

Group Debate

Group Names - Period _____

Mercury in the Environment - Group Debate

Choose from the characters listed below - list your 1st, 2nd and 3rd choices. Write the name of your character on the board. Groups will be selected by lottery number. If your character has already been chosen, select the next character that is available.

- _____ Mine owner
- _____ Miner
- _____ Water treatment plant employee (orange hat from video)
- _____ People impacted:
_____ People who live in the area
- _____ Recreational people ex: skiers, fishermen, etc.
- _____ Fish
- _____ Animal - you select
- _____ Fisherman in Japan
- _____ Chisso Company
- _____ Chisso employee
- _____ Other

Mercury Poisoning

True/False: Circle (T) if the statement is true, (F) if the statement is false

- T F 1. Mercury can affect a person's health.
- T F 2. The most likely source of contamination is eating contaminated fish.
- T F 3. Adults are more likely to be harmed by mercury contamination than infants or young children.
- T F 4. Breathing mercury vapor is less harmful than touching or eating mercury.
- T F 5. A woman's placenta forms a good barrier between the developing fetus and harmful substances such as mercury.
- T F 6. The chemical symbol for mercury is Me.

Multiple Choice: choose the letter of the most appropriate word to match the definition.

Write the letter in the space provided.

- ___ 7. Name of the famous mining area around Virginia City.
A) Dayton B) Gold Hill C) Silver City D) Comstock
- ___ 8. Which federal agency determined the Dayton area needed to be cleaned up from mercury contamination?
A) Bureau of Land Management B) Environmental Protection Agency
C) Nevada Department of Wildlife D) Forest Service
- ___ 9. Some negative health effects of mercury in **humans** include:
A) kidney and nervous system damage B) cranial stenosis
C) growth retardation in fish D) skin lesions
- ___ 10. One method used by the EPA to determine the mercury contamination in Dayton:
A) Public opinion B) flood control C) turbidity measurements D) soil sampling
- ___ 11. Animals that are most likely to be negatively affected by mercury in the food chain:
A) Crustaceans & Coelenterates B) Predators at the top of the food chain
C) Racoons and coyotes D) Rabbits feeding on alfalfa
- ___ 12. The Carson river flows into
A) Lake Tahoe B) The Atlantic Ocean
C) Lake Lahontan D) The Pacific Ocean

Short Answer: Fill in the blanks with a short response that makes the statement correct.

- 13. Mercury is used to extract _____ from rock.
- 14. The Carson River was contaminated as a result of _____.
- 15. Mercury is a/an _____ (phase of matter) at room temperature.
- 16. The _____ (group) classified Dayton as a National Priority Superfund site in 1990.
- 17. The two minerals that they mined from the Comstock Lode were _____ and _____.
- 18. Too much Mercury has harmful effects on humans; it affects the brain, kidneys and the _____.

Essay: Answer the following question completely. (7 points)

Explain why the EPA has recommended that pregnant woman NOT eat predator fish like tuna:

Mercury Poisoning

True/False: Circle (T) if the statement is true, (F) if the statement is false

- F 1. Mercury can affect a person's health.
- F 2. The most likely source of contamination is eating contaminated fish.
- T F 3. Adults are more likely to be harmed by mercury contamination than infants or young children.
Infants, young children are more readily harmed by mercury contamination
- F 4. Breathing mercury vapor is less harmful than touching or eating mercury.
- T F 5. A woman's placenta forms a good barrier between the developing fetus and harmful substances such as mercury.
Developing fetuses are much more susceptible to mercury contamination
- T F 6. The chemical symbol for mercury is Me. **The chemical symbol is Hg.**

Multiple Choice: choose the letter of the most appropriate word to match the definition.
Write the letter in the space provided.

