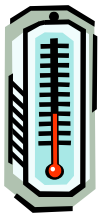
# Lesson 2: Thermometers & Temperature Scales



## Content: Science and Math

## PLANNING PHASE

**Performance Objectives:**

1. Students will be able to read a thermometer.
2. Students will become familiar with and will be able to read different temperature scales (Celsius and Fahrenheit).
3. Students will be able to convert temperature scales.
4. Students will be able to use an online conversion calculator (http://www.allmeasures.com/temperature.html)
5. Students will be able to work cooperatively with peers.

## Lesson Outline

**Overall Description:**

The purpose of this lesson is to get the students familiar with thermometer, temperature scales and conversion of temperature units.

**National Standards: TESOL Standards**

*Oral and Written Language*

Goal 1, Standard 3:

- Students will listen to and imitate how others use English.

Goal 2, Standard 1:

- Students will be able to participate in full class, group, and pair discussions.

**This lesson follows the Fairfax County Public Schools' Middle School sixth, seventh and eight grade Program of Studies (POS), which expand the State of Virginia Standards for Learning (SOLs).**

Standard 1: Students read and write a variety of forms

Benchmarks

MS 1.2. Students read and write for a variety of purposes.

ESOL Indicators:

- Read to gain information and develop academic language proficiency.
- Read a variety of materials to build vocabulary, acquire language patterns, and develop fluency.

Standard 2: Students use strategies to construct meaning when working with language.

Benchmarks

MS 2.4 Students use collaborative leaning strategies

Standard 5: Students use language processes to acquire, organize, and communicate information

Benchmarks:

MS 5.3. Students use technology to assist them in reading, writing, viewing, speaking, and listening.

ESOL Indicators: Access information using technology

**Virginia Science Standards of Learning / Benchmarks, Indicators**

6.1. The student will plan and conduct investigations in which
a) precise and approximate measures are recorded;

LS1. The student will plan and conduct investigations in which
a) metric units are used.

PS. 1. The student will plan and conduct investigations in which
a) …temperature is measured and reported using the metric unit
b) …thermometers are used to gather data.
c) …equipment is used safely

PS.7 The student will investigate and understand temperature scales.
Indicators
The student will be able to explain Celsius and Fahrenheit temperature scales.

**TEACHING PHASE**

**(1) Preparation**

*Warm-Up Activity:*
The warm-up activity will focus on reviewing Lesson 1 and discussing the previous lesson's homework assignment. Students are invited to share their information about today's weather forecast with a small group. All members compare and contrast their weather forecasts.

Cooperative Strategy: Oral presentation of weather forecast, work in small group.

*Language Goals*
Students will learn how to work in a cooperative group, listen to the answers of his peers, and compare and contrast different data.

**(2) Presentation**

a. Activity 1: Thermometer and Temperature Units/Scales

- Teacher introduces new vocabulary on board: thermometer, Celsius, Fahrenheit, unit and scale.
- Teacher asks students "How can we measure temperature?" Answer: with a thermometer.
- Teacher passes out thermometers (one per student) and discusses the features of a thermometer and how to read both scales (Fahrenheit/ Celsius). Students pair up, read room temperature, discuss with partner and share with class.

b. Extension:
Activity 2, Converting Temperature Scales

- Teacher introduces how to convert temperature scales on overhead (transparency, see appendix)

**Practice**:

- Handout with some conversion for to students to work with partners.
-

Cooperative Strategy: Working with a partner or in small group.

**(4) Evaluation**

- Informal performance evaluation based on working w/ partner, small group and class participation.
- Handouts /practice and homework

**(5) Expansion/Extension:**

- Practicing reading a thermometer. Teacher brings cups with ice water, cold and hot water. Students make predictions, and record the actual data.

**Four Skills Used in This Lesson:**

1. *Listening Activity:* Students listen to each other weather forecasts (homework assignment from Lesson 1) in a small group. Students listen to teacher explaining basic features of a thermometer and how to convert different temperature scales.
2. *Speaking Activity:* Students discuss weather forecasts in a small group and participate in small and whole class discussions. Students discuss reading room temperature with a partner.
3. *Reading Activity:* Students read temperature on a thermometer, conversion handout, practice and homework paper.
4. *Writing Activity:* Various handouts

**Methods/Approaches/Strategies**

- Warm Up: Tapping into prior knowledge
- Cooperative learning strategies are implemented throughout the lesson.
- Teacher modeling of expected responses.

**Other Activities:**

**Follow-up:**

- Other weather tools (anemometer, barometer, hygrometer, rain gauge, wind vane, and weather satellite) used by meteorologists and what they measure (wind speed, wind direction, precipitation, relative humidity, atmospheric pressure) see appendix/ examples.

**Assessment:**

Assessment will be informal, based on classroom participation. Self-assessment of conversion handout by using website with conversion calculator.

**Homework (extension):**

- Students take the thermometer home and measure temperatures in the evening and morning inside and outside your house. Record data on worksheet (see appendix)

**Technology:**

- Computer clip art to design handouts
- Website to convert temperature units: http://www.allmeasures.com/temperature.html

**Materials:**

- Warm up activity: data of weather forecast.
- Student handouts
- Transparencies with conversion chart agenda, chart (comparing various weather forecasts), and thermometer
- A classroom set of thermometers

**Books and Websites Used to Prepare Lesson Plan 2**


- Fairfax County Public Schools. (2003). *Middle school ESOL focus science odd year curriculum.* Fairfax, VA: Author.

- Fairfax County Public Schools. (2002). *Middle school A-level alignment with the middle school*. Fairfax, VA: Author.

