



## Guiding Principles of Science Instruction

### Academic standards:

- State and national standards are written with the belief and intent that when given the opportunity to learn, all students can attain a high level of scientific literacy.
  - Academic standards describe what students should know.
  - Teachers determine the instructional strategies necessary to meet the needs of all learners.
- Students come with diverse backgrounds, as such, students should engage in activities that are relevant to their life experiences.
- It should be recognized that some students will require more time and alternative resources for achieving the same level of proficiency as their peers.

### Balanced, comprehensive and sustainable curriculum:

- Science literacy is best achieved when the process of learning occurs through a balanced and comprehensive curriculum.
- Curriculum, instruction and assessments must be aligned to the Minnesota Academic Standards in Science.
- Science instruction should engage students in all levels of the scientific process through both hands-on and minds-on learning.
- Process skills are foundational to learning science and should be explicitly taught then reinforced through repeated application to content learning.
- Students should engage in direct instruction, reading and investigations that follow a scaffolded inquiry model.
- New programs and materials should be reviewed based on standards alignment, equity, and cost.

### Assessment:

- All students in grades 5, 8 and after completing biology in high school, take the MCA in science
- Classroom assessments should measure both the progression of learning and the overall proficiency toward understanding specific content.
- Classroom assessment should align to state and local benchmarks and be informative in nature.
  - Assessments must address both content and the scientific process.
- A variety of assessments should be used including verbal, written, projects, lab practicals and science notebooks.

### Reading, writing and communication:

- Science literacy requires exposure to various types of text specific to science including textbooks, journals, laboratory procedures and laboratory reports.
- Reading, writing and communication skills are foundational to achieving science literacy.
- Students need to be instructed explicitly on how to access information in nonfiction text.
- Students should be able to communicate their understanding of a concept, process or skill in speaking, writing and graphing.
- Progression of learning technical communication skills should be evident in instruction across grade levels.
- Academic language is foundational to understanding content.

### Professional development:

- Teachers have an obligation to participate in and shape the ongoing professional development necessary to achieve expected student outcomes.
- Teachers are encouraged to observe others in their classrooms and engage in professional discussion around teaching and learning.
- Grade level or content groups should meet regularly and teachers should be provided the opportunity to work in vertical teams.