

# The Bakken Museum

## Science & Engineering Standards Addressed

The Bakken Museum's **Guided Exhibit Tour** supports the following Minnesota Science **Standards**:

### K-8

<b>1.1.1</b>	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.
<b>1.1.2</b>	Students will be able to ask questions about a problem to be solved so they can define constraints and specifications for possible solutions.
<b>1.2.1</b>	Students will be able to design and conduct investigations in the classroom, laboratory, and/or field to test students' ideas and questions and to provide evidence to support claims the students make about phenomena.
<b>2.1.1</b>	Students will be able to represent observations in order to recognize patterns, the meaning of those patterns, and possible relationships between variables.
<b>3.1.1</b>	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.
<b>3.2.1</b>	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.
<b>3.2.2</b>	Students will be able to use their understanding of scientific principles and the engineering design process to design solutions that meet established criteria and constraints.
<b>4.1.1</b>	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.
<b>4.1.2</b>	Students will be able to argue from evidence to justify the best solution to a problem or to compare and evaluate competing designs, ideas, or methods.
<b>4.2.1</b>	Students will be able to read and interpret multiple sources to obtain information, evaluate the merit and validity of claims and design solutions, and communicate information, ideas, and evidence in a variety of formats.

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## Science & Engineering Standards Addressed

The Bakken Museum's **Guided Exhibit Tour** workshop supports the following Minnesota Science **Benchmarks**:

### Grade 1

- 1P.3.2.2.1** Build a device that uses light to solve the problem of communicating over a distance.
- 1L.3.2.2.2** Plan and design a solution to a human problem by mimicking how plants and/or animals use their external parts to help them survive, grow, and meet their needs.

### Grade 2

- 2P.1.1.1.1** Ask questions about an object's motion based on observation that can be answered by an investigation.
- 2P.2.2.1.1** Identify and predict quantitative patterns of the effects of balanced and unbalanced forces on the motion of an object.

### Grade 4

- 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.

### Grade 5

- 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)

- 6E.2.1.1.3** Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.
- 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.
- 8P.3.1.1.3** Develop and revise a model to describe that when the arrangement of objects interacting at a distance changes, different amounts of potential energy are stored in the system.
- 8P.3.2.1.1** Construct an explanation based on evidence and scientific principles of a common phenomenon that can be explained by the motions of molecules.

### High School (Grade 9-12)

- 9C.1.2.1.1** Gather evidence to compare the structure of substances and infer the strength of electrical forces between particles.
- 9C.4.2.1.1** Communicate scientific and technical information about why the molecular-level structure is important in the functioning of designed materials.
- 9P.2.2.1.2** Apply Coulomb's Law to describe and predict the electrostatic forces between objects.