تم تحميل هذا الملف من موقع المناهج الإماراتية

شرح مراجعة عامة وفق الهيكل الوزاري منهج انسباير

موقع المناهج ⇦ المناهج الإماراتية ⇦ الصف السادس ⇦ علوم ⇦ الفصل الأول ⇦ ملفات متنوعة ⇦ الملف

تاريخ إضافة الملف على موقع المناهج: 2024-11-26 23:05:54

المزيد من مادة علوم:	ملفات ا كتب للمعلم ا كتب للطالب ا اختبارات الكترونية ا اختبارات ا حلول ا عروض بوربوينت ا أوراق عمل منهج انجليزي ا ملخصات وتقارير ا مذكرات وبنوك ا الامتحان النهائي ا للمدرس

التواصل الاجتماعي بحسب الصف السادس

صفحة المناهج الإماراتية على فيسبوك					
المواد على تلغرام	التربية الاسلامية	اللغة العربية	اللغة الانجليزية	الرياضيات	

المزيد من الملفات بحسب الصف السادس والمادة علوم في الفصل الأول

1	حل نموذج اختبار تجريبي وفق الهيكل الوزاري القسم الورقي منهج انسباير
2	نموذج اختبار تجريبي وفق الهيكل الوزاري القسم الورقي منهج انسباير
3	حل نموذج اختبار تجريبي وفق الهيكل الوزاري منهج انسباير
4	نموذج اختبار تجريبي وفق الهيكل الوزاري منهج انسباير
5	حل ملزمة شاملة وفق الهيكل الوزاري منهج انسباير المسار المتقدم

EOT 1

Science
Grade 6 General
2024-2025

MCQ

Question* / السؤال*		Learning Outcome/Performance Criteria** / نتاج التعلم/ معيارالأداء**	Grade 6 General Science Book Example/Exercise / مثال/تمرين	Page / الصفحة	PDF Question Number
					PDF Question number in MCQ section
	1	Students will present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	Engineering Connection	17	1
			Collect Evidence	18	2
	2	Students will determine the type of matter.	Collect Evidence	21	3
			Three-Dimensional Thinking	27	4
	3	Students will plan and carry out investigations to understand factors, such as the nature of the matter that affect the amount of energy transfer.	Explain the Phenomenon	74	5
			Three-Dimensional Thinking	83	6
	4	Students will determine the relationships among the energy transferred and the change in the average kinetic energy of the particles.	Lesson 1 Review (Summerize it!)	26	7
			Lesson 2 Launch (What's the Difference?)	29	8
	5	Students will explore how energy moves when objects are at different temperatures.	Three-Dimensional Thinking	65	9
			Collect Evidence	65	10
	6	Students will understand factors such as the nature of the matter and the size of the sample that affect the amount of energy transfer of a sample of matter.	Three-Dimensional Thinking	51	11
			Real-World Connection	52	12
	7	Students will determine the average kinetic energy of the particles as measured by the temperature of the sample.	Three-Dimensional Thinking	27	13
	8	Students will plan and carry out investigations to understand the nature of matter and the amount of energy transfer needed to change the temperature of a sample of matter.	Three-Dimensional Thinking	83	14
			Collect Evidence	83	15
	9	Students will explore how energy moves when objects are at different temperatures.	Radiation	65	16
	10	Students will develop and use models to enhance their understanding of the mass and the change in the average kinetic energy of the particles.	Movement and Collisions	12	17
			Three-Dimensional Thinking	14	18
	12	Students will investigate the transfer of energy from the Sun to Earth.	Albedo and Temperature	163	21
	13	Students will explore atmospheric and oceanic circulation.	Investigation	176	22
			Collect Evidence	176	23
	14	Students will describe how rotation of Earth cause global patterns of winds and ocean currents.	Investigation	178	24
			Collect Evidence	179	25
	15	Students will explore atmospheric and oceanic circulation.	Three-Dimensional Thinking	175	26
			Collect Evidence	186	27

