

Developing Technology

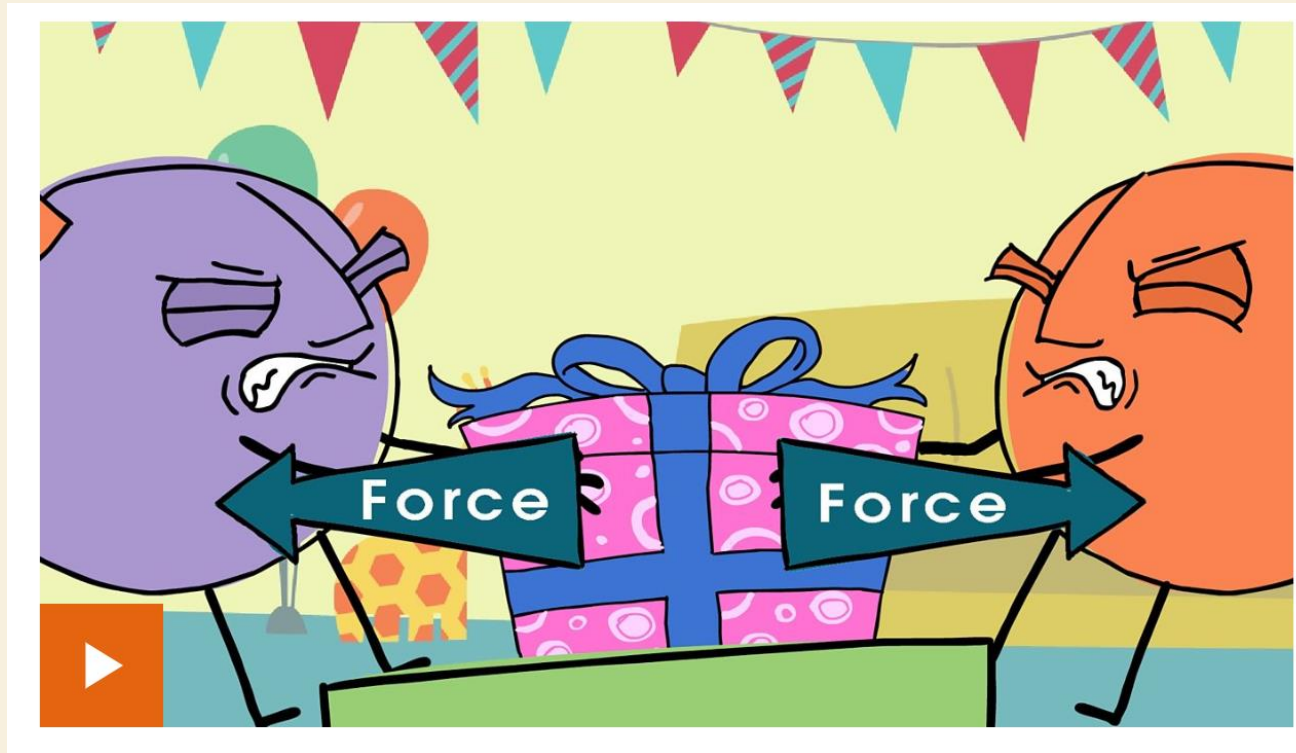
Drones are playing an increasingly important role in all our lives; surveillance (observing), leisure and potentially parcel delivery.



Task 1

How do drones get flight?

First, we need to revisit forces. Click on the picture to watch the clip.



Task 1

Complete these sentences:

