EXOPLANET COLORING BOOK

Have fun while learning about Exoplanets, Transit Science, and the Transiting Exoplanet Survey Satellite (TESS)
Note to Parents and Educators:
This Coloring Book is designed for ages 5 through 10.
It contains general information about NASA and TESS.
INTRODUCING TESSie
Welcome to TESSie’s Universe!

TESSie is our very own planet finder! She will sniff around and point out exciting facts about exoplanets and NASA’s TESS Satellite.

Look for TESSie throughout this activity book!
**WHAT IS AN EXOPLANET?**

New Worlds Outside of Our Solar System!

*ex·o·plan·et*

/ˈeksəˌplænət/

*noun*

An exoplanet is a planet orbiting a star different from the sun ("exo" means "outside" in Greek).

Thousands of planets have been found around other stars!

The "E" in TESS stands for Exoplanet!

Planets may be different from Earth. What kind of planets do you think are out there?
Exoplanets are also in different orbits around their stars. If an orbit is too close, the exoplanet will be very hot. If it has an orbit that is too far away from its star, the exoplanet will be very cold. When an exoplanet's orbit is not too close or too far away from its star, the temperature may be just right to have water and maybe life (like Earth). We call this the **habitable zone**.
Hot Jupiters are very large gas planets that are close to their star. Some are so hot that their atmospheres are boiling away into space. A year is when the planet revolves around its sun one time. Hot Jupiters may complete one revolution in just a few hours—this makes their year very short.
Some exoplanets may be made of mostly water, with large oceans covering them.
Some exoplanets are made mostly of rocks and metals. They are smaller than the large gas planets. Mars, Earth, Venus, and Mercury are Rocky Planets in our solar system.
EXOPLANETS IN BINARY STAR SYSTEMS

Are You Seeing Double?

This exoplanet orbits two stars (called binary) in the same system. Think about what it would be like seeing two sunrises and sunsets!
Wow, TESSie found a planet that is rocky like Earth, but much bigger. This planet is called a Super Earth and it can be twice the size of Earth, but it is smaller than gas exoplanets.
Gas giants have many layers of a very cloudy atmosphere. These exoplanets are much larger than the rocky worlds; when the size of a planet core becomes so large, it is able to capture all kinds of gases to form a thick atmosphere.
This exoplanet is too far away from its star and is freezing cold. TESSie can’t live here.

UNINHABITABLE!
FLAMING HOT

Hot Dog!

This exoplanet is too close to its star. TESSie can’t live here.

UNINHABITABLE!
This exoplanet is just right. Not too cold that water may be frozen and not too hot that it boils away. TESSie would love this planet. **THIS IS IN THE HABITABLE ZONE!**
This exoplanet is named _____________.

Draw the things that TESSie and the astronauts will find on this exoplanet.
When an exoplanet passes in front of a star, it blocks out some of the light, like a solar eclipse. We call that “transit!”

The more light that is blocked from a star, the bigger the planet. Scientists can use this information to learn about the type of exoplanet that is discovered.
To find exoplanets making transits, we need to take pictures of stars using cameras. TESS will have four cameras on the spacecraft to measure the light of stars.
TESS in Color

Give the TESS Spacecraft a Touch of Color

The Past and the Future

TESS will survey (the 1st “S” in TESS) the entire sky looking at 200,000 stars during a two-year mission to find new planets!

The History of Exoplanet Missions

NASA has spacecraft in orbit today, new spacecraft being built now, and large telescopes on the ground looking for new exoplanets.

Each one uses different types of telescopes and cameras to find exoplanets.
The Transiting Exoplanet Survey Satellite (TESS) will use cameras to look for exoplanet transits. TESS will discover thousands of new exoplanets in orbit around the brightest stars in the sky. The exoplanets TESS will find will be closer to Earth where future missions can investigate if they are like Earth.

http://tess.gsfc.nasa.gov
TESS will *survey* (the 1st "S" in TESS) the entire sky looking at 200,000 stars across the whole sky during a two-year mission to find new planets!
DOWNLOADING TESS DATA

How Does Information Get to Us?

To get the information from space to the scientists on the ground, there are three stages:

1. The four TESS cameras gather the exoplanet transit data.
2. TESS sends the data down to Earth to ground stations in Spain, Australia, and the United States in California.
3. The data is sent to the scientists at the Massachusetts Institute of Technology (MIT) to look for exoplanet transits.

What is a transit?

The "T" in TESS stands for Transit!
DRAWING TIME

What Is Your Favorite Type of Exoplanet? Draw It Below.
DESIGN A NEW SPACECRAFT

Next Exoplanet Hunter Satellite!

Gas giants have many layers of a very cloudy atmosphere. These exoplanets are much larger than the rocky worlds; when the size of a planet core becomes so large, it is able to capture all kinds of gases to form a thick atmosphere.
EXPLORING A NEW WORLD WITH TESSie

Draw Yourself Standing on an Exoplanet
EXOPLANET: USE YOUR IMAGINATION

Draw as Many Exoplanets as You Can
MAYBE ONE DAY YOU’LL HELP US FIND NEW PLANETS?

Hot Jupiters are very large gas planets that are close to their star. Some are so hot that their atmospheres are boiling away into space. A year is when the planet revolves around its sun one time. Hot Jupiters may complete one revolution in just a few hours—this makes their year very short.

TESS will find lots of exoplanets that we will study for years. Join us in learning what is beyond our solar system.
For more information on NASA and the TESS mission, visit these websites:

http://education.nasa.gov
http://nasascience.nasa.gov/
http://tess.gsfc.nasa.gov/
http://www.nasa.gov
For more information, please visit our web site:
http://tess.gsfc.nasa.gov/

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Don’t forget to watch our launch!