STEM Glasgow Advent Challenges

#STEMGlasgow

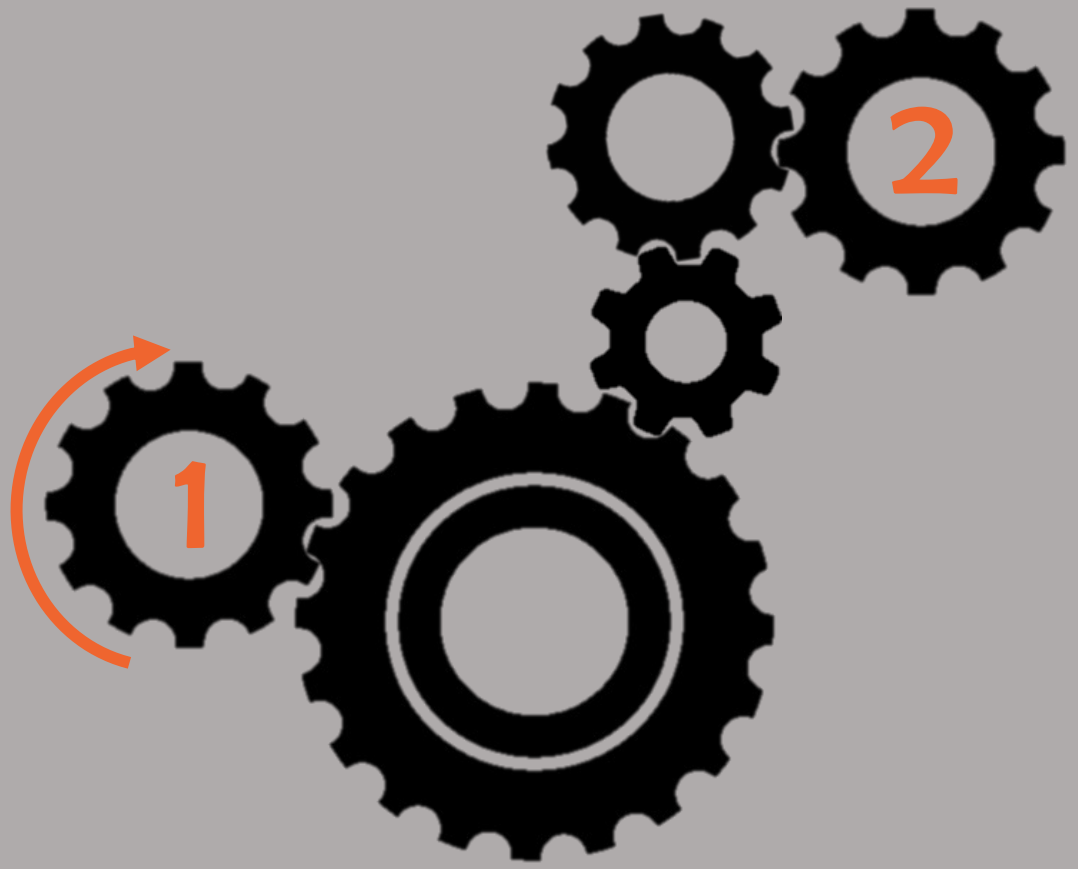
Oh *deer,* Mark is having a difficult time solving this festive maths question. Do you think you can give him a helping hand and work out how many triangles are in the Christmas tree?

I'm looking fir a bit of help with this first challenge. Can yew work it out?

#STEMGlasgow

Don't leave Alex out in the *coal'd*! Help her work out the speed of the gears so she can deliver all her STEM gifts in time for Christmas. Gear 1 and 2 have the same radius. How fast does gear 2 rotate when gear one is being driven?

a) Gear 2 does not rotate
b) Faster than gear 1
c) Slower than gear 1
d) The same speed as gear 1



#STEMGlasgow

Help Hannah sleigh this festive maths problem and tweet your answers using #STEMGlasgow.