- Fairfax County Public Schools. (2002). *Science program of studies.* Fairfax, VA: Author.

- Kagan, S., & Kagan, M. (1998). *Multiple intelligences: The complete MI book*. San Clemente, CA: Kagan Cooperative Learning

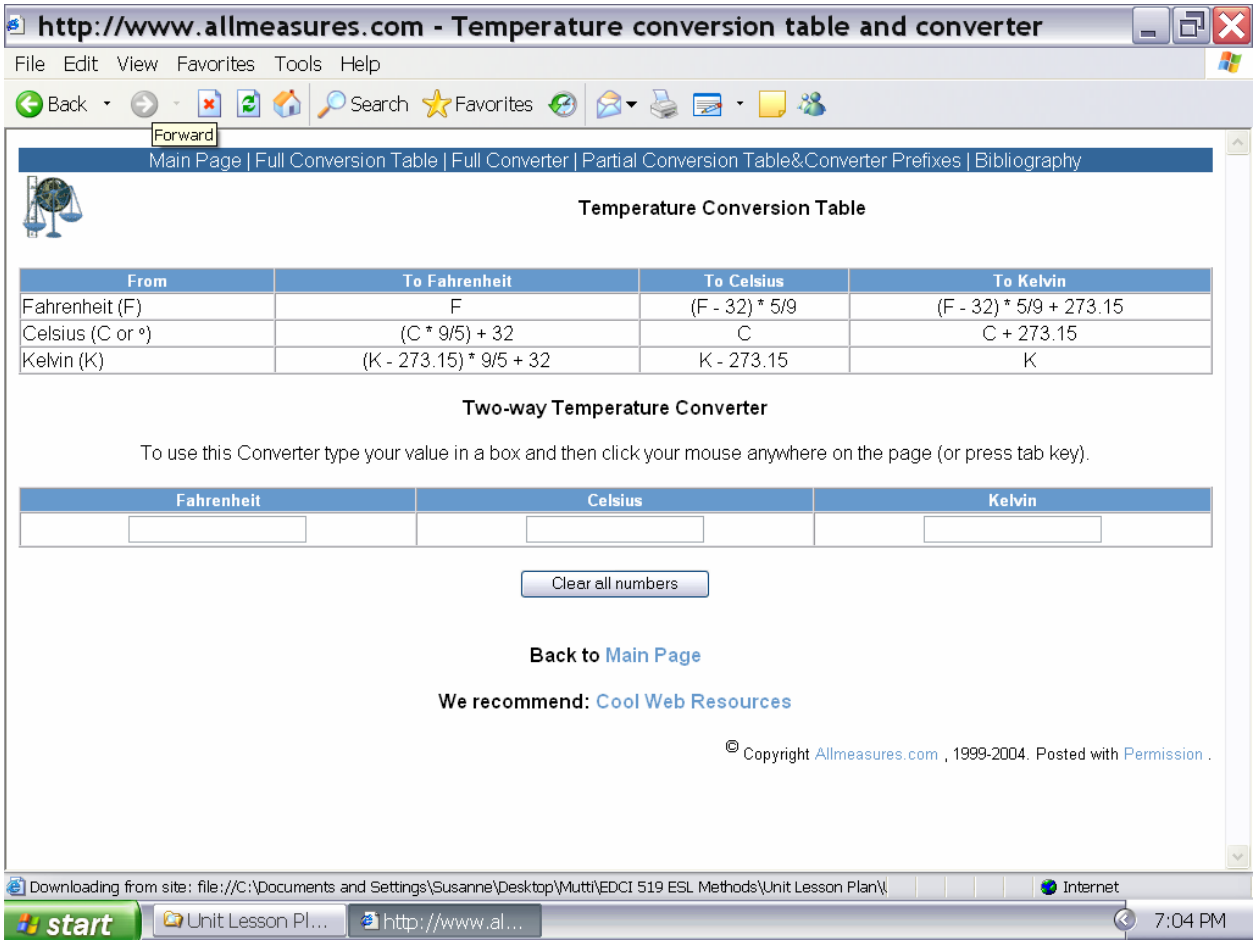
- Vriesenga, D. (1991). *Earth science, grades 5-8*. Grand Rapids, MI: Instructional Fair, Inc.

- www.tesol.org

- http://www.allmeasures.com/temperature.html

**Closure:**

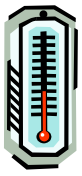
The teacher gives a quick summary of the lesson (temperature scales) and shares a website http://www.allmeasures.com/temperature.html that students can use to check if they converted their temperatures correctly on the practice handout.



Appendix, Lesson 2

Homework: Name: _____

Use your thermometer to read temperatures
in and outside your home

What is the temperature in °C? 

| When? | Outside your home: | Inside your home: |
|---|---|---|
| In the afternoon at 4 pm | | |
| In the evening at 6pm | | |
| In the morning at 7am | | |

Research:
Discuss the question below with your parent / look it up on the Internet or in a book:

What is your body's normal temperature? _____°C?

What is your body's temperature when you have a fever?
Between _____°C and _____°C.

## Lesson 3: Graphing Temperature

**Content: Science and Math**

**PLANNING PHASE**

**Performance Objectives:**

6. Students will be able to correctly read a thermometer.
7. Students will be able to recording temperature from various locations in the school and at home
8. Students will be able to display data in a bar graph
9. Students will be able to read, draw and interpret a temperature graph.

**Lesson Outline**

**Overall Description:**

The purpose of this lesson is to get the students familiar with collecting data and expressing them in temperature graphs.

