

Gifted & Talented and Advanced Potential in Science

Science is a multidisciplinary subject area that is guided and informed by the Next Generation Science Standards (NGSS). Throughout grade bands, students develop an understanding of three dimensions: Disciplinary Core Ideas (DCI), Science and Engineering Practices (SEP), and Crosscutting Concepts (CCC). The content and skills in each dimension have an expectation or endpoint at the end of each grade band.

Identifying giftedness and potential for success in advanced academics in Science takes into consideration a student's ability to grasp scientific concepts, apply, analyze, and transfer knowledge while using scientific practices.

AREAS OF IDENTIFICATION

Best practices in identifying giftedness or advanced potential in Science include multiple measures of identification, including scoring within the top quartile of the Maryland Integrated Science Assessment (MISA), atypical growth or ability in measured areas of Science, and the following non-exhaustive list of characteristics.

Gifted or potentially gifted students across grade bands may:

- Demonstrate a persistent and intense interest in STEM fields and concepts, making observations and often asking many questions, especially “Why?”
- Demonstrate highly analytical thinking, observation, curiosity, and reasoning beyond those of their peers. The student is able to take a complex issue and see more than one side. They may like to argue about scientific ideas.
- Demonstrate deep knowledge, interest, or curiosity of specific scientific concepts or domains (to the exclusion of other scientific areas. Interests may be specific and nuanced). The student is thirsty for science knowledge and will read books, magazines, and websites to find information on this topic. They might also spend hours watching Science or Discovery channels.
- Demonstrate intense interest and curiosity about details and attempts to attain deep meaning and understanding of scientific concepts. The student loves to discuss science with other students or adults. For example, they might speak often and very enthusiastically about the characteristics of certain organisms.
- Demonstrate intense interest and/or advanced skill in testing theories and concepts, verifying information, and/or independently experimenting with ideas and concepts. The student enjoys designing investigations informally or formally to solve problems. For example, the student might try to figure out which type of fish in an aquarium are most responsive to light or human presence.
- Demonstrate intense interest and/or advanced skill in collecting, sorting, and classifying.
- Demonstrate the ability to collect, analyze, and develop a conceptual understanding with self-collected data.

- Enjoy challenges and problem solving. The student works on a variety of puzzles, brain teasers, or logic games.
- Use a more extensive scientific vocabulary than their peers when explaining things and events.
- Be highly reflective of thoughts and processes. The student might delve back into a specific example or situation to better understand it. For example, they may use the phrase: “suppose you” or propose hypothetical situations based on the example.
- Be able to perceive the direction of an investigation and anticipate outcomes. For example, they may create a flow chart or try to develop an equation to predict outcomes.
- Be able to identify patterns in data where the links are not obvious. For example, the student may like to put numbers into a graph and search for patterns.
- Be able to produce models and apply mathematical models.
- Be able to accurately hypothesize and generate creative and valid explanations.
- The student may be the one who becomes excited when a school STEM fair is announced, or they may express interest in doing “real” research.

Alternative Assessments:

Evidence of giftedness or potential for success in advanced academics in Science may also include assessment data and top scores or significant growth from the following assessments, as one possible measure among other considerations.

- NWEA / MAP-Growth Science
- Maryland Integrated Science Assessments (MISA)

Additional evidence should include a [portfolio](#). A portfolio should contain evidence of unusual presentation styles, topics and ideas, evidence of advanced work quality or mature interests, in-depth understanding of an idea or problem, creative, and well-organized work.

Sources cited:

Buğra Ülger, B., & Çepni, S. (2020). Gifted education and STEM: A Thematic Review. *Journal of Turkish Science Education*, 17(3), 443–466. <https://doi.org/10.36681/tused.2020.38>

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