🎄 + 🎄 + 🎄 = 72

🎄 + 🎁 + 🎁 = 50

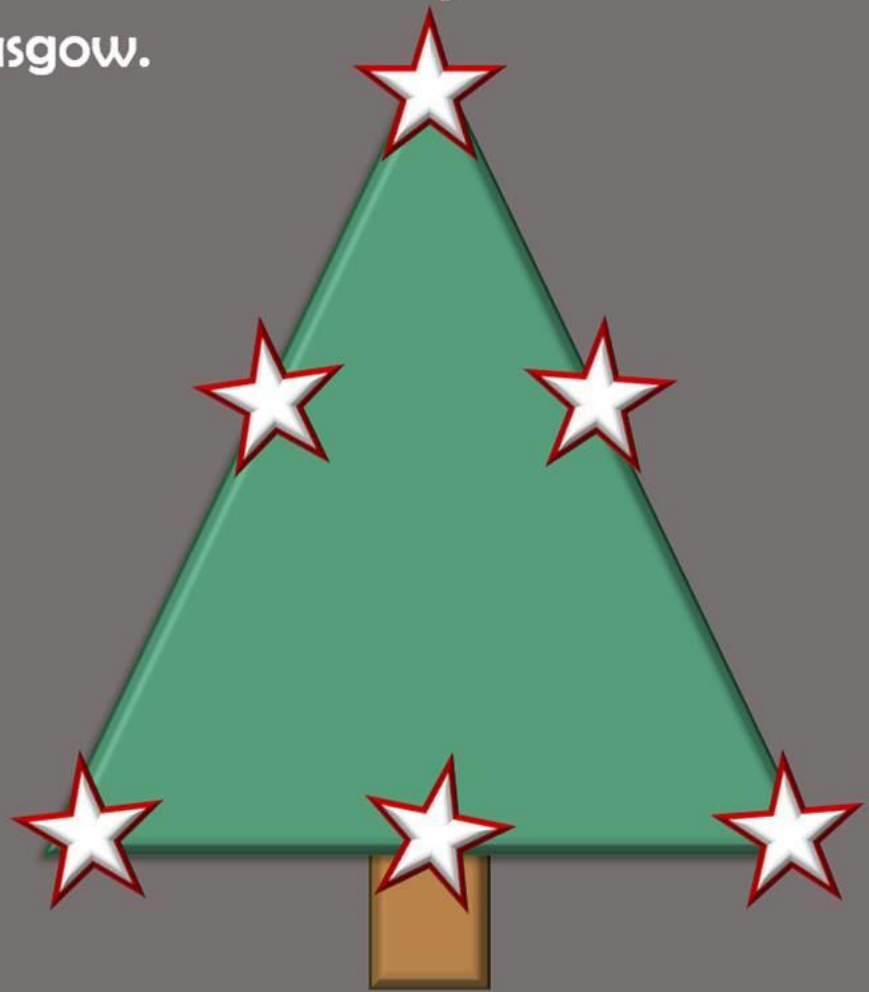
🎁 - ❄️ = 6

🎄 + 🎁 × ❄️ =

#STEMGlasgow

Mark needs to use his math's knowledge to help decorate his tree. Can you give him a little myrrh help to get it finished? Tweet your answers using #STEMGlasgow.

Only using the numbers **1 through 9** place them in the star decorations so that each side of the tree totals the same amount



#STEMGlasgow

Alex is thinking about all the places that Santa will fly over on Christmas eve. Can you help her name all of the places below? Tweet your answer using #STEMGlasgow.