**National Standards: TESOL Standards**

*Oral and Written Language*

Goal 1, Standard 3; Goal 2, Standard 1;

**This lesson follows the Fairfax County Public Schools' Middle School sixth, seventh and eight grade Program of Studies (POS), which expand the State of Virginia Standards for Learning (SOLs).**

Standard 1: Students read and write a variety of forms

Benchmarks

MS 1.2. Students read and write for a variety of purposes.

Standard 2: Students use strategies to construct meaning when working with language.

Benchmarks

MS 2.4 Students use collaborative leaning strategies

**Virginia Science Standards of Learning / Benchmarks, Indicators**

6.1. The student will plan and conduct investigations in which

b) precise and approximate measures are recorded;
c) data are organized and communicated through graphical representation (graphs, charts)

**TEACHING PHASE**

**(2) Preparation**

*Warm-Up Activity:*

- The warm-up activity will focus on reviewing the content of Lesson 2. Students share their homework handout in a small group. They collected data of evening and morning temperatures inside and outside their homes.

Cooperative Strategy: Share results with small group/ class

*Language Goals*
Students will learn how to work in a cooperative group, listen to the answers of his peers, and share them with the class.

**(2) Presentation**

a. Activity 1: Collecting Temperature Data

- New vocabulary: data table, bar graph, analyze, conclude
- Teacher tells students that they will be able to use their thermometer and collect temperature from 8 different locations in the school.
- Students pair up, and each pair is assigned a location (e.g,. cafeteria, upstairs, hallway) where they have to collect data temperature.
- Teacher passes out student handout (see appendix)
- After students return the data is collected on a transparency in a data table. Students copy information on their data table handout. Teacher explains that *data tables* are rectangular, grid-like organizational tools, in which to record quantitative information

b. Extension:
Activity 2: Displaying the data in a bar graph

- Teacher explains that they will display class data from the data table in a graph. She explains that a *graph* is a visual display of data. Teacher models how to shade in collected data. She further points out that each graph has a title; the locations are posted on the x-axis, the temperature on the y-axis, they have to be labeled and put into equal increments (Depending on the student knowledge of the coordinate system, teacher will modify and differentiate instruction)

Strategies: Working collaboratively with a partner. Teacher models expected student behavior, scaffolds steps.

Activity 3: Analyzing the graph

- Teacher models and scaffolds answers to the questions on the handout. Students are encouraged to infer and conclude. One possible conclusion is that heat rises and upstairs rooms are usually warmer than downstairs locations.

**(3) Practice**:

- Homework: Take home the thermometer and measure temperatures at eight different locations in your home. Record data on worksheet, draw a bar graph, analyze the data and conclude.

**(4) Evaluation**

- Informal performance evaluation based on working w/ partner, and class participation. Teacher will give feedback on handout and homework assignment.

**(5) Expansion/Extension:**

- Introducing various forms of graphs: scatter plot/ line graph, circle or pie graph.

- Implementing a graphing checklist or rubric, so students can self-assess their graphing skills.

**Four Skills Used in This Lesson:**

5. *Listening Activity:* Students listen to teacher's explanations of new concepts and to other students presenting their findings and temperature measurements.
6. *Speaking Activity:* Students discuss data with partner and participate in whole class discussions about data, temperature and graphs.
7. *Reading Activity:* Students read handouts, temperatures on a thermometer, data tables.
8. *Writing Activity:* Warm up activity (filling in the blanks); recording data on data sheet; answering questions when analyzing and concluding data on their handouts.

**Methods/Approaches/Strategies**

- Warm Up: Tapping into prior knowledge, reviewing concepts of measuring temperature.
- Cooperative Learning strategies are implemented throughout the lesson.
- Teacher modeling of expected responses, scaffolds new skills (using a data table, designing a bar graph, analyzing and concluding)

**Other Activities:**

**Follow-up:** Passing out newspapers and having students cut out various graphs, explain what they display.

**Assessment:**
Assessment will be informal, based on classroom participation; teacher feedback on handout and homework.

**Homework (extension):**
See above, handouts

**Technology:**

- Handouts will be displayed on an overhead transparency.
- Computer clip art to design handouts

**Materials:**

- Student handouts
- Transparencies
- A classroom set of thermometers

**Books and Websites Used to Prepare Lesson Plan 3**

- Fairfax County Public Schools. (2002). *Inquiry skills. Fairfax county public schools grade 7 science. Investigations in environmental science. Teacher resource guide.* Fairfax, VA: Author.

- Fairfax County Public Schools. (2003). *Middle school ESOL focus science odd year curriculum.* Fairfax, VA: Author.

- Fairfax County Public Schools. (2002). *Middle school A-level alignment with the middle school*. Fairfax, VA: Author.

- Fairfax County Public Schools. (2002). *Science program of studies.* Fairfax, VA: Author.


**Closure:**
The teacher gives a quick summary of the lesson and asks the class to listen to other teachers using verbs *analyze* and *conclude* and share during the next class period.

## Lesson 3: Graphing Temperature

**Content: Science and Math**

**PLANNING PHASE**

**Performance Objectives:**

10. Students will be able to correctly read a thermometer.
11. Students will be able to recording temperature from various locations in the school and at home
12. Students will be able to display data in a bar graph
13. Students will be able to read, draw and interpret a temperature graph.

**Lesson Outline**

**Overall Description:**

The purpose of this lesson is to get the students familiar with collecting data and expressing them in temperature graphs.

**National Standards: TESOL Standards**

*Oral and Written Language*

Goal 1, Standard 3; Goal 2, Standard 1;

**This lesson follows the Fairfax County Public Schools' Middle School sixth, seventh and eight grade Program of Studies (POS), which expand the State of Virginia Standards for Learning (SOLs).**

Standard 1: Students read and write a variety of forms

Benchmarks

MS 1.2. Students read and write for a variety of purposes.