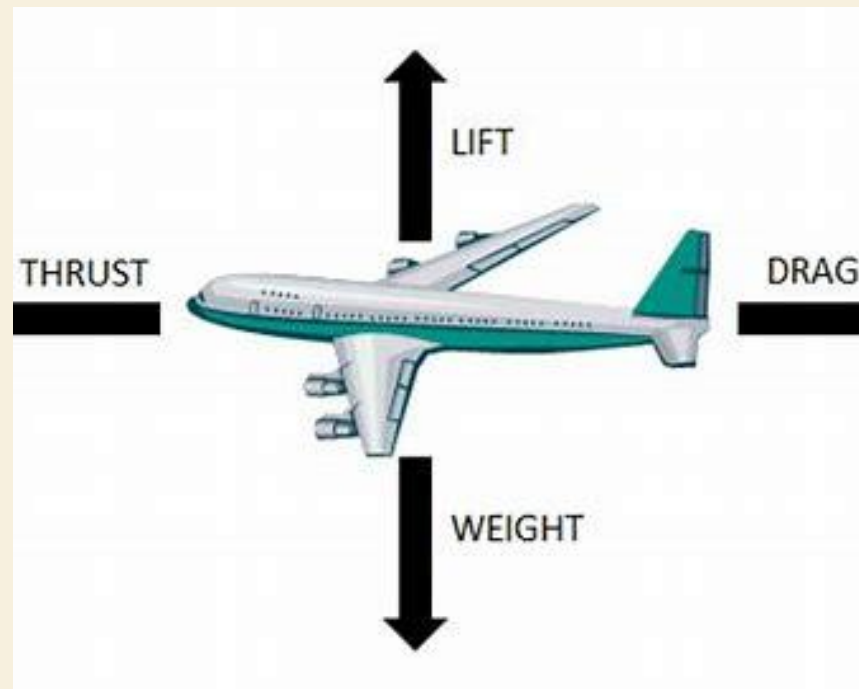
There are two types of forces p_____ and p_____ .

Forces can be b_____ or u_____.

Task 1

To get flight, a drone needs to be able to lift off the ground.

It needs to be able to make the forces up thrust (lift) and weight (mass and gravity) unbalanced.



Task 1

Click on the picture to watch the clip about gravity.



Task 1

How do drones actually fly?

Click on the picture to watch the clip and answer your questions



Task 1

Key points and questions.

The force of gravity acts in which direction?

To stay level the upward force from the propellers must equal the weight of the drone.

To move the drone higher what must happen to the upward force?

Task 1

To move the drone sideways (eg to the right) the propellers on the left hand side (1 and 4) must spin faster to give more upwards force and the propellers on the right hand side (2 and 3) must spin slower to reduce their upward force.

To stay level the total upward force must not change.



Task 1

Use the above information and the drone diagram to complete the table.
The drone has a weight of 60N.

P1 means propeller 1

Run	Upthrust (N)				Total (N)	Movement	
	P1	P2	P3	P4		Up/down or level	Left/right or stationary
1	15	15	15	15		level	
2	20	20		20	80		
3	20	10	10	20		upward	
4	10	10	10		40		
5	5		25	5	60		

Task 1

Drones are made using four key types of material.
Aluminium, Lithium ion batteries, Thermoplastics and Carbon fibre reinforced composites (CRFCs).

Use the Periodic table to find:-

The chemical symbol for

1. Aluminium
2. Lithium
3. Carbon

Task 1

THE PERIODIC TABLE

1		2		Group										3	4	5	6	7	0			
				<div style="border: 1px solid black; padding: 5px; display: inline-block;"> 1 H Hydrogen 1 </div>																		<div style="border: 1px solid black; padding: 5px; display: inline-block;"> 4 He Helium 2 </div>
7 Li Lithium 3	9 Be Beryllium 4											11 B Boron 5	12 C Carbon 6	14 N Nitrogen 7	16 O Oxygen 8	19 F Fluorine 9	20 Ne Neon 10					
23 Na Sodium 11	24 Mg Magnesium 12											27 Al Aluminium 13	28 Si Silicon 14	31 P Phosphorus 15	32 S Sulfur 16	35.5 Cl Chlorine 17	40 Ar Argon 18					
39 K Potassium 19	40 Ca Calcium 20	45 Sc Scandium 21	48 Ti Titanium 22	51 V Vanadium 23	52 Cr Chromium 24	55 Mn Manganese 25	56 Fe Iron 26	59 Co Cobalt 27	59 Ni Nickel 28	63.5 Cu Copper 29	65 Zn Zinc 30	70 Ga Gallium 31	73 Ge Germanium 32	75 As Arsenic 33	79 Se Selenium 34	80 Br Bromine 35	84 Kr Krypton 36					
86 Rb Rubidium 37	88 Sr Strontium 38	89 Y Yttrium 39	91 Zr Zirconium 40	93 Nb Niobium 41	96 Mo Molybdenum 42	99 Tc Technetium 43	101 Ru Ruthenium 44	103 Rh Rhodium 45	106 Pd Palladium 46	108 Ag Silver 47	112 Cd Cadmium 48	115 In Indium 49	119 Sn Tin 50	122 Sb Antimony 51	128 Te Tellurium 52	127 I Iodine 53	131 Xe Xenon 54					
133 Cs Caesium 55	137 Ba Barium 56	139 La Lanthanum 57	179 Hf Hafnium 72	181 Ta Tantalum 73	184 W Tungsten 74	186 Re Rhenium 75	190 Os Osmium 76	192 Ir Iridium 77	195 Pt Platinum 78	197 Au Gold 79	201 Hg Mercury 80	204 Tl Thallium 81	207 Pb Lead 82	209 Bi Bismuth 83	210 Po Polonium 84	210 At Astatine 85	222 Rn Radon 86					
223 Fr Francium 87	226 Ra Radium 88	227 Ac Actinium 89																				

