

## *Аудуоскрпунм*

*That's the beginning of the Listening task. I am going to give you the instructions for this task. You will hear the recording twice. Remember, while you are listening, write your answers on the answer sheet. You will have 5 minutes at the end of the task to copy your answers onto the separate answer sheet. You must not speak during the task. Now open your question paper and look at the Listening task. You will hear the talk about space and stars.*

*Do the following statements agree with the information given in the recording?*

*In boxes 1 to 10 on your answer sheet write A (TRUE) if the statement agrees with the information; B (FALSE) if the statement contradicts the information.*

*You have 30 seconds to read the questions. Now we begin the listening task.*

Chris - Now, Carolin, we've got this question which is probably one for you. Can you get green stars?

Carolin - Well, this is a very interesting question because some people are always amazed to know that stars have colours. Because if you stand out in your back garden and you look with your naked eye they all look white, except one or two like Beetlejuice maybe look vaguely orange. Now if you look through a telescope you begin to see a few more colours and, obviously, if you have pictures taken with a digital camera those colours begin to pop out. You see there are blue stars, and yellow stars, and red stars, and white stars but yet, curiously, there aren't any green stars, and the colour of stars is related to their temperatures. So in the same way that you heat a lump of metal up it's starts glowing this sort of dull red, it goes through to orange, and at it's hottest a bright almost like blue/white. The same with stars, they are glowing because they are hot - it's thermal radiation. And in physics, unlike your plumbing, red is cool and blue is hot.

But if you could analyse the spectrum, in other words you look at the distribution of light given off by stars, they're not just giving off that one colour, they're giving off a whole range of colours. It's something called the black body radiation. And if you could map it out, it would look like a spread of all colours but with a definite peak. So with a cool star that peak is in the red, so the red light dominates. And as the star heats up that peak shifts through to the blue. So if you get a star at 3,000 degrees it's very cool and red, at 30,000 degrees it's stonkingly blue.

Now what is curious is if you get a star like our Sun (about 6,000 degrees) that peak is bang in the middle of the visible spectrum. Now the difference is you've got that peak, that's where most of the light comes out but if you're right in the middle of the spectrum you've got as much yellow light and as much blue light to either side. So your eye kind of mixes it together and sees white. But if that peak is at one end, so either at the red or the blue, you're just seeing that peak and one side of the colour so you don't get so much mixing. So even though our Sun predominantly gives off most of it's light green, we've got all this yellow and blue next to it and it get's mixed out as white.

Chris - Dani?

Dani - I was just going to ask does the colour give any indication, and does the temperature give any indication of the life span? Are the really hot ones about to explode or is it not as simple as that?

Carolyn - You can't... Well, it is very, very clever because the temperature tells you how hot the star is, which in turn tells you how massive the star is, and also how old it is. And you think we learn all this just from taking spectral images of stars and we can work out all these things. It's kind of perverse because if you have a really hot star, it has to burn energy at such a rate because it's a really massive star. So a star's life is just basically a battle against gravity. So if you have a really massive star, it's going to burn that much hotter, it's going to go through its fuel that much quicker to, you know, withstand gravity. However, even though it's a bigger star it goes through its fuel faster and so it has a shorter life. So if you see a bright blue star, it's a really young star and it's a really massive star. And if you see a very cool dim red star, that's actually going to have a lifespan of billions of years unlike the hot blue star which is perhaps millions of years, so you can learn an awful lot from the colour.

Chris – Thank you very much.

*Now you will hear the recording one more time.*

*--The recording is repeated.--*

*That is the end of the Listening task.*

*Now you have 5 minutes to copy your answers onto the separate answer sheet.*