Standard 2: Students use strategies to construct meaning when working with language.

Benchmarks

MS 2.4 Students use collaborative leaning strategies

**Virginia Science Standards of Learning / Benchmarks, Indicators**

6.1. The student will plan and conduct investigations in which

d) precise and approximate measures are recorded;
e) data are organized and communicated through graphical representation (graphs, charts)

**TEACHING PHASE**

**(3) Preparation**

*Warm-Up Activity:*

- The warm-up activity will focus on reviewing the content of Lesson 2. Students share their homework handout in a small group. They collected data of evening and morning temperatures inside and outside their homes.

Cooperative Strategy: Share results with small group/ class

*Language Goals*
Students will learn how to work in a cooperative group, listen to the answers of his peers, and share them with the class.

**(2) Presentation**

a. Activity 1: Collecting Temperature Data

- New vocabulary: data table, bar graph, analyze, conclude
- Teacher tells students that they will be able to use their thermometer and collect temperature from 8 different locations in the school.
- Students pair up, and each pair is assigned a location (e.g,. cafeteria, upstairs, hallway) where they have to collect data temperature.
- Teacher passes out student handout (see appendix)
- After students return the data is collected on a transparency in a data table. Students copy information on their data table handout. Teacher explains that *data tables* are rectangular, grid-like organizational tools, in which to record quantitative information

b. Extension:
Activity 2: Displaying the data in a bar graph

- Teacher explains that they will display class data from the data table in a graph. She explains that a *graph* is a visual display of data. Teacher models how to shade in collected data. She further points out that each graph has a title; the locations are posted on the x-axis, the temperature on the y-axis, they have to be labeled and put into equal increments (Depending on the student knowledge of the coordinate system, teacher will modify and differentiate instruction)

Strategies: Working collaboratively with a partner. Teacher models expected student behavior, scaffolds steps.

Activity 3: Analyzing the graph

- Teacher models and scaffolds answers to the questions on the handout. Students are encouraged to infer and conclude. One possible conclusion is that heat rises and upstairs rooms are usually warmer than downstairs locations.

**(3) Practice**:

- Homework: Take home the thermometer and measure temperatures at eight different locations in your home. Record data on worksheet, draw a bar graph, analyze the data and conclude.

**(4) Evaluation**

- Informal performance evaluation based on working w/ partner, and class participation. Teacher will give feedback on handout and homework assignment.

**(5) Expansion/Extension:**

- Introducing various forms of graphs: scatter plot/ line graph, circle or pie graph.

- Implementing a graphing checklist or rubric, so students can self-assess their graphing skills.

**Four Skills Used in This Lesson:**

9. *Listening Activity:* Students listen to teacher's explanations of new concepts and to other students presenting their findings and temperature measurements.
10. *Speaking Activity:* Students discuss data with partner and participate in whole class discussions about data, temperature and graphs.
11. *Reading Activity:* Students read handouts, temperatures on a thermometer, data tables.
12. *Writing Activity:* Warm up activity (filling in the blanks); recording data on data sheet; answering questions when analyzing and concluding data on their handouts.

**Methods/Approaches/Strategies**

- Warm Up: Tapping into prior knowledge, reviewing concepts of measuring temperature.
- Cooperative Learning strategies are implemented throughout the lesson.
- Teacher modeling of expected responses, scaffolds new skills (using a data table, designing a bar graph, analyzing and concluding)

**Other Activities:**

**Follow-up:** Passing out newspapers and having students cut out various graphs, explain what they display.

**Assessment:**
Assessment will be informal, based on classroom participation; teacher feedback on handout and homework.

**Homework (extension):**
See above, handouts

**Technology:**

- Handouts will be displayed on an overhead transparency.
- Computer clip art to design handouts

**Materials:**

- Student handouts
- Transparencies
- A classroom set of thermometers

**Books and Websites Used to Prepare Lesson Plan 3**

- Fairfax County Public Schools. (2002). *Inquiry skills. Fairfax county public schools grade 7 science. Investigations in environmental science. Teacher resource guide.* Fairfax, VA: Author.

- Fairfax County Public Schools. (2003). *Middle school ESOL focus science odd year curriculum.* Fairfax, VA: Author.

- Fairfax County Public Schools. (2002). *Middle school A-level alignment with the middle school*. Fairfax, VA: Author.

- Fairfax County Public Schools. (2002). *Science program of studies.* Fairfax, VA: Author.


**Closure:**
The teacher gives a quick summary of the lesson and asks the class to listen to other teachers using verbs *analyze* and *conclude* and share during the next class period.

Homework, Name: _____

**Collecting and Graphing Temperature at my Home**


** Before you start collecting temperatures, make a prediction in this column.

Step 1: Measure temperatures at 8 different locations in your home and record data in the table:

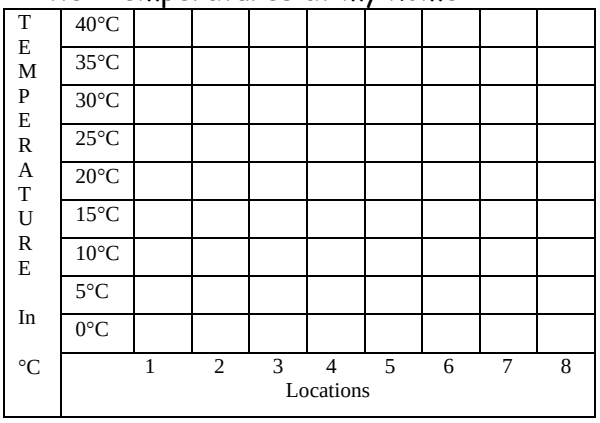
Data Table:

| **My prediction of Temperature in °C | Collection points: | Measured Temperature in °C |
|---|---|---|
| | 1. Outside | |
| | 2. Kitchen | |
| | 3. Living room | |
| | 4. Dining room | |
| | 5. My room | |
| | 6. _____* | |
| | 7. _____* | |
| | 8. _____* | |

* Possible locations: Basement, attic, balcony, porch, parents bedroom, bathroom,….

