



Telescope Treasure Hunt

How Do Stars and Planets Form?

About the Activity

Participants tour the telescopes to hunt for different objects that contribute to stellar and planetary formation, using a Treasure List. Participants can mark each item with a pen or pencil or sticker. When all the items on the handout are found, one of the astronomers signs off on it.

Topics Covered

- An overview of how stars and their planets form
- Find objects in the telescope that illustrate this process

Materials Needed

- 1 copy of the Treasure Hunt Handout for each participant
- Telescopes
- Pen or pencil for each participant
- *(Optional)* Stickers
- *(Optional)* One or more prizes for the winners

Set Up

Ask each astronomer to point at one of the types of objects listed on the handout. See the Activity Description and Background Information for more details and suggestions.



Photo Credit:
NASA/Hubble/Spitzer

Participants

Adults, teens, families with children 5 years and up

If a school/youth group, ages 9 and higher

No minimum or maximum number of participants

Location and Timing

Use with telescopes at a star party. Can last as long as participants want to observe, usually an hour to find the objects.



Photo Credit: NASA/Spitzer

<u>Included in This Packet</u>	<u>Page</u>
Detailed Activity Description	2
Helpful Hints	3
Background Information	4
Handout: Treasure List	5



Detailed Activity Description

Leader's Role	Participants' Roles (Anticipated)
<p>Preparation Notes:</p> <p><u>To Do:</u></p> <ol style="list-style-type: none"> 1. Each participating amateur astronomer may pick any object(s) he or she wishes to show and that his or her telescope is capable of viewing. 2. Prepare the astronomers by giving each person a copy of the Treasure List. Explain that your visitors will have these and be on a “treasure hunt” to look at these objects. The information on the back of the Treasure List may give each astronomer some talking points about their object. (Of course, there may be objects that some of the astronomers will be viewing that are not on the Treasure List – like the Moon, globular clusters, or another galaxy – you can refer to these as “bonus” or “surprise” items). 	
<p><u>Note:</u></p> <p>If examples of one or more of the objects on the Treasure List are not accessible (sky too bright, out of range of the telescopes, no examples far enough above the horizon) of the items on the Treasure List, you can have someone explaining about the object (e.g. supernova remnant Crab Nebula) and indicating its position in the sky if it was dark enough to see it, or when you would be able to see it.</p>	
<p>Introduction:</p> <p>Introduce the activity and explain to the participants what to expect. You can use the following script, if you wish:</p> <p><u>To Say:</u></p> <p>Tonight, you will be on a treasure hunt as you tour the telescopes. You can find many different and exotic objects found in our Galaxy that contribute to the formation of stars and planets. Travel from telescope to telescope and hunt for these amazing objects. You will receive a Treasure List and set of stickers. For each object on the Treasure List that you see through a telescope, place one of your stickers next to that object. (Hold up the Treasure List)</p>	<p>Participants tour from one telescope to another to view different objects in the night sky.</p> <p>At each telescope, participants can place a sticker on their Treasure List next to the object they viewed.</p>



<p><i>To Say (continued):</i> When you have found all the items on the Treasure List, take the List to any one of the astronomers and he or she will sign off on your Treasure List.</p> <p>Look up at all the stars. Where do you think they come from? Have they always been there? How many of these do you think we will find planets around – like the planet you are standing on?</p> <p>Tonight, you will see a star, other than our own Sun, that actually has been found to have planets orbiting around it. You won't be able to see the planets themselves, but as you gaze at the star, imagine the kinds of planets orbiting the star – does it have any planets like ours? Any with life?</p> <p>Over the next 25 years, NASA will be sponsoring a series of missions that will answer those questions.</p> <p>So enjoy your treasure hunt and discover the secrets of the sky! You may pick up your Treasure Lists and stickers...<indicate how you are distributing the Treasure Lists and stickers>.</p> <p><i>Or, even more simply:</i> Did you know that the calcium in your bones and the oxygen you breathe were formed inside of a star? Here's a Treasure List to take on a treasure hunt through the telescopes to view objects in the sky that make stars like our Sun and planets like the Earth we're standing on. Place one of these stickers next to each object you see.</p>	<p>Discuss questions</p>
--	--------------------------

Helpful Hints

To simplify/shorten: Carry out Telescope Treasure Hunt activity without using stickers. Participants mark items they find with pen or pencil. Kids really enjoy the stickers, though.

