

CAREER-FOCUSED REFLECTION

1. What does a climatologist do?
2. How does the career of climatology connect to this lesson?
3. **Columb's Law and lightning:** A climatologist is researching how changing climate patterns may affect the frequency and intensity of thunderstorms. As part of the research, the climatologist models two charged regions inside a thunderstorm cloud as point charges.
 - The upper region has a charge of +4.0 C.
 - The lower region has a charge of -2.5 C.
 - The centers of the charged regions are 500 m apart.

Using Coulomb's Law, calculate the magnitude of the electric force between the two charged regions.

$$\text{Coulomb's Law: } F = k \frac{q_1 q_2}{r}$$

$$\text{Coulomb's constant: } k = 8.99 \times 10^9 \text{ N} \cdot \text{m}^2 / \text{C}^2$$

- What is the magnitude of the electric force between the two charged regions?
- Is the force attractive or repulsive?
- Why is understanding of electric charges in thunderstorms useful for climatologists studying long-term climate trends?