**Step 2: Display data in a bar graph**

Title: Temperatures at my home




Step 3: Analyze the data; answer the questions on the back of the paper:

1. Which is the coolest location? Why?
2. Which is the warmest location? Why?
3. How did your predictions compare to the real measurements?
4. Are locations warmer upstairs or downstairs? Why?

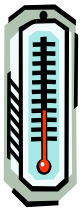
Other conclusions:

Name: _____ My Partner's Name: _____

## Collecting and Graphing Temperature


Before you start collecting temperatures, make a prediction (guess) in the first column ** of the data table.

Step 1: Work with a partner and collect temperature from your assigned location in the school



| Name of our collection point | Temperature in °C |
|---|---|
| | |

Step 2: Copy the data that was collected by your classmates into a data table:

Data Table:

| **My prediction of Temperature in °C | Collection points: | Measured Temperature in °C |
|---|---|---|
| | 1. Cafeteria | |
| | 2. Gym | |
| | 3. Library | |
| | 4. Upstairs Hall | |
| | 5. Downstairs Hall | |
| | 6. Computer Lab | |
| | 7. Parking Lot | |
| | 8. Our Classroom | |

**Step 3: Display data in a bar graph**

Title: Temperatures in our school

| TEMPERATURE In °C | 40°C | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | 35°C | | | | | | | | |
| | 30°C | | | | | | | | |
| | 25°C | | | | | | | | |
| | 20°C | | | | | | | | |
| | 15°C | | | | | | | | |
| | 10°C | | | | | | | | |
| | 5°C | | | | | | | | |
| | 0°C | | | | | | | | |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | Locations | | | | | | | |

Step 4: Analyze the data, answer the questions:

5. Which is the coolest location? Why?

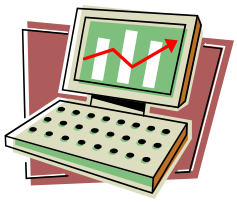
6. Which is the warmest location? Why?

7. How did your predictions compare to the real measurements?

8. Are locations warmer upstairs or downstairs? Why?

9. What is your conclusion about heat and temperature?

**Lesson 4: Monthly Average Temperature Charts / Technology**



**Content : Science/ Technology**

**PLANNING PHASE**

**Performance Objectives:**

14. Student will become familiar using a computer and retrieving information from the Internet.
15. Students will become familiar with average daily average temperature charts.
16. Student will be able to design an average temperature bar graph from their native country, share with small group / large class.
17. Students will be able to compare and contrast graphs from countries close to the equator with countries farther north/south.
18. Students will be able to work cooperatively with peers.

**Lesson Outline**

**Overall Description:**

The purpose of this lesson is to get the students familiar with reading, comparing and contrasting monthly average temperature charts of different locations by using the Internet.

**National Standards: TESOL Standards**

Goal 1, Standard 3; Goal 2, Standard 1; Goal 3 Standard 1.

**This lesson follows the Fairfax County Public Schools' Middle School sixth, seventh and eight grade Program of Studies (POS), which expand the State of Virginia Standards for Learning (SOLs).**

Standard 1: Students read and write a variety of forms

Benchmarks

MS 1.2. Students read and write for a variety of purposes.

ESOL Indicators:

- Read to gain information and develop academic language proficiency.
- Read a variety of materials to build vocabulary, acquire language patterns, and develop fluency.

Standard 2: Students use strategies to construct meaning when working with language.

Benchmarks

MS 2.4 Students use collaborative leaning strategies

ESOL Indicators:

- Demonstrate collaborative skills, as taking turns, voice level, social skills, etc.

***Standard 5: Students use language processes to acquire, organize, and communicate information***

Benchmarks:

MS 5.3. Students use technology to assist them in reading, writing, viewing, speaking, and listening.

ESOL Indicators: Access information using technology data are organized and communicated through graphical representation (graphs, charts)

**Virginia Science Standards of Learning / Benchmarks, Indicators**

PS.1 The student will plan and conduct investigations in which
- f) precise and approximate measures are recorded;
- g) data are organized and communicated through graphical representation (graphs, charts)

**TEACHING PHASE**

**(4) Preparation**

*Warm-Up Activity:*
- The warm-up activity will focus on reviewing the content of previous lessons by using a morning message in a cloze text format (handout and transparency, see appendix)

- Students share their homework graphs with a small group and turn them in for teacher assessment.

Cooperative Strategy: Share results with small group/ class

*Language Goals*
Students will learn how to work in a cooperative group, listen to the answers of his peers, and share them with the class.