Key

Task 1

Try the questions on your sheet.



Task 2

Lets investigate!

What goes up must come down.

How can we save drones for getting damaged when they have a fault?



Task 2

How can we stop them causing harm?



From a public safety point of view and to prevent further damage to expensive drones they can be fitted with a 'failure-parachute'.

Task 2

You will investigate the best size parachute for a drone.

What will you need:

1. Scissors
2. Ruler.
3. Pencil & pen
4. Plastic bag(s).
5. String
6. Old yogurt pot.
7. Plasticine / Play-doh / coins etc. (Objects to make up a known mass)
8. Kitchen scales & a timer (mobile phone)



Task 2

You will need to include:

1. Prediction – what do you think will happen?

The larger the parachute the..... the fall time because.....

2. State what the variables (Control, Dependant and Independent)
3. Method – how did you set-up the investigation & record the results*

Use instruction text (number or bullet points for each step in the instructions.

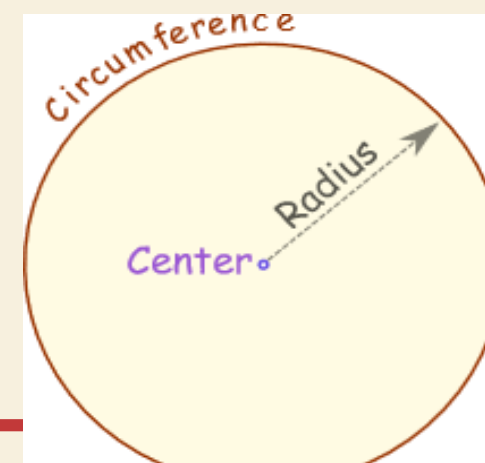
Useful connectives: first, next, then, following

4. Construct and complete a results table*
5. Sketch a graph of the drop time against the suspended load.
6. Write a conclusion to help interpret the recorded results.
7. Improvements – How could you improve this investigation?

Task 2

You will need to draw a table. You can use this one to help you.

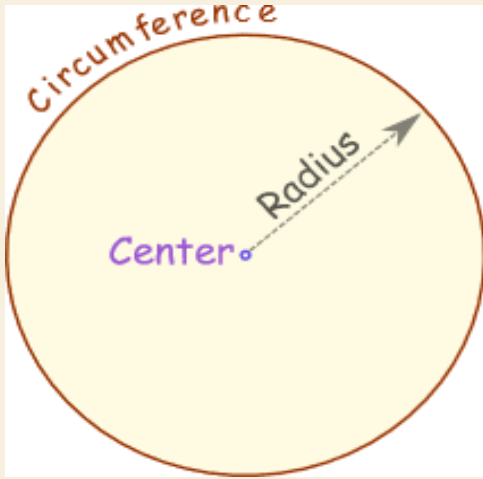
Chute	Drop time (s)			Mean drop time (s)	Diameter of parachute (cm)	Radius (cm)	Area (cm ²)
	1st	2nd	3rd				
1.	1.4	1.8	1.6		10		
2.	2.1	2.3	2		20		
3.	2.4	2.6	2.6		30		
4.	3.0	2.9	3.0		40		
5.	3.4	3.3	3.3		50		



Task 2

How to calculate the radius and then the area of a circular parachute.

