

Minnesota's Changing Climate Learning Outcomes and Alignment with Minnesota Science and Literacy Standards

Grades 3-12

Lesson 1: What is a journal for?

- Students will identify key features of a journal
- Students will identify journal entry themes
- Students will compare journal entries from different time periods and in different styles
- Students will create their own journal to be used for outdoor observation

Online Classroom Outcomes:

- Students will view examples of journals from historical figures in Minnesota history
- Students will submit their own journal entries about their biome or "place."
- Students will comment on journal entries made by other students.

Minnesota Science Standards

3.3.2.1

5.1.1.1, 5.1.1.2.1

Literacy in History/Social Studies, Science, and Technical Subjects

Level 6-8

12.1.1, 12.2.2

13.6.6

14.3.3, 14.4.4, 14.10.10

Level 9-10

13.6.6

14.2.2, 14.3.3, 14.4.4, 14.10.10

Level 11-12

13.6.6

14.2.2, 14.3.3, 14.4.4, 14.10.10

Grades 3-12

Lesson 2: What defines Minnesota's biomes?

- Students will identify Minnesota's four main biomes.
- Students will identify characteristic vegetation and animals found in each biome.
- Students will observe the biome they live and record observations in their journal.
- Students will describe the factors that define each biome.

In addition Grades 9-12

- Students will describe how the land has changed from its "natural vegetation"
- Students will define what are other anthropogenic characteristics of each biome
- Students will hypothesize the impact land use change on vegetation and animals in each biome

Online Classroom Outcomes:

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- Students will “explore” Minnesota’s biomes learning key characteristics, flora and fauna, etc.
- Students will submit observations in photo, video or written form of their biome.
- Students will interact with data associated with Minnesota’s biomes.
- Students will watch videos from experts and other Minnesotans about their sense of place in their Minnesota biome.

Minnesota Science Standards

3.1.1.2.1, 3.1.1.2.3, 3.1.1.2.4, 3.1.3.2.1, 3.1.3.2.2, 3.4.1.1.2

5.1.1.1.4, 5.1.1.2.1, 5.1.3.4.2, 5.4.1.1.1, 5.4.2.1.1

6.1.3.1.1, 6.1.3.4.2

7.1.1.2.1, 7.1.3.4.1, 7.1.3.4.2, 7.4.2.1.1, 7.4.2.1.3, 7.4.3.2.4, 7.4.4.1.2

8.1.3.4.2

9.1.3.1.1, 9.1.3.4.3, 9.4.4.1.2

Literacy in History/Social Studies, Science, and Technical Subjects

Level 6-8

14.2.2, 14.3.3, 14.4.4, 14.7.7, 14.8.8, 14.10.10

Level 9-10

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Level 11-12

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14.2.2, 14.3.3, 14.4.4, 14.6.6, 14.10.10

Grades 3-8

Lesson 3: What defines Minnesota’s Climate?

- Students will define climate, weather and phenology
- Students will define climate change.
- Students will gather their own weather data from their school site and record it in their journal.
- Students will graphically represent authentic data from Minnesota’s Climatology site.

In addition Grades 9-12

- Students will interpret graphs showing long-term precipitation and temperature trends in Minnesota
- Students will discuss the importance of longitudinal data
- Students will gather their own weather data from their school site and record it in their journal

Online Classroom Outcomes:

- Students will interact with data associated with Minnesota’s climate
- Students will submit their own weather reports
- Students will watch videos from experts and other Minnesotans about weather and climate.

Minnesota Science Standards

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3.1.1.1.1, 3.1.1.2.3, 3.1.1.2.4, 3.1.3.2.1, 3.1.3.2.2, 3.1.3.4.1

4.2.1.1.1, 4.3.2.3.1

5.1.1.2.2, 5.1.3.4.1, 5.1.3.4.2, 5.4.2.1.2

7.1.1.2.3, 7.1.3.4.1, 7.4.2.1.3

8.1.3.3.3, 8.1.3.4.1

9.1.1.1.2, 9.1.1.2.4, 9.1.3.1.1, 9.1.3.1.2, 9.1.3.4.3

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Level 9-10

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Grades 3-12

Lesson 4: What is climate change and what does it mean for Minnesota?

