

Number and Place Value Prior Assessment Question 2:

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

NPV3: interpret negative numbers in context, count forwards and backwards with positive and negative whole numbers, including through zero.

Teacher Input:

Recap with the children when negative numbers are used. Why do we need them? How do they work? Introduce that often the most common places to see negative amounts are in temperature, money(overdraft) and below ground/sea level.

Collect a word bank of vocabulary that may be used in these contexts such as: over drawn, in credit, increase of temperature, decrease temperature, cooler, warmer etc.

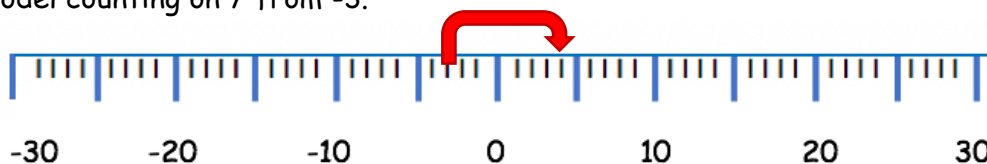
Recap Question 2 with the children. What strengths did they show? Are there any misconceptions? Discuss where the misconceptions may have been. Is it with the vocabulary used or strategies to calculate ?

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:

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 as -3 on one morning. By the afternoon the temperature had increased by 7 degrees. Encourage the children to work this out. What vocabulary is being used? What is the question asking us to do? How do they use the number line to help?

Model counting on 7 from -3.



You may want to repeat with other problems involving calculations such as

$$-5 + 8$$

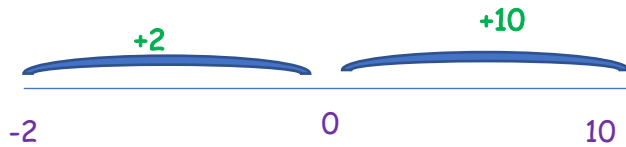
$$5 - 9$$

$$3 - 12$$

Mental methods:

You may want to use a blank number line to show how you are counting on chunks . Again provide amounts where the difference is not large and easy to count on when introducing the methods.

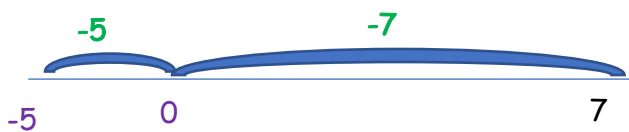
Such as - 2 the temperature increases 12 degrees.



$$-2 + 12,$$

Model the jump to zero as being 2. I know that the difference between -2 and 0 is 2. I need to get to zero and then work out how much more I have left to add. I wanted to add 12, so if I have added 2 to get to zero I now have 10 left to add. So the answer will be 10.

Model taking amounts away crossing to such as $7 - 12$



Take away the 7 to get to zero. There will be 5 left as this is the difference between negative number -5) $7 - 12 = -5$

Once the children have demonstrated understanding of why we can either count on/back, introduce the children to larger amounts where they may be less reliant on a number line or blank number line and can apply to a mental calculation.

Such as:

The temperature in Russia one morning was -21. It increased by 35 degrees

$$35 - 21 = 14.$$

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 the places used in examples. 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 demonstrated difficulty in Q2 of the prior assessment learning and will benefit from exploring vocabulary and the support of number lines.

The children are provided with 4 word problems. The children should be encouraged to read the problem and find the key vocabulary that helps them to identify what they are being asked to do. Encourage the children to explore which vocabulary is used and how it has been used.

When the children are ready to calculate, they are provided with a number line for each question so that they can count on or back using this. As the children are showing more confidence encourage the children to jump in chunks.

Green Practice: Most suited for children who made errors in Question 2 and will benefit from developing mental strategies to calculate with negative amounts.

The children are provided with the temperatures of 3 countries to use as starting points. The children are then given sentences about other countries and how much warmer or cooler they are. The children are to look at each block with clues and to calculate the temperature of that country. The children can create blank number lines or use mental methods to calculate.

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 4 word problems. The children should decide what they are being asked to work out by picking out the key vocabulary and information in each problem. The amounts for these questions are further apart, therefore they will need to use mental or written calculation methods to solve the problem rather than counting on using a number line.

Mastery

For the mastery task the children are presented blocks with information about the temperature of different countries in February. The children are asked to work out the temperature of Greenland in February. Provide the children time with ideas as how to tackle this problem and their starting point once the task sheet has been presented.

The children should spot that each clue leads on to the next clue and by working systematically through each clue they will be able to find the temperature in Greenland.

Key questions:

Where will you start? What have you noticed about the clues?

How will the clues help you? Which strategies will you choose to calculate? Why?

