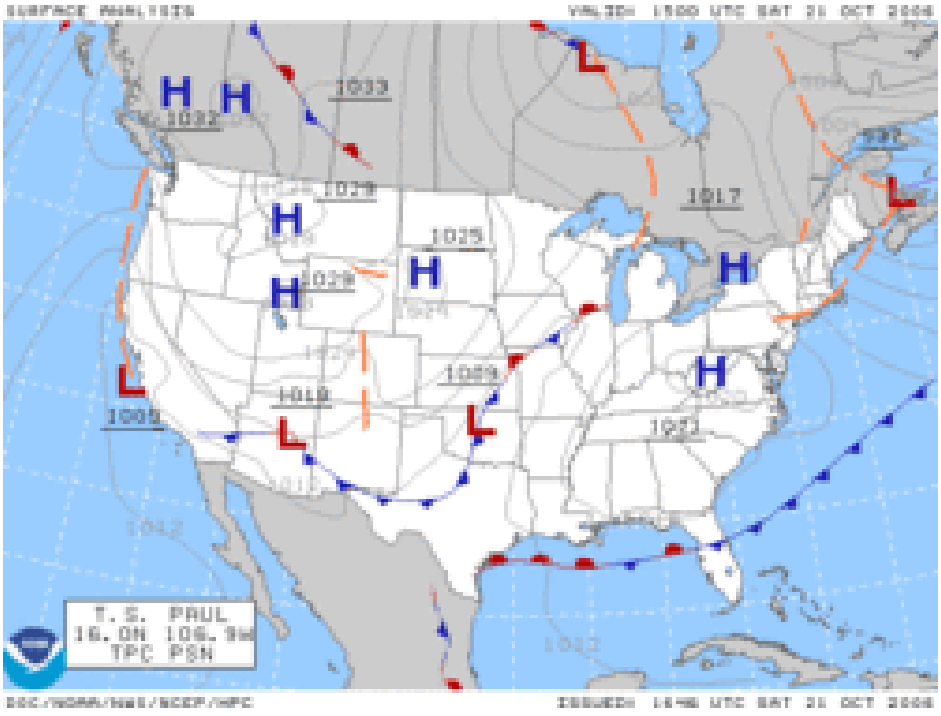
SCIENCE 20F

WEATHER



WORK PACKAGE 8

TUESDAY MAY 5TH

This week's Assignments

Lesson #	Possible dates for completion
Assignment 5 – Heat Transfer	6 May
Lesson 9 Temperature.	7 May
Lesson 4 Forecasting Severe Weather Systems	8 May
Assignment 6 – Weather Terms	11 May

