

DARK ENERGY

**SciArt colouring &
educational booklet**

Download & complete

**With colouring & drawing pages,
& mini quizzes**

Age group: 9+ years old

@artisticphysicist

@artisticphysicist

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**"Dark Energy", Raghda Abdel Khaleq,
oil & string on canvas, 2022**



This book is being used by

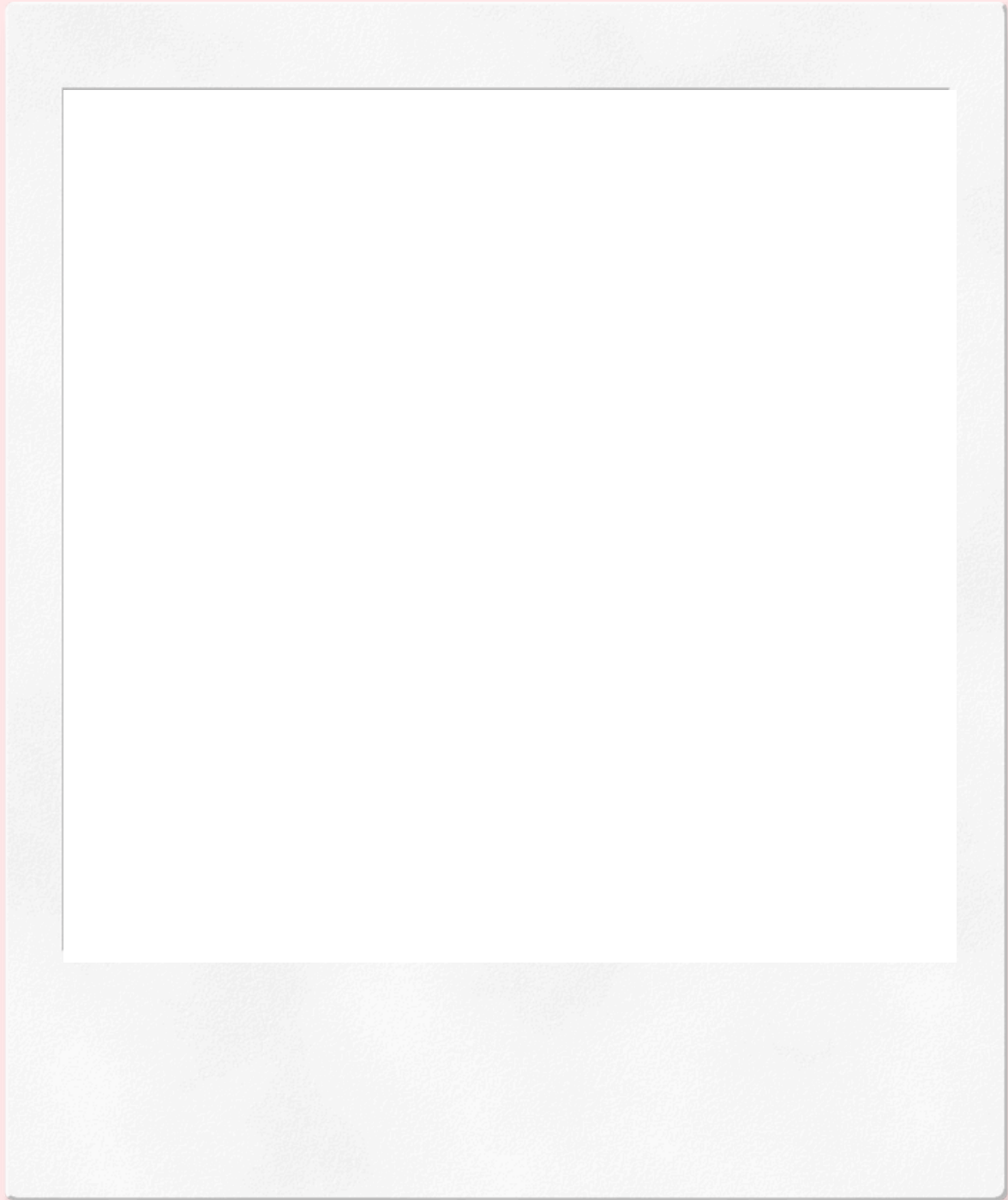
(write your name)

**I promise to learn and follow this
book to the best of my ability, and
have a lot of fun along the way!**

Sign

Date

Draw an image of yourself



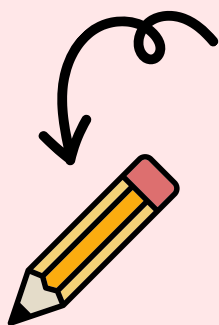
My favourite hobby:



How to use this book

Take your time going through the activities.

You can stop and start any time you want.



If you see this symbol next to a black & white image, feel free to colour or paint it

**Come on this journey
to learn about the
universe!**

Our topic for this book is

DARK ENERGY

PART I

WHAT IS DARK ENERGY?

DARK ENERGY

is a type of
energy that makes
the universe get

BIGGER!

Over time, it just keeps getting

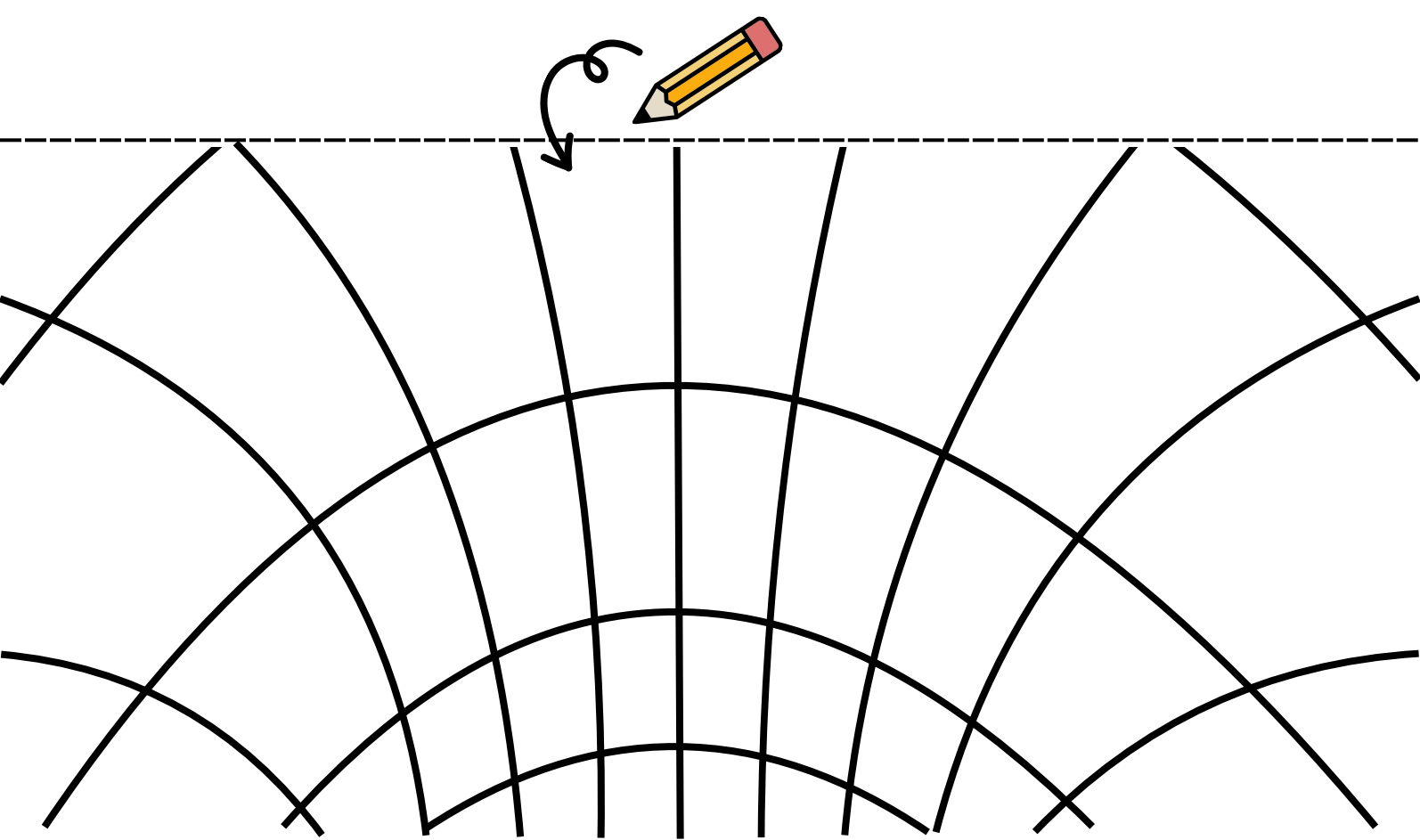


BIGGER...

