Carson River Watershed Lesson – 5th Grade

NACS:

5-ESS2-1 Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.

5-ESS2-2 Describe and graph the amounts and percentages of water and fresh water in various reservoirs to provide evidence about the distribution of water on Earth.

5-ESS3-1 Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.

Addressing Topic Big Question:
How and why is Earth constantly changing?
Sub question: How do Earth's major systems interact?
Sub question: How do the properties and movements of water shape Earth's surface and affect its systems?
Sub question: How do humans change the planet?

Performance Expectations:

Students should be able to formulate answers to questions such as: "How much water can be found in different places on Earth: How does matter cycle through ecosystems? Through the development of a model using an example, students are able to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact. They describe and graph data to provide evidence about the distribution of water on Earth.

Fifth grade students are expected to demonstrate grade-appropriate proficiency in developing and using models, using mathematics and computational thinking, and obtaining, evaluating, and communicating information; and to use these practices to demonstrate understating of the core ideas.

3-5-ETS1-2 Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Project Goal: Students will design their own watershed showing decrease or increase crisis in water overtime. Students will present possible solutions for water needs in their watershed to reflect their understanding of the interactions of biosphere, hydrosphere, geosphere, and/or atmosphere.

Background development:

Students will study the Carson River Watershed map with the goal of being able to define watershed and understand the changes that can occur in a watershed based on interactions of the various –spheres.

Project Wet: Common Water

Project Wet: Color Me a Watershed

Class Project:

Students will create/design their own watershed on graph paper to indicate environment prior to human habitation; second graph paper to indicate human arrival depicting growth and development.

Students select randomly from the Biome Cards and design their watershed on graph paper following the directions on the card and incorporating the number of lakes from the roll of a six-sided die.

Students select randomly from the Impact Cards and depict the changes to their watershed on the second graph paper. Discussion: Where in your watershed do these places need to be placed to take best advantage of the local resources? What resources do they need?

If available… a transparency could be used as an overlay to show the changes.

Students select randomly their Crisis Card. Students will outline the impact drought or flood will have on their watershed and decide on a solution that uses science ideas to protect their resources and environment.

Discussion:

A. Aswan Dam in Egypt
B. Levees
C. Irrigation
D. Reservoirs
E. Ground Water/wells and pumps

Students collect their data based on cards selected.

Students graph changes.

Students write an essay discussing:

Addressing Topic Big Question:

How and why is Earth constantly changing?

Sub question: How do Earth's major systems interact?

Sub question: How do the properties and movements of water shape Earth's surface and affect its systems?

Sub question: How do humans change the planet?

Generating a possible solution to a problem and how well it is likely to meet the criteria and constraints of the problem.

Using data and math to explain their model and to defend their solution.

Students present their projects.

Students compare and discuss the multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

Optional additional models to consider:

A. 3D clay model of their watershed
B. Illustrated Map similar to Carson River Watershed Map
C. Interactive Map on computer

Materials:

Graph paper for 24 x 15 array
Transparencies
Data chart
Biome Cards
Impact Cards
Crisis Cards
Modeling Clay
12 x 17 white construction paper

Name: _____

	First Map prior to human habitation		Second Map indicating human impact	
Biome	360 km^2 total	% of map	360 km^2 total	% of map
Forest				
Grassland				
Wetland				
Streams To include lakes				
Desert				
Residential (cities and towns)				
Industry (factories and other businesses)				
Agriculture				

Biome Cards

Your watershed has

Mountains which can contain forests and reservoirs

135 km^2 Forests

120 km^2 Reservoirs
- Wetlands
- Streams
- Lakes

100 km^2 Grasslands

5 km^2 Desert

Your watershed has

Mountains which can contain forests and reservoirs

120 km^2 Forests

100 km^2 Reservoirs
- Wetlands
- Streams
- Lakes

140 km^2 Grasslands

0 km^2 Desert

Your watershed has

Mountains which can contain forests and reservoirs

100 km^2 Forests

120 km^2 Reservoirs
- Wetlands
- Streams
- Lakes

100 km^2 Grasslands

40 km^2 Desert

Your watershed has

Mountains which can contain forests and reservoirs

135 km^2 Forests

100 km^2 Reservoirs
- Wetlands
- Streams
- Lakes

120 km^2 Grasslands

5 km^2 Desert

Your watershed has

Mountains which can contain forests and reservoirs

120 km^2 Forests

130 km^2 Reservoirs
- Wetlands
- Streams
- Lakes

100 km^2 Grasslands

10 km^2 Desert

Your watershed has

Mountains which can contain forests and reservoirs

100 km^2 Forests

140 km^2 Reservoirs
- Wetlands
- Streams
- Lakes

50 km^2 Grasslands

70 km^2 Desert

Impact Cards

20 km^2 Cities

30 km^2 Industry

70 km^2 Agriculture

Impact Cards

70 km^2 Cities

30 km^2 Industry

20 km^2 Agriculture

Crisis Cards
Flood
Gain 100 km^2
Of water

Crisis Cards
Drought
Lose 50 km^2
Of water

Impact Cards

20 km^2 Cities

70 km^2 Industry

30 km^2 Agriculture

Impact Cards

70 km^2 Cities

20 km^2 Industry

30 km^2 Agriculture

Crisis Cards
Drought
Lose 75 km^2
Of water

Impact Cards

30 km^2 Cities

20 km^2 Industry

70 km^2 Agriculture

Crisis Cards
Flood
Gain 50 km^2
Of water

Crisis Cards
Drought
Lose 100 km^2
Of water

Impact Cards

30 km^2 Cities

70 km^2 Industry

20 km^2 Agriculture

Crisis Cards
Flood
Gain 75 km^2
Of water