**(2) Presentation**

a. Activity 1: Geography and average temperature

- Teacher introduces a world map, hands out small post-it notes and asks the students to write the name of their native city/country on it.
- Teacher invites students to put stickies on the map.
- Teacher introduces new vocabulary (world map, equator, South Pole, North Pole, average temperature) and displays them on the board.
- Teacher asks students to make predictions about possible average temperatures in their native countries (class discussion)

Activity 2: Introducing the technology project:

- Teacher tells students that they are going to look up average daily temperatures of their native city/country on the Internet. Using the webpage: www.infoplease.com
- She goes over basic technology guidelines (how to start and shut down a laptop computer, how to get to the internet, which website to use)
- Teacher models procedures with the help of an LCD projector.
- She passes out student technology handout (see appendix) and invites students to work cooperatively with a partner.

b. Extension:

- Recording Data: After students found the required data, they record them on the data table.
- Displaying the data in a bar graph (on handout)
- Sharing various bar graphs with class

Strategies: Working collaboratively with a partner. Teacher models expected student behavior, scaffolds steps.

Activity 3: Analyzing the graph

- Teacher models and scaffolds answers to the questions on the handout. Students are encouraged to infer and conclude.

Possible conclusions:

- Average temperatures are more extreme in locations farther away from the equator. Countries that are close to the equator in tropical regions have almost the same average temperatures all year long.
- Seasons are opposite in the southern and northern hemisphere.
- The distance to the sun and the earth's tilt are responsible for various differences in temperature.

**(3) Practice**:

Homework: The sun is a major source of heat.
Write down 5 facts that you know about the sun.

**(4) Evaluation**

- Informal performance evaluation based on working w/ partner, and class participation. Teacher will give feedback on handout.

**(5) Expansion/Extension:**

- Implementing a graphing checklist or rubric, so students can self-assess their graphing skills.
- Uses of heat: cooking food, drying clothes/hair,..
- Musical Cloze (Places in the World) , see appendix

**Four Skills Used in This Lesson:**

13. *Listening Activity:* Students listen to teacher's explanations of new concepts, how to use the laptops and Internet appropriately; to other students presenting their findings and temperature averages.
14. *Speaking Activity:* Students discuss data with partner and participate in whole class discussions about average temperatures and graphs.
15. *Reading Activity:* Students read handouts, temperatures graphs on the Internet and data tables.
16. *Writing Activity:* Recording data on data sheet; answering questions when analyzing and concluding data on their handouts.

**Methods/Approaches/Strategies**

- Warm Up: Cloze exercise, reviewing unit concepts.
- Cooperative Learning strategies are implemented throughout the lesson.
- Teacher modeling of expected responses, scaffolds new skills (using a laptop, the internet)

**Other Activities/ Follow-up:**

**Assessment:**

Warm up activity assesses previously presented content; assessment will be informal, based on classroom participation; teacher feedback on handout and homework.

**Homework (extension):**

See above: Write 5 facts about the sun

**Technology:**

- LCD projector & teacher computer
- Internet access /one laptop for 2 students
- Handouts will be displayed on an overhead transparency.
- Computer clip art to design handouts

**Materials:**

- 1 laptop computer for 2 students, internet access
- World Map, Post-it notes (small)
- Student handouts and transparencies (Warm Up, Tech handout)
- Color pencils

**Books and Websites Used to Prepare Lesson Plan**


- Fairfax County Public Schools. (2002). *Inquiry skills. Fairfax county public schools grade 7 science. Investigations in environmental science. Teacher resource guide.* Fairfax, VA: Author.

- Fairfax County Public Schools. (2003). *Middle school ESOL focus science odd year curriculum.* Fairfax, VA: Author.

- Fairfax County Public Schools. (2002). *Middle school A-level alignment with the middle school*. Fairfax, VA: Author.

- Fairfax County Public Schools. (2002). *Science program of studies.* Fairfax, VA: Author.

- www.infoplease.com


**Closure:**

The teacher gives a quick summary of the lesson and asks the students to put 3 new vocabulary words on an “exit slip” (Post-it Note) and turn it in before they leave.

Appendix, Lesson 4

Warm Up, Name: _____

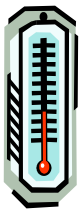
Cloze Text: Fill in the missing works, using the words from the word bank.

Word Bank

| | | | | | |
|---|---|---|---|---|---|
| Fahrenheit | warmer | predict | thermometer | temperature | |
| scales | graph | Celsius | weather | table | forecast |

Good Morning Students.

This week we are studying weather. On Monday we watched a weather _____ on TV. We also listened to weather predictions on the telephone _____ line and on the radio. Meteorologists are scientists who study and _____ weather.



On Tuesday we learned how to use and read a _____. Thermometers are used to measure heat. Scientists use the _____ scale, but American weather forecasters use the _____ scale. Therefore it is important to be familiar with both _____.

On Wednesday we collected _____ in many different locations in our school. We recorded our temperatures in a data _____ and displayed it in a bar _____. Finally we analyzed our table and learned that upstairs rooms are _____ than downstairs rooms.