#STEMGlasgow

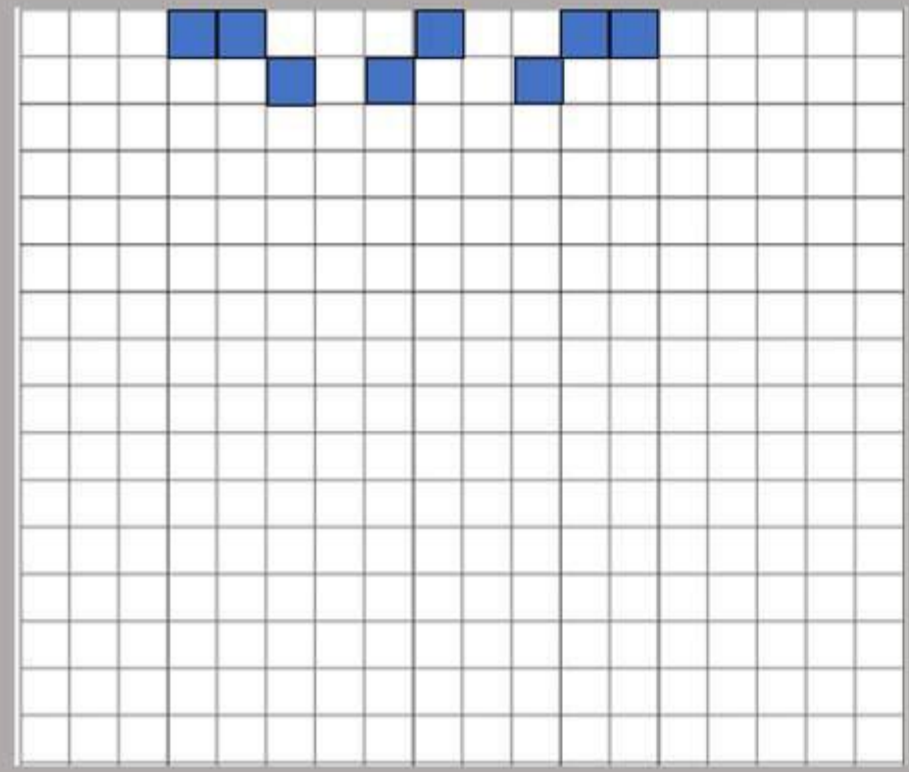
Can I ent-ice you to help Hannah with this coding question? She has forgotten when the STEM Glasgow Christmas night out is. Alex and Mark have sent her the message below. Can you help her decode it and tweet your answer using #STEMGlasgow

101 0011 – 101 0100 – 100 0101 – 100 1101
100 0111 – 100 1100 – 100 0001 – 101 0011 – 100 0111 – 100 1111 – 101 0111
100 0001 – 101 1010 – 100 0101
100 1101 – 100 0101 – 100 0101 – 101 0100 – 100 1001 – 100 1110 – 100 0111
101 0100 – 100 1111 – 100 1110 – 100 1001 – 100 0111 – 100 1000 – 101 0100
100 0110 – 100 1111 – 101 1010
101 0000 – 100 1001 – 101 1010 – 101 1010 – 100 0001

A	100 0001	H	100 1000	O	100 1111	V	101 0110
B	100 0010	I	100 1001	P	101 0000	W	101 0111
C	100 0011	J	100 1010	Q	101 0001	X	101 1000
D	100 0100	K	100 1011	R	101 1010	Y	101 1001
E	100 0101	L	100 1100	S	101 0011	Z	101 1010
F	100 0110	M	100 1101	T	101 0100	a	110 0001
G	100 0111	N	100 1110	U	101 0101	b	110 0010

#STEMGlasgow

Mark is having a go at some festive image representation. A couple of lines have been done for you. Can you complete the rest? Tweet your answer using #STEMGlasgow.



3, 2, 3, 1, 2, 2, 5
5, 1, 1, 1, 2, 1, 7
6, 4, 8
7, 1, 10
5, 3, 10
0, 1, 4, 1, 1, 2, 8, 1
1, 7, 8, 1, 1
2, 5, 8, 1, 2
5, 2, 4, 2, 1, 1, 3
4, 2, 2, 6, 4
3, 11, 4
2, 12, 4
1, 2, 2, 8, 5
2, 2, 3, 4, 1, 2, 4
3, 2, 8, 2, 3
4, 1, 9, 1, 3

#STEMGlasgow

Alex is looking at structures and shape. Can you label all the angles on the snowflake below? Then count how many acute, obtuse, right and straight angles there are and fill in the boxes. Tweet your answer using #STEMGlasgow.

Number of:

