

# Layered Earth Meteorology Correlations For Texas State Science Standards



## Middle School: Grades 5-8

## Lesson Plans

### §112.16. Science, Grade 5

**(8) Earth and space. The student knows that there are recognizable patterns in the natural world and among the Sun, Earth, and Moon system. The student is expected to:** **D1, E1**

**(A)** Differentiate between weather and climate **E1**

**(B)** Explain how the Sun and the ocean interact in the water cycle **D1**

### §112.19. Science, Grade 7

**(8) Earth and Space. The student knows that natural events and human activity can impact Earth systems. The student is expected to:** **D4**

**(A)** Predict and describe how different types of catastrophic events impact ecosystems such as floods, hurricanes, or tornadoes **D4**

### §112.20. Science, Grade 8

**(10) Earth and space. The student knows that climatic interactions exist among Earth, ocean, and weather systems. The student is expected to:** **B1, C3, D2-4**

**(A)** Recognize that the Sun provides the energy that drives convection within the atmosphere and oceans, producing winds and ocean currents **B1, C3**

**(B)** Identify how global patterns of atmospheric movement influence local weather using weather maps that show high and low pressures and fronts **D2-3**

**(C)** Identify the role of the oceans in the formation of weather systems such as hurricanes **D4**

## High School: Grades 9-12

## Lesson Plans

### §112.36. Earth and Space Science

**(9) Solid Earth. The student knows Earth's interior is differentiated chemically, physically, and thermally. The student is expected to:** **B2, D2, E2**

**(A)** Evaluate heat transfer through Earth's subsystems by radiation, convection, and conduction and include its role in plate tectonics, volcanism, ocean circulation, weather, and climate **B1, D2, E2**

**(13) Fluid Earth. The student knows that the fluid Earth is composed of the hydrosphere, cryosphere, and atmosphere** **C1-3, F4**

**subsystems that interact on various time scales with the biosphere and geosphere. The student is expected to:**

- |             |  |                                   |
|-------------|--|-----------------------------------|
| (B)         | Analyze how global ocean circulation is the result of wind, tides, the Coriolis effect, water density differences, and the shape of the ocean basins   | C1-3                              |
| (C)         | Analyze the empirical relationship between the emissions of carbon dioxide, atmospheric carbon dioxide levels, and the average global temperature trends over the past 150 years   | F4                                |
| <b>(14)</b> | <b>Fluid Earth. The student knows that Earth's global ocean stores solar energy and is a major driving force for weather and climate through complex atmospheric interactions. The student is expected to:</b>                               | <b>A1-3, B1-4, C1, C3, D1, E2</b> |
| (A)         | Analyze the uneven distribution of solar energy on Earth's surface, including differences in atmospheric transparency, surface albedo, Earth's tilt, duration of insolation, and differences in atmospheric and surface absorption of energy | A1-3, B1-4                        |
| (B)         | Investigate how the atmosphere is heated from Earth's surface due to absorption of solar energy, which is re-radiated as thermal energy and trapped by selective absorbers   | B1-4                              |
| (C)         | Explain how thermal energy transfer between the ocean and atmosphere drives surface currents, thermohaline currents, and evaporation that influence climate  | B1, C1, C3, D1, E2                |
| <b>(15)</b> | <b>Fluid Earth. The student knows that interactions among Earth's five subsystems influence climate and resource availability, which affect Earth's habitability. The student is expected to:</b>  | <b>C2-3, D4, E3, F1-3</b>         |
| (A)         | Describe how changing surface-ocean conditions, including El Niño-Southern Oscillation, affect global weather and climate patterns   | C3, F2-3                          |
| (B)         | Investigate evidence such as ice cores, glacial striations, and fossils for climate variability and its use in developing computer models to explain present and predict future climates   | E3, F1                            |
| (E)         | Analyze recent global ocean temperature data to predict the consequences of changing ocean temperature on evaporation, sea level, algal growth, coral bleaching, hurricane intensity, and biodiversity.                                      | C2, D4                            |