

[Indiana Earth Science Standards](#)

Science: Earth and Space Science I: Standard 1
Principles of Earth and Space Science

Students investigate, through laboratory and fieldwork, the universe, Earth, and the processes that shape Earth. They understand that Earth operates as a collection of interconnected systems that may be changing or may be in equilibrium. Students connect the concepts of energy, matter, conservation, and gravitation to Earth, the solar system, and the universe. Students utilize knowledge of the materials and processes of Earth, planets, and stars in the context of the scales of time and size.

ES.1.23 Explain motions, transformations, and locations of materials in Earth's lithosphere and interior. For example, describe the movement of the plates that make up Earth's crust and the resulting formation of earthquakes, volcanoes, trenches, and mountains.

Objective: Students will investigate locating earthquake epicenters. They attempt to determine the minimum-optimum number of sites receiving earthquake information needed to accurately determine the epicenter of an earthquake.

Materials Needed: Internet access, local seismograph data (if available), computer programs – WinQuake and Scream, sample hard copies of seismograph recordings

Background Information: textbook – Modern Earth Science by Holt Rinehart and Winston, Chapter 6

Activity:

Discuss terminology: Epicenter, focus, p-waves, s-waves, seismograph, seismograph recording

Guided Practice: Students use sample hard copies of seismographs to identify p-waves and s-waves

Computer work: Students will use WinQuake to examine selected seismograph records (select records from a specific major earthquake – these can be obtained through IRIS)

Show students how to manipulate the recordings using WinQuake, have students determine epicenters using 2, 4, 6, 8 recordings – when is the epicenter most accurate?

Provide students with current real time data, students compete to determine the epicenter. Provide a treat for the student or student group that is closest to reported epicenter.

Supplemental Activities: Use Holt, Rinehart and Winston – Modern Earth Science, chapter 6 – In depth Investigation – locating epicenters. Also use internet activity: [Virtual Earthquake](#) or [Understanding Earthquakes](#).