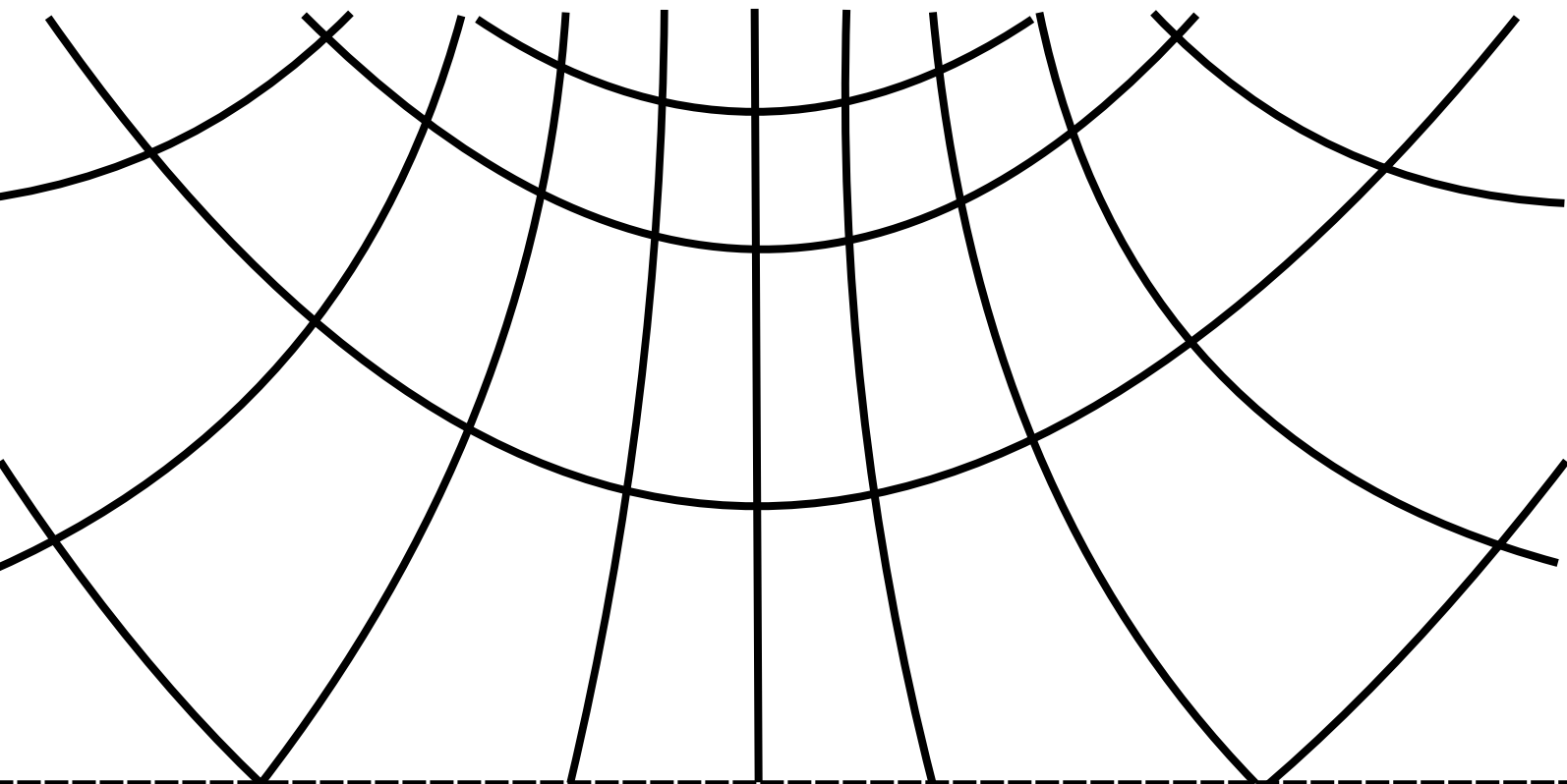
and **BIGGER...**

and **BIGGER**

and it doesn't stop!



Space is expanding!



The word “expand” means “to get bigger”

What does “expansion” mean to you?

Write 3 words that remind you of
“expansion” or “getting bigger”

e.g. balloon blowing up

•

•

•

**Draw something that
“expands” or “gets bigger”**

**Colour it or Paint it
(or get creative in your own way)**

Art piece #1

Art piece #2

Art piece #3

MINI QUIZ

Tick the correct answer

What is dark energy?

- ☐ Something that makes the universe expand (get bigger)
- ☐ Something that makes your cat get sick
- ☐ Something that makes all the tree leaves fall down
- ☐ Something that makes all the stars explode

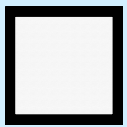
MINI QUIZ

Correct Answer

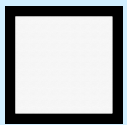
What is dark energy?



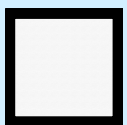
Something that makes the universe expand (get bigger)



Something that makes your cat get sick



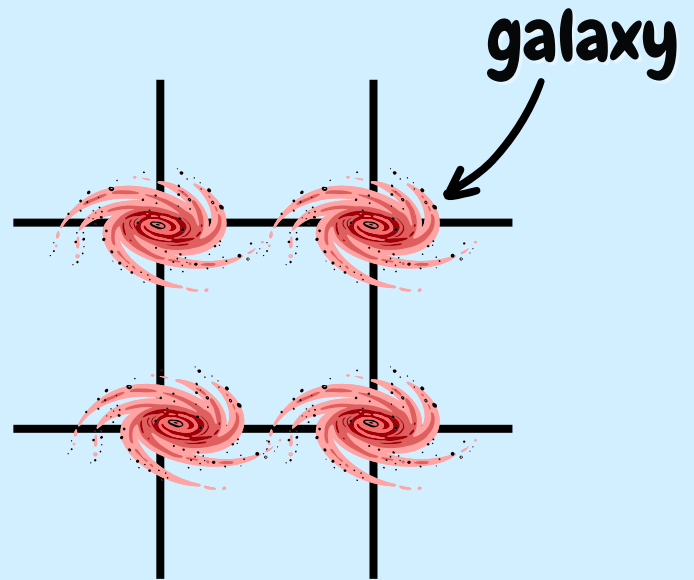
Something that makes all the tree leaves fall down



Something that makes all the stars explode

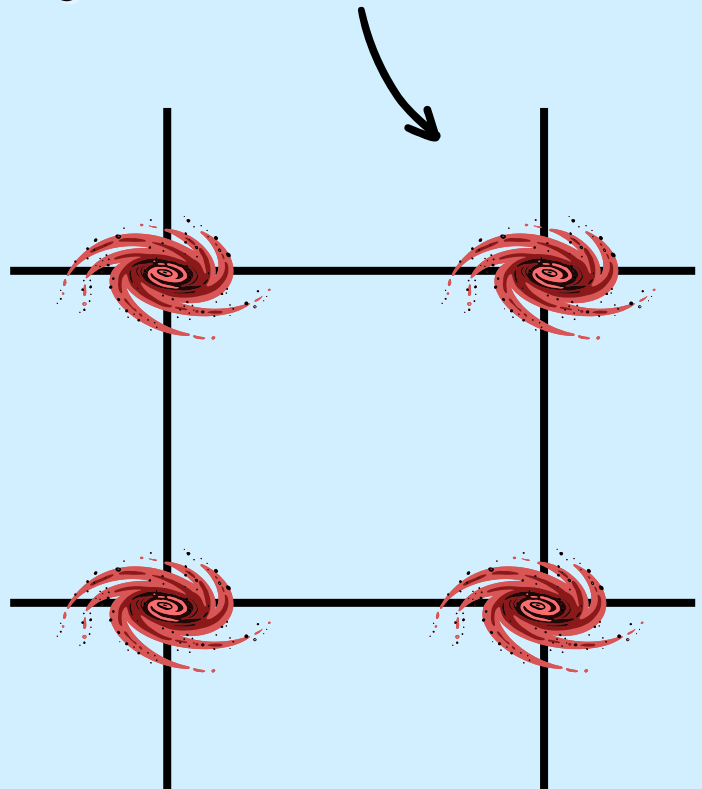
How does expansion look like?