FRQ

FRQ - الأسئلة المقالية					PDF Question number in FRQ section
	1	Students will determine the type of matter and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	Movement and Energy, Three-Dimensional Thinking	14	28, 29
		Students will determine the relationships among the energy transferred, the change in the average kinetic energy of the particles as measured by the temperature of the sample.	Summerize it!	26, 27	30, 31
		Students will construct explanations of these relationships for a variety of substances.	Three-Dimensional Thinking	43	32
	2	Students will explore how energy moves when objects are at different temperatures.	Lesson 3 Launch, Three-dimensional Thinking	53, 60, 65	33, 34, 35
		Students will develop and use models to enhance their understanding of this process.	Lesson 4 Launch	71	36
		Students will plan and carry out investigations to understand factors, such as the nature of the matter that affect the amount of energy transfer needed to change the temperature of a sample of matter.	Encounter the Phenomenon, Three-dimensional Thinking , Collect Evidence	73, 83, 89	37, 38, 39, 40
	3	Students will explore how the transfer of thermal energy drives processes of the water cycle, including evaporation, condensation, and crystallization.	Lesson 1 Launch, Collect Evidence, Three-Dimensional Thinking,	103, 111, 112, 113, 116	41, 42, 43, 44, 45, 46
		Students will explore the motion and cycling of water among Earth's subsystems.	Three-dimensional Thinking, Collect Evidence, Three-dimensional Thinking.	116, 118,	47, 48, 49, 50
		Students will recognize various water reservoirs.	Lesson 2 Launch, Encounter the Phenomenon and Collect Evidence	121, 123,	51, 52, 53
		Students will explore the role of gravity in moving water downhill.	Three-dimensional Thinking, Lesson 2 Review (Summarize it!), Three-dimensional Thinking	131, 134,	54, 55, 56
	4	Students will investigate the transfer of energy from the Sun to Earth and the atmosphere.	Lesson 1 Launch, Encounter the Phenomenon, and Three-Dimensional Thinking	45, 147, 15	57, 58, 59
		Students will use models to describe the unequal heating of Earth by the Sun and how energy flows through the system of Earth and the atmosphere.	Three-dimensional Thinking, Lesson 1 Review (Summerize it!)	59, 164, 16	60, 61, 62, 63
		Students will look for patterns in weather and explore how and why weather changes.	Investigation	176	64
		Student will provide evidence for how the interactions of air masses result in changes in weather conditions.	Three-dimensional Thinking, Investigation (The great ocean Conveyor Belt)	189	65, 66

Important pages in simple form

L.No	Topic/lesson	Pages MCQ(online)	FRQ(writing)
1	Particles in Motion	12,14,17,21,26,27,27	14,26,27
2	States of Matter	29,51,52	43
3	Thermal energy Transfer	65,65,65	53,60,65
4	Thermal energy conductivity	74,83,83,83,	71,73,83,89
5	Water in the atmosphere	103,111	103,111,112,113,116,116,118,119
6	Water on Earth's surface		121,123,129,131,134,135
7	Solar energy on Earth	163	145,147,151,159,160,164,166
8	Atmospheric and oceanic circulation	175,176,176, 178,179,186	176,189,190