This week's instructions

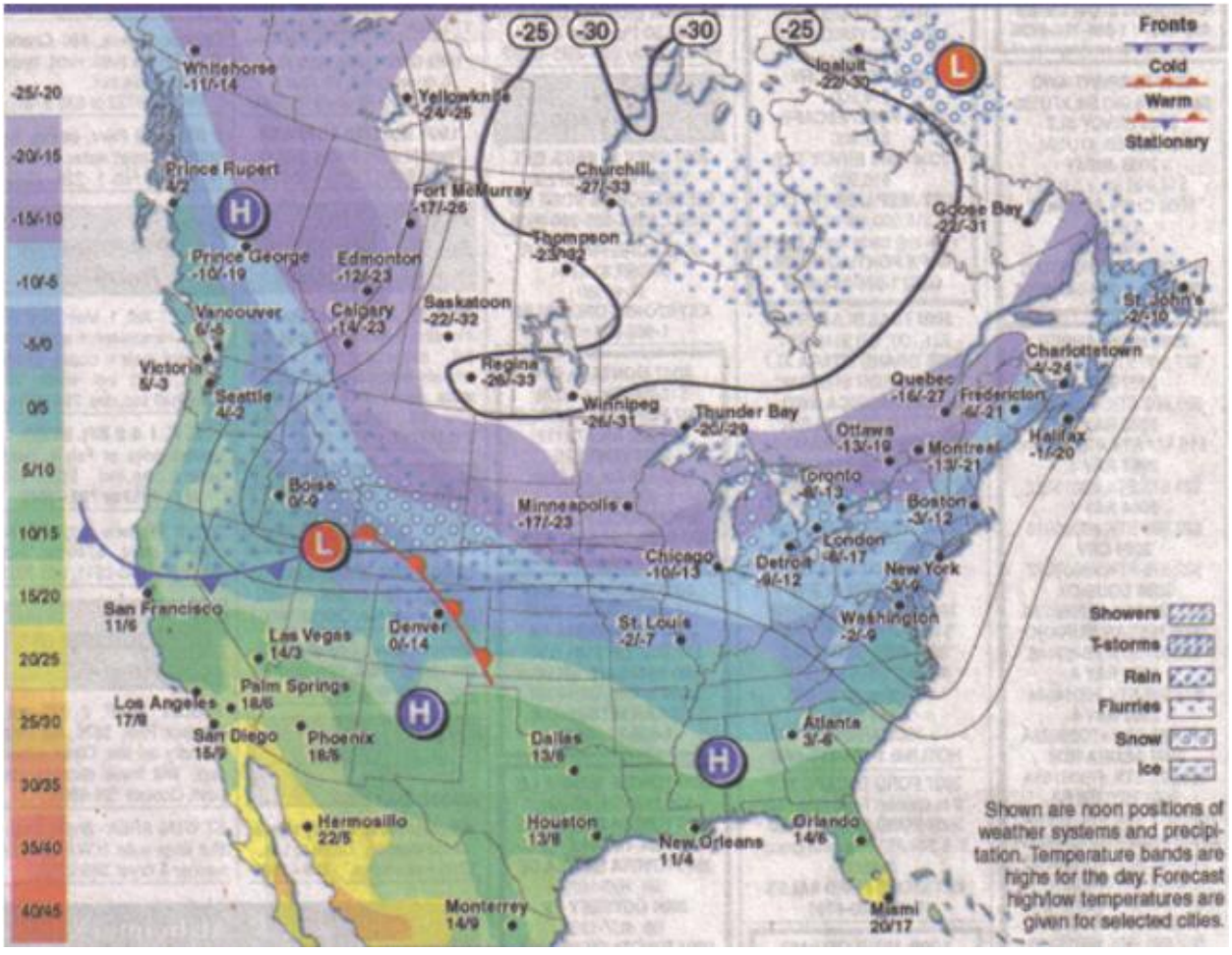
- Assignment 5 Weather: **Heat Transfer**: This is an assignment based on lesson 6 and 7, heat transfer and solar radiation. You will find the answers to these questions in your notes. Once this assignment is completed, please remember to send it back to school when you are finished with your name at the top!
- Lesson 9 **Temperature**: This is normally the final lesson in this unit, however due to some rearranging there will be one more lesson after this one for you to read through and work on comprehension. This lesson, lesson 9, is all about the real facts behind the science of temperature. The notes explain how temperature is not really a measure of hot and cold but of how fast molecules are moving within a substance. Please read the noes and make some extra notes for yourself, highlighting certain parts, or write down questions you may have for me. Keep these notes at home.

- Lesson 4 **Forecasting Severe Weather Systems**: This is basically a lesson on *Weather Systems and Weather Maps* and this lesson does not follow my normal format and is not one of my “Regular in class lessons”. I waited until now to hand out this lesson because it encapsulates all the information from my previous lessons and pulls the information together to explain weather phenomena to you. I would like you to read through this lesson and take from it what you can. This lesson explains weather maps and how to interpret information from weather symbols. I am not expecting you to remember the weather symbols, nor am I expecting you become an expert at reading the weather maps. Also, I know that the weather maps in the photocopies will likely be too difficult to see and interpret so I will not be asking any questions related to the information on the maps itself. Therefore, when you get to “learning activity 4.4: Reading a Weather Map”, you do not need to complete this activity in the notes, just read through them and see if you can make anything out. If you cannot, no worries. Again, I will not ask you questions about specific symbols on a map in the future because we are not able to complete activities such as this. After the weather map questions, complete your reading on sever weather systems and complete the “compare and contrast” of Hurricanes and Tornadoes. I do not need to see this comparison that you write down, you will do this for your own proper notes. Following this

lesson will be the final work assignment for this work package called: Assignment 6 – Weather Terms.