- D 7. Name of the famous mining area around Virginia City.
 A) Dayton B) Gold Hill C) Silver City D) Comstock
- B 8. Which federal agency determined the Dayton area needed to be cleaned up from mercury contamination?
 A) Bureau of Land Management B) Environmental Protection Agency
 C) Nevada Department of Wildlife D) Forest Service
- A 9. Some negative health effects of mercury in **humans** include:
 A) kidney and nervous system damage B) cranial stenostosis
 C) growth retardation in fish D) skin lesions
- D 10. One method used by the EPA to determine the mercury contamination in Dayton:
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- B 11. Animals that are most likely to be negatively affected by mercury in the food chain:
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- C 12. The Carson river flows into
 A) Lake Tahoe B) The Atlantic Ocean
 C) Lake Lahontan D) The Pacific Ocean

Short Answer: Fill in the blanks with a short response that makes the statement correct.

13. Mercury is used to extract minerals/ore from rock.
14. The Carson River was contaminated as a result of mining.
15. Mercury is a/an liquid (phase of matter) at room temperature.
16. The EPA (group) classified Dayton as a National Priority Superfund site in 1990.
17. The two minerals that they mined from the Comstock Lode were gold and silver.
18. Too much Mercury has harmful effects on humans; it affects the brain, kidneys and the nervous system, developing fetuses.

Essay: Answer the following question completely. (7 points)

Explain why the EPA has recommended that pregnant woman NOT eat predator fish like tuna:
Discuss bioaccumulation and human health issues

Eight Suggested Objectives for Integrating the Carson River Watershed Map into Your Classroom

These objectives are some of the many ways the Carson River Watershed map may be used to teach Nevada Standards. Their primary purpose is to develop an awareness of the natural world, an understanding of ecosystems, an awareness of the impact of our actions, and an awareness and knowledge of local water resources and water quality issues. These eight objectives have been correlated to Nevada standards.

Objective 1: Investigate and describe how environmental conditions in the upper portion of the watershed differ from environmental conditions in the middle and lower portions of the watershed.

1a. Annual precipitation is the amount of water received in the form of rain and snow in one year's time. True False

Grade 8

Earth and Science— *Students understand that the Earth is composed of interrelated systems of rocks, water, air, and life*

13.8.4 Cycles of Matter and Energy. Simulate and describe how clouds, latitude, altitude, topographical features, and proximity to large bodies of water affect weather and climate.

Grades 6, 8, 12

Geography: Physical Systems—*Students understand how physical processes shape Earth's surface patterns and ecosystems*

3.6.1 Explain how conditions in the atmosphere can affect those on the lithosphere.

3.8.1 Explain how the physical processes within each of the four basic systems (atmosphere, lithosphere, hydrosphere, and biosphere) influence the Earth's surface.

3.8.4 Compare and contrast the biodiversity and productivity of various ecosystems on Earth.

3.12.1 Describe and analyze how interactions of the four basic physical systems (atmosphere, biosphere, lithosphere, and hydrosphere) affect different regions of the U.S. and the world.

Grades 7, 8, 12

Geography: Environment and Society— *Students understand the effects of interactions between human and physical systems and the changes in use, distribution, and importance of resources.*

5.7.1 Changes in the Physical Environment. Investigate changes in the physical environment that could have an impact on humans.

5.8.1 Describe and predict the regional or global impact of changes in the physical environment.

5.12.1 Compare and contrast how changes in the physical environment can increase or diminish its capacity to support human activity.

- 5.7.2 Explain a specific constraint on a physical environment that impacts human activity.
- 5.8.2 Compare and contrast the opportunities and constraints that the physical environment places on human activity.
- 5.12.2 Constraints of the Physical Environment Evaluate strategies to respond to constraints placed on human systems by the physical environment.

Objective 2: Learn about and describe the variety of plants that grow in the Carson River Watershed to support many wildlife species.

Identify three plants found in rangeland, riparian or forest habitats. Explain similarities and differences in their use and identify living species that thrive on these different habitats. What is the name of the habitat type that is found in the lower end of the watershed that is very dry or salty.

