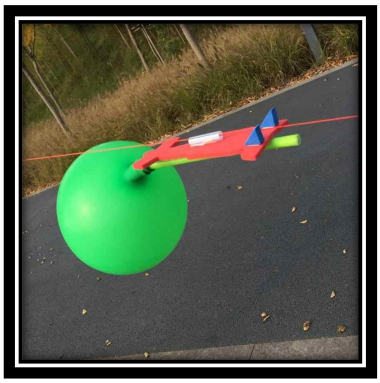
# Children's University Club Challenge:

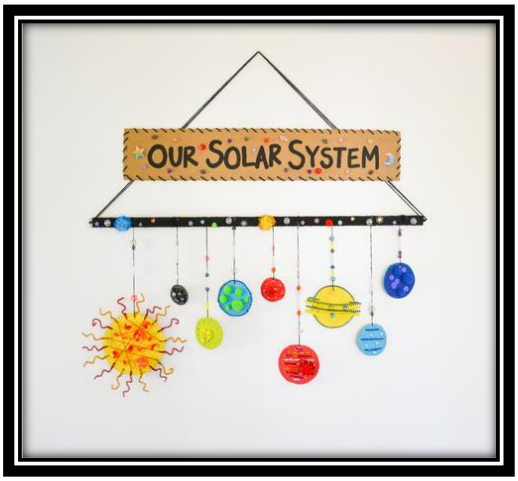
## Space!

Space is an amazing place! From planets and stars to rockets and astronauts, there are so many interesting facts to learn about.  But let's not delay, ready for take-off…?

### Part 1: Balloon Rocket



When British Astronaut Time Peake was launched into space, the rocket that flew him there, the Soyuz, flew at an incredible speed - it only took 8 minutes 48 seconds from take off! We'd like you to make your own rocket and see how fast you can make it fly!




### Part 2: The Solar System

Our solar system is home to eight amazing planets.  Some are small and rocky; others are big and gassy. Some are so hot that metals would melt on the surface.  Others are freezing cold.  We're learning new things about our neighbouring planets all the time, and even discovering new ones!  So, here's a challenge to get you learning all about each of the eight plants!

### Part 3: Tim Peake - life as an astronaut

In December 2015, Tim Peake became the first British astronaut to visit the International Space Station and conduct a spacewalk during his six month mission.  Throughout his mission, Tim made sure he kept answering questions from children and young people, and taking lots of beautiful photos to ensure that we could all learn as much as possible from his time in space.

We'd like you to get creative and imagine you were one of the other Astronauts on Tim Peake's mission!

**3 CU Credits** for completing this challenge.  To claim your credits, please complete your CU Club Reflection Diary and return to your school along with your work.

Finally:  Remember to add the Learning Stamp to your Digital Dashboard once you receive it from your school

# Children's University Club Challenge:

ESSEX 2020
A YEAR OF SCIENCE + CREATIVITY

# Space!

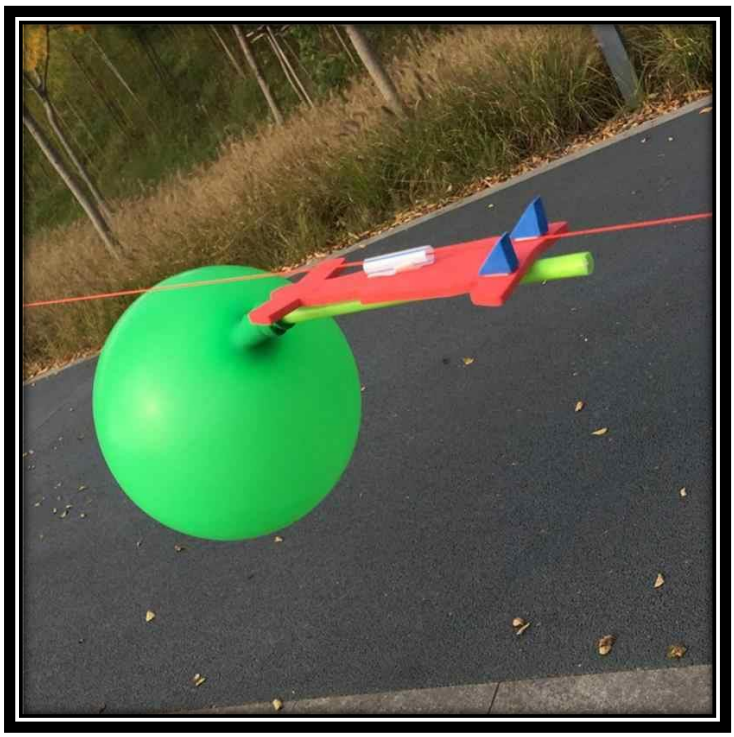
## Part 1: Balloon Rocket

When British Astronaut Time Peake was launched into space, the rocket that flew him there, the Soyuz, flew at an incredible speed - it only took 8 minutes 48 seconds from take off! We'd like you to make your own rocket and see how fast you can make it fly!