- Assignment 6 Weather: **<u>Weather Terms</u>**: This is an assignment based on lesson 4 “Forecasting Severe Weather Systems” *<u>Weather Systems and Weather Maps</u>*. You will find the answers to these questions in your notes. However sometimes the definitions or phrases for the specific terms may, or may not be word for word. Use your best judgement to place the correct word from the word bank on the correct line. Each word is only used once. The assignment is out of 20 Marks. Once this assignment is completed, please remember to send it back to school when you are finished.

<u>Here is how a weather map would be displayed in a newspaper!</u>



As you continue to work through these work packages, keep in mind that only assignments need to be turned in, not full lessons of notes. You can keep your notes!

Weather Assignment 5 and 6 need to be handed back in for marks when you are able to get them in.

Please remember to put your name on every assignment you hand in. First name and last name please!

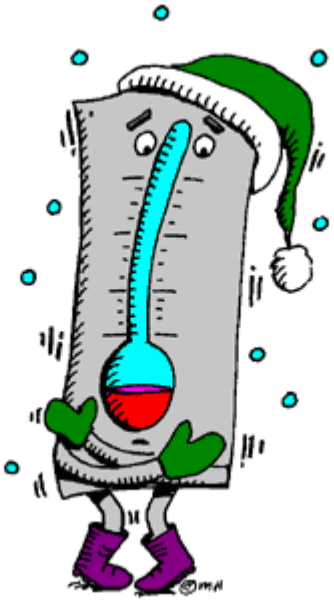
If you have any questions or concerns, please don't hesitate to contact me:

At school – Phone: (204) 367-2296

At Home – Phone: (431) 808-0816

Email: **M. Puranen** at kpuranen@sunrisesd.ca

Science 20F
What is Temperature
Lesson 9



Date: _____

What is temperature? Lesson # 9
Page 427 Date: _____
Interactions - Solar Energy with water, soil and air

Background: What do you know?

1. Define temperature.

Temperature is the average kinetic energy (energy in motion) of particles in a substance.
So in other words – Temperature is an indication of how quickly particles are moving.

2. Which heats up faster; an aluminum pan or a pot of water? Why?

The aluminum pan heats up faster because the particles are moving faster in the pan than in the pot of water.

Make Sense?

When we heat up objects (change their temperature) we **"increase" the movement of the particles it is made of**. (the speed of the atoms vibrating inside of it)

Water is difficult to heat, (it takes a lot of energy - heat energy) and also, it takes a lot of energy to cool it down (it needs to lose energy, loose heat) and does so slowly.

Aluminum is easy to heat (it takes less energy) and it is easy to cool. It takes less time to lose the energy and "cool down" because there is less energy to lose therefor it cools quickly!

3. If a gram of sand/soil and a gram of water receive the same amount of energy, which one will get hotter more quickly?

The sand needs less energy to get it particles moving compared to the soil.

4. Why does snow melt faster on the land than the ice on the Winnipeg River during the spring?

It takes less energy to heat land and more energy is needed to change the temperature of the water (or ice) in this case (heat the water) – (melt the ice).

5. Why does Vancouver and Toronto have milder climates during the winter compared to Winnipeg and Powerview? **It takes more time to change the temperature of the water (Vancouver and Toronto are situated by water) compared to the soil.**

Soil cools quickly. Water cools very slowly.

It takes longer for water to lose its heat energy (lakes and oceans take longer to cool down) - therefore stay warmer longer than land and keep coastal cities warmer longer. The land loses its heat more quickly and cools more quickly. However, land around lakes and oceans will be somewhat warmed by the heat escaping from the water bodies.

(Vancouver and Toronto are found near large water bodies)

(Winnipeg and Powerview are far from larger water bodies)

Properties of Water page 427 (Science Power 10 Textbook)

Specific heat: **is the amount of heat energy needed to raise 1 gram of a substance 1 degree Celsius.**
(remember raising the temperature is increasing the movement of the particles)

Examples: p.427 Science Power - *Properties of water*

Water has a specific heat of approximately **4J / 1g / 1°C** (it takes about 4 joules of energy to raise 1g of water 1°C.)

Aluminum has a specific heat of approximately **1J/g °C (C_g)** What does this mean?

This means that it takes 1 joule of heat energy to raise 1g of Aluminum 1°C.