**Space
today**



objects move away from each other

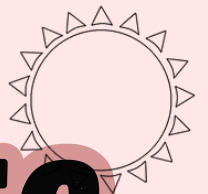
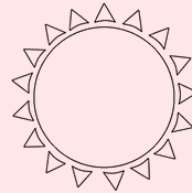
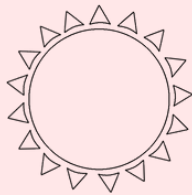
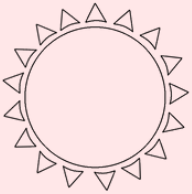
**Space
after some
time**



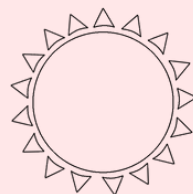
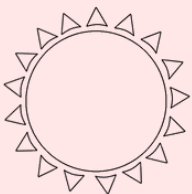
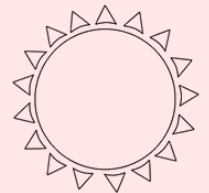
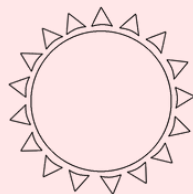
PART II

**HOW DO WE
KNOW THE
UNIVERSE IS
EXPANDING?**

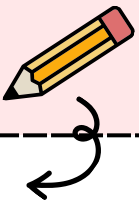
**We know space is
expanding by looking at**