1.



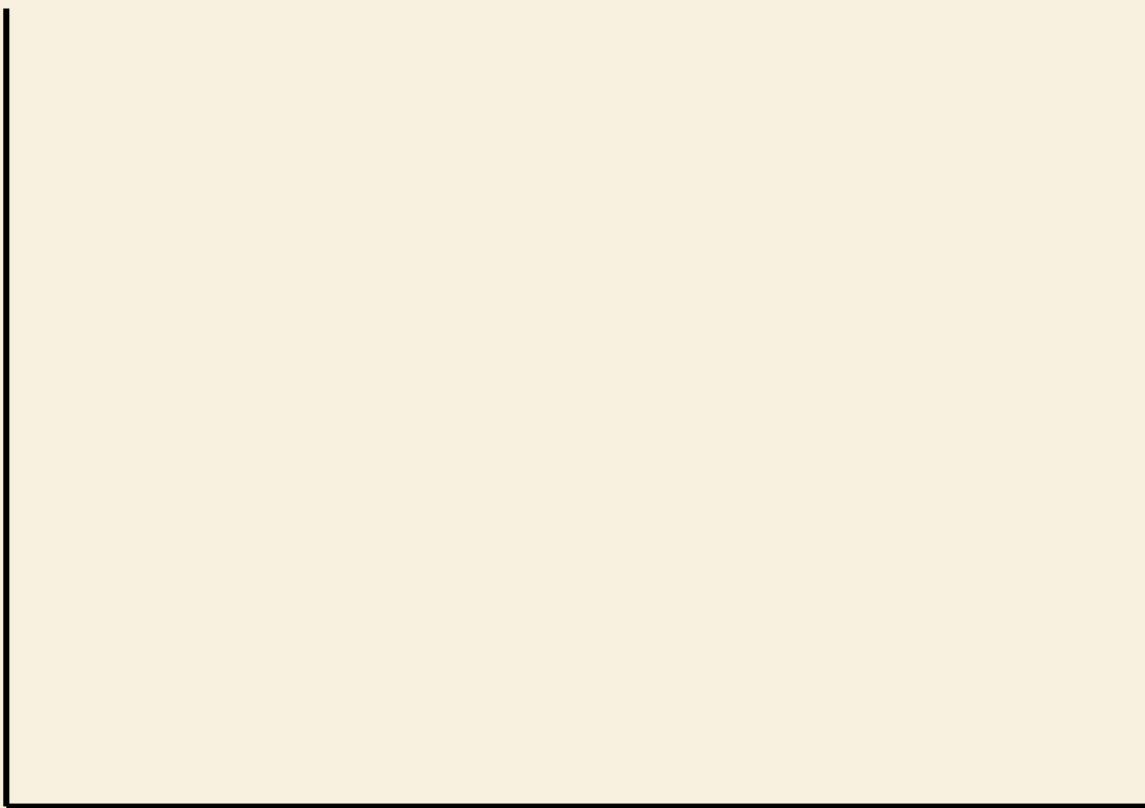
2. Area = πr^2 - Calculated in cm^2
= $\pi \times (\text{radius} \times \text{radius})$

$\pi = 3.14$

Task 2

Draw a line graph to show your data. Remember to use the proper labels (use your table headings)

Dependent
What you
measure?



Independent
What you changed?

Task 2

Conclusion

1. What does your data show?
2. How does your data tell you which parachute you would use to minimize the impact of your drone crashing?
3. How do you think the **Force** of the impact relates to the **Speed** of the drone hitting the ground?

Task 2

Some help:

1. What does your data show?

From my results table and graph, I can see that as the parachute size increased the drop times

The quickest drop time was with a parachute size of cm^2 and the slowest drop time was with a parachute size of cm^2

Task 3

Do drones have a positive or negative impact on our society, the economy and the environment?

