DESCRIPTION OF THE SEA FLOOR GEOLOGY OF DANA POINT FIELD PROGRAM

Student researchers conduct a series of geological investigations of the Dana Point Headlands and surrounding area. Students will rotate through stations and the program culminates with the mapping of an inactive fault.

- **Metamorphic Rocks Investigation Station**
  Students explore the Dana Point Marine Life Refuge, identify at least three metamorphic rocks, and explain their geologic origin. They use the rocks to begin building an explanation of the geologic forces that support plate tectonics.

- **Mapping Station**
  Students use clinometers to identify and measure the angle of the ancient seabed and use survey equipment. In addition, they locate and map the fault with Global Positioning Systems units.

- **Geology Application Station**
  Students explore plate movement through the ***When Barstow Becomes a Beach*** activity. Students use a seismometer and oscilloscope to investigate ways that we measure seismic waves.

LINKS TO SCIENCE CONTENT STANDARDS

Grade Six

Plate Tectonics and Earth's Structure

1.a. Students know evidence of plate tectonics is derived from the fit of the continents; the location of earthquakes, volcanoes, and midocean ridges; and the distribution of fossils, rock types, and ancient climatic zones.
1.b. Students know Earth is composed of several layers: a cold, brittle lithosphere; a hot, convecting mantle; and a dense, metallic core.
1.c. Students know lithospheric plates the size of continents and oceans move at rates of centimeters per year in response to movements in the mantle.
1.e. Students know major geologic events, such as earthquakes, volcanic eruptions, and mountain building, result from plate motions.
1.f. Students know how to explain major features of California geology (including mountains, faults, volcanoes) in terms of plate tectonics.
2.d. Students know earthquakes, volcanic eruptions, landslides, and floods change human and wildlife habitats.

Investigation and Experimentation

7.b. Students select and use appropriate tools and technology to perform tests, collect data, and display data.
7.e. Students recognize whether evidence is consistent with a proposed explanation.
7.f. Students read a topographic map and a geologic map for evidence provided on the maps and construct and interpret a simple scale map.
7.g. Students interpret events by sequence and time from natural phenomena.

Grade Seven

Earth and Life History

4.a. Students know Earth processes today are similar to those that occurred in the past and slow geologic processes have large cumulative effects over long periods of time.
4.c. Students know that the rock cycle includes the formation of new sediment and rocks and that rocks are often found in layers, with the oldest generally on the bottom.

Investigation and Experimentation

7.a. Students select and use appropriate tools and technology to perform tests, collect data, and display data.

Grade Eight

Motion

1.a. Students know position is defined in relation to some choice of a standard reference point and a set of reference directions.
1.c. Students know how to solve problems involving distance, time, and average speed.
1.d. Students know the velocity of an object must be described by specifying both the direction and the speed of the object.

Forces
2.a. Students know a force has both direction and magnitude.
2.e. Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction).

Density and Buoyancy
8.c. Students know the buoyant force on an object is an upward force equal to the weight of the fluid the object has displaced.
8.d. Students know how to predict whether an object will float or sink.

Investigation and Experimentation
9.a. Plan and conduct a scientific investigation to test a hypothesis.
9.b. Evaluate the accuracy and reproducibility of data.
9.e. Construct appropriate graphs from data and develop quantitative statements about the relationships between variables.