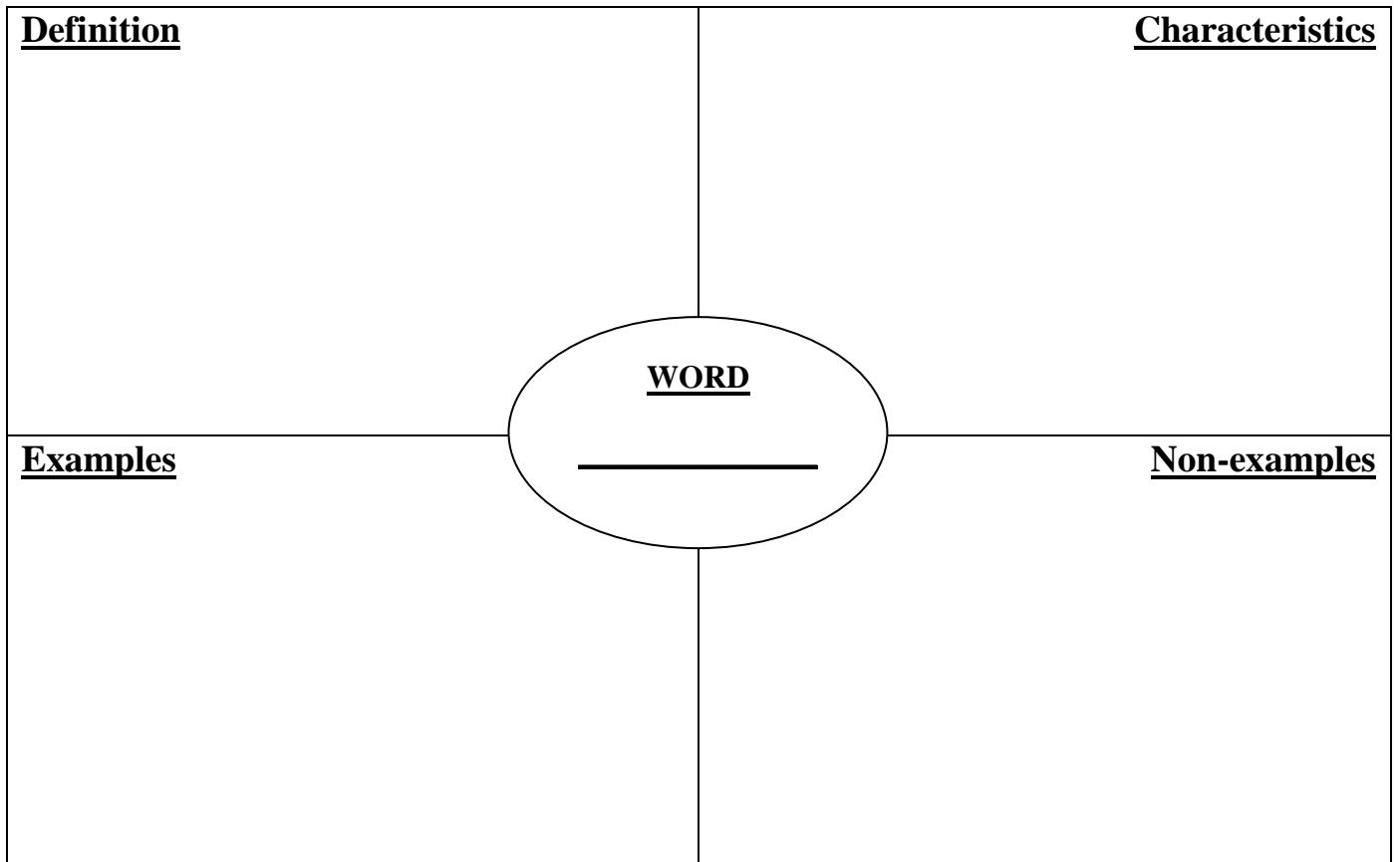
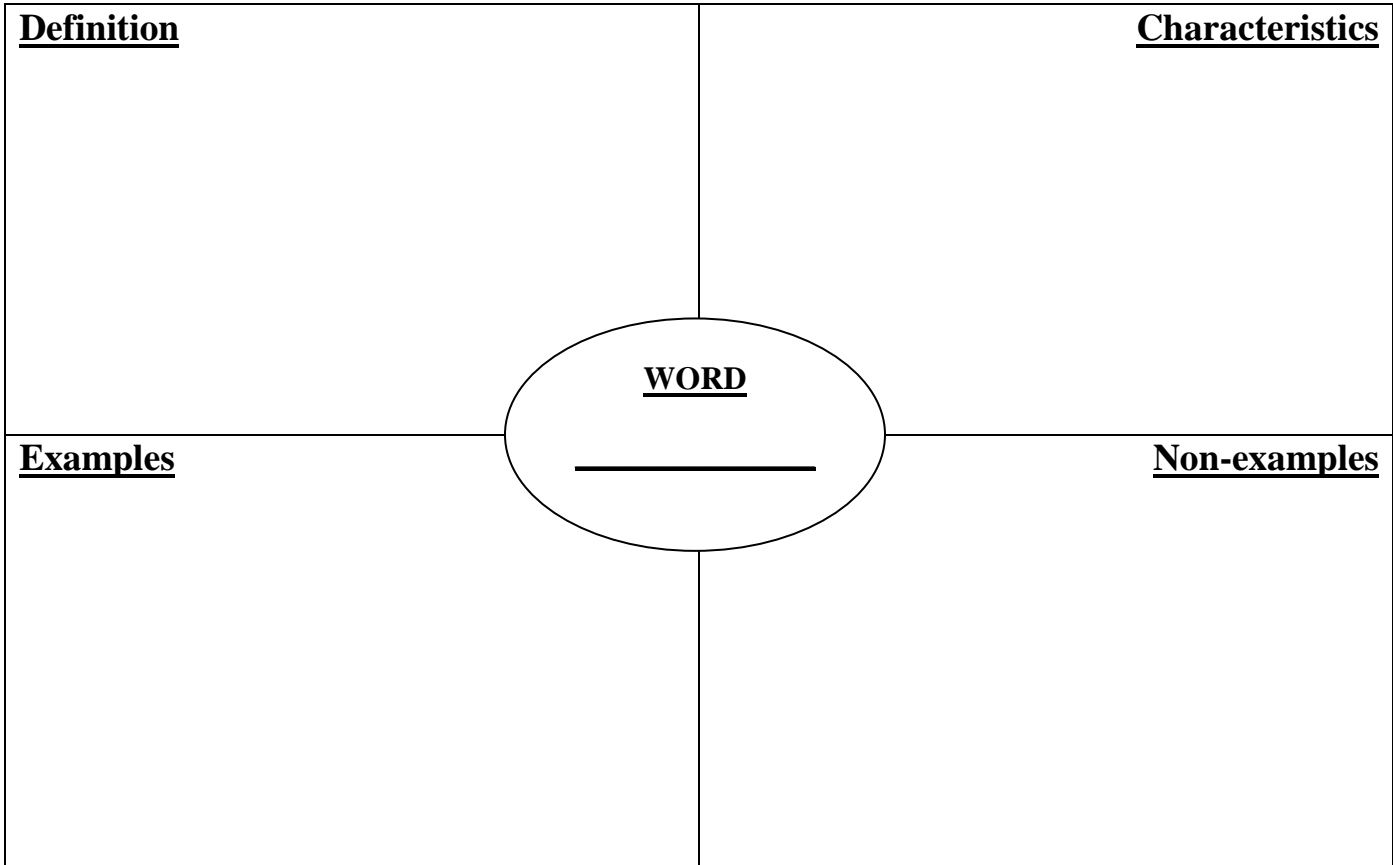