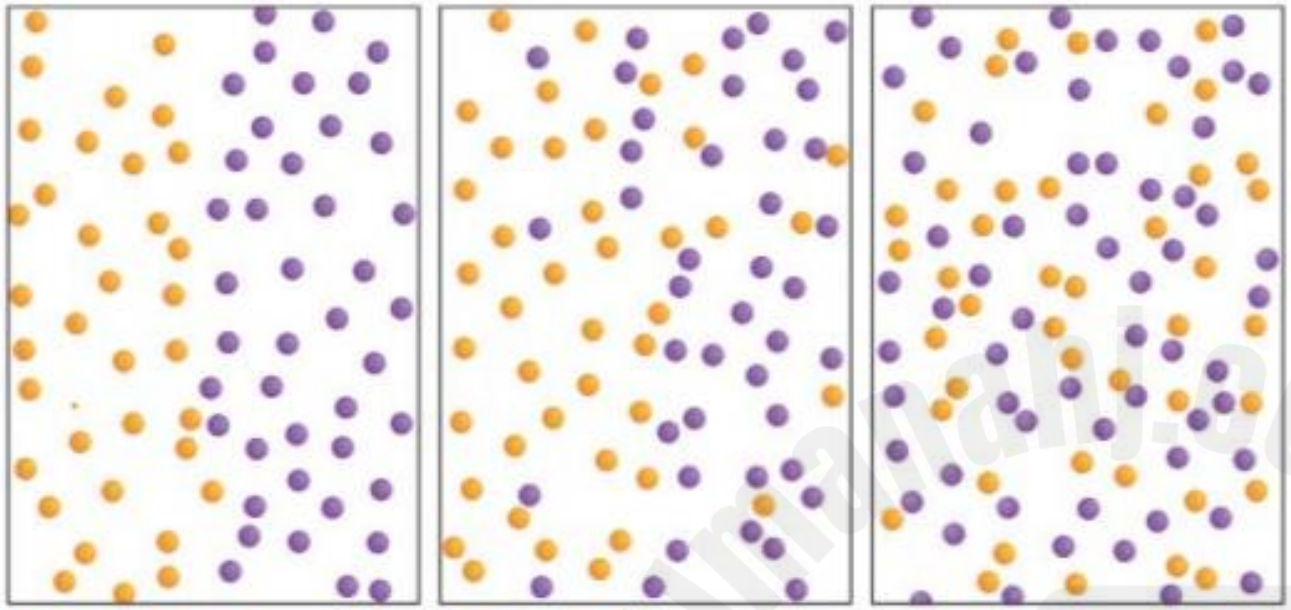
L1 Particles in Motion

- MCQ Pg 12, 14, 17, 21, 26,27,27
- FRQ Pg 14, 26, 27

L1

Diffusion

12

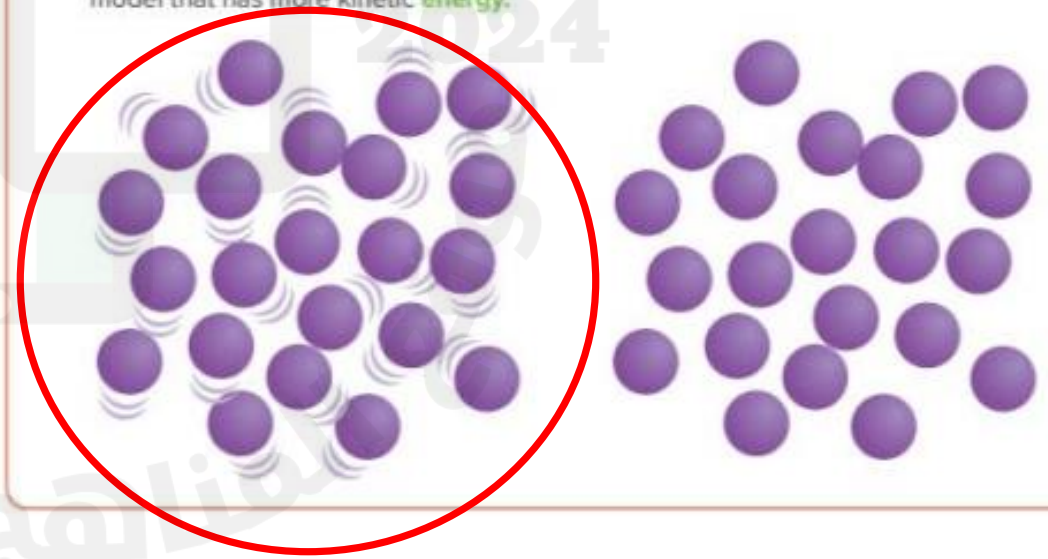


What **process** does the image above represent?

14

THREE-DIMENSIONAL THINKING

Add motion lines to the liquid particles **model** on the right to show they are moving faster than the liquid particles on the left. Circle the model that has more kinetic energy.



17

ENGINEERING Connection Investigate how thermometers use thermal contraction and thermal expansion to measure temperature.

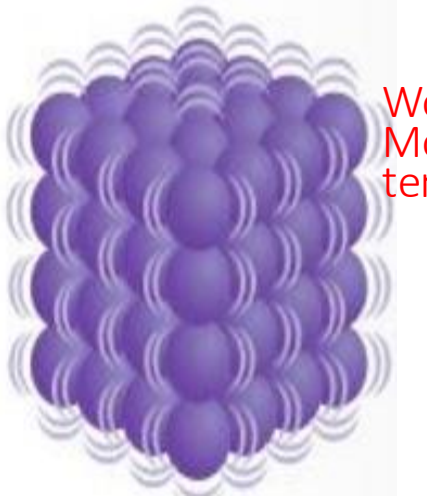
L1

Metals expand on heating and contract on cooling. This property is used to measure temperature.

21

COLLECT EVIDENCE

How could models of the particles in the wood and metal blocks show why one felt colder than the other?