Answers:

Purple:

- 1) 5 degrees 2)- 25 degrees 3) £8 4) - 4

Green:

- Russia: -21 degrees India 24degrees Australia 26degrees
Germany -1 degree Saudi Arabia 16 degrees Mongolia -24 degrees.

Yellow:

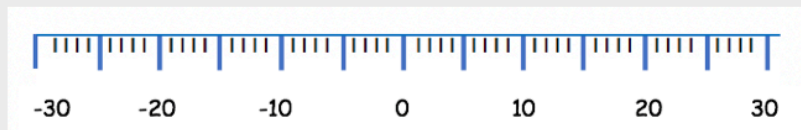
- 1) -£22.50 2) 23degrees 3)42degrees 4) 175 cm

Mastery:

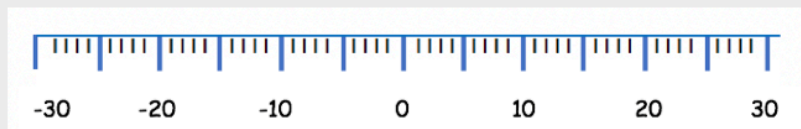
Greenland 's temperature-9

Use the number lines to help you to calculate adding and subtracting with positive and negative numbers.

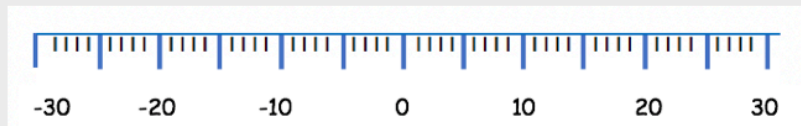
- 1) The temperature in the morning was -2 degrees. It increased 7 degrees by lunch time. What was the temperature at lunch?



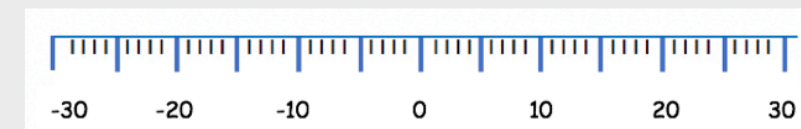
- 2) The lowest temperature recorded in Russia in July was -11 degrees. The lowest record temperature recorded in Russia in September was 14 degrees cooler than July. What is the lowest recorded temperature in Russia in September?



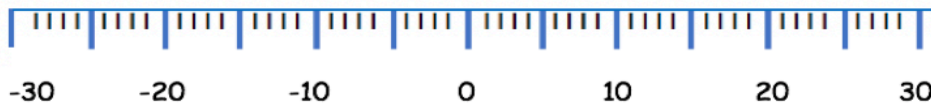
- 3) Daniel was overdrawn in his bank account by $\pounds 12$. We can write this as $-\pounds 12$. He then added $\pounds 20$ into his bank account. How much money is now in his account?



- 4) Sophia recorded the temperature in April one day as 19 degrees. She recorded the temperature again in December and it was 23 degrees cooler. What was December's temperature?



Challenge: Ashram has $\pounds 17$ in his bank account. He buys a pair of shoes that cost $\pounds 25$. How much will he be over drawn by? How can you write this?



Below are flags of 3 different countries. Each flag is recorded with the average temperature in January for that country. Using the clues on the purple blocks, work out the temperature of other countries in January.

United Kingdom



5 degrees

China



- 4 degrees

Canada



- 11 degrees

Russia is 10° cooler than Canada.
Russia's temperature is

India is 19° warmer than the U.K.
India's temperature is

Australia is 30° warmer than China.
Australia's temperature is

Germany is 6° cooler than the U.K.
Germany's temperature is

Saudia Arabia is 27° warmer than Canada.
Saudia Arabia's temperature is

China is 20° warmer than Mongolia.
Mongolia's temperature is

Challenge: Can you order the countries from the coldest to the warmest?

Yellow 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) Hattie has £27.50 in her bank account. She buys a coat for £50. How much is she over drawn by? How would this be written in her bank account?

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

- 3) Alpha compares the temperatures in the summer and winter in different places in Canada. In Alberta, the temperature in the winter was -41 degrees. In the summer in Manitoba, the temperature was 83 degrees warmer. What was the temperature in Manitoba?

- 4) Sophia and Vinay are at the swimming pool. Sophie is standing on a diving board 5 metres above the pool. Vinay's feet are touching the floor of the pool. His feet are 6.75 metres away from the diving board. How deep is the pool in centimetres?

Find the temperature of Greenland in February.

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 degrees cooler than New Zealand.

In February, the average temperature in Greenland is 7 degrees cooler than Norway.