Acute angles

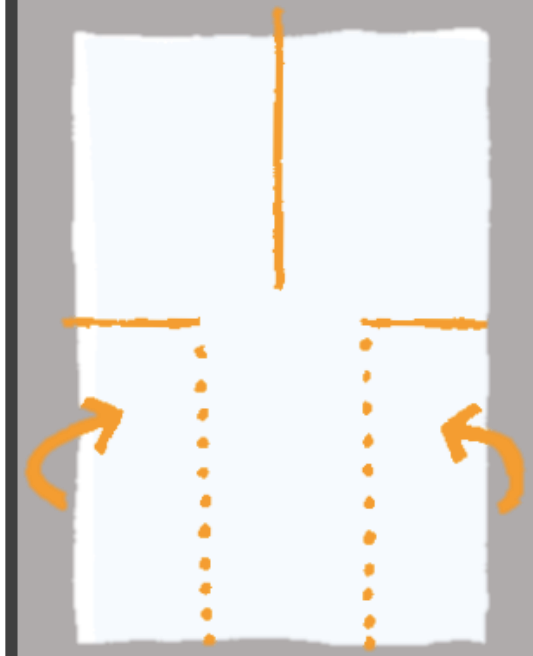
Obtuse angles

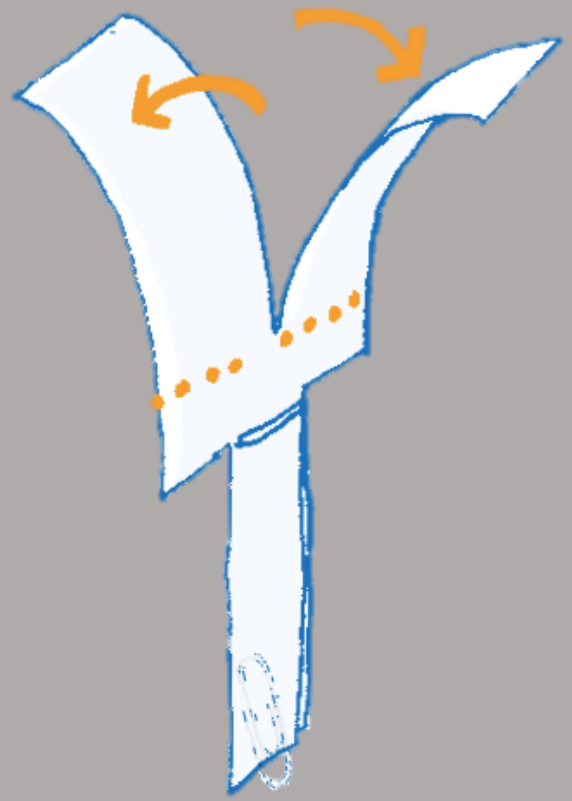
Right angles

Straight angles

#STEMGlasgow

All this cold weather makes Hannah want to jet set to a hotter climate. Today she's asking you to create your own helicopter using just paper, scissors and a paper clip. Tweet your helicopter using #STEMGlasgow.