- Students will explain the causes of climate change
- Students will explain the implications of climate change
- Students will predict how climate change might impact or is impacting the area where they live
- Students will describe five key issues for Minnesotans facing climate change

Online Classroom Outcomes

- Students will submit journal entries with their climate change predictions
- Student will visit the online classroom section on climate change and use the interactive climate change game.

Minnesota Science Standards

3.1.1.1.1, 3.1.1.2.1, 3.1.1.2.3, 3.1.1.2.4, 3.1.3.2.1, 3.1.3.2.2

4.1.2.1.1,

5.1.1.1.1, 5.3.4.1.1, 5.4.2.1.2, 5.4.4.1.1

7.1.12.3, 7.4.3.2.4

8.1.3.3.3, 8.1.3.4.1, 8.3.2.2.1, 8.3.2.2.3

9.1.1.2.4, 9.1.3.1.3, 9.1.3.3.1, 9.1.3.4.3, 9.2.4.1.1, 9.3.4.1.2, 9.4.4.1.2,

9C.1.3.3.1, 9P.1.3.3.1

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Grades 3-8

Lesson 5: What does the data show?

- Students will make their own interpretations of authentic graphs representing different impacts of climate change in Minnesota.
- Students will make the connection between a 3-D object and what the graph represents.
- Students will divide 6 statements about the graph into True or False categories.
- Students will share their results.
- Students will brainstorm how climate change could affect their biome.

Grades 9-12

- Students will make their own interpretations of authentic graphs representing different impacts of climate change in Minnesota
- Students will make the connection between a 3-D object and what the graph represents
- Students will divide 6 statements about the graph into True or False categories
- Students will share their results
- Students will brainstorm how climate change could affect their biome.
- Students will develop their own True/False statements about scientific figures and exchange with another student
- Students will share their results
- Students will discuss the importance of corroborative data in support of climate change science

Online Classroom Outcomes:

- Students will “explore” the effects of a changing climate on Minnesota’s biomes
- Students will watch videos from experts and other Minnesotans on the effects of a changing climate on Minnesota’s biomes.
- Students will submit journal entries about how a changing climate might affect their place.

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5.1.1.1.1, 5.3.4.1.1, 5.4.2.1.2, 5.4.4.1.1

6.1.3.4.1

7.1.1.2.3, 7.1.3.4.1

8.1.1.2.1, 8.1.3.3.3, 8.1.3.4.1, 8.3.2.2.1, 8.3.2.2.3

9.1.1.1.2, 9.1.1.2.4, 9.1.3.1.3, 9.1.3.4.3, 9.3.4.1.2, 9.4.4.1.2

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Grades 3-12

Lesson 6: What can I do?

- Students will brainstorm appropriate solutions and select one for their group, class or school.
- Students will develop a climate action plan and begin to implement it.

Online Classroom Outcomes:

- Students will submit their climate actions plans.
- Students will share photo and video of their climate action projects.
- Students will watch videos of experts doing research in mitigation/adaptation.

Minnesota Science Standards

3.1.1.1.1, 3.1.1.2.1, 3.1.1.2.4, 3.1.3.2.1, 3.1.3.2.2

4.1.2.1.1

5.3.4.1.3, 5.4.4.1.1

7.4.4.1.2

8.3.4.1.2

9.1.1.1.2, 9.1.1.2.2, 9.1.1.2.3, 9.1.3.1.1, 9.1.3.1.3, 9.1.3.3.2, 9.1.3.4.3, 9.3.4.1.2,

9.4.4.1.2

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Level 11-12

12.1, 12.2

13.3.3

14.1.1, 14.2.2, 14.3.3, 14.4.4, 14.6.6, 14.7.7, 14.8.8, 14.9.9, 14.10, 14.10