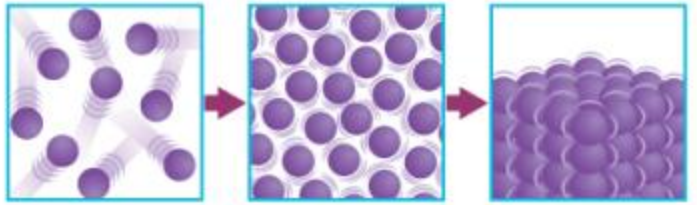


Wood
More KE, higher temperature

27

Metal
Less KE, lower temperature

Examine the model below. The particles are undergoing a change in energy.



4. Which statement best describes what is taking place in the images?

A The kinetic energy of the particles on the right is the greatest of the three images of particles.

B The particles in the middle have more kinetic energy than the particles on the right.

C The particles in the middle have less space between them than the particles on the left, which means they have more kinetic energy.

D Energy was added to the particles on the left to give them more energy than the particles in the middle.

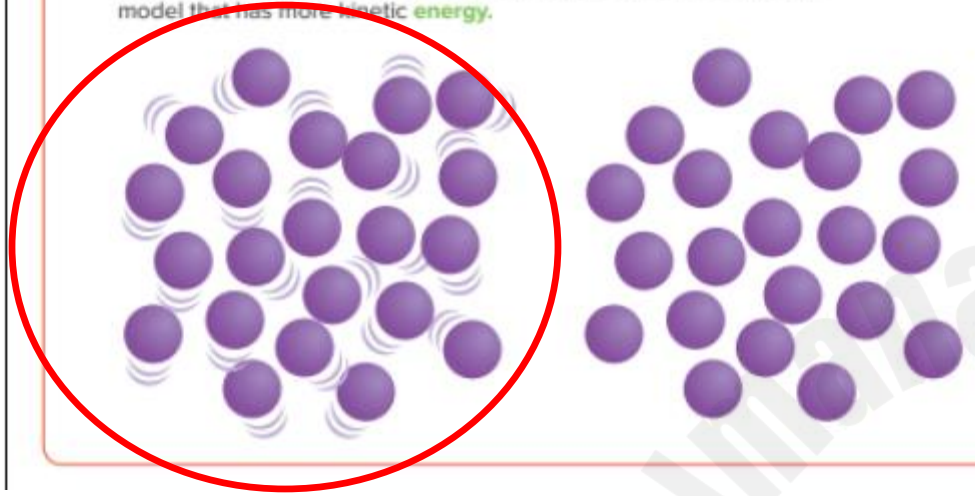
L1-Writing

28

14

THREE-DIMENSIONAL THINKING

Add motion lines to the liquid particles **model** on the right to show they are moving faster than the liquid particles on the left. Circle the model that has more kinetic energy.

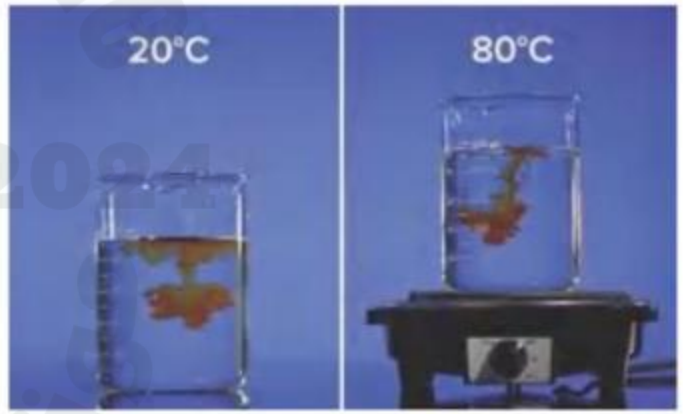


A- because it shows lines of motion.

27

13

What can you conclude about how adding energy to the liquid on the right will affect the speed of the particles?



As temperature increases, KE increases, speed increases.

26

1. **Relate** kinetic energy to the speed of particles.

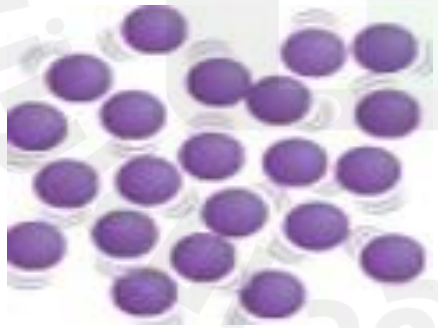
No speed →	No	kinetic energy
Greater mass →	greater	kinetic energy
Greater speed →	greater	kinetic energy

L1

1. **Relate** kinetic energy to the speed of particles.