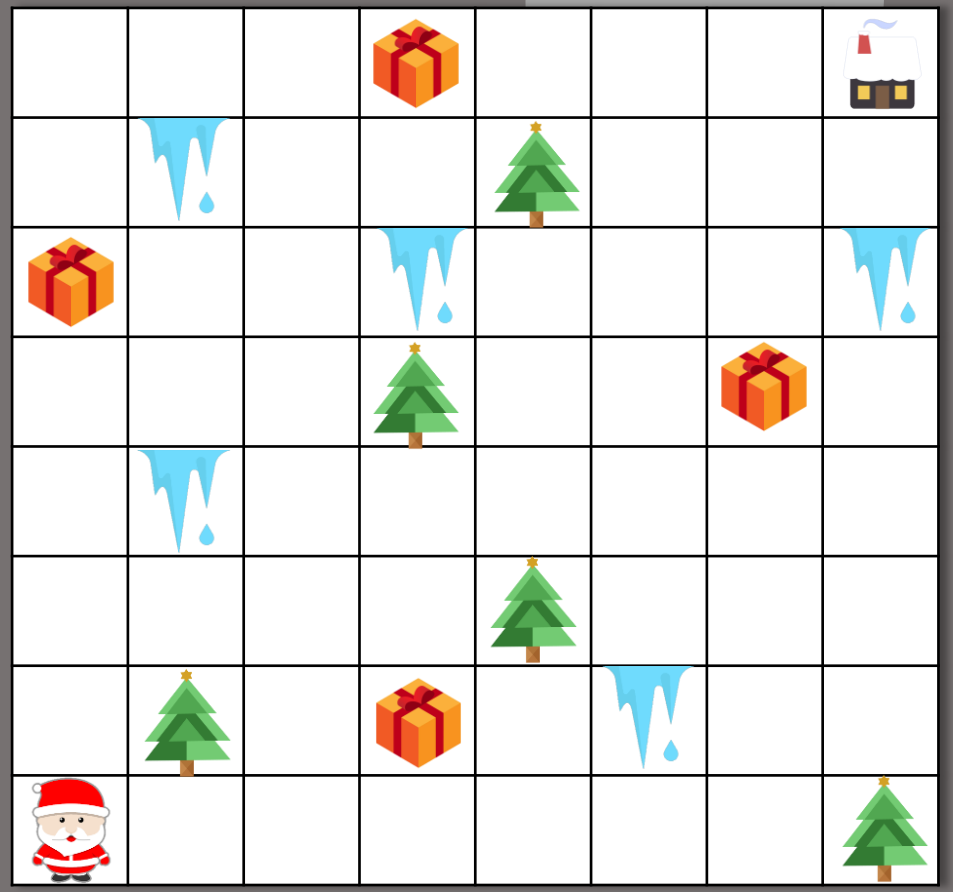




Get yourself a piece of paper and make the cuts as suggested on the diagram. Fold as shown and then attach a paper clip to the bottom. Throw it high in the air and watch what happens.

#STEMGlasgow

Mark is helping Santa plan his route for Christmas Eve. Can you plot a course and save Christmas? Tweet your answer using #STEMGlasgow.



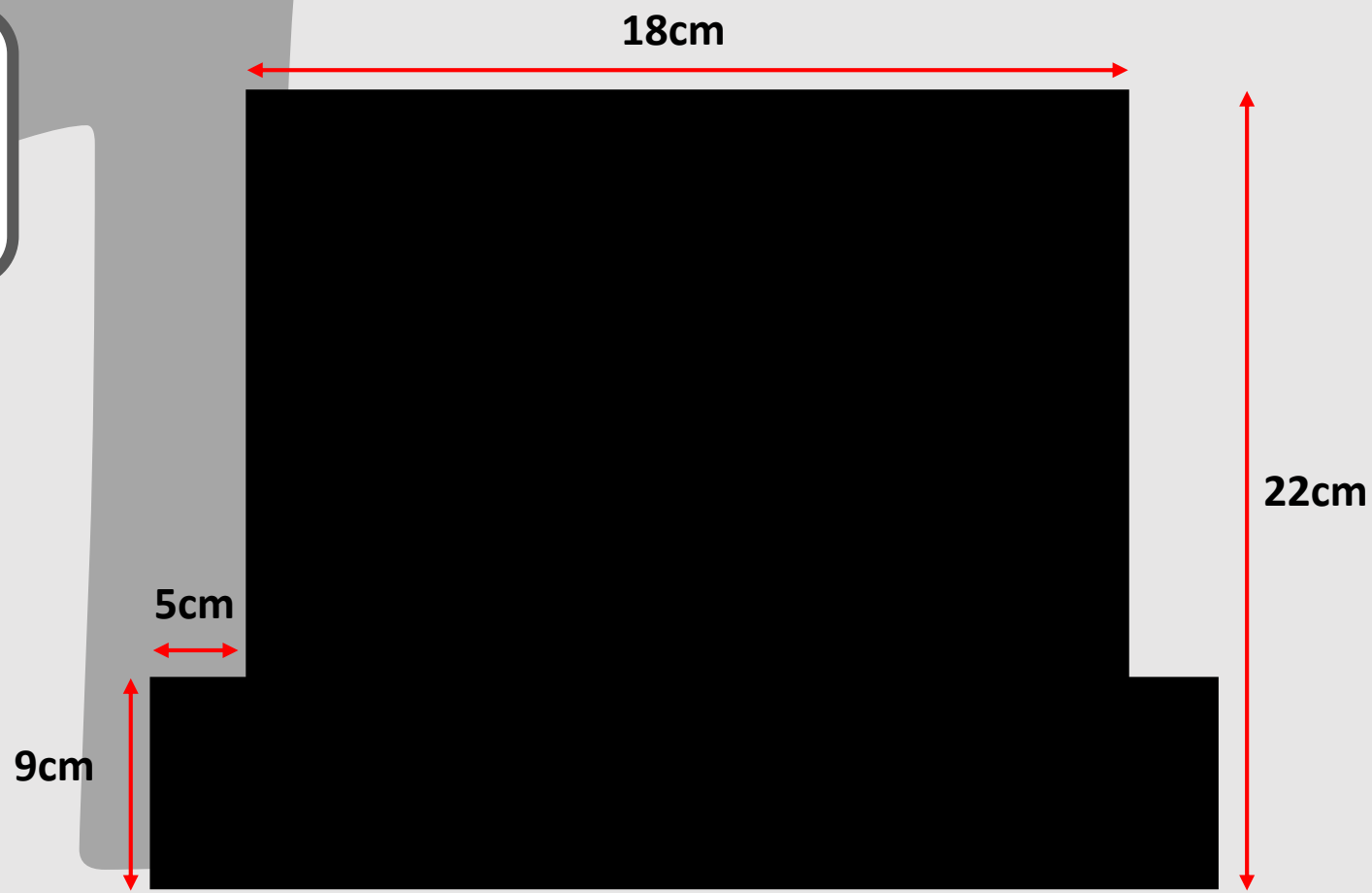
I'm using coding unplugged to help Mr. Claus pick up all the presents and deliver them to the house without crashing into a tree or slipping on ice. Can you help me?

