

The Bakken Museum

Science & Engineering Standards Addressed

The Bakken Museum's **Magnets & Electricity** workshop supports the following Minnesota Science **Standards**:

K-8

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| 1.1.1 | Students will be able to ask questions about aspects of the phenomena they observe, the conclusions they draw from their models or scientific investigations, each other's ideas, and the information they read. |
| 1.2.1 | Students will be able to design and conduct investigations in the classroom, laboratory, and/or field to test students' ideas and questions, and will organize and collect data to provide evidence to support claims the students make about phenomena. |
| 3.1.1 | Students will be able to develop, revise, and use models to represent the students' understanding of phenomena or systems as they develop questions, predictions and/or explanations, and communicate ideas to others. |
| 3.2.1 | Students will be able to apply scientific principles and empirical evidence (primary or secondary) to explain the causes of phenomena or identify weaknesses in explanations developed by the students or others. |
| 4.1.1 | Students will be able to engage in argument from evidence for the explanations the students construct, defend and revise their interpretations when presented with new evidence, critically evaluate the scientific arguments of others, and present counterarguments. |

The Bakken Museum's **Magnets & Electricity** workshop supports the following Minnesota Science **Benchmarks**:

Kindergarten

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| OP.2.2.1.1 | Identify and describe patterns that emerge from the effects of different strengths or different directions of pushes and pulls on the motion of an object. |
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Grade 2

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| 2P.2.2.1.1 | Identify and predict quantitative patterns of the effects of balanced and unbalanced forces on the motion of an object. |
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Grade 4

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| 4P.1.1.1.1 | Ask questions to determine cause and effect relationships of electric and magnetic interactions between two objects not in contact with each other. |
| 4P.1.1.2.1 | Define a simple design problem that can be solved by applying scientific ideas about magnets. |

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The Bakken Museum's **Magnets & Electricity** workshop supports the following Minnesota Science **Benchmarks**:

Grade 5

- 5P.1.2.1.2** Evaluate appropriate methods and tools to identify materials based on their properties prior to investigation.
- 5P.3.1.1.1** Develop and refine a model to describe that matter is made of particles too small to be seen.

Middle School (Grade 6 - 8)

- 8P.1.1.1.2** Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.
- 8P.1.2.1.3** Conduct an investigation and evaluate the experimental design to provide evidence that fields exist between objects exerting forces on each other even though the objects are not in contact.

High School (Grade 9-12)

- 9P.1.2.1.1** Conduct an investigation to provide evidence that an electric current can produce a magnetic field and that a changing magnetic field can produce an electric current.
- 9P.3.1.1.2** Use a model of two objects interacting through electric or magnetic fields to illustrate the forces between the two objects and the changes in energy of the two objects due to the interaction and describe how these forces are present in phenomena.