Background Information

A description of how each type of object contributes to star and planet formation is on the Treasure List. For more information:

<http://planetquest.jpl.nasa.gov/science/origins.html>

Please Note: Not all objects needed for the Treasure Hunt are visible in the sky all year around (see **NOTES** below). Examples of objects in each category on the Treasure List:

Supernova Remnant:

M1: Crab Nebula

NGC 6960 & NGC 6992: Veil Nebula

NOTE: There are **no “Supernova Remnants”** visible through amateur telescopes from about **mid-April to the end of June** in the early evening (before 11 p.m.). The Crab Nebula is no longer visible after mid-April and the Veil Nebula does not get high enough to be seen (and only under very dark skies) until the beginning of July.

Planetary Nebula:

M57: Ring Nebula

M27: Dumbbell Nebula

NGC 2392: Eskimo or Clown Nebula

Clouds of Gas and Dust (star forming regions):

M8: Lagoon Nebula

M20: Trifid Nebula

NGC 7000: North American Nebula

M42: Orion Nebula

NOTE: There are **no “Clouds of Gas and Dust”** visible through amateur telescopes from **May to the end of June** in the early evening (before 11 p.m.). The Orion Nebula is no longer visible after the end of April and the Lagoon (M8), the Trifid (M20), and the North American Nebula (NGC 7000) all start coming into view toward the end of June.

Open Star Clusters:

M11: Wild Duck

M45: Pleiades

NGC 869 and 884: Perseus Double Cluster

A Star with Planets:

See the star maps in the Activity: “Where are the Distant Worlds?”

A Planet Orbiting our Sun:

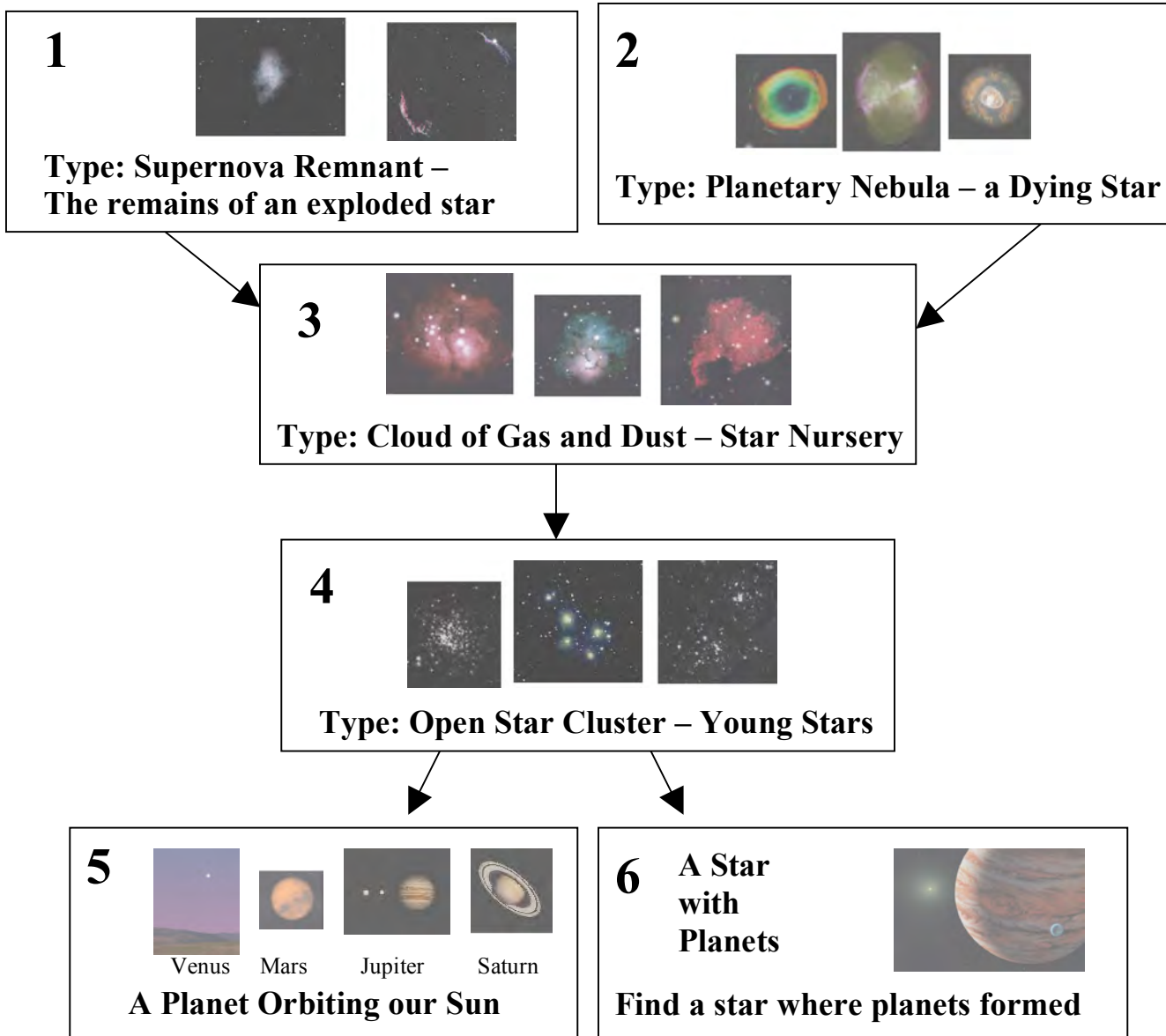
Check your favorite astronomy reference or magazine for star maps that show planets visible at the time you are observing



How do stars and planets form?

For over 400 years astronomers have been asking this question and we still only have some of the answers.

Visit the telescopes to hunt for these objects that contribute to building planets like the Earth you are standing on. Place a sticker next to each type of object you see.



Treasure Hunt Completed! _____ Date _____

1. Supernova Remnant

A massive star ends its life in a spectacular supernova explosion with the brilliance of 100 million Suns. A rapidly expanding, glowing shell of material called a supernova remnant contains silicon, iron, and carbon formed inside the star during its life, as well as heavier elements like copper and lead forged in the explosion.

Space is enriched with the ingredients to make new stars and planets. And life. The iron in your blood originated inside of a star.

2. Planetary Nebula – A Dying Star

After living for billions of years, a star like our Sun dies, slowly ejecting its outer layers and enriching space with a variety of elements essential for life as we know it.

One of these elements, oxygen, can combine with the hydrogen gas in space to make water for future planetary systems and the life that might evolve on them.

3. Clouds of Gas and Dust

Huge clouds of gas and dust hundreds of light years across reside between the stars. Denser areas of the cloud collapse under the force of gravity to form new stars, recycling the material ejected from supernovae and dying stars.

4. Open Star Cluster

Born together from the same cloud of gas and dust, open clusters of stars eventually overcome their mutual gravitational attraction and drift apart. Many remain linked as double or triple star systems. Others live alone, like our Sun. There may be planets around some of these stars!

5. A Planet Orbiting our Sun

Our Sun is a star that has planets. From a few light years away, our Sun would look like any other star. Do you suppose a civilization living on a planet around another star can see one of the Sun's planets?

6. A Star with Planets

Astronomers have discovered over 100 planets around other stars. These are called extrasolar planets. Do you suppose the star you saw might have a planet with life, like our Solar System does?

Find out more about upcoming NASA missions to study stars and their planets:

<http://planetquest.jpl.nasa.gov/>