We can use these moves:

- One box up
- One box down
- One box left
- One box right

#STEMGlasgow

Alex wants to build a snowman this year but doesn't know if she's got enough room in the garden.
Can you help her work out the area of her snowman's hat?
Tweet your answer using #STEMGlasgow.



#STEMGlasgow

At Christmas time Mark always loves a chocolate coin. He's been using them to work on his maths and spatial awareness. Can you change the direction by only moving 3 coins? Tweet your answer using #STEMGlasgow.

I've made the arrow point at the present but I'd like you to make the arrow point at the tree. You can only move 3 of the coins so no cheating!

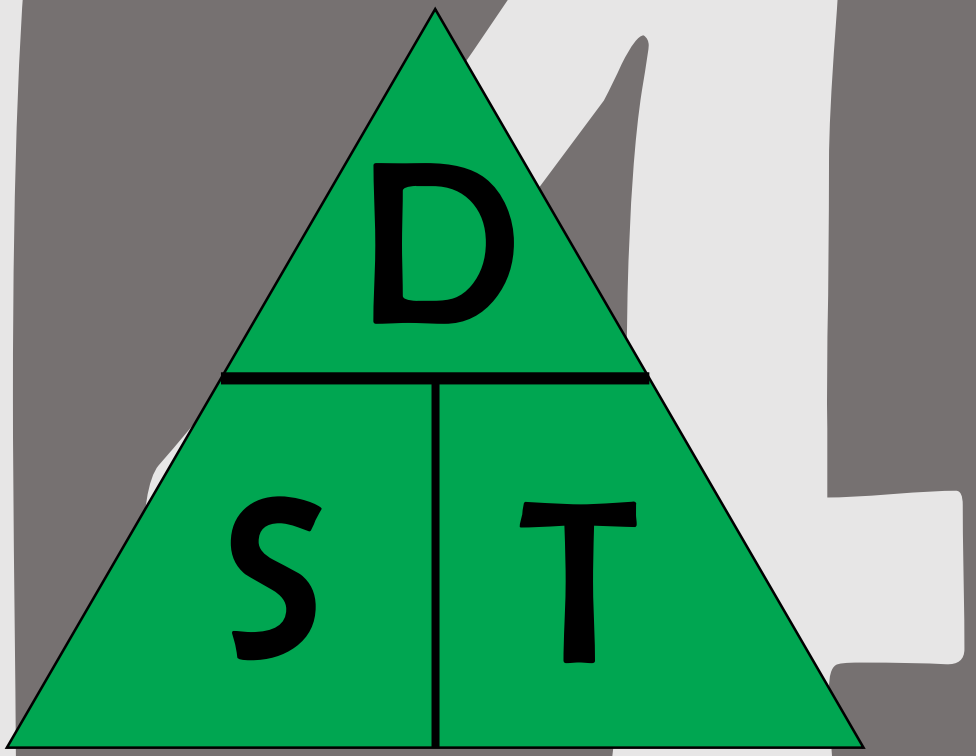
#STEMGlasgow

Can you help Hannah arrange the shapes below so that they fit perfectly in the square to the right? Tweet your answer using #STEMGlasgow.

#STEMGlasgow

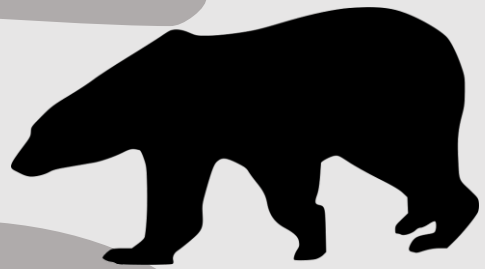
Help Alex sleigh this challenge and work out how far away the reindeer stable is from Santa Claus' house. Tweet your answer using #STEMGlasgow.