No speed	→	No kinetic energy
Greater mass	→	greater kinetic energy
Greater speed	→	greater kinetic energy

Model each statement above. Model the first statement as solid particles, the second statement as liquid particles, and the last statement as gas particles.



12

27

L1

30

27

Three-Dimensional Thinking

Some students want to demonstrate thermal expansion. They devise the following method: A large black balloon is taken to a shady area and filled with cool air. The balloon is then taken to a bright, sunny location. After a short time, the balloon begins to expand.

3. What explanation does this investigation verify?

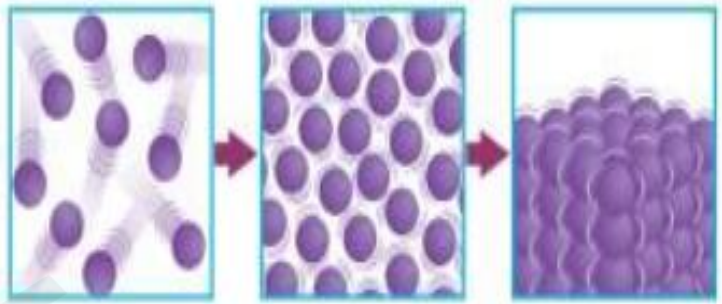
A A balloon filled with cool air will rise into the atmosphere.

B As particles gain energy, the material takes up more space.

C The air inside the balloon lost energy.

D The sunlight caused the air in the balloon to contract.

Examine the model below. The particles are undergoing a change in energy.



4. Which statement best describes what is taking place in the images?

A The kinetic energy of the particles on the right is the greatest of the three images of particles.

B The particles in the middle have more kinetic energy than the particles on the right.

C The particles in the middle have less space between them than the particles on the left, which means they have more kinetic energy.

D Energy was added to the particles on the left to give them more energy than the particles in the middle.

L2 States of matter

- MCQ Pg 29,51,52
- FRQ Pg 43

LESSON 2 LAUNCH

SCIENCE PROBES

What's the Difference?

Five friends were talking about the differences among solids, liquids, and gases. They each agreed that the differences have to do with the particles in each type of matter. However, they disagreed about which differences determine whether the matter is a solid, liquid, or gas. This is what they said:

Gwyneth: I think it has to do with the number of particles.
George: I think it has to do with the shape of the particles.
Hoda: I think it has to do with the size of the particles.
Natalie: I think it has to do with the movement of the particles.
William: I think it has to do with how hard or soft the particles are.

Natalle

With whom do you agree most? _____ Explain why you agree with that friend.

Because the state of matter is determined by the arrangement, force of attraction and motion of particles.

L2

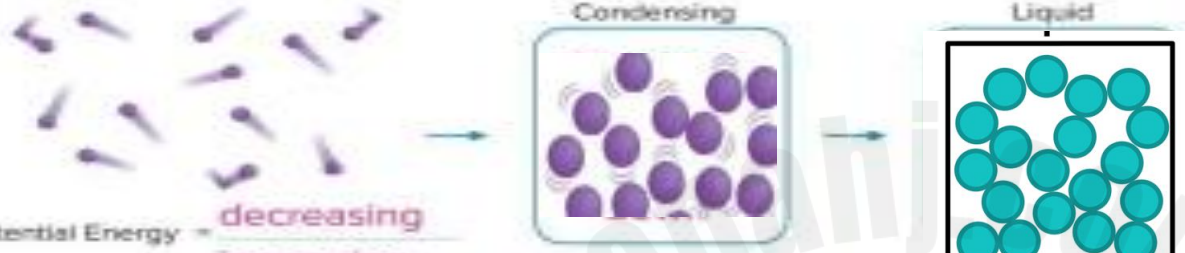
43

THREE-DIMENSIONAL THINKING

For each example:

1. Complete the model of the particles.
2. Indicate how potential energy is changing (increasing or decreasing).
3. Indicate how the attractive forces are changing (increasing or decreasing).