TSOKOS READING ACTIVITY

Section 9-4

1. Essential Idea: Resolution places an absolute limit on the extent to which an optical or other system can separate images of objects.
2. Nature Of Science:
 - a. Improved technology: The Rayleigh criterion is the limit of resolution. Continuing advancement in technology such as large diameter dishes or lenses or the use of smaller wavelength lasers pushes the limits of what we can resolve.
3. International-Mindedness: Satellite use for commercial and political purposes is dictated by the resolution capabilities of the satellite.
4. Theory Of Knowledge:
 - a. The resolution limits set by Dawes and Rayleigh are capable of being surpassed by the construction of high quality telescopes.
 - b. Are we capable of breaking other limits of scientific knowledge with our advancing technology?
5. Understandings:
 - a. The size of a diffracting aperture
 - b. The resolution of simple monochromatic two-source systems
6. Applications And Skills:
 - a. Solving problems involving the Rayleigh criterion for light emitted by two sources diffracted at a single slit
 - b. Resolvance of diffraction gratings
7. Guidance: Proof of the diffraction grating resolvance equation is not required
8. Data Booklet Reference:
 - a. $\theta = 1.22 \frac{\lambda}{b}$
 - b. $R = \frac{\lambda}{\Delta\lambda} = mN$
9. Utilization:
 - a. An optical or other reception system must be able to resolve the intended images. This has implications for satellite transmissions, radio astronomy and many other applications in physics and technology (see Physics option C)
 - b. Storage media such as compact discs (and their variants) and CCD sensors rely on resolution limits to store and reproduce media accurately
10. Aims:

- a. Aim 3: this sub-topic helps bridge the gap between wave theory and real-life applications
 - b. Aim 8: the need for communication between national communities via satellites raises the awareness of the social and economic implications of technology
11. Read section 9-4, pg. 376-380, in your textbook.
 12. Use the attached Frayer Model worksheets to explore the following terms:
 - a. resolution
 - b. Rayleigh criterion
 - c. angular separation
 - d. diffraction grating resolution
 13. This assignment may be typed or neatly printed. Drawings may be freehand, but try to make use of the ‘Shapes’ or ‘Insert Clipart’ functions of MS Word. If you submit this assignment electronically, the filename must be in the following format, “LastnameFirstinitialPerXReadActX-X”. You do not need include a copy of these instructions with the assignment you hand in.



<u>Definition</u>	<u>Characteristics</u>
<p><u>WORD</u></p> <hr/>	
<u>Examples</u>	<u>Non-examples</u>

<u>Definition</u>	<u>Characteristics</u>
<p><u>WORD</u></p> <hr/>	
<u>Examples</u>	<u>Non-examples</u>