

Name \_\_\_\_\_ Block \_\_\_\_\_

## Notes: What makes a planet habitable?

**Circumstellar Habitable Zone (CHZ)** "Goldilocks Zone" - is the \_\_\_\_\_ around a star within which \_\_\_\_\_ - \_\_\_\_\_ objects with sufficient \_\_\_\_\_ can support \_\_\_\_\_ at their surfaces.

Sketch our CHZ

### **Not too hot, not too cold (T\_\_\_\_\_):**

Liquid water is \_\_\_\_\_ to exist on the \_\_\_\_\_ of a planet.

Too Close - Water \_\_\_\_\_ the surface

Too far - Water is \_\_\_\_\_, not allowing for molecules to \_\_\_\_\_ and \_\_\_\_\_

Our solar system has \_\_\_\_\_ planet in the Goldilocks Zone (\_\_\_\_\_ - \_\_\_\_\_ AU)

\_\_\_\_\_ (But \_\_\_\_\_ had \_\_\_\_\_ water at one time)

\_\_\_\_\_ **habitable zone** (\_\_\_\_\_ - \_\_\_\_\_ AU-extended to Ceres)

Could Venus's atmosphere be \_\_\_\_\_ to allow liquid water to exist?

Why is "liquid" water important instead of ice/steam?

### **Not too big not too small (\_\_\_\_\_)**

Planets need to have sufficient \_\_\_\_\_ to hold onto its \_\_\_\_\_, Mars \_\_\_\_\_ most of its atmosphere. If planet is too big, \_\_\_\_\_ could limit the development of life.

### **What type of star is it?**

To determine the habitable zone you need to know total \_\_\_\_\_ a star emits.

OBAFGKM- Our star is \_\_\_\_\_-class

Massive stars- \_\_\_\_\_, \_\_\_\_\_ with radiation, zone is \_\_\_\_\_.

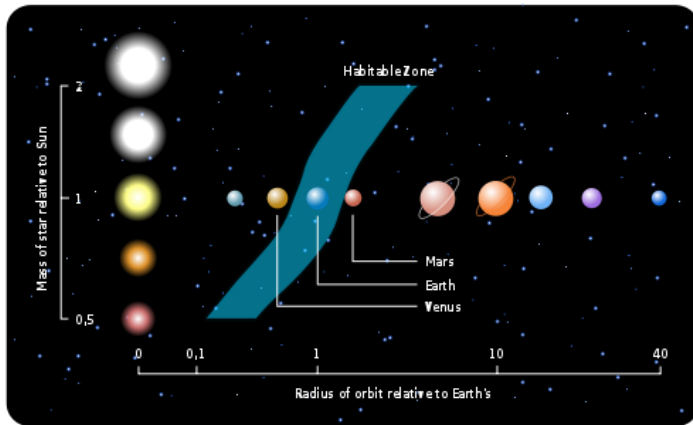
Live for \_\_\_\_\_ time, not \_\_\_\_\_ time for life to \_\_\_\_\_

Smaller stars- \_\_\_\_\_ belts than our sun, \_\_\_\_\_ to the star

Live for \_\_\_\_\_ time, more \_\_\_\_\_ for life to evolve.

Ex. Kepler-62f, takes \_\_\_\_\_ days to complete an orbit

Best stars to search are \_\_\_\_\_ - \_\_\_\_\_ class, \_\_\_\_\_ - \_\_\_\_\_ don't live long enough



How does the HZ change with difference star types?

**Is that star stable?**

Solar \_\_\_\_\_ from a star could \_\_\_\_\_ a planet in \_\_\_\_\_.  
 New stars/old stars- \_\_\_\_\_ in radiation  
 Middle-aged star – radiation tends to be \_\_\_\_\_  
 Liquid water- \_\_\_\_\_ high amount of radiation, could \_\_\_\_\_ life underwater

Would a white dwarf be a good place to look for life?

**A planet's chemistry?**

A planet's atmosphere will \_\_\_\_\_ a certain amount of energy from starlight and \_\_\_\_\_ the rest back out.  
 Atmosphere- Tends to \_\_\_\_\_ heat, more CO<sub>2</sub> or methane can \_\_\_\_\_ the greenhouse effect and \_\_\_\_\_ the zone.  
 Energy that is trapped- difference between \_\_\_\_\_ sea vs. \_\_\_\_\_ volcanoes  
 Atmosphere- look for \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_ and \_\_\_\_\_ (could indicate life).

Could Venus' atmosphere be transferred to Mars? What would our HZ be like then?

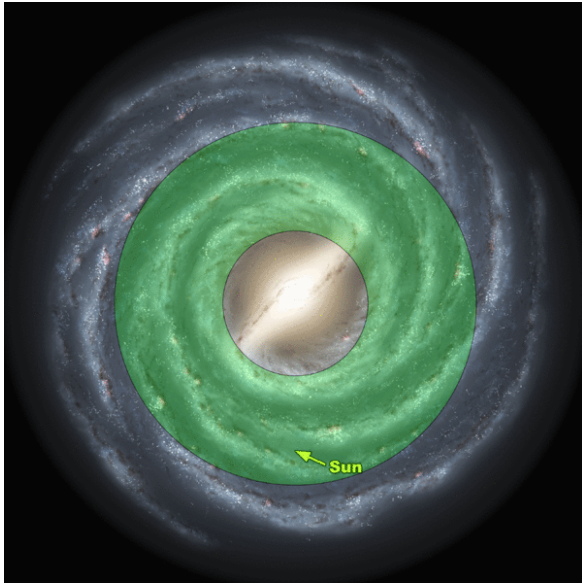
**CHZ Controversy-** Other ways for liquid water - \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, or \_\_\_\_\_ by other non-atmospheric means, and basic conditions of life in interstellar \_\_\_\_\_ on \_\_\_\_\_ planets or their \_\_\_\_\_. Non-water \_\_\_\_\_ to hypothetical life based on \_\_\_\_\_ biochemistries.

Why shouldn't a super Jupiter out past a HZ be ruled out for harboring life?

**Galactic Habitable Zone :** Area in a galaxy where \_\_\_\_\_ has the best \_\_\_\_\_ of occurring.

Too close to the \_\_\_\_\_, star density increases, greater chance of being taken out by a \_\_\_\_\_ explosion.

Too far out, less stars to \_\_\_\_\_ the heavier \_\_\_\_\_ necessary for planets and life to form.



Why is it necessary to have a 2<sup>nd</sup> generation solar system to harbor life vs. a 1<sup>st</sup> generation solar system?

Where is the best places to look for the possibilities of life in our solar system?