**You will need:**
- drinks straw
- some thread or string (as long as it can be threaded through your straw easily)
- balloon (torpedo shaped are best but any will do)
- sticky tape
- craft items to make your rocket shape

**Step 1:** Create your rocket shape! All rockets need a triangle-shaped nose and some windows. Perhaps you could make some flames to shoot from the bottom end? Anything is great but just don't make it too heavy!

**Step 2:** Tie one end of your thread to an object (e.g. a door handle, a fence post, a tree, etc.), then thread your straw onto it. Pull your straw up to the loose end of the thread and tape your rocket shape to it (make sure the rocket is pointing in the right direction!)



**Step 3:** Blow up the balloon and quickly nip the hole to stop the air coming out (you could try using a peg?). With the hole of the balloon pointing towards the start (untied) end of the thread, tape it along your straw close to the hole and not too tight.

**Step 4:** Give your rocket countdown….5…4…3…2…1…then let go! Watch your rocket fly! The air being forced out of the balloon pushes your rocket along the thread. This is the same as the rocket launchers on Tin Peake's rocket - the force from the engines and the flames at the bottom of the rocket is stronger than the gravity force trying to keep it on earth, so they manage to push it up and into space! Amazing!

**Step 5:** What changes could you make to help your rocket fly faster or further?

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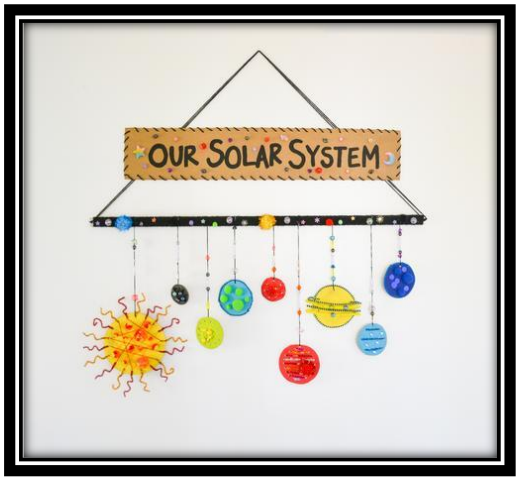
## Part 2: The Solar System

Our solar system is home to eight amazing planets. Some are small and rocky; others are big and gassy. Some are so hot that metals would melt on the surface. Others are freezing cold. We're learning new things about our neighbouring planets all the time, and even discovering new ones! So, here's a challenge to get you learning all about each of the eight plants!

**You will need:**
- drinks straw
- some thread or string (as long as it can be threaded through your straw easily)
- balloon (torpedo shaped are best but any will do)
- sticky tape
- craft items to make your rocket shape

**Step 1:** First, you need to find out all about each of the planets in our solar system. This is a great website to help you: https://spaceplace.nasa.gov/planets/en/ Fill in what you learn on the sheet attached.




**Step 2:** Create a model or picture of each of the planets, using what you have learned. Which is the largest? Which is the smallest? What colours do think they might be? What shape are they? You could make 2D (flat) pictures of the planets using card board and colouring pencils, crayons or paint. Or, you could create 3D models of the planets using recycled items or even papier mache (screwing up balls of newspaper and covering with wallpaper paste or watered down PVA (white school glue)).


**Step 3:** Display your solar system. You could use a coat hanger, and hang all your planets from it. You could use an old shoe box and hang the planets inside (you could even decorate the inside of the box to look like space!)

**Step 4:** Choose your favourite planet. Can you tell someone all about your favourite planet - why is it your favourite and some of the facts you've learned? If you could go and live on one of the planets, which one would it be and why?

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## Part 2: The Solar System

| Planet name | Which other planets is it next to? | How big is it? Size? Biggest, smallest? | How could you describe it? What does it look like (colour, surface, etc.)? Is it hot or cold? |
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# Children's University Club Challenge:
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## Part 3: Tim Peake - life as an astronaut

In December 2015, Tim Peake became the first British astronaut to visit the International Space Station and conduct a spacewalk during his six month mission. Throughout his mission, Tim made sure he kept answering questions from children and young people, and taking lots of beautiful photos to ensure that we could all learn as much as possible from his time in space.

Now we'd like you to get creative and imagine you were one of the other Astronauts on Tim Peake's mission! We've collated some of Tim's answers to the most frequently asked questions on the 'interview sheet' attached.

**You will need:**
- Paper
- Pen or pencil
- Colouring pencils, etc.

**Step 1:** Have a read through (or ask an adult to read them to you), and imagine what it must have been like on the International Space Station. How do you think you might have felt? Happy, excited, nervous or all of those feelings?!

