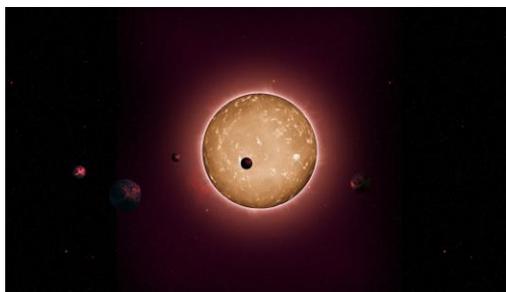


S1 Astrobiology: Worksheet 3

You are an **astrobiologist**, searching for **life in other solar systems**.

A star system with **5 planets** has been discovered: Planets A, B, C, D and E.



Samples and data from a space probe has been sent back for you to **evaluate**, including:

- ✓ liquid and solid samples from the planet surfaces.
- ✓ a data report from a space probe
- ✓ charts showing the distance from the systems star.

Greetings
Earthling!



Complete the following tasks to help locate the aliens!

Activity 1.: The presence of water

Samples of liquid from each planet are to be tested to find out if they are water.

Use your GLOW details to watch the following twig film and answering the following questions

<https://www.twigscotland.com/film/changing-states-of-matter-1472/>

Can you list some of the properties of water?



How could we use these facts to inform us which samples could be water?

The liquid samples were chilled to try and freeze them.

Use the power point slides to complete the your data of results.

Which sample(s) could be water? _____

Why? _____



Liquid Sample	Freezing Temperature (°C)	Is the liquid water? y/n
A		
B		
C	0	
D	0	
E		

Activity 2: The presence of important elements

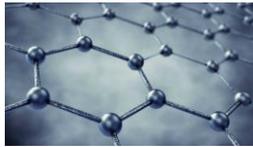
An **element** is a pure substance made from **one type of atom**.

Elements are grouped together according to their properties in the **Periodic Table**.

Complex Carbohydrates

Carbohydrates contain important elements for life: carbon, hydrogen and oxygen.

Starch is a complex carbohydrate.



The presence of starch is good evidence that **life is, or was present**.

We can test for starch using **iodine**, a **yellow-brown** liquid that changes to **blue-black** in the presence of starch.



Which of our samples show the presence of starch? Which are a good candidate for life? _____

Soil Sample	Colour after Iodine added	Is starch (life) present?
A	Yellow brown	
B	Blue-black	
C	Blue-black	
D	Yellow-brown	
E	Yellow-brown	

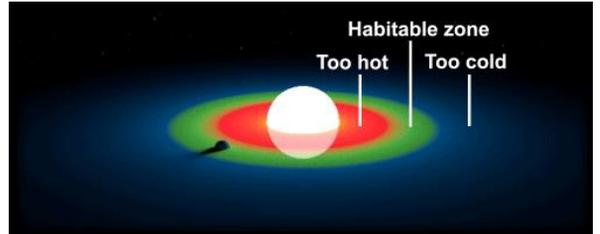
The 'Goldilocks Zone'

Use the link below to watch the following film on the habitable zone and answer the following question.

<https://www.twigscotland.com/film/the-goldilocks-zone-885/>

The **habitable zone**, or '**Goldilock Zone**'