SPACE OBJECTS

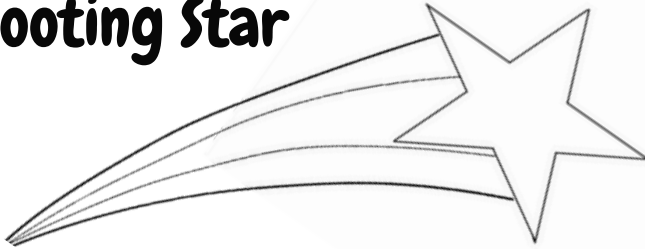


Colour the images below

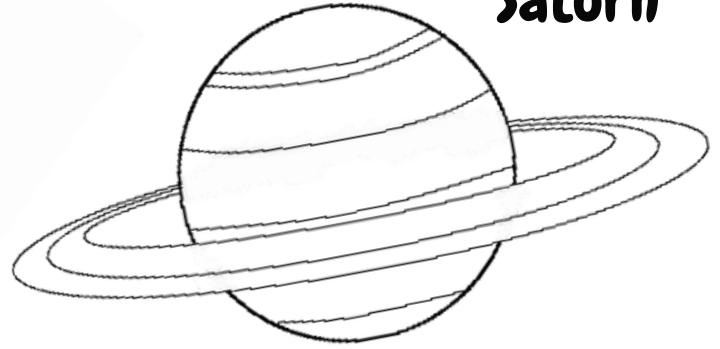


SPACE OBJECTS

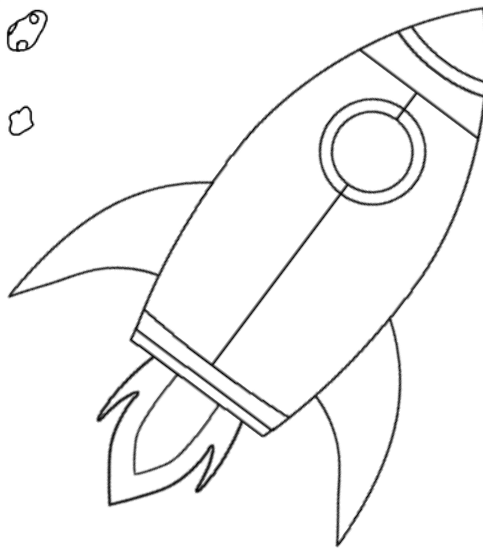
Shooting Star



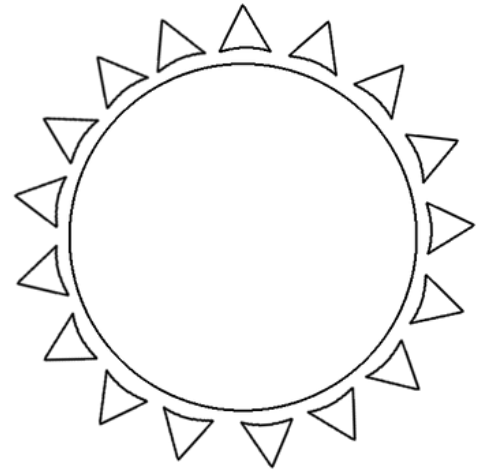
Saturn



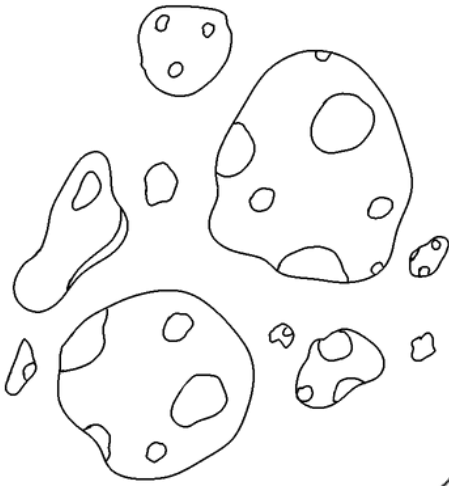
Rocket



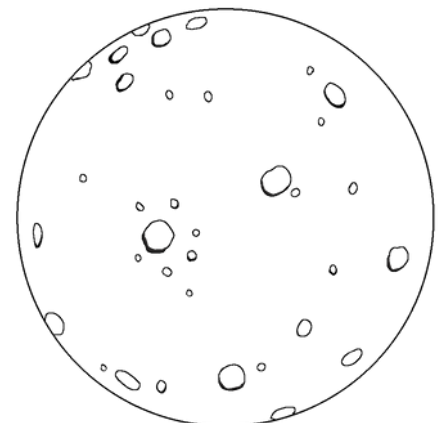
Sun



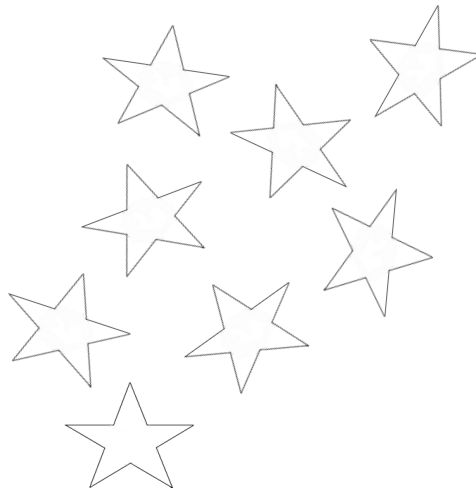
Asteroids



Moon



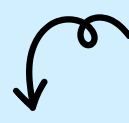
Stars



Earth



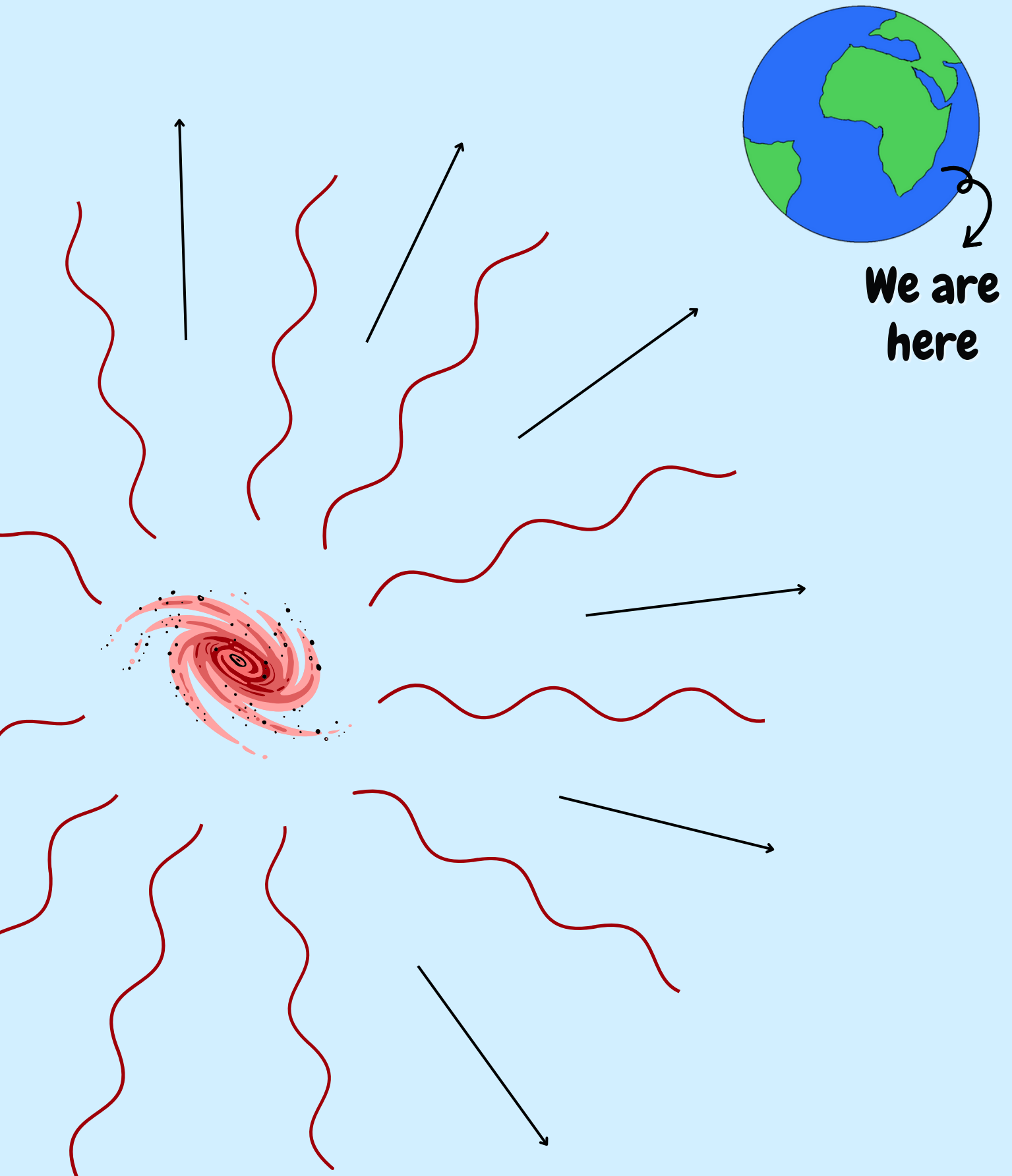
**We use light from space
objects to help us study
how space changes**

 **This is light**



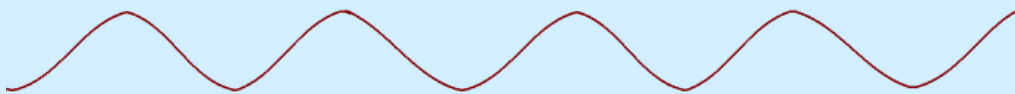
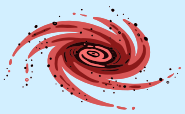
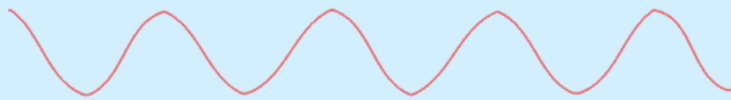
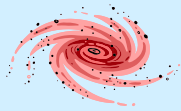
It is in the shape of a wave!

Light travels from objects to us



The colour of the light
changes, based on how
far away the object is

Closer



Farther

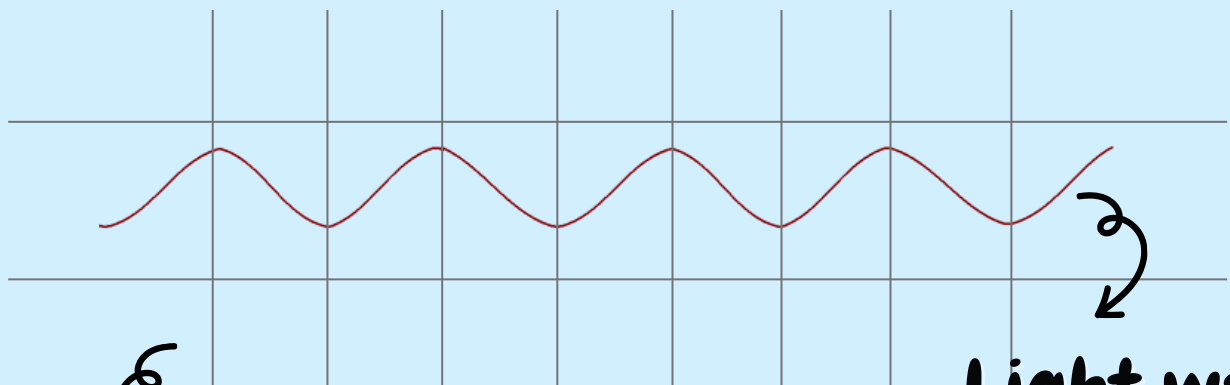
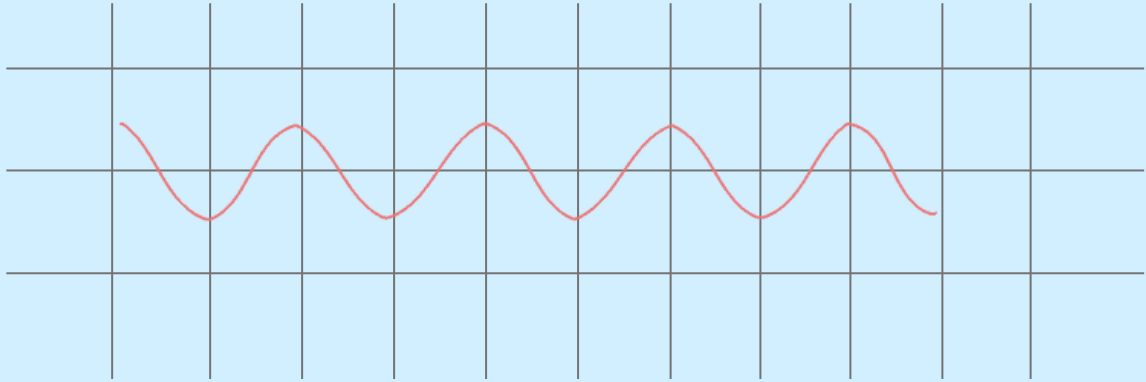
The farther away, the
redder the light becomes!