**Step 2:** Think about how you would like to present this information, as if you were an astronaut. Could you write a diary entry? Could you write a newspaper article as if you were being interviewed by a reporter? Could you create a video of you talking about 'your time in space'? Could you write a poem or song about 'when you were in space'? The choice is yours - be as creative as possible!

# Children's University Club Challenge

Space!

## Part 3: Tim Peake - life as an astronaut

## His answers to some of the most frequently asked questions!

1**. Do astronauts all sleep at the same time, and what time do they go to bed?**
Yes, we sleep pretty much all at the same time. We try to get about 8 hours of sleep per night, but this varies. Mission Control back on earth can wake us up if anything goes wrong while we're asleep. I sleep in my crew quarter, which is a bit smaller than a public telephone box, but big enough for everything I need. I strap my sleeping bag loosely to the wall and then zip myself into it and let myself float. Our sleeping bags are quite close fitting, which is good because you don't want to move around inside them too much. I find it easy to sleep in space but it's probably not as good quality sleep as I get on Earth. It's sometimes hard to get your arms into a comfortable position – I normally just fold them across my chest. I am actually looking forward to sleeping in a proper bed again and having the feeling of gravity pull me down into a comfy mattress!

2**. Is there gravity in space, and why do astronauts appear 'weightless'?**
Gravity is everywhere in space! It's what keeps the Moon in orbit around Earth, it keeps Earth in orbit about the Sun and holds galaxies together. We don't fall back down to earth - we fall 'around' Earth. We travel about 28 000 km/h (17 500 mph) but as we accelerate towards Earth under the pull of gravity, Earth curves away beneath us and we never get any closer. Since we have the same acceleration as the Space Station, we feel 'weightless'.

3. **What does it feel like to float in space?**
Floating in space is the most incredible feeling. It's really easy just to float around the space station to pick things up and do a somersault and come back down again. We can store items on the walls and overhead without worrying about them falling down (Velcro is your friend here). It takes a while to get used to weightlessness and moving around but once mastered you can move around quickly with just the smallest of pushes. Imagine being able to travel down a long corridor on Earth without any effort – it would be great! We hardly use the soles of our feet at all – and because of this they become very smooth and soft – but we are constantly using the tops of our feet to grab under handrails and hold us down and so the skin becomes rough and hard on the tops of our toes.

4. **How do we wash our clothes in space?**
We do not have a washing machine so we wear the same clothes, including underwear, for several days before we change. It is not as bad as it sounds. We live in a temperature-controlled environment, so clothes do not get as dirty as they might on Earth.

**5. What happens to waste from the Space Station?**
Our used and dirty clothes are placed in a waste bag and put on a supply spacecraft (Progress or Cygnus) that undocks and then burns up in Earth's atmosphere. This is also how we get rid of other rubbish, such as empty food packaging or our solid waste from the toilet, for example. We don't get rid of urine – that is recycled back into drinking water!

**6. What food do you eat in space?**

We eat fairly normal food, like you might eat on Earth, but it is out of cans or packets. Some of it is dried food to which we add water to make it edible. Other food comes in pouches which we place in our electrical food heater to warm up. The portions are also quite small so you have to be careful not to lose too much weight… a great excuse for eating dessert every night! My favourite foods are the breakfast menus (scrambled eggs, baked beans and sausages!). We also get a very small supply of fresh fruit every so often on the supply spacecraft. I love making myself a peanut butter and jam sandwich in the afternoon. We don't have proper bread so I use a tortilla wrap instead, but it tastes pretty good! Also, occasionally we have 'Maple Muffin Pancackes' which taste great for breakfast – especially with a bit of extra honey on them! And, of course, I have my favourite 'Space Dinners' salmon dish from the kids competition and designed by Heston Blumenthal.

**7. You've trained for most situations on the International Space Station, but what thing surprised you most when you first got into space?**
The thing that most surprised me was how black space appears during the day. You know that stars are out there, but because your eyes adjust for brighter objects, space looks so incredibly dark. During my spacewalk, it felt scary being on the farthest edge of the Space Station and having nothing but the vast blackness of space over my right shoulder. It reminded me not to let go!

**8. What feature or place on Earth's surface do you look forward most to seeing each time you go round?**
Well, on viewing Earth's surface, it's all truly amazing. Often I go to the window expecting to see a certain mountain range, city or other landmark but I'll come away with photographs of something completely different. Earth has so many secrets and the longer you spend in space the more time you have to find and appreciate them. Even every sunrise and sunset is unique and special in its own way.

**9. What's your favourite part of your day in space?**
I enjoy finishing 'work' at the end of the day and having some time to take photographs, look out the window and call friends and family. The working day is fun but we're always trying to keep to a tight timeline, so it's nice to have a couple of free hours in the evening.

**10. Can we see other planets from space?**
Yes, we can see other planets from space and I have been able to photograph Venus rising over Earth and also Jupiter, Mars (pictured) and Saturn. Most of our windows look down on Earth – so although we see the planets rising and setting it's much harder to see them when they're above us.