Part 1 – some uses of drones in society

Watch the clip and use it to answer the questions below



Task 3

List the ways drones are being used in the clip.

What is being placed on the father's chest?

What is being delivered to the man and the boy?

How is the fire being put out?

How long did it take the drone to reach the small island?

Task 3

Highlight all **positive** points in the text **green** and all **negative** point **red**.

Summarise your points into the table

Positive Point	Negative Point

Task 3

Are you for the use of drones or against their use?



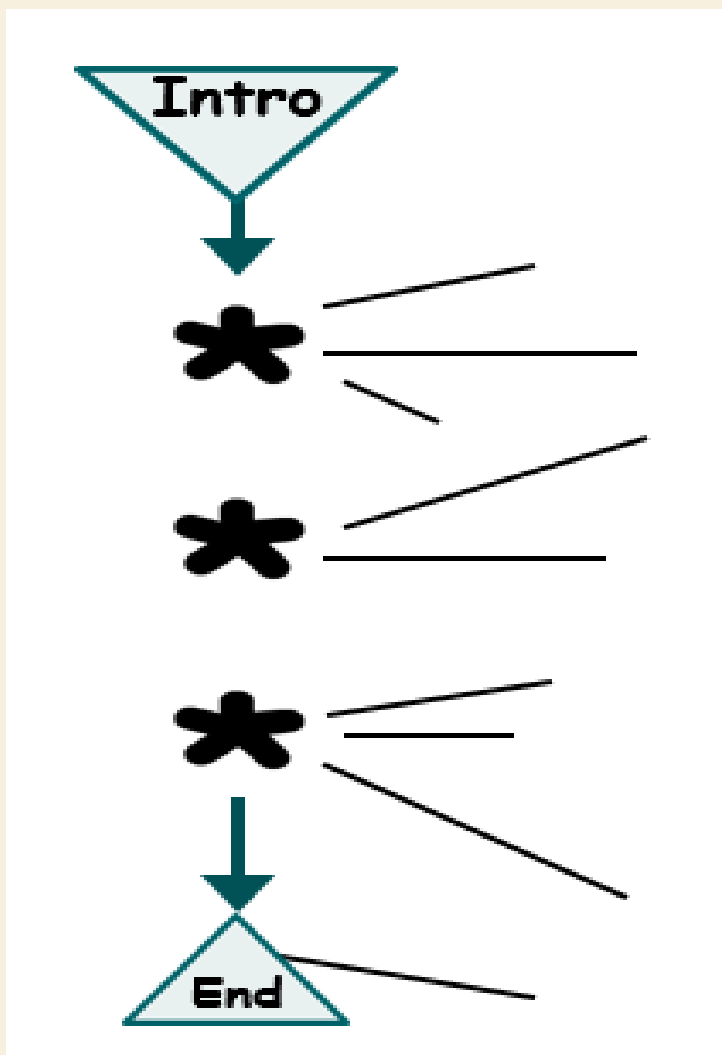
These are some helpful websites for you:

<https://www.edie.net/news/8/Drone-technology-environmental-sustainability-impact-for-the-UK/>

https://en.wikipedia.org/wiki/Agricultural_drone

<https://www.pwc.co.uk/issues/intelligent-digital/the-impact-of-drones-on-the-uk-economy.html>