Use the table on page 427 to find the specific heat of:

damp mud _____2.51_____

granite rock _____0.79_____

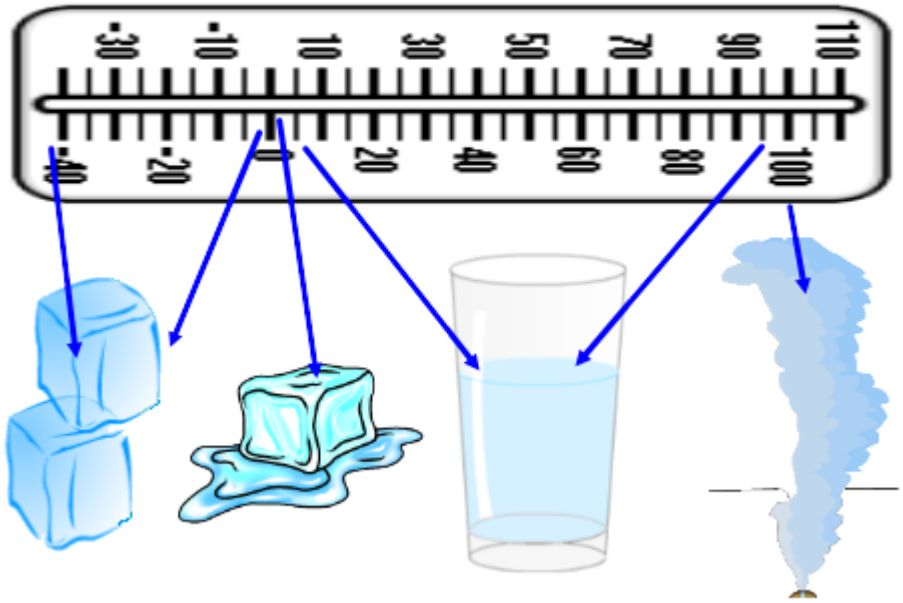
Other properties of Water page 428-29

Heat of fusion: **the heat necessary to change a solid to a liquid**

Ex. water has a large heat of fusion
- it takes about 300 joules /g to change ice into water

Heat of vapourization: **the heat necessary to change a liquid into a gas**

Ex. water has a much larger heat of vapourization
- it takes about 2260 joules/g to change water into water vapour.

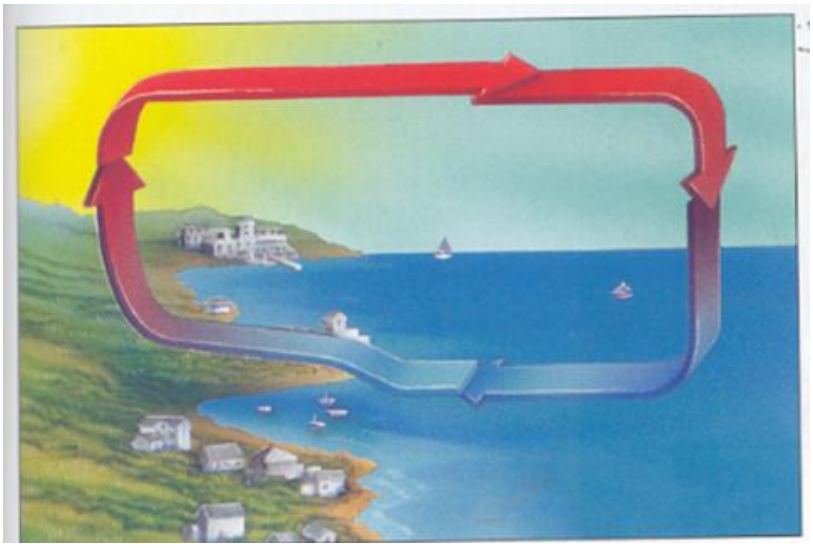


Sea Breezes and Land Breezes next page!

During the day-> A Sea Breeze blow towards land.

During the day sea breezes blow towards land. During the day, the land is **warmer** than the water so... the air above the land **rises** and **expands** and cools. The cool ocean air moves onto the land to **replace** the warm air. The cool air also sinks over the water.

Draw a sea breeze:



At night-> A Land Breeze flows out to sea.

