

DRAFT CHANGES TO SUBJECT MATTER KNOWLEDGE REQUIREMENTS FOR EDUCATOR LICENSURE

PUBLIC COMMENT: WWW.SURVEYGIZMO.COM/S3/3620828/DRAFT-PUBLIC-COMMENT-SMK-UPDATES

Subject matter knowledge requirements (SMKs) outline the minimum level of content and pedagogical skills Massachusetts educators are expected to hold. SMKs establish the content assessed in Massachusetts Tests for Educator Licensure ([MTEL](#)) and guide content-area coursework for educator preparation programs. SMKs are aligned to [Massachusetts curriculum frameworks](#).

Massachusetts regulation [603 CMR 7.06](#) requires a public comment period of at least thirty days prior to any changes to the guidelines where SMKs are published. More information on the 2017 proposed changes is available at [www.doe.mass.edu/edprep](http://WWW.DOE.MASS.EDU/EDPREP).

EARTH & SPACE SCIENCE

CURRENT SUBJECT MATTER KNOWLEDGE REQUIREMENTS 2011-2016

EARTH SCIENCE, LEVELS: 5-8; 8-12

- (a) Geology.
 - (b) Oceanography.
 - (c) Astronomy.
 - (d) Environmental biology, physics, and chemistry.
 - (e) Meteorology.
 - (f) Related aspects of chemistry, physics, biology, and mathematics.
 - (g) Engineering and technical applications of earth science.
 - (h) History and philosophy of science.
 - (i) Methods of research in the sciences, including laboratory techniques and the use of computers.
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DRAFT CHANGES TO SUBJECT MATTER KNOWLEDGE REQUIREMENTS 2017

EARTH AND SPACE SCIENCE, LEVEL 8-12

The following topics will be addressed on a subject matter knowledge test:

- (a) Understanding of Earth's Place in the Universe:
 - 1 Nuclear fusion in a star's core affects its lifespan, produces elements from helium to iron, and releases energy in the form of radiation.
 - 2. The Big Bang Theory including: the motion of galaxies; background microwave radiation; and matter in the universe.
 - 3. Kepler's laws of planetary motion can predict and describe how interactions and collisions between planets can affect orbits.



4.The movement of the crust, the theory of plate tectonics, and density of rocks explains why continental rocks are older than rocks on the ocean floor.

(b) Understanding of Earth's Systems:

1. Use of data to support that one change to Earth's surface water can cause changes to other Earth systems and the properties of water affect Earth materials and surface processes.

2. Convection currents and the effects of gravity on denser materials causes the cycling of matter inside the earth.

3. Use of a model to describe how energy variations in Earth's systems over time result in changes in climate. Use of data to illustrate that changes in the Earth's tilt and orbit result in climate change.

4. Use of a model to describe the carbon cycle through the Earth's systems and how human activity causes increases in carbon dioxide resulting in atmospheric and climate changes.

(c) Earth and Human Activity:

1. How the availability of natural resources and changes in climate has influenced human activity.

2.Design solutions for minimizing the impacts of developing/using resources, and conserving/recycling those resources, based on cost-benefit ratios.

3. Relationships between natural resources, human populations, and biodiversity.

4. Use of global climate models to describe how forecasts are made of climate change and associated future impacts to Earth systems.