Big sagebrush habitat

Riparian habitat

Salt desert shrub habitat

High mountain habitat

2c. Vegetation along the river channel helps to make water cleaner by . . .

(circle all that apply) Holding the soil in place

Filtering and taking up pollutants

Cooling the water

Scrubbing the water

Grade 8

Environmental Science—*Students will demonstrate an understanding that ecosystems display patterns of organization, change, and stability as a result of the interactions and interdependencies among the life forms and the physical components of the Earth.*

15.8.1 Ecosystems: Stability and Change in Ecosystems. Investigate and describe how living and non-living components of ecosystems interact in various ways.

Objective 3: Describe (understand) how historical and present environmental impacts have resulted in the present landscape of Carson River watershed.

Grades 8-12

Earth & Space Science—*Students understand that the Earth is composed of interrelated systems of rocks, water, air, and life.*

10.8.2 Earth Structures and Composition. (Landforms) Investigate and describe how the combination of constructive and destructive forces result in the formation of landforms.

Geography: Human Systems—*Students understand how economic, political, and cultural processes interact to shape patterns of human migration and settlement, influence and interdependence, and conflict and cooperation.*

4.8.2 Migration and Settlement. Define the reasons for human migration and settlement and explain the effects on places and cultures.

4.12.2 Evaluate the impact of migration and settlement on physical and human systems.

Objective 4: Identify the mountain ranges that surround portions of the Carson River.

Circle all that apply.

- Cascade Mountain Range
- Sierra Nevada Range
- Pinenut Mountains
- Rocky Mountains
- Virginia Range
- Dead Camel Range

Where is the Carson River Watershed in relation to the Sierra Nevada mountain range?

East West North South

What is the name of the canal that brings water from the Truckee River Watershed over to the Carson River Watershed?

Bypass Canal

Lahontan Canal

Truckee Canal

Derby Canal

Grade 8

Earth & Space Science—*Students understand that the Earth is composed of interrelated systems of rocks, water, air, and life.*

11.8.2 Earth Models. Compare a variety of map types, and locate Nevada and Nevada features on each.

Objective 5: Name six attractions our watershed offers. Describe their location in relation to water bodies, communities, accessibility, or other influencing factors. Describe any contribution and influence the attraction may have upon water quality.

5a. Where does water go after it runs down your street into a ditch or storm drain?

Storage tanks

Lakes and rivers

A water treatment plant

All of these

I don't know

5b. Circle actions that help watersheds; draw a line through actions that harm watersheds.

- Plant trees or shrubs
- Plant flowers and grasses
- Rake leaves into the street
- Put chemicals down the storm drain when finished with them
- Wash cars in the street
- Pick up litter
- Tell people that streets flow to rivers
- Ride your bike
- Keep fertilizers off driveways and streets
- Mulch and compost leaves
- Pick up after your pet

Grade 12

Environmental Science—*Students will demonstrate an understanding that ecosystems display patterns of organization, change, and stability as a result of the interactions and interdependencies among the life forms and the physical components of the Earth.*

15.12.1 Ecosystems–Relationships and Interactions in Ecosystems. Investigate and describe how ecosystems change or remain the same in response to different kinds of influences.

Objective 6: Two-part question. 1. In what way am I part of the Carson River? 2. How do I impact the water of the Carson River?

Grades 8-12

Geography Content: Places and Regions—*Students understand the physical and human features and cultural characteristics of places and use this information to define and study regions and their patterns of changes.*

2.8.1 Describe the relationship between physical and human features, such as landforms and political boundaries.

2.12.1 Characteristics of Places and Regions. Determine how relationships between humans and the physical environment lead to the development of and connections among places and regions.

2.8.2 Relate how places and regions are important to the expression of cultural identity.

2.12.2 Cultural Identity. Explain why places and regions are important to cultural identity and can serve as forces for both unification and fragmentation.