At night, a land breeze flows out to sea. At night, the water **holds** its heat longer than the land, so... the air above the **water** rises, expands and cools. The cool **land** air replaces the warm air over the **water**. The cool air also sinks over the land.

Draw a land breeze:

Name: _____ /20 Date: _____

Mr. Puranen **Science 20F**

Weather Assignment 5 – Heat Transfer

Write in the answers for each question or statement!

1. List three ways that heat is transferred _____ /1

   _____ /1

   _____ /1

2. Heat that is transferred through liquids and gases is _____ /1

3. Heat transfer in solids is called _____ /1

4. In water currents; the warm water _____ and the cold water_____ /2

5. Energy that travels through empty space is called _____ /1

6. Explain the term albedo_____ /1

7. Which type of electromagnetic wave is the longest? _____ /1

8. Which electromagnetic wave has the most energy? _____ /1

9. How much **(%)** radiant energy is absorbed by the earth only, (not including clouds and air)?

   _____ /1

10. Which part of the electromagnetic waves can we see with our eyes? _____ /1

11. Do oceans **reflect** or **absorb** heat energy? _____ /1

12. Why is there uneven heating on the earth's surface? _____ /1

13. Would asphalt parking lots have a **high** or **low** albedo? _____ /1

14. Why do seasons exist on Earth? _____ /1

15. Which is heavier warm air or cold air? _____ /1

16. Name two of the three green house gasses? (One bonus point if you name the third!) /2

    _____ _____ _____

Name: _____ /20 Date: _____

Mr. Puranen **Science 20F**

Weather Assignment 6 – Weather Terms!

Match the words in the word-bank below with the correct Weather term from Lesson 4. (Each word only used once!)

Atmospheric pressure	Air mass	Humidity	Dew Point
High Pressure system	Cold front	Storm Surge	Blizzard
Low pressure system	Warm front	Cyclone	Isotherms
Weather Station Glyph	Stationary front	Typhoon	Isobars
Thunderstorms	Jet stream	Tornado	Hurricane

_____: A winter storm with wind speed in excess of 50 kilometers per hour with snow and blowing snow that reduce visibility to near zero.

_____: A symbol that provides information about the atmospheric pressure, windspeed and direction, cloud cover, temperature, current weather conditions and dew point of an exact location.

_____: A tropical cyclone that forms over oceans and seas, with an extremely low pressure. (Only forms over Atlantic Ocean, eastern Pacific Ocean, Caribbean Sea, or Gulf of Mexico).

_____: Region of relatively "low" surface pressure. (Areas of cloudy and stormy weather)

_____: Connected "curved" lines of same atmospheric pressure on a weather map.

_____: A region where a cold air mass advances against a warm air mass, forcing the warm air upward in front of it. (Causes clouds, precipitation and sever weather during passage of the front).

_____: A tropical cyclone that forms over oceans and seas in the north-western Pacific Ocean.

_____: The unusual rise in seal level along coast lines caused by winds from approaching hurricanes that flood low lying areas.

_____: Large bodies of air that have different temperatures and different relative humidity.

_____: Lines drawn on a weather map to connect locations with the same temperatures.

_____: A region where a warm air mass advances against a cold air mass, riding up over the cooler air in front of it. (Causes clouds and precipitation to form like rain, snow, sleet, hail).

_____: A gray funnel, cylinder, or rope like object that has high wind speeds and extends down from a cloud with an extremely low pressure.

_____: Region of relatively “high” surface pressure. (Areas of pleasant, sunny weather)

_____: A region where neither the cold air mass nor the warm air mass advance against each other.

_____: A large-scale system of rotating winds around a central low-pressure area that covers a large area of the ocean or land. (Occurs in the Indian Ocean and South Pacific Ocean)

_____: High speed winds in the troposphere that occur around the mid latitudes.

_____: The Measure of the amount of moisture (water vapour) in the air.

_____: The temperature that the air would have to be cooled down to for the air to become saturated and for water vapour to condense. (When air becomes 100 % saturated the water vapour will begin to condense to form water droplets, clouds, fog, or dew.)

_____: Severe weather events of heavy rain, thunder and lightning caused by warm air that rises very high very fast and cools, condensing the water vapour into clouds.

_____: The force exerted on an object or a person by the weight of the air above it.