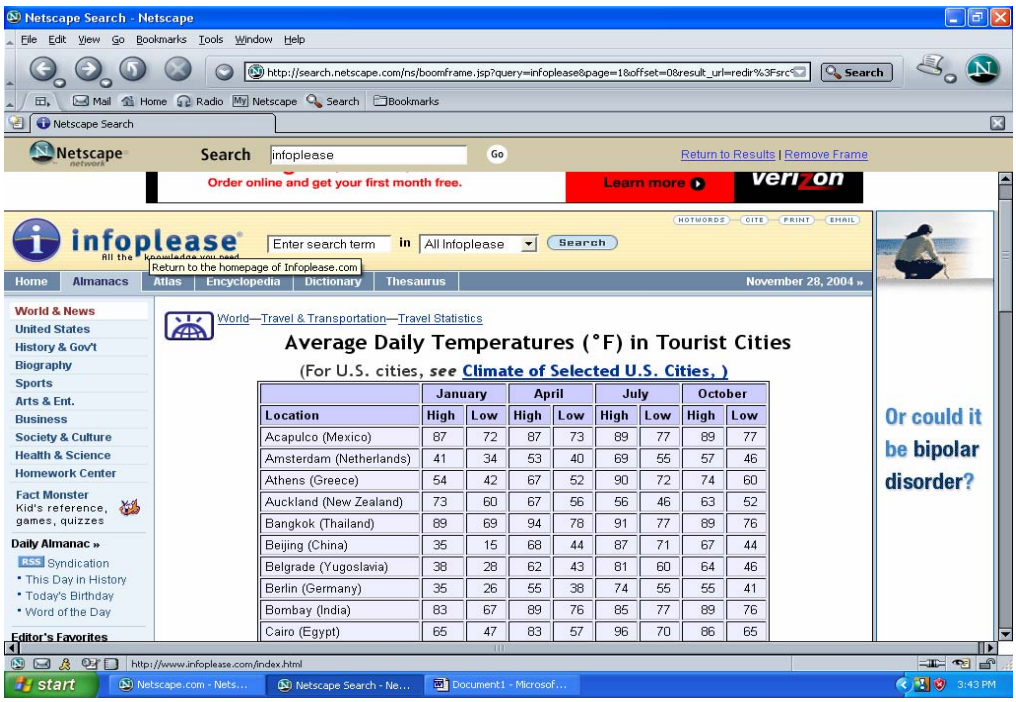
Today we are going to use the Internet and print monthly average (=typical, normal) temperature graphs from our native countries.

Technology Handout, Name: _____

# Average Daily Temperature Project

Go to the Internet, type in www.infoplease.com
In the search window type in *average temperature*
Click on *Search* this window will open:


Click on *Average Daily Temperature in Tourist Cities*, this window will open:
Now you are able to read your cities average daily temperature




| Location | January High | January Low | April High | April Low | July High | July Low | October High | October Low |
|---|---|---|---|---|---|---|---|---|
| Acapulco (Mexico) | 87 | 72 | 87 | 73 | 89 | 77 | 89 | 77 |
| Amsterdam (Netherlands) | 41 | 34 | 53 | 40 | 69 | 55 | 57 | 46 |
| Athens (Greece) | 54 | 42 | 67 | 52 | 90 | 72 | 74 | 60 |
| Auckland (New Zealand) | 73 | 60 | 67 | 56 | 56 | 46 | 63 | 52 |
| Bangkok (Thailand) | 89 | 69 | 94 | 78 | 91 | 77 | 89 | 76 |
| Beijing (China) | 35 | 15 | 68 | 44 | 87 | 71 | 67 | 44 |
| Belgrade (Yugoslavia) | 38 | 28 | 62 | 43 | 81 | 60 | 64 | 46 |
| Berlin (Germany) | 35 | 26 | 55 | 38 | 74 | 55 | 55 | 41 |
| Bombay (India) | 83 | 67 | 89 | 76 | 85 | 77 | 89 | 76 |
| Cairo (Egypt) | 65 | 47 | 83 | 57 | 96 | 70 | 86 | 65 |

Read and record your cities average daily temperatures:

| | January | | April | | July | | October | |
|---|---|---|---|---|---|---|---|---|
| Location | High | Low | High | Low | High | Low | High | Low |
| | | | | | | | | |

Draw a bar graph:

Title : _____

| TEMPERATURE | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
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| | | | | | | | | | |
| | Months | | | | | | | | |

Label your graph
Use colors for the bars: blue for low temperature, red for high temperature.

<u>Analyze your graph:</u>
When is the hottest time of the year?
When is the coolest time of the year?
Is your city/country in the northern or southern hemisphere?
Is it closer to the equator or to the south/north pole?

## Lesson 5: The Sun / Mind Mapping

**Content: Language Arts/ Science**

**PLANNING PHASE**

**Performance Objectives:**

19. Students will be able to brainstorm facts about the sun by using a KWL handout
20. Students will become familiar with and will be able to read a non-fiction book about the sun.
21. Students will be able to use the post reading strategy *mind mapping* to organize and remember information
22. Students will be able to work cooperatively with peers.

**Lesson Outline**

**Overall Description:**

The purpose of this lesson get the students familiar with facts about the sun, read a book about it, visualize the content and create a mind map in a small group.

**National Standards: TESOL Standards**

*Oral and Written Language*

Goal 1, Standard 3:

- Students will listen to and imitate how others use English.

Goal 2, Standard 1:

- Students will be able to participate in full class, group, and pair discussions.

**This lesson follows the Fairfax County Public Schools' Middle School sixth, seventh and eight grade Program of Studies (POS), which expand the State of Virginia Standards for Learning (SOLs).**

Standard 1: Students read and write a variety of forms

Benchmarks

MS 1.2. Students read and write for a variety of purposes.

ESOL Indicators:

- Read to gain information and develop academic language proficiency.
- Read a variety of materials to build vocabulary, acquire language patterns, and develop fluency.

MS 1.3 Students expand and enhance vocabulary through language and literature.

ESOL Indicators:

- Recognize words and phrases as units of meaning.

Standard 2: Students use strategies to construct meaning when working with language.

Benchmarks

MS 2.4 Students use collaborative leaning strategies

ESOL Indicators:

- Demonstrate collaborative skills, as taking turns, voice level, social skills, etc.