This is called

REDSHIFT

**It tells us that space
objects are moving
farther away over time**

As space stretches, the light wave stretches too!



Space
expanding

Light wave
stretching

Light waves that are more stretched look more red

Colour Gradient of Light Waves

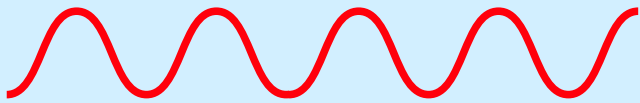
Light more stretched;
More space expansion



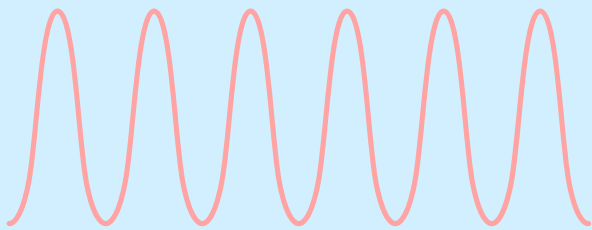
Light less stretched;
Less space expansion

Colour Gradient of Light Waves

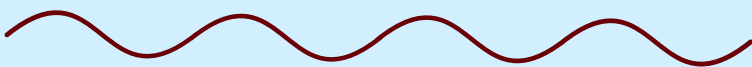
Match the wave with the level of expansion. Draw a line between the wave and the word.



Little
expansion



Lots of
expansion



Some
expansion

Colour Gradient of Light Waves

Match the wave with the level of expansion. Draw a line between the wave and the word.

Little expansion

Lots of expansion

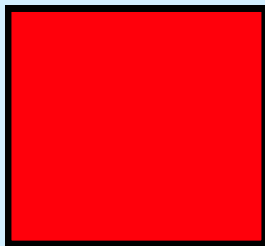
Some expansion

Correct Answer

**Match the amount of redshift with
the distance of the object.
Draw a line between the
word and the box.**



Very Far

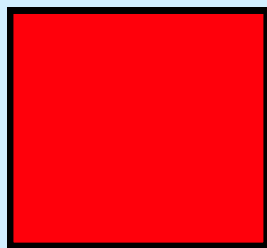


Close



Far

**Match the amount of redshift with
the distance of the object.
Draw a line between the
word and the box.**



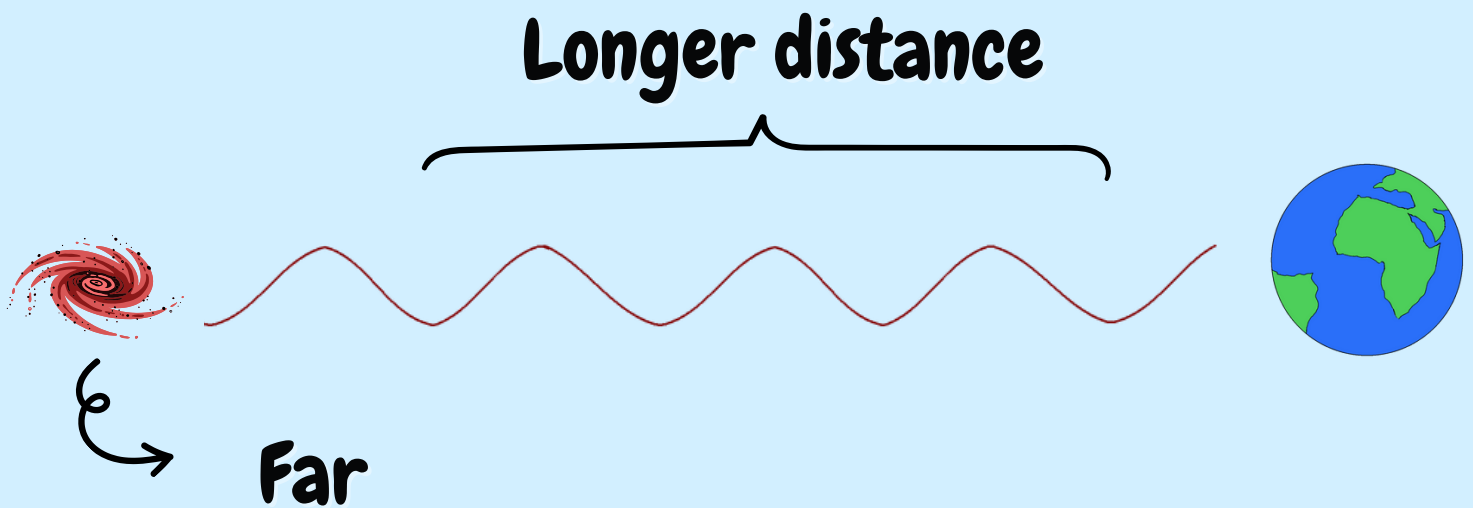
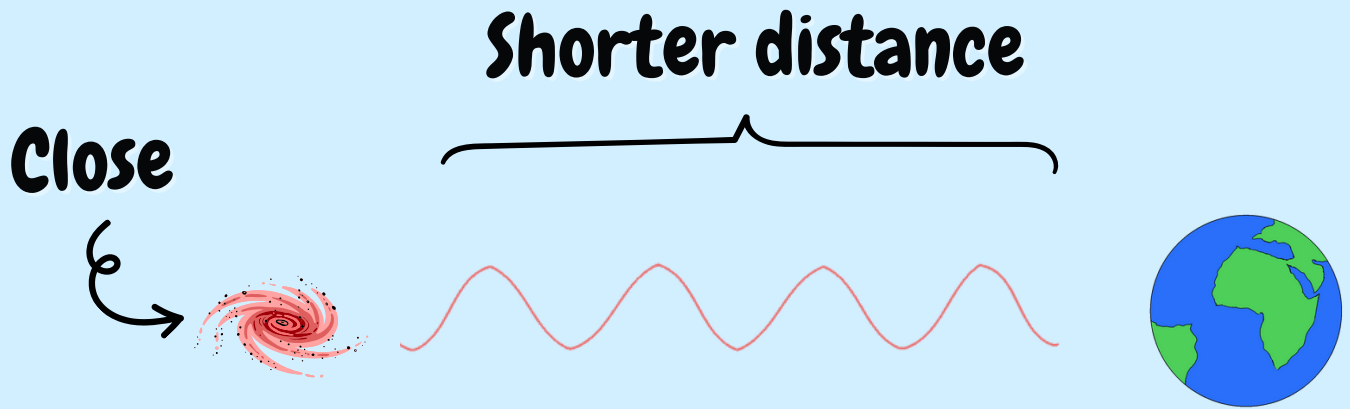
Very Far

Close

Far

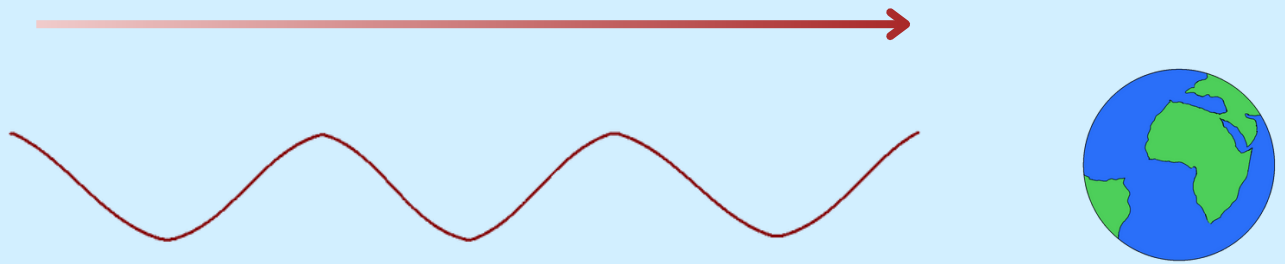
Correct Answer

**When an object is farther away,
light takes longer to get to us.**



**The farther away,
the older the light!**

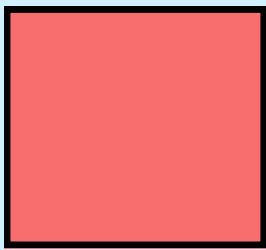
Because space is **expanding**,
light from far away objects
takes **even** longer to travel!



