

TSOKOS READING ACTIVITY

Section 10-1

1. Essential Idea: Electric charges and masses each influence the space around them and that influence can be represented through the concept of fields.
2. Nature Of Science:
 - a. Paradigm shift: The move from direct, observable actions being responsible for influence on an object to acceptance of a field's "action at a distance" required a paradigm shift in the world of science.
3. Theory Of Knowledge:
 - a. Although gravitational and electrostatic forces decrease with the square of distance and will only become zero at infinite separation, from a practical standpoint they become negligible at much smaller distances.
 - b. How do scientists decide when an effect is so small that it can be ignored?
4. Understandings:
 - a. Gravitational fields
 - b. Electrostatic fields
 - c. Electric potential and gravitational potential
 - d. Field lines
 - e. Equipotential surfaces
5. Applications And Skills:
 - a. Representing sources of mass and charge, lines of electric and gravitational force, and field patterns using an appropriate symbolism
 - b. Mapping fields using potential
 - c. Describing the connection between equipotential surfaces and field lines
6. Guidance:
 - a. Electrostatic fields are restricted to the radial fields around point or spherical charges, the field between two point charges and the uniform fields between charged parallel plates
 - b. Gravitational fields are restricted to the radial fields around point or spherical masses and the (assumed) uniform field close to the surface of massive celestial bodies and planetary bodies
 - c. Students should recognize that no work is done in moving charge or mass on an equipotential surface
7. Data Booklet Reference:
 - a. $W = q\Delta V_e$

- b. $W = m\Delta V_g$
8. Utilization: Knowledge of vector analysis is useful for this sub-topic (see Physics sub-topic
 9. Aim 9: models developed for electric and gravitational fields using lines of forces allow predictions to be made but have limitations in terms of the finite width of a line
 10. Read section 10-1 in your textbook.
 11. Write an outline of the section using each of the concepts listed below:
 - a. Gravitation Fields
 - b. Gravitational Potential Energy
 - c. Gravitational Potential
 - d. Electric Fields
 - e. Electric Potential and Energy
 - f. Equipotential Surfaces
 - g. The Connection Between Potential and Field
 - h. The Connection Between Field Lines and Equipotential Surfaces
 - i. Parallel Plates
 - j. Similarities Between Electricity and Gravitation
 12. 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.