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| **TEXAS CTE LESSON PLAN**  [www.txcte.org](http://www.txcte.org) | |
| **Lesson Identification and TEKS Addressed** | |
| **Career Cluster** | Agriculture, Food, and Natural Resources |
| **Course Name** | Mathematical Applications in Agriculture, Food, and Natural Resources |
| **Lesson/Unit Title** | Geographic Information Systems and Global Positioning Systems |
| **TEKS Student Expectations** | **130.5 (c) Knowledge and skills**  (10) The student demonstrates mathematical knowledge and skills required to solve problems related to natural resource systems and related career opportunities.  (C) use statistical and data analysis to evaluate natural resource systems data reported numerically or graphically such as Geographic Information Systems and Global Positioning Systems data, weather-related data, and data related to wildlife and habitat |
| **Basic Direct Teach Lesson**  **With Special Education Modifications/Accommodations and**  **one English Language Proficiency Standards (ELPS) Strategy** | |
| **Instructional Objectives** | **The student will be able to:**   * Explain the purpose and benefit of a Geographic Information System * Explain the purpose and benefit of Global Positioning Systems * Access geographic information specific to agriculture, food, and natural resources and be able to explain the benefit of that information |
| **Rationale** | Allows students to develop knowledge and skills regarding career and educational opportunities, personal development, globalization, industry standards, details, practices, and expectations. |
| **Duration of Lesson** | Teacher’s Discretion |
| **Word Wall/Key Vocabulary**  *(ELPS c1a, c, f; c2b; c3a, b, d; c4c; c5b) PDAS II (5)* | **Global Positioning System (GPS):** a satellite network used to determine a geographic location on the earth’s surface  **Geographic Information Systems (GIS):** a system used to store, analyze, and graphically display tabular data that has a spatial component  **Layer:** digital representation of a geographic feature (ex. soil type, drainage, etc…)  **Altitude:** height above sea level  **Latitude:** measurement of a location’s distance north or south of the equator  **Longitude:** measurement of a location’s distance east or west of the Prime Meridian |
| **Materials/Specialized Equipment Needed** | **Equipment:**   * Computer   **Material:**   * Notecard |
| **Anticipatory Set**  (May include pre-assessment for prior knowledge) | Give students a notecard. Ask students, to describe their current location. Once everyone has an answer, have the student consult with a partner.  Tell the students that they may modify or add to their answer to make their answer more precise. Have them consult with two more people and continue to modify their answer for precision. Call on a few students to share their answers. Did anyone mention latitude/longitude coordinates? Discuss this concept with the students asking them to share their thought processes during this activity. |
| **Direct Instruction \*** | * Introduce GPS and GIS to the class using the presentation * Students will fill in notes during presentation   *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*  NONE |
| **Guided Practice \*** | *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*  NONE |
| **Independent Practice/Laboratory Experience/Differentiated Activities \*** | * Students will perform webquest on benefits of GIS and GPS in Precision Agriculture. * Students will answer questions on word document using the following website. <http://www.gislounge.com/geospatial-technologies-in-precision-agriculture/>   *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*  NONE |
| **Lesson Closure** |  |
| **Summative/End of Lesson Assessment \*** | Student will explain the purpose of GIS and GPS and the benefits that both have on the agricultural community in a short summary. See summary rubric for grading.  Grading Summary Rubric (Attached)  *Individualized Education Plan (IEP) for all special education students must be followed. Examples of accommodations may include, but are not limited to:*  NONE |
| **References/Resources/Teacher Preparation** | * ESRI’s website <http://www.esri.com/industries/agriculture> |
| **Additional Required Components** | |
| **English Language Proficiency Standards (ELPS) Strategies** |  |
| **College and Career Readiness Connection[[1]](#footnote-1)** | II Reading A2, A3, A4  I Science D1  III Science B1 |
| **Recommended Strategies** | |
| **Reading Strategies** |  |
| **Quotes** |  |
| **Multimedia/Visual Strategy**  **Presentation Slides + One Additional Technology Connection** |  |
| **Graphic Organizers/Handout** |  |
| **Writing Strategies**  **Journal Entries + 1 Additional Writing Strategy** |  |
| **Communication**  **90 Second Speech Topics** |  |
| **Other Essential Lesson Components** | |
| **Enrichment Activity**  (e.g., homework assignment) | Extended Learning:  Have students research a current event article of GIS in agriculture using ESRI’s website.  <http://www.esri.com/industries/agriculture> |
| **Family/Community Connection** |  |
| **CTSO connection(s)** |  |
| **Service Learning Projects** |  |
| **Lesson Notes** |  |

1. Visit the Texas College and Career Readiness Standards at <http://www.thecb.state.tx.us/collegereadiness/CRS.pdf>, Texas Higher Education Coordinating Board (THECB), 2009. [↑](#footnote-ref-1)