Standard 3: Students adapt their language to communicate.
Benchmarks
MS 3.3 Students use grammar and conventions of language in writing and speaking
ESOL Indicators:

- Begin to recognize basic structures including sound-symbol relationships and sentence patterns in writing and speaking

## TEACHING PHASE

### (5) Preparation

*Warm-Up Activity:*
The warm-up activity will focus on tapping into prior knowledge and using a KWL handout (see attachment)

- Teacher refers to weather, temperature and heat, concepts that were discussed all week long and leads the students to think about the major source of energy our Sun.
- Teacher passed out handout (see appendix) and models the use of the KWL strategy on an overhead transparency.
- Students are encouraged to use their homework assignment with the 5 facts about the SUN, collaborate with a partner if desired.
- Students fill in column one and two; share results with small group/class.
- Results are recorded on transparency and discussed with the class.

Strategy: prereading strategy: brainstorm collaboratively, share results with class, opportunity for teacher to check actual facts and misconceptions

*Language Goals*
Students will learn how to brainstorm using a prereading strategy KWL, listen to the answers of his peers, and share their own with the class.

### (2) Presentation

a. Activity 1: Introducing the mind-mapping project

- Teacher introduces the trade book " The Sun" (by National Geographic) and shows a teacher–prepared exemplar of a mind map. The Sun is the center and title of the poster; the main ideas of four chapters are presented on extensions from the center. Students are encouraged to visualize concepts, draw colorful pictures, and support them with short summaries or a bulleted list of the most important facts.

Activity 2: Introducing text

- Teacher introduces the organization of the book " The Sun" and points to various pages of the book, the layout of chapters and subtitles, pictures and diagrams, and the new vocabulary in the glossary in the back.

Activity 3: Using Post-It notes while reading

- Students are encouraged to use Post-it notes on pages to summarize the most important facts while reading. Students read collaboratively with a partner, are encouraged to use the glossary or dictionary to look up unknown words; and to ask for clarification.

b. Extension:

Activity: Mind-Mapping.

- Students receive poster paper and markers to work on their mind map.

Cooperative Strategy: Working with a partner or in small group.

**(3) Practice**:

- Homework: Fill in the third column of your KWL handout

**(4) Evaluation**

- Using a self-assessment rubric for grading the poster (see attachment).
- Informal performance evaluation based on working w/ partner, small group and class participation.

**(5) Expansion/Extension:**

- Presenting mind-map in front of a small group/class

**Four Skills Used in This Lesson:**

17. *Listening Activity:* Students listen to teacher's explanations on how non-fiction text is organized, listen to other students during brainstorming discussion; and to presentations.
18. *Speaking Activity:* Students share prior knowledge about the sun, present project to class.
19. *Reading Activity:* Students read a trade book about the Sun.
20. *Writing Activity:* KWL, mind-map.

**Methods/Approaches/Strategies**

- KWL warm up: Tapping into prior knowledge
- Using Post-it notes during reading.
- Cooperative learning strategies are implemented throughout the lesson.
- Using post reading strategy: Mind mapping to visualize and remember content.
- Differentiation: Beginning readers might focus on fewer chapters in the book.
- Pairing up students of various reading levels

**Other Activities:**

**Follow-up:**

- Other concepts to visualize in a mind-map: water cycle (evaporation, condensation, and precipitation), types of clouds
- *Fact or Fiction Handout* about the Sun

**Assessment:**

- Assessment will be formal, based on a self-assessment rubric
- Informal: classroom participation.
- Mind map is assessment of reading comprehension

**Homework (extension):**
See above, handouts

**Technology:**

- Agenda will be displayed on an overhead transparency.
- Computer clip art to design handouts

**Materials:**

- Warm up activity: KWL student handout and transparency
- Book: "The Sun" ( National Geographic) / Sample page see appendix
- Rubric & self-assessment / student handouts
- Poster paper & markers
- Post-it Notes
- Dictionaries

**Books and Websites Used to Prepare This Lesson Plan**


- Fairfax County Public Schools. (2002). *Middle school A-level alignment with the middle school*. Fairfax, VA: Author.

- Mallow, F., & Patterson, L. (1999). *Framing literacy: Teaching/learning in K-8 classrooms.* Norwood, MA: Christopher-Gordon Publisher.

- National Geographic Society. (2002). *The Sun*. Washington, D.C.: National Geographic Society.

- Peregoy, S. F., & Boyle, O. F. (2001) Reading, writing & learning in ESL: A resource book for K-12 teachers (3rd ed) . New York: Longman.

- www.tesol.org


**Closure:**

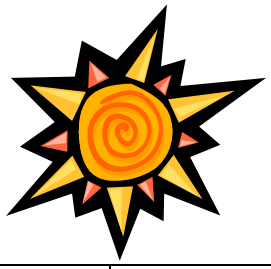
The teacher summarizes the lesson and asks the students what would happen if there would be no sun & share during the next class period.

Appendix, Lesson 5

**The Sun**

K-W-L Handout, Name: _____

| K<br>What do I know about the Sun? | W<br>What I want to find out about the Sun? | L<br>What did I learn about the Sun?<br>What do I still want to know? |
|---|---|---|
| | | |



| | | |
|---|---|---|
| | | |

# Mind Map: The Sun
# Rubric & Self Assessment

**Checklist** **Names:**_____

| ✓ | **Requirements:** | Points (maximum) **Self assessment** |
|---|---|---|
| | Your names are displayed in a corner of the mind map. | _____/5 |
| | A picture of the sun is displayed in the center of your map. | _____/10 |
| | A creative title is displayed in the center. | _____/10 |
| | There are four main ideas/ concepts displayed on extensions from the center. | _____/20 |
| | Each main idea is supported with a picture (visual) | _____/20 |
| | Each main idea is supported with some interesting information (text). | _____/20 |
| | Our mind map is colorful and attractive. | _____/5 |
| | The text is typed or neatly handwritten in black ink. | _____/10 |
| | Total Points | _____/100 |