

EARTH SCIENCE Lesson Plan

Quarter 1, Week 5, Day 1



Outcomes for Today

Standard Focus: Earth Sciences 9.c *Students know the importance of water to society, the origins of California's fresh water, and the relationship between supply and need.*

PREPARE

1. Background knowledge necessary for today's reading.

More than 90% of the fresh water on Earth is in glaciers and ice caps. Of the remaining fresh water only a small portion is contained in surface water, the rest is groundwater, the subsurface water below the water table.

2. Vocabulary Word Wall.

Introduce 3-5 important, useful words from today's reading

Hydrosphere

infiltration

porosity

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say and define the word quickly and add to the word wall

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 10.1, pp. 239-241 (Groundwater Storage)

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and 3-5 important facts/ideas.

Students might mention:

- Fresh water is an abundant, renewable resource.
- Most of the precipitation that falls enters the ground through infiltration.
- Groundwater slowly moves through the ground and eventually resurfaces through springs.

7. Post information on the billboard. Add new information to ongoing class projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Groundwater – Water we doing to our planet?

Description of the activity: Students will calculate the yearly runoff created by a parking lot, and calculate the loss of water that would have entered the groundwater system

Procedure: Students use local rainfall averages to calculate how much water is lost to runoff that would replenish the water supply.

Discussion: To replenish water supplies, precipitation must be absorbed into the ground. Yet in urban areas, there is increased demand for more development, more roads.

Key questions:

- Why are urban areas likely to have a water shortage?
- What could we do to decrease the amount of land we use for building, while meeting the needs of a growing population?

Source: <http://www.geosociety.org/LessonPlans/Groundwater.pdf>

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world.

EARTH SCIENCE Lesson Plan

Quarter 1, Week 5, Day 2



Outcomes for Today

Standard Focus: 9.c

PREPARE

1. Background knowledge necessary for today's reading.

The water table is never completely horizontal, so gravity affects the movement of groundwater. Groundwater is present everywhere beneath the water table. Its depth and accessibility vary.

2. Vocabulary Word Wall.

Introduce 3-5 important, useful words from today's reading

Zone of saturation

water table

permeability

aquifer

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say and define the word quickly and add to the word wall

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 10.1, pp. 241-243

RESPOND

6. Fix the facts. Clarify what's important.

Discuss the reading and add 3-5 facts/ideas.

Students might mention:

- The depth of the water table varies.
- The water table changes depending on the amount of precipitation and weather conditions.
- Most groundwater flows through permeable layers called aquifers.

7. Post information on the billboard. Add new information to ongoing class projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Thirstin Builds an Aquifer in a cup

Description of the activity: A model that illustrates how water is stored in an aquifer, how groundwater can become contaminated, and how the contamination can show up in a drinking water well.

Procedure: Layers of materials are added to a clear plastic glass to simulate an aquifer

Discussion: Many communities obtain their drinking water from aquifers. Property owners who cannot obtain their water from a public source will have their own private wells drilled on their property. Groundwater can become contaminated by a number of harmful chemicals.

Key questions:

- What other sources or activities could pollute the aquifer?

Source: <http://www.epa.gov/ogwdw000/kids/>

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or to the world.

EARTH SCIENCE Lesson Plan

Quarter 1, Week 5, Day 3



Outcomes for Today

Standard Focus: 9.c

PREPARE

1. Background knowledge necessary for today's reading.

Groundwater that is acidic dissolves calcium carbonate. Acidic groundwater produces caves and karst topography in limestone regions. Precipitation from calcium carbonate forms stalactites and stalagmites in caves.

2. Vocabulary Word Wall.

Introduce 3-5 important, useful words from today's reading

Cave **sinkhole** **karst topography** **stalactite** **stalagmite**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say and define the word quickly and add to the word wall

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Chapter 10.2, pp. 244-248

RESPOND

6. Fix the facts. Clarify what's important.

Students might mention:

- Caves are formed when groundwater dissolves limestone.
- Sinkholes, sinks, and caves are evident in Karst topography.
- Tap water contains various dissolved minerals.