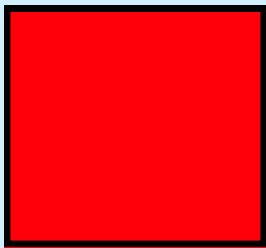
Light from these objects
carries old information.

The farther away the
object, the **redder** the
light, and the **older** it is.

**Match the amount of redshift
with the age of the light.
Draw a line between the
word and the box.**



Very Old

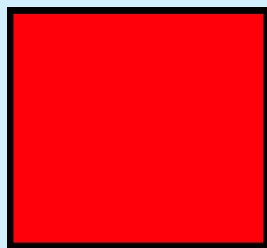
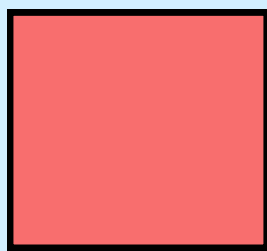


New



Old

**Match the amount of redshift
with the age of the light.
Draw a line between the
word and the box.**



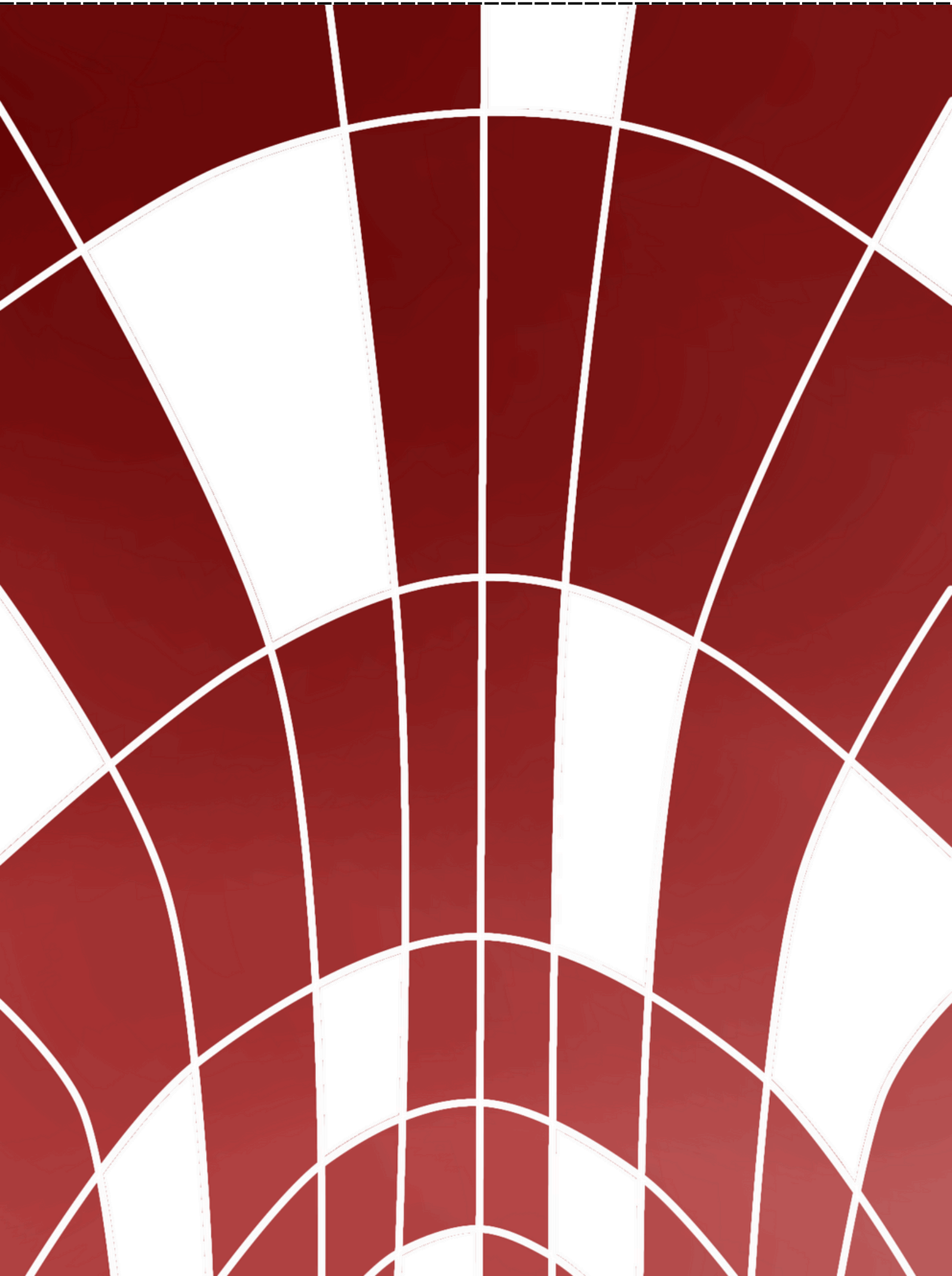
Very Old

New

Old

Correct Answer

Copy the pattern to colour the image



Draw 3 of your favourite red things (of different shades).

Colour or paint them

Art piece #1

Art piece #2

Art piece #3

MINI QUIZ

Tick the correct answer

We know the universe is getting bigger because the light from space objects:

- ☐ Is getting redder over time
- ☐ Is really black all the time
- ☐ Is making the sky rain
- ☐ Is making the clouds disappear

MINI QUIZ

Correct Answer

We know the universe is getting bigger because the light from space objects:

- ☒ Is getting redder over time
- ☐ Is really black all the time
- ☐ Is making the sky rain
- ☐ Is making the clouds disappear