Santa needs to feed the reindeer tonight. It took him 30 minutes traveling at 14mph last night. How far away is the stable?



#STEMGlasgow

Hannah is looking at some of the animals that live in the North Pole. Can you help her order the animals below into a food chain. Number them **1 to 5** with 1 being the bottom of the food chain and 5 at the top. Tweet your answer using #STEMGlasgow.



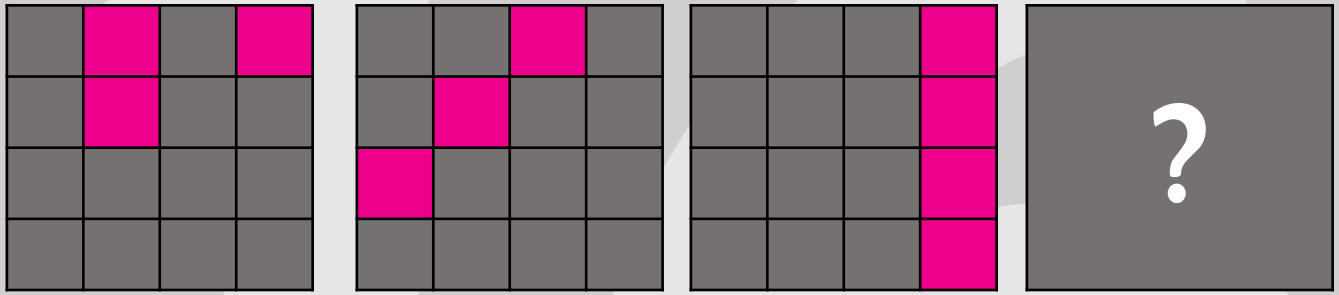
The pictures are of a:

1. Seal
2. Polar Bear
3. Shrimp
4. Arctic Cod
5. Algae

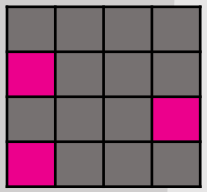
#STEMGlasgow

Help Mark solve this festive sequence puzzle and tweet your answer using #STEMGlasgow.

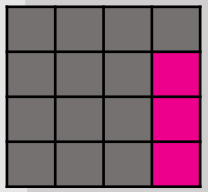
Help me work out what comes next in the sequence. There are 4 options to choose from