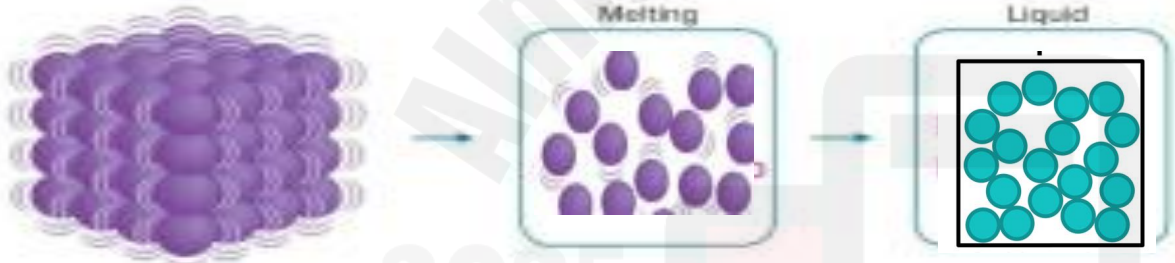
A



Potential Energy = decreasing

Attractive Forces = increasing

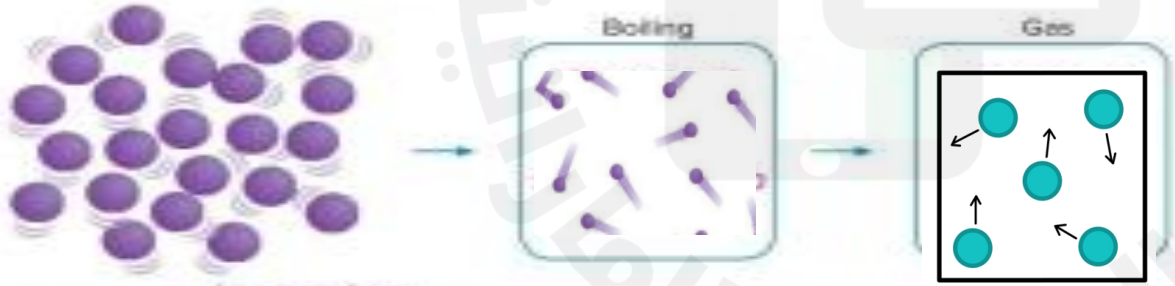
B



Potential Energy = increasing

Attractive Forces = decreasing

C



Potential Energy = increasing

Attractive Forces = decreasing

51

L2

3. A scientist was working with substance *Y*. Which of the following does not represent an increase in thermal energy?

A The temperature of the substance rose by 10°C.

B The volume of the substance increased by 10 mL.

C The mass of the substance increased by 10 g.

D The substance changed from a liquid into a solid.

52

Real-World Connection

4. **Explain** Think of a time that you noticed a change of state. Explain what happened using the terms *temperature*, *particle motion*, and *energy*.

5. **Compare** the amount of thermal energy required to melt a solid with the amount of thermal energy released when the same liquid becomes a solid.

52

L3Thermal energy transfer

- MCQ Pg 65,65,65
- FRQ Pg 53,60,65

32

L3

53

Janey had a bowl of hot soup for lunch. The soup was so hot she decided put it in the refrigerator for a few minutes to cool it. What happened to coo the soup so Janey could eat it?

A. The heat moved from the soup to the cold air in the refrigerator.

B. The cold in the refrigerator moved into the hot soup.

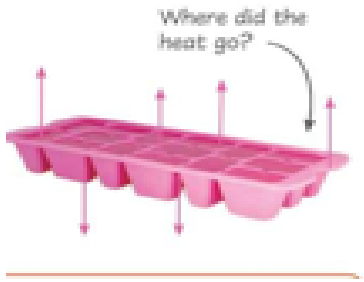
C. No heat or cold moved out of or into the soup. It just cooled off.

Circle the answer that best matches your thinking. Explain your thinking. Describe what happened to cool the soup down.

Because thermal energy always moves from hot objects to cold objects.