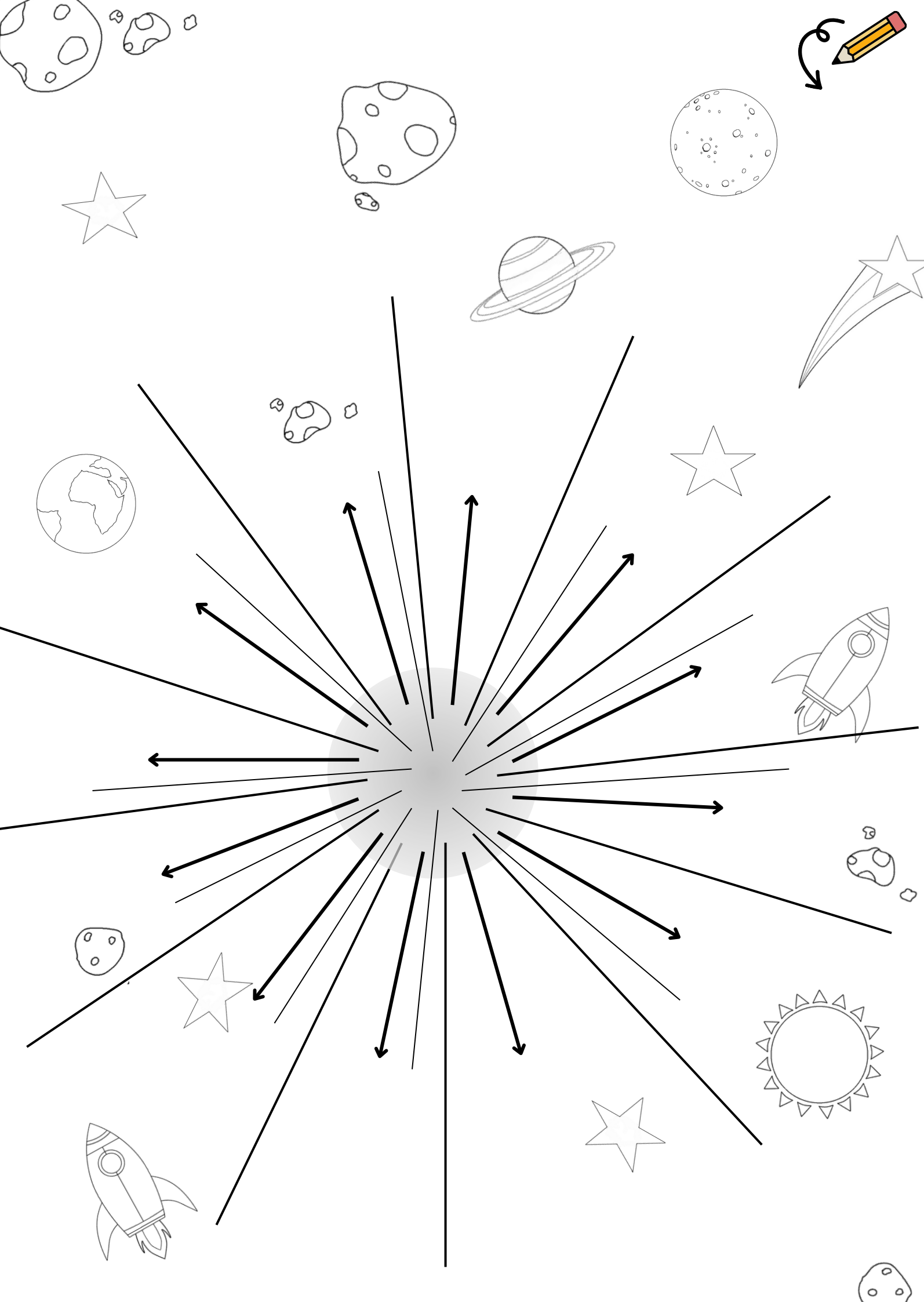
PART

III

**WHAT WILL
HAPPEN TO
THE UNIVERSE
IN THE
FUTURE?**

**No one knows
with certainty...**

**If Dark Energy keeps
pushing things apart, the
universe will eventually
rip, and everything will
fly apart!**



What will you miss?

Write down anything you will miss if the universe explodes

e.g. your family, your pet,
your school

- _____

- _____

- _____

- _____

**Draw 3 of the things
you wrote down.**

Colour or paint them

Art piece #1

Art piece #2

Art piece #3

What did you learn about dark energy?

Tick as many as you like

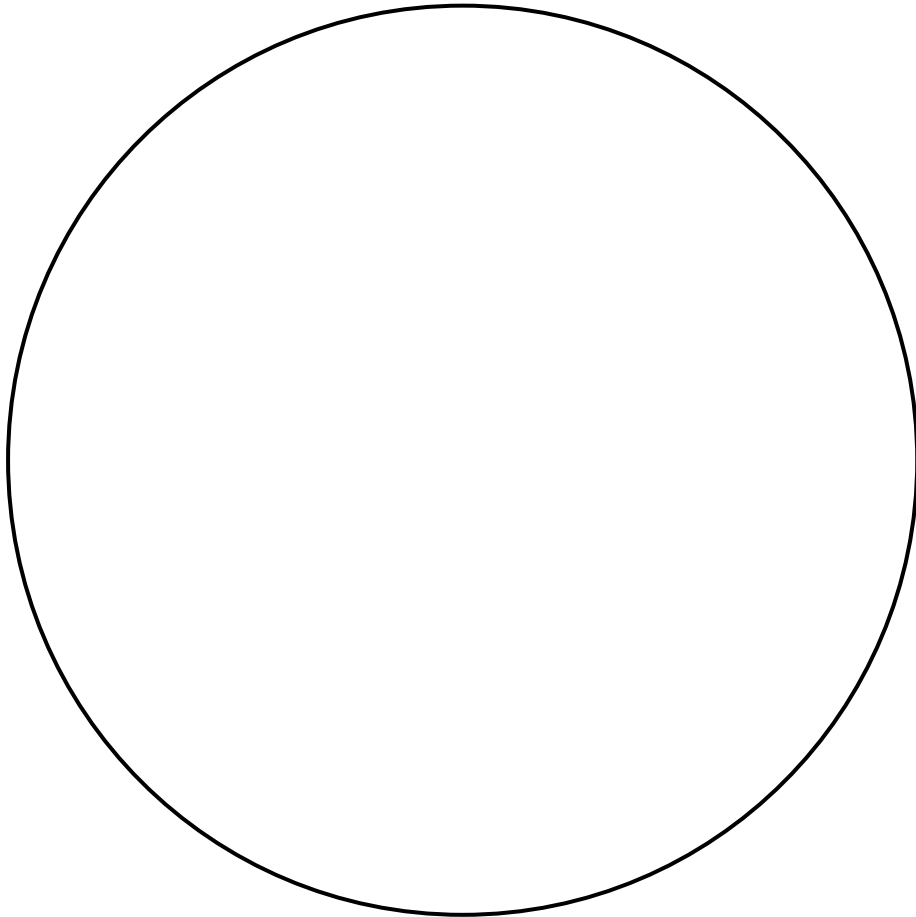
- ☐ Dark energy is cool!
- ☐ Dark Energy is scary
- ☐ I'm still confused
- ☐ I don't want the universe to explode

ADDITIONAL ACTIVITIES

Design Your Own Planet

Get creative drawing your own planet. Colour or paint it.

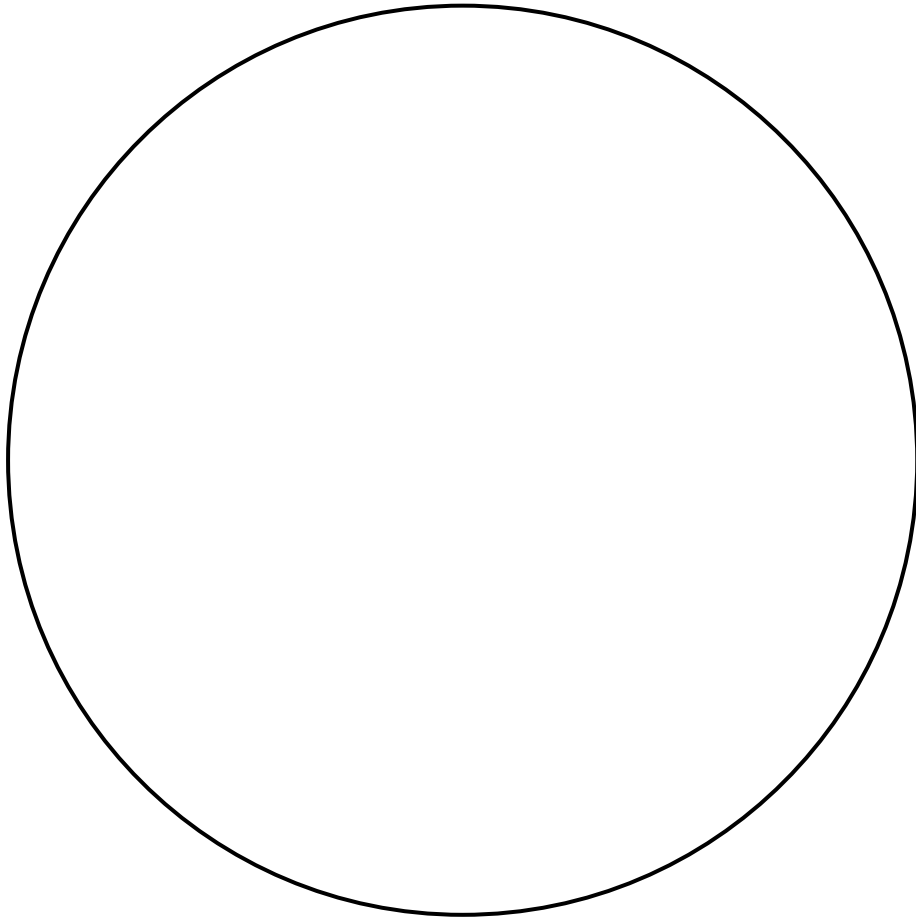
#1



Design Your Own Planet

Get creative drawing your own planet. Colour or paint it.