Task 3

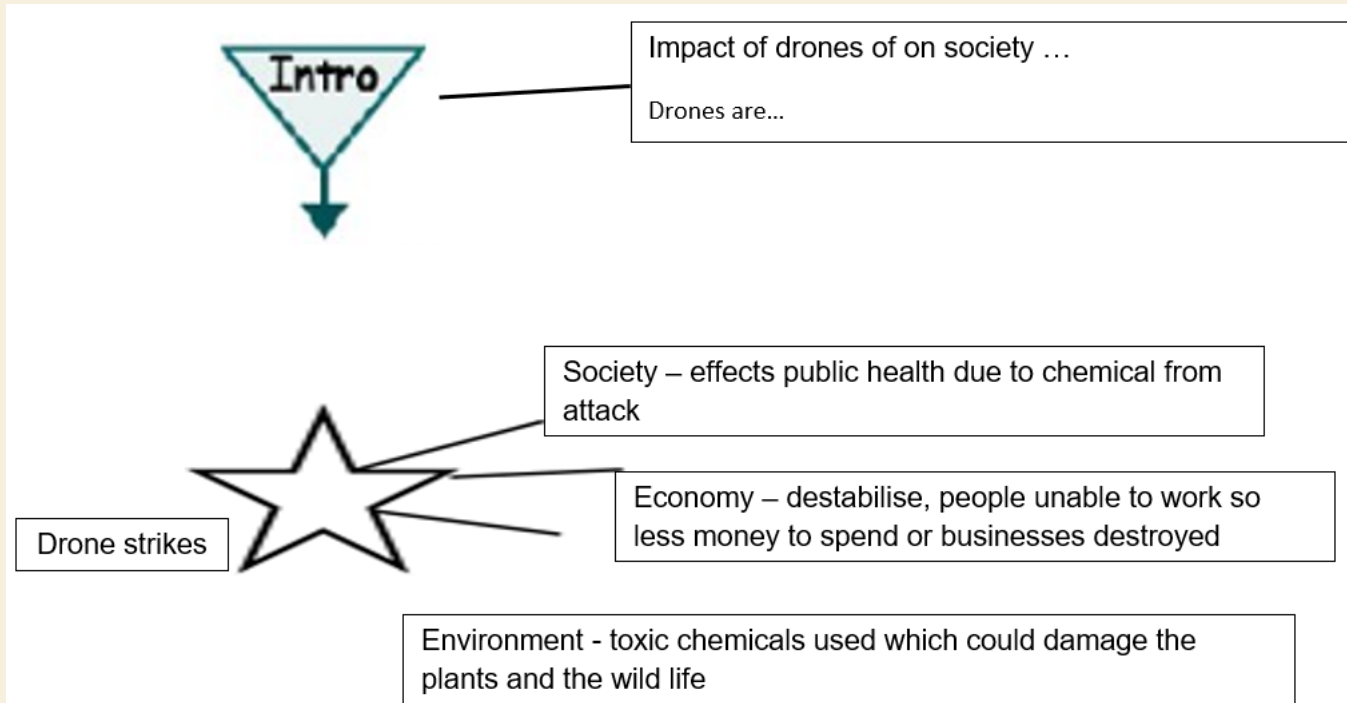


Using the information you have collected from parts 2 and 3, plan your persuasive argument using the planning skeleton provided.

On each star give a positive or negative impact and support with reasons or opinions. Your speech must have at least three points for society, economy and the environment.

Task 3

WAGOLL



Useful connectives when thinking about your argument:

because ... , consequently ... , nevertheless ... , as a result ... , first ... , also ... , in conclusion ...

Task 3

Use your plan to write your speech.

Remember to talk about these points and only one side of the argument (are you for or against?):

- The positive or negative impacts of drones in society
- The positive or negative impacts of drones on the economy
- The positive or negative impacts of drones on the environment

The speech should list clearly the negative or positive impacts of drones and lead to a conclusion based on the argument you have laid out.

Sentence Starters

Introduction – Say who you are and why you are speaking to the class.

Say which side of the argument have you chosen for/against the use of drones?

Good afternoon/morning Year 9. Today I am here to speak to you about the uses of drones...

Give some information on the background of drones – when was it first developed? Who developed them? What they are used for?

Drones where first developed by...

The drones are used in the following applications...

Sentence Starters

Explain why you are for or against the use of drones. Discuss for all three areas society, economy and the environment.

I would like to limit the use of drones...

This is because the damage the environment ...

or

I would like to promote the use of drones...

This is because they can help society ...

Sentence Starters

Discuss the types of issues/benefits of using drones.

Some people say that drones are very useful...

Some organisations say that drones are having a major impact...

Summarise your arguments for or against drones (Repeat key points made earlier in your speech).

I am against / for the use of drones because....

I conclude that drones are ...