is _____



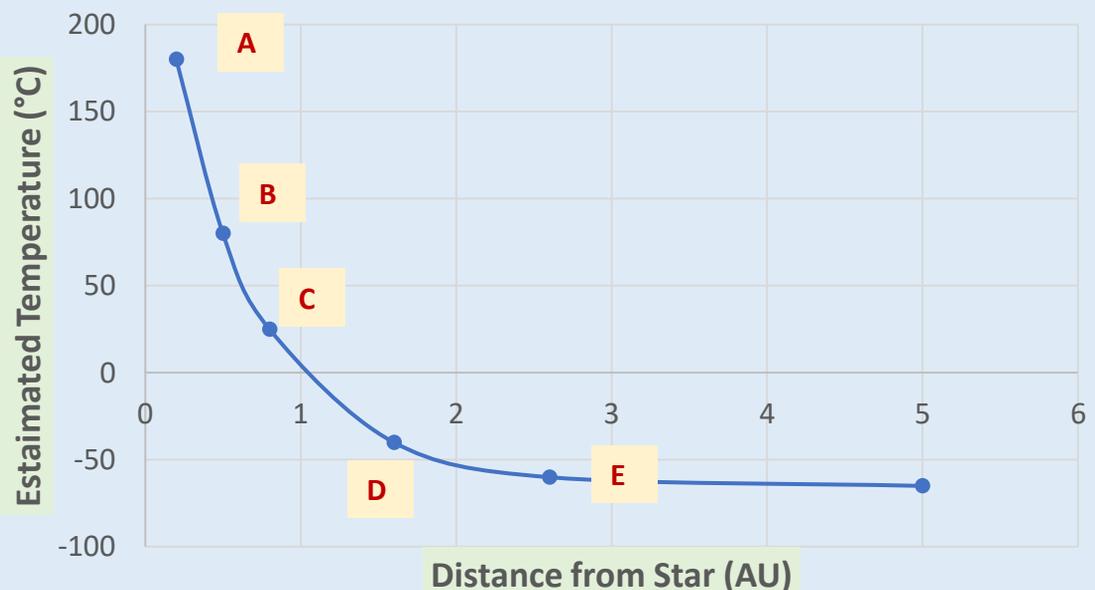
Activity 3: Surface Temperature

Which of our planets are in the 'Goldilocks Zone'?

The graph below shows the surface temperature and distance from the star for each planet.

Use the graph to find the surface temperature of each planet and complete the table overleaf.

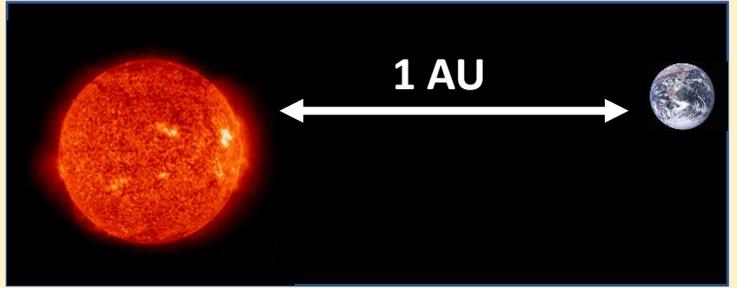
Planet Surface Temperature versus Distance from Star



Did you know an **astronomical unit** or **'AU'** is used to measure the vast distances in space?

1AU is the same as the distance between the Earth and the Sun.

AU = 1 500 000 000 000 metres



Planet	Distance	Estimated Temperature
A		
B		
C		
D		
E		

Use the information in your table to identify which planet or planets are in the habitable zone and potentially hold life. Explain your choice.

Activity 4: Planetary Observations

A probe has been sent out to pass close to the planets.

It has sent back information about:

- the size
- visible features
- atmospheric conditions.



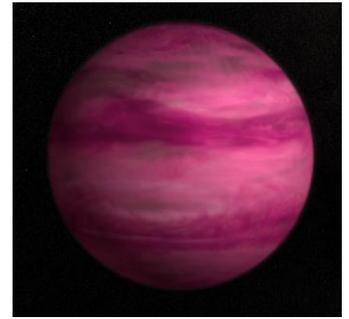
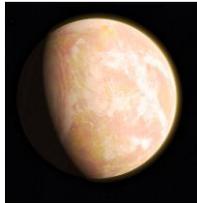
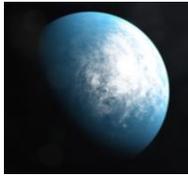
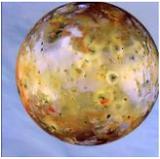
Use the table below to record the **favourable** and **unfavourable** characteristics shown in planetary reports (on the power point slideshow).

Planet	Favourable Conditions	Unfavourable Conditions	Could life exist here?
A			
B			
C			
D			
E			

Which planets are in the **habitable zone** and therefore maybe hold life?

Analysis

Which planet could support life and potentially harbour life?



Gather all the information you have to complete the final table in the workbook to help you answer the questions.

	Planets				
	A	B	C	D	E
Water					
Temperature 0°C to 100°C					
Carbohydrate					
Planet observations					

Conclusion

The planet I think has all the right conditions for life is_____.

I think it deserves further investigation because_____
