -6.5,
e) 350, - 50
f) -25 , 5

BRICKWORK Mathematics

Purple Practice 1

LO: I can select methods when adding and subtracting with negative numbers.

In February , the average temperature in England is 7 degrees.

Finland is 17 degrees cooler than England in February.

In February , the average temperature in Russia is 3 degrees warmer than Finland.

In February the average temperature in New Zealand is 27 degrees warmer than Russia .

In February , the average temperature in Norway is 22.5 degrees cooler than New Zealand.

In February , the average temperature in Greenland is 7.25 cooler than Norway.

BRICKWORK Mathematics

Purple Practice 2

LO: I can select methods when adding and subtracting with negative numbers.

The temperature of Zarah's freezer is -17.5 °C.

The temperature of Zarah's body is 53.5 °C warmer than her freezer.

Zarah's Freezer is 62.8 degrees cooler than her hairdryer.

The temperature of Zarah's kettle once boiled is 117.5 degrees warmer than Zarah's freezer.

Zarah melts some chocolate. The melting point is 49.5°C warmer than her freezer.

Zarah's Slushie machine is 49.1 ° cooler than her hairdryer.

BRICKWORK Mathematics

Green Practice

LO: I can select methods to calculate sums with negative numbers.

Look at each question carefully. Use mental or written methods to calculate the answers.

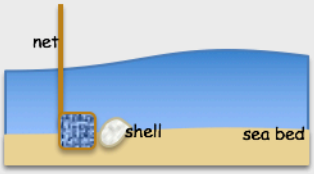
1) In December, the average temperature in Helsinki (Finland) is -4 degrees. In December, Sydney (Australia) is 27 degrees warmer. What is the temperature of Sydney?

°

2) Sophia and Vinay are at the swimming pool. Sophie is standing on a diving board 3 metres above the pool. Vinay's feet are touching the floor of the pool. He is 165 cm tall. The top of his head is 2.5 metres beneath Sophia. How deep is the swimming pool in metres?

m

3) Sally places a shell on the bottom of the sea bed. Her brother Harry uses his fishing net to try to get it. His fishing net is 2.5 metres long and just reaches the sea bed. Harry's arm is 1.1 metres above the sea level. How far is the shell beneath the sea?



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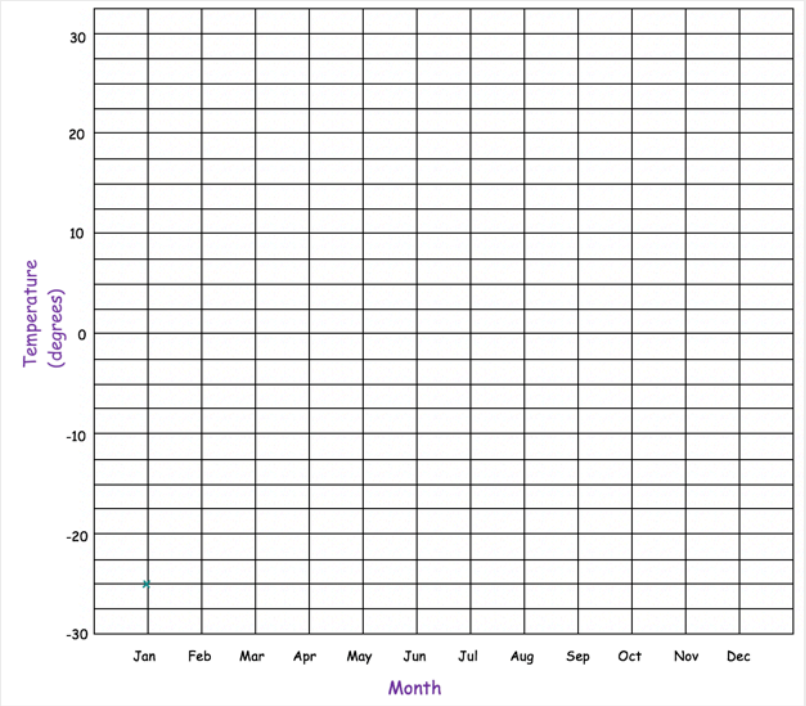
4) Alpna compares the temperatures in the summer and winter in different places in Canada. In Alberta, the lowest recorded temperature in the winter was -43.8. In the summer in Manitoba, the highest temperature recorded was 87.1 degrees warmer. What is the highest temperature recorded in Manitoba?

°

Yellow Practice

LO: I can add and subtract with negative numbers.

Ajay collected the average temperature of Mongolia for a year. Ajay began presenting this as a line graph when some of the data was lost.
Use the information provided to complete the table and the line graph.



Month	Temperature
January	-25 degrees
February	
March	
April	
May	8 degrees
June	
July	16 degrees
August	
September	
October	
November	
December	

February is 11 degrees cooler than March.
May is 17 degrees warmer than March.
April is 9 degrees warmer than March.
May is 7 degrees cooler than June.
August is 17.5 degrees warmer than October.
September 10 degrees warmer than October.
November is 12.5 degrees cooler than October.
December is 7 degrees cooler than November.
December is 3 degrees warmer than January.

BRICKWORK Mathematics

Mastery

Problem Solving

Look at each sequence and find the missing amounts.

a) In this sequence 17 is subtracted each time.

19	2			

b) In this sequence 45 is added each time.

	-150			-15

c) Complete this sequence:

12.5	7.5			

d) Complete this sequence:

-9			- 5.25	- 4

e) Complete this sequence:

	150		-250

f) Complete this sequence:

-55			35