7. Post information on the billboard. Add new information to ongoing class projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Karsts, Caves and Groundwater Contamination

Description of the activity: Students will simulate a stable soil type and a karst soil type and observe accessibility to groundwater.

Procedure: Students compare the soil types and the amount of water that passed through

Discussion: Groundwater is susceptible to contamination from surface activities. Karst topography is a fragile system that provides accessibility to groundwater through openings in the land surface.

Key questions:

- Why does soil in karst areas allow more water through?
- What are some precautions people can take to protect the groundwater?

Source: http://watersheds.org/tuac/karst_groundwater.pdf

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or the world.

EARTH SCIENCE Lesson Plan

Quarter 1, Week 5, Day 4



Outcomes for Today

Standard Focus: Earth Sciences 9.c

PREPARE

1. Background knowledge necessary for today's reading.

Ground water remains underground for hundreds of years. It moves through aquifers and eventually re-emerges at the surface where it intersects with the water table.

2. Vocabulary Word Wall.

Introduce 3-5 important, useful words from today's reading

Spring **hot spring** **geyser** **well** **recharge**

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say and define the word quickly and add to the word wall

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 10.3, pp. 249-252

RESPOND

6. Fix the facts. Clarify what's important.

Students might mention:

- Springs emerge where the water table intersects the Earth's surface.
- The temperature of discharged groundwater is generally the average temperature of the area where it is located.
- Geysers and hot springs occur in areas of geothermal activity.

7. Post information on the billboard. Add new information to ongoing class projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Groundwater Contamination

Description of the activity: To understand the effects of leaking tanks and the release of contaminants on groundwater resources

Procedure: Students read two short articles and compare/contrast the causes, effects, solutions, and prevention.

Discussion: Groundwater is threatened every day by people that don't even realized what it is and how they are affecting it.

Key questions:

- What are the causes and effects of pollution?
- Are there ways to prevent contamination?

Source: http://www.geosociety.org/educate/lessonPlans/s_water.htm

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or the world.

EARTH SCIENCE Lesson Plan

Quarter 1, Week 5, Day 5



Outcomes for Today

PREPARE

1. Background knowledge necessary for today's reading.

Saltwater is denser than freshwater. Fresh groundwater floats on top of denser saltwater within the zone of saturation.

2. Vocabulary Word Wall.

Introduce 3-5 important words from today's reading

Artesian well subsidence radon pollution plumes

- Show, say, explain, expand, explode or buzz about the word briefly
- Show, say and define the word quickly and add to the word wall

READ

3. Review the vocabulary and concepts previously covered in this chapter.

4. Read directions for investigation/activity.

5. Read text.

Ch. 10.3, pp. 253-257

RESPOND

6. Fix the facts. Clarify what's important.

Students might mention:

- The over pumping of wells can lower the water table around the well.
- Water from runoff and precipitation can add back water into the zone of saturation, but it may not keep pace with the withdrawal.
- The most common sources of groundwater pollution are sewage, industrial waste, landfills, and agricultural chemicals.

7. Post information on the billboard. Add new information to ongoing class projects on the wall.

EXPLORE

8. Explore today's investigation with inquiry activities.

9. Explore today's simulation with inquiry activities.

10. Collect data and post.

One possible activity: Water, Water Everywhere?

Description of the activity: Students will use a data module showing the relationship between population growth and water availability and answer questions about what the chart shows

Procedure: Students will analyze data, draw bar graphs, and research water scarcity in another country.

Discussion: As the world's population increases, the accessibility to freshwater declines. Water is a constant concern in industrial and developing countries, and in both arid and wet climates.

Key questions:

- How might the lack of water affect how humans live?
- How might a country's growth rate affect water availability?

Source: <http://school.discovery.com/lessonplans/activities/watereverywhere/>

EXTEND

11. Prompt every student to write a short product tied to today's reading.

12. Close with a short summary.

Extend the reading to the students' lives or the world.