Objective 7: Explain the controversy over the first established human settlement in the 1860's**Grades 8-12**

History—*Students use chronology to organize and understand the sequence and relationship of events.*

1.8.2 Chronology. Create a tiered time line.

1.12.2 Chronology. Explain the sequence and relationship of events on a tiered time lines.

History—*Students will use social studies vocabulary and concepts to engage in inquiry, in research, in analysis, and in decision-making.*

2.8.1 Frame historical questions that examine multiple viewpoints.

2.12.1 Inquiry. Frame and evaluate historical questions from multiple viewpoints.

2.8.2 Evaluate sources of historical information based on: bias, credibility, cultural context, reliability, and time period.

2.12.2 Research and Analysis. Integrate, analyze, and organize historical information from a variety of sources.

Objective 8: Describe (understand) how historical and present environmental impacts have resulted in the present landscape of Carson River watershed.**Grades 8, 12**

History: 1700 to 1865—Students understand the people, events, ideas, and conflicts that led to the creation of new nations and distinctive cultures.

6.8.22. Nevada. Explain the events that led to Nevada statehood, including Comstock Lode and Election of 1864.

History: 1860 to 1920—*Students understand the importance and impact of political, economic, and social ideas.*

7.8.5 Describe the western frontier, including communication, pony express, telegraph, farming and water issues, mining, ranching, transportation.

7.8.9 Identify immigrant and native groups involved in mining, ranching, railroads, and commerce in Nevada and the United States.

7.12.5 United States and Nevada. Describe the role of farming, railroads, and mining in the settlement of the West.

Grades 8, 12

Geography: The World in Spatial Terms—*Students use maps, globes, and other geographic tools and technologies to locate and derive information about people, places, and environments.*

1.8.2 Compare and contrast the characteristics and purposes of several types of maps, map projections, and other geographic representations.

1.12.2 Map Selection. Select appropriate maps, map projections, and other representations to analyze and interpret geographic information.

Standards Correlations

Explore Your Watershed

1.8.5 Compare and contrast maps of similar areas for purpose, accuracy, content, and design.

1.12.5 Map Analysis. Analyze maps for similarities and differences in purpose, accuracy, content, and design.

Geography: Places and Regions—*Students understand the physical and human features and cultural characteristics of places and use this information to define and study regions and their patterns of changes.*

2.8.6 Describe how and why regions change over time.

2.12.6 Patterns of Change. Analyze why places and regions once characterized by one set of criteria may be defined by a different set of criteria today, and evaluate these changes.

Geography: Environment and Society—*Students understand the effects of interactions between human and physical systems and the changes in use, distribution, and importance of resources.*

5.8.4. Describe the patterns of change caused by human modification of the physical environments.

5.12.4 Human Modification. Develop possible responses to changes caused by human modification of the physical environment.

5.8.6 Identify and locate examples of renewable and non-renewable natural resources.

Renewable resource—An aspect that can be regenerated if used carefully (for example, fish, timber).

5.12.6 Earth's Resources. Analyze the patterns of use, the changing distribution, and the relative importance of Earth's resources.

5.8.7 Select a resource and evaluate different viewpoints regarding its use.

5.12.7 Management of Earth's Resources. Develop policies for the use and management of Earth's resources that consider the various interests involved.

Grades 5-8, 12

Geography: Geographic Applications—*Students apply geographic knowledge of people, places, and environments to interpret the past, understand the present, and plan for the future.*

6.5.1 Describe how people and places have influenced events in the past.

6.6.1 Identify resources that have played a role in historical events or movements.

6.7.1 Identify and discuss strategic geographic locations that have played a pivotal role in historic events.

6.8.1 Explain how different characteristics of people, places, and resources have affected events and conditions in the past.

6.12.1 Applying Geography in History. Analyze the ways in which physical features and human characteristics of places and regions have influenced the evolution of significant historical events.