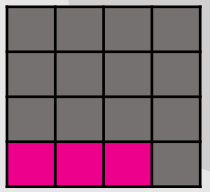
A



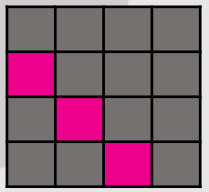
B



C

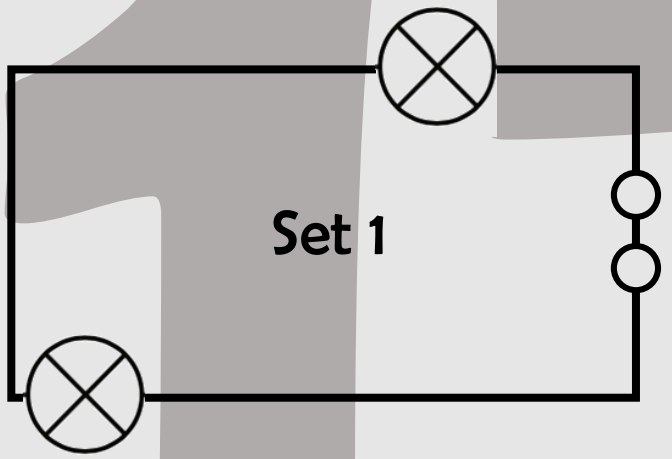


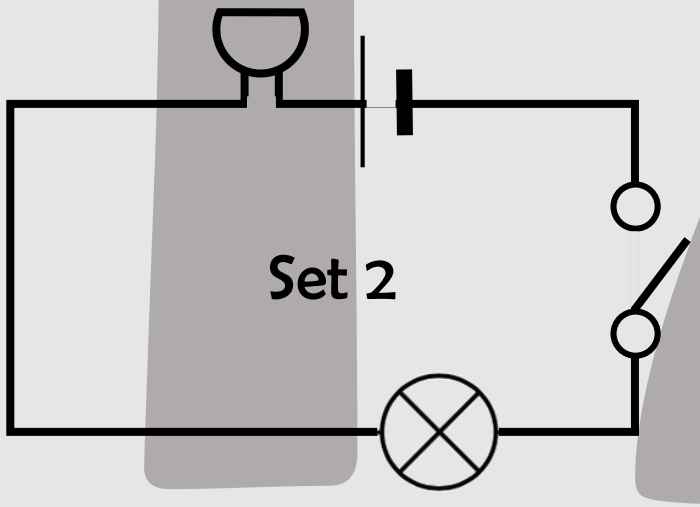
D

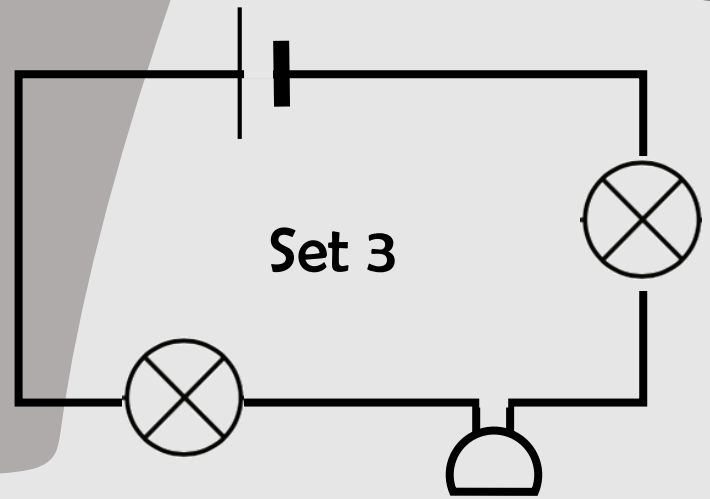


#STEMGlasgow

Hannah is about to buy a Christmas themed door bell for her house. It needs to have a light and make a noise. Can you look at the 3 options below and help her choose the best one?








Battery


Switch (off)

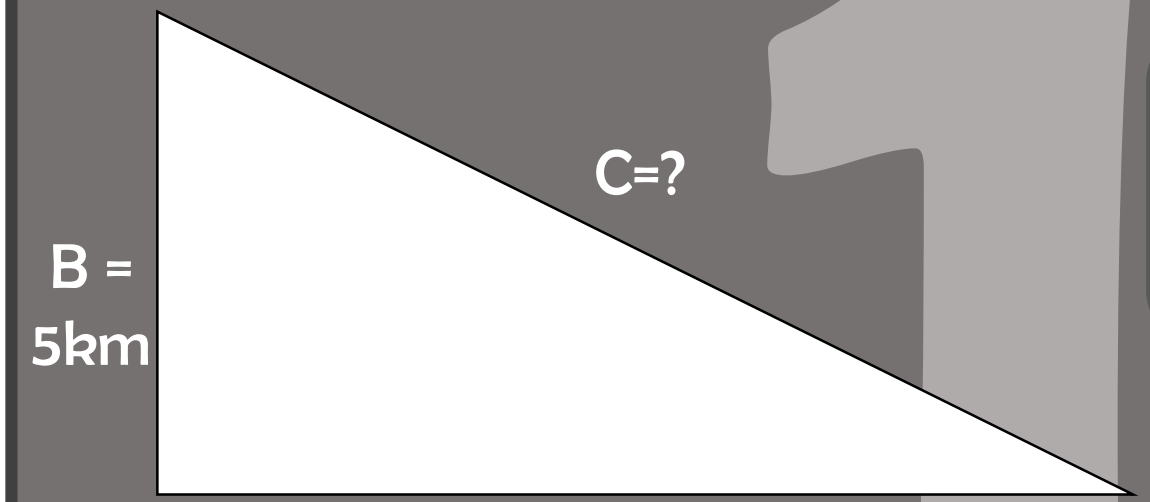

Bulb


Switch (on)


Buzzer

#STEMGlasgow

Alex is taking advantage of the snow and has gone skiing this week. She wants to know how long the slope is. Can you use Pythagoras' theorem to find the length of C? Tweet your answer using #STEMGlasgow.



Use $c^2 = a^2 + b^2$ to work out how steep the ski slope is.

#STEMGlasgow