33

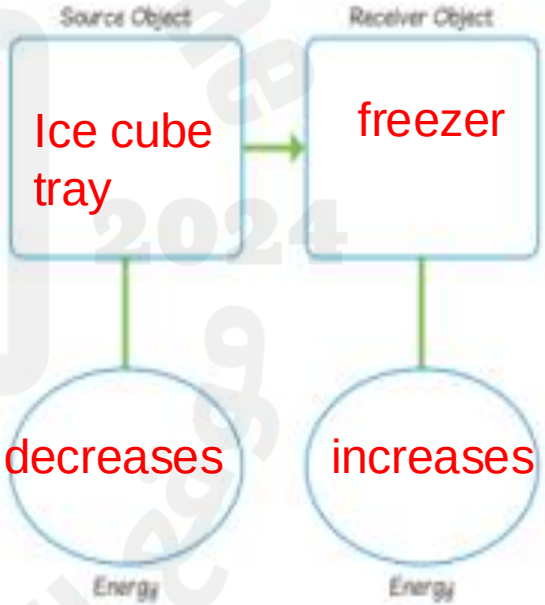
60



THREE-DIMENSIONAL THINKING

In the figure above, the water in the ice cube tray is 10°C. It is placed in the freezer at 0°C. Add arrows to the figure to model the direction of energy transfer.

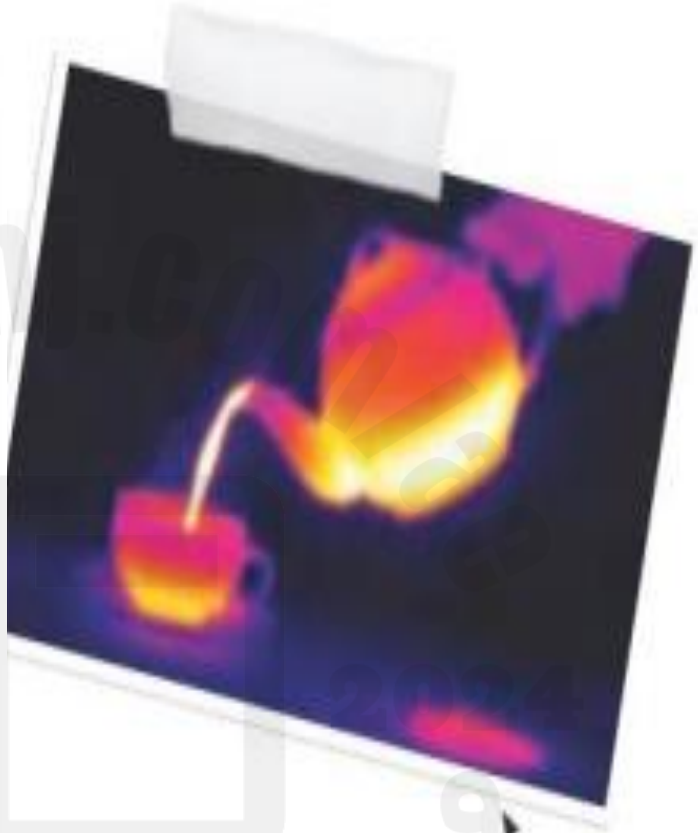
Thermal energy moves rom ice tray to the freezer.



THREE-DIMENSIONAL THINKING

In the thermogram on the right, how do conduction and radiation explain the energy transfers occurring?

Conduction happened between the teapot and the table leaving behind a spot of high thermal energy when it was picked up. Radiation is happening on all objects.



65

COLLECT EVIDENCE

How does radiation help explain the direction of thermal energy transfer between the toast and the environment?

Thermal energy always moves from hot objects to cold objects
Radiation is the transmission of heat through electromagnetic waves.
The energy is transferred from the hot toast to the surrounding environment.

65

Radiation Another process that transfers energy is radiation. **Radiation** is the transfer of thermal energy from one material to another by electromagnetic waves. All matter, including the Sun, fire, and even you, transfers thermal energy by radiation. Warm objects emit more radiation than cold objects do.

What is **Radiation**?

L4 Thermal energy Conductivity

- MCQ Pg 74,83,83,83
- FRQ Pg 71,73,83,89

35

71

L4

Adita and his friends were learning about insulators and conductors in school. They all agree that metal, a conductor, will heat up more quickly than ceramic, an insulator. They have different ideas about how the materials will cool. This is what each friend said:

Adita: I think the ceramic will cool quicker than the metal.

Niabi: I think the metal will cool quicker than the ceramic.

Irene: I think they will both cool at the same rate.

Rafi: I think conductors and insulators have nothing to do with how a material cools, just how a material heats up.

Which student do you agree with the most? Niabi- Because thermal energy easily pass through conductors and metal is a conductor.

Explain your ideas about conductors and insulators.

73

ENCOUNTER
THE PHENOMENON

Why is this kitchenware made out of so many different materials?