#2



Word Find

Highlight or circle the words below

Star

Wave

Expand

Dark Energy

Sun

Space

Rocket

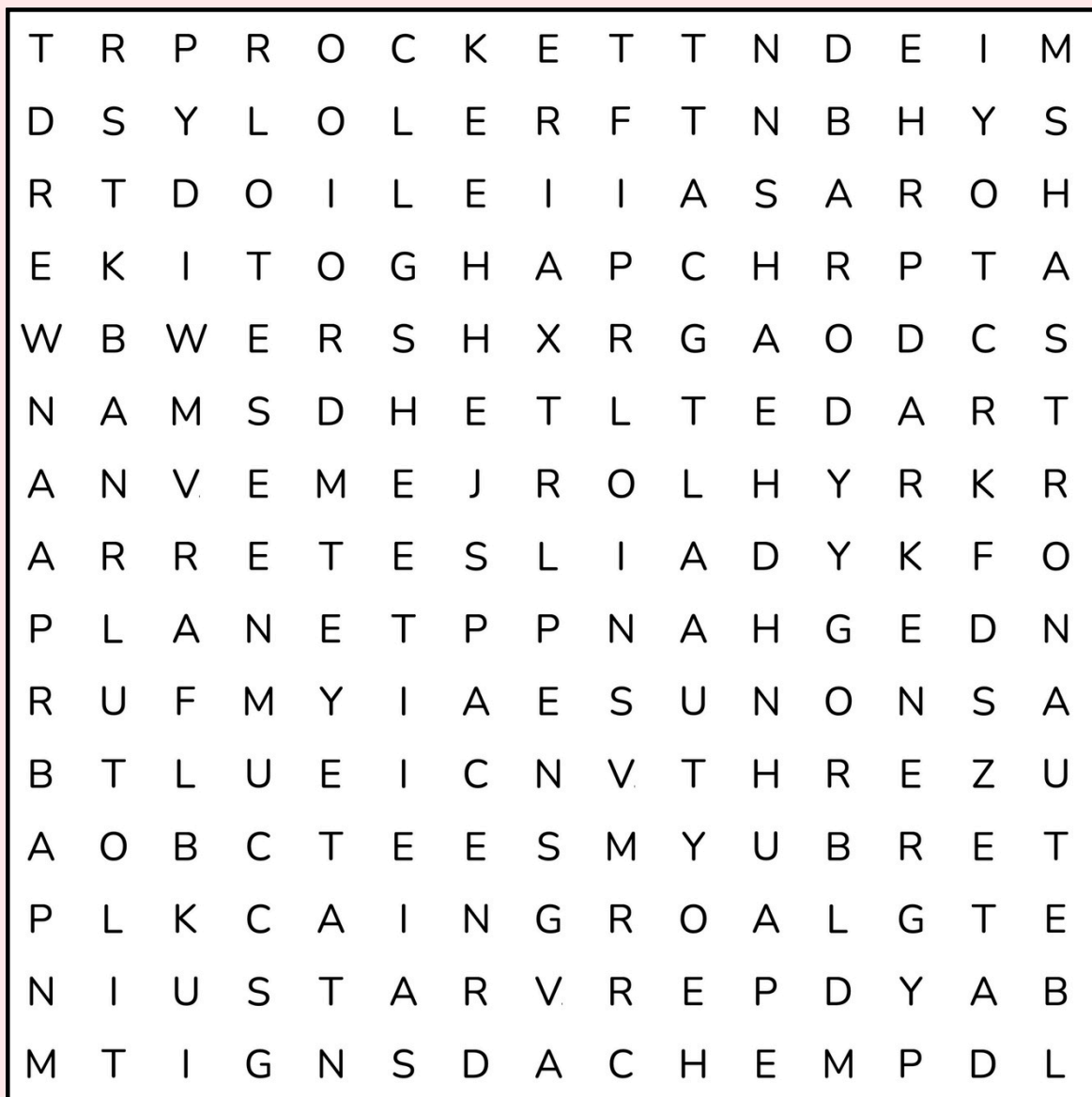
Astronaut

Planet

Earth

Light

Redshift



Crossword

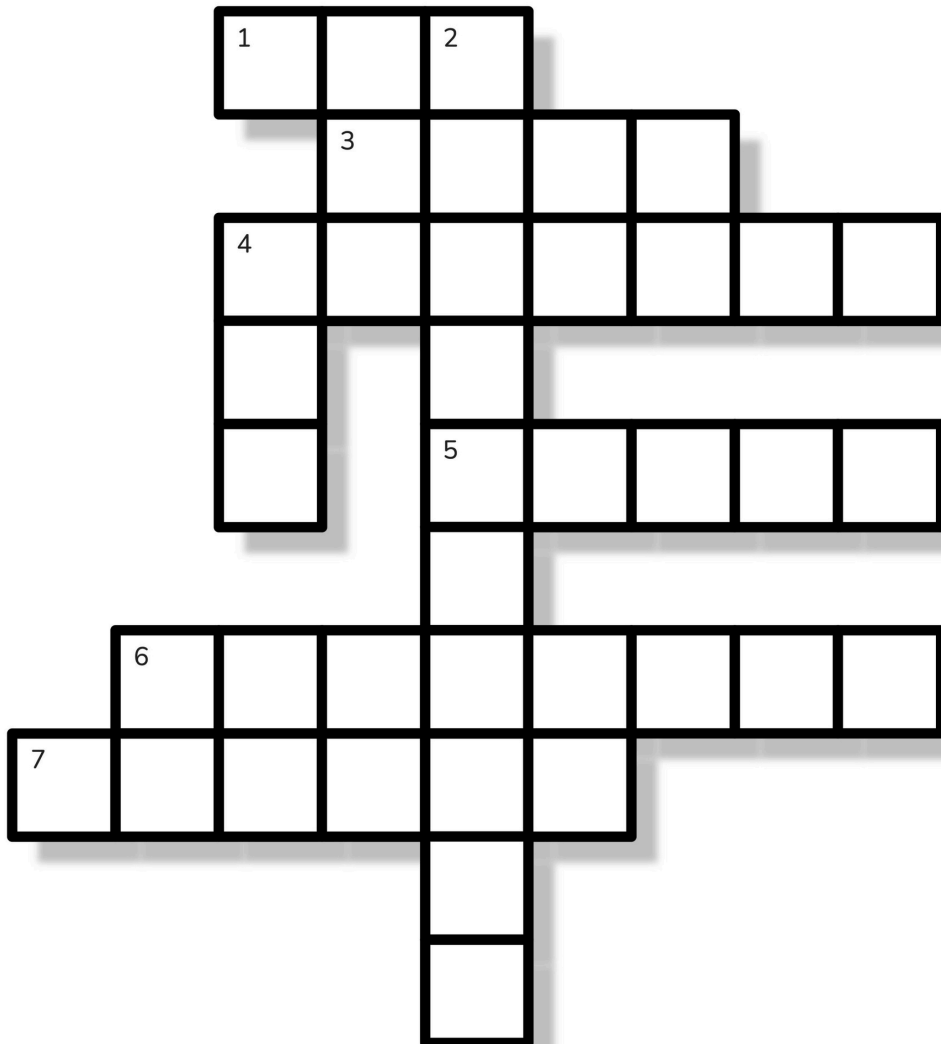
Finish the crossword below

Across

1. Light from far away objects tends to be more:
3. Shape of light
4. As space expands, light waves:
5. Planet where humans live
6. Space rock
7. Planet in solar system with clear rings

Down

2. Energy that makes the universe expand
4. Name of the star at the centre of our solar system



**Thank you for coming
on this physics journey!**

**To provide feedback or ask
questions, visit
[www.artisticphysicist.com/
contact/](http://www.artisticphysicist.com/contact/)**

Until next time friends!