Standards Correlations

Explore Your Watershed

High School Standards Correlated by Curtis Kortemeier of Carson High School

Standard Number	Standard
10.12.2	Investigate and describe how landforms are the result of a combination of constructive and destructive forces resulting from weathering, erosion, and the movement of lithosphere plates.
10.12.6	Compare and contrast the geologic features of Nevada and local geological features
10.12.6	Compare and contrast the geologic features of Nevada and local geological features
11.6.3	Investigate, design, and use various kinds of maps.
11.8.2	Compare a variety of map types, and locate Nevada and Nevada features on each.
13.12.5	Explain how large-scale, long-term equilibrium can accommodate small-scale changes.
13.12.6	Investigate and describe how elements necessary for life on Earth pass through both living and non-living cycles in a series of changes that form a global system
13.5.3	Investigate and describe the factors which affect the processes such as evaporation and condensation.
15.12.1	Investigate and describe how changes in an ecosystem can affect bio-diversity and bio-diversity contributes to an ecosystem's stability
15.12.2	Investigate and describe how ecosystems change or remain the same in response to different kinds of influences
15.12.2	Investigate and describe how ecosystems change or remain the same in response to different kinds of influences
15.12.4	Describe the unique geologic, hydrologic, climatic, and biological characteristics of Nevada's bioregions . (e.g. Northern NV cold desert, Southern low warm desert, Mountain).
15.12.4	Describe the unique geologic, hydrologic, climatic, and biological characteristics of Nevada's bioregions . (e.g. Northern NV cold desert, Southern low warm desert, Mountain).
15.8.1	Investigate and describe how living and non-living components of ecosystems interact in various ways.
15.8.1	Investigate and describe how living and non-living components of ecosystems interact in various ways.
15.8.1	Investigate and describe how living and non-living components of ecosystems interact in various ways.
16.12.1	Evaluate the consequences of changing patterns of resources use.
16.12.1	Evaluate the consequences of changing patterns of resources use.
16.12.4	Analyze and describe the limitations of the Earth's ability to respond to stresses produced by human or natural activities.
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Standards Correlations

Explore Your Watershed

Standard Number	Standard
16.12.4	Analyze and describe the limitations of the Earth's ability to respond to stresses produced by human or natural activities.
16.12.5	Analyze and evaluate the effects that increases in human populations can cause (e.g., resource depletion and environmental degradation).
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16.12.5	Analyze and evaluate the effects that increases in human populations can cause (e.g., resource depletion and environmental degradation).
16.8.5	Describe how unintended consequences of technologies can cause resource depletion and environmental degradation, but technology can also increase resource availability, mitigate environmental degradation, and make new resources economical.
16.8.5	Describe how unintended consequences of technologies can cause resource depletion and environmental degradation, but technology can also increase resource availability, mitigate environmental degradation, and make new resources economical.
17.12.1	Analyze and evaluate how consumption patterns, conservation efforts, and cultural or social practices in countries have varying environmental impacts.
17.12.2	Investigate and describe how human actions may impact the dynamic equilibrium of global systems (e.g., global warming, ozone depletion).
17.12.4	Evaluate and describe actions which affect the global environment in terms of trade-offs that may have effects on local environments or economics.
17.12.4	Evaluate and describe actions which affect the global environment in terms of trade-offs that may have effects on local environments or economics.
17.12.4	Evaluate and describe actions which affect the global environment in terms of trade-offs that may have effects on local environments or economics.
18.12.4	Explain that scientists work with others to resolve differences in interpretation of observations.
19.12.3	Recognize and describe situations in which a system is qualitatively different from the parts which comprise it (e.g., how a population differs from an individual).
20.12.2	Use models to identify and predict cause-effect relationships (e.g., effect of temperature on gas volume, effect of carbon dioxide level on the greenhouse effect).
20.8.5	Use a systematic approach to thinking critically about risks and benefits.