L4

Utensils made of metals will transfer thermal energy more easily. Utensils made of wood will transfer thermal energy less.

74

EXPLAIN
THE PHENOMENON

Kitchenware is made of many different types of materials. Have you ever thought about how those different materials transfer thermal energy? Use your ideas about kitchenware to make a claim about what affects how a material transfers thermal energy.

Some materials, such as metals, conduct thermal energy easily. Other materials, such as wood or plastic, do not. The amount of energy needed to change the temperature of a material by a given amount depends on several factors.

L4
83

THREE-DIMENSIONAL THINKING

You can bake food in either a metal pan or oven safe glass. Which would require more energy to heat up? Which would cool down the fastest? Explain your reasoning.

A glass dish would require more energy to heat up because it has a higher specific heat. The metal pan would cool down the fastest because it has a low specific heat.

83

COLLECT EVIDENCE

How does the type of material in the kitchenware affect how it transfers thermal energy?

Some materials, such as metals, conduct thermal energy easily. Other materials, such as wood or plastic, do not. The amount of energy needed to change the temperature of a material by a given amount depends on several factors.

How fast thermal energy transfers through a substance depends on 3 things.

Type of matter Mass of matter Shape of matter

39

89

4. The specific heat of air is 1.0 J/g•K and the specific heat of copper is 0.4 J/g•K. Which statement describes how each material would affect the amount of thermal energy transferred?

A Air and copper transfer thermal energy the same.

B Copper transfers thermal energy the quickest.

C Air transfers thermal energy the quickest.

D Specific heat does not determine how thermal energy transfers.

L5 Water in the atmosphere

- MCQ Pg 103,111
- FRQ Pg103,111,112,113,116,116,118,119

L5

LESSON 1 LAUNCH

What happened to the puddle?

Four friends noticed a large puddle on the sidewalk when they walked to school in the morning. When they walked home, the puddle was gone. They wondered what happened to the water that was in the puddle.

Desi: I think the water soaked into the bricks.

Trudi: I think the water went up into the clouds.

Max: I think the water is in the air around us.

Carli: I think the Sun changed it into something else.

Circle the student you most agree with. Explain why you agree with that student.

Max- Water is present in all 3 states of matter on earth. Water in vapor form in the air, in liquid form on earth and in solid form on polar ice caps.

19

111

THREE-DIMENSIONAL THINKING

On the figure below, **model** the process that changes liquid water to water vapor. Label the transfer of **energy** that takes place during this process.

Liquid water changes into vapor by absorbing energy from the sun.

How does **energy** from the Sun drive the cycling of **matter**?

Thermal energy from the Sun causes liquid water on or near Earth's surface to evaporate and become water vapor.

COLLECT EVIDENCE

Why do clouds and other bodies of water "disappear?" Record your evidence (A) in the chart at the beginning of the lesson.

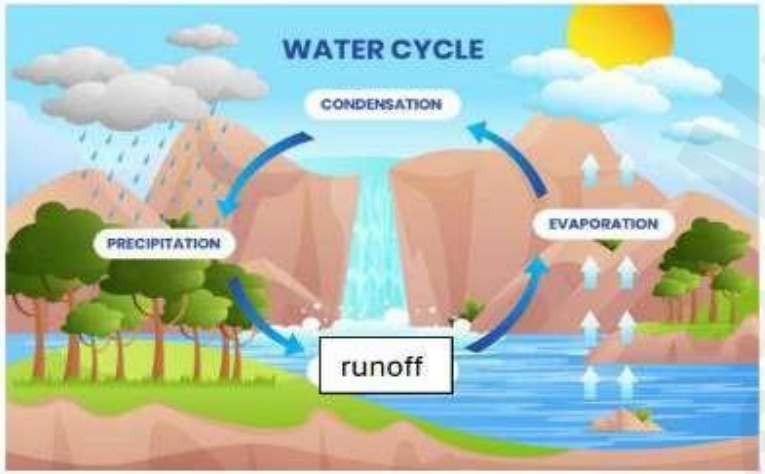
the Sun's energy causes liquid water to "disappear." When enough thermal energy is absorbed by water in clouds, they evaporate into invisible water vapor and the clouds "disappear."

COLLECT EVIDENCE

How else does water enter the atmosphere?

Water enter the atmosphere through **evaporation, transpiration** by plants and **cellular respiration