

- ① Read the pages outlined and/or follow the instructions given.
- ② Unless space has been given, answer the questions on a separate sheet and then staple it to this sheet.
- ③ Use complete sentences when necessary (i.e. explain, describe, why, ...). Also, watch your spelling and grammar and be sure to write neatly!

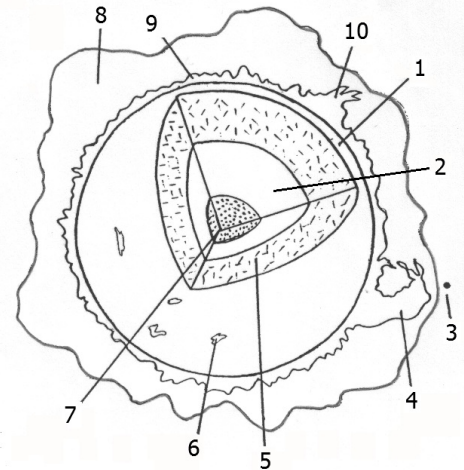
**A. Definitions/Check & Reflect on ... (P.306-321)**

- {3} 1. Define the following terms:
 

|                     |                  |
|---------------------|------------------|
| (a) aurora borealis | (d) minor planet |
| (b) comet           | (e) planet       |
| (c) meteor          | (f) solar wind   |
- {2} 2. Which two elements make up more than 98% of the Sun? Include their %.
- {3} 3. How are astronomers able to estimate the Sun's mass?
- {3} 4. What two effects does a coronal mass ejection on the Sun have on Earth?
- {5} 5. Explain the following:
  - (a) the process that astronomers believe created our solar system and other star-and-planet systems
  - (b) why the inner planets are rocky and the outer planets are gaseous
- {3} 6. The Moon does not have a dense metallic core as Earth does and instead appears to be composed only of the same materials as are found in Earth's outer layers. Based on this information, what conclusion can be drawn about the formation of the Moon?

**B. Activity #1 (Sun Diagram P.308-311)**

- {10} 1. By far the most important star to us is the one at the centre of our solar system. It provides the energy needed by all the plants and animals on Earth, and its gravitational pull keeps us in our steady orbit. Complete the chart below using the following diagram.



| # | STRUCTURE | DESCRIPTION  |
|---|-----------|--|
|   |           | <ul style="list-style-type: none"> <li>▶ thin layer located above the photosphere</li> <li>▶ has a red colour (can only be seen during solar eclipse)</li> </ul>                                     |
|   |           | <ul style="list-style-type: none"> <li>▶ layer outside the radiative zone</li> <li>▶ bubbles of hot plasma ooze to surface carrying energy while cooler plasma sinks (convection current)</li> </ul> |
|   |           | <ul style="list-style-type: none"> <li>▶ the inner part of the Sun (at least 15 million °C)</li> <li>▶ where nuclear fusion occurs</li> </ul>  |
|   |           | <ul style="list-style-type: none"> <li>▶ outermost layer of the Sun</li> <li>▶ extends beyond chromosphere for millions of kilometres</li> </ul>   |
| X |           | <ul style="list-style-type: none"> <li>▶ extremely powerful solar flare</li> <li>▶ causes vivid &amp; active auroras (&amp; can damage satellites)</li> </ul>  |
| 3 | EARTH     | <ul style="list-style-type: none"> <li>▶ for comparison purposes</li> <li>▶ to see how large the Sun is compared to this planet</li> </ul>   |
|   |           | <ul style="list-style-type: none"> <li>▶ boundary between the inside &amp; outside of the Sun</li> <li>▶ yellow part we see from Earth (coolest layer ~ 5500°C)</li> </ul>                           |
|   |           | <ul style="list-style-type: none"> <li>▶ large, often curved, bright stream of particles</li> <li>▶ extends outward from the photosphere into the corona</li> </ul>                                  |
|   |           | <ul style="list-style-type: none"> <li>▶ layer outside the core (plasma is very dense here)</li> <li>▶ takes solar radiation ~ 100,000 years to pass through</li> </ul>                              |
|   |           | <ul style="list-style-type: none"> <li>▶ a massive explosion at the surface of the Sun</li> <li>▶ flings hot plasma out into space</li> </ul>  |
|   |           | <ul style="list-style-type: none"> <li>▶ dark region on the Sun's surface (cooler than surrounding areas)</li> <li>▶ region where the magnetic field is strong (slows convection)</li> </ul>         |

**C. Activity #2 (The Brightness of Stars)**

What are some factors that affect the brightness of ordinary light bulbs? Does the brightness change as your distance from the bulb increases? Does the power of the bulb affect its brightness? Are there other factors? If you think about these questions, you may get clues about how the brightness of stars depends on certain factors.

**Question**

What factors (3) affect the apparent brightness of a light source? If the light source were a star, would those factors be the same? Explain.

**Materials**

- solar cell
- light source
- metre stick
- ammeter

**Procedure**

1. The solar cell (which produces a current) was connected to the ammeter (which measures the current).
2. A light source (of various power) was shone on the solar cell from various distances.
3. The distances and the ammeter readings were recorded. Refer to the data chart below.

**Analysis**

{10} 1. Create a line graph for each bulb on the attached graph (i.e. distance on the x-axis and ammeter readings on the y-axis). Don't forget to include a title, a legend and the labels.

{4} 2. Examine the graph you just made and describe:  
 (a) the relationship between the ammeter reading and the distance from the light source.

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(b) the relationship between the observed brightness of a light source and the power (or size) of the source.

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{2} 3. Suppose you observe two identical stars but one star appears to be 100 times brighter than the other. What would you conclude about the distances of these two stars from Earth?

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{3} 4. Suppose you observe two stars that appear to have the same brightness. Could these two stars be giving off different amounts of light? Explain.

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{2} 5. What effect would pollution in the atmosphere have on a star's brightness?

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| Distance from bulb (m) | AMMETER READINGS          |                          |
|------------------------|---------------------------|--------------------------|
|                        | 100 W Bulb - Ammeter (mA) | 60 W Bulb - Ammeter (mA) |
| 1                      | 30                        | 18                       |
| 2                      | 7.5                       | 4.5                      |
| 3                      | 3.3                       | 2                        |
| 4                      | 1.9                       | 1.1                      |
| 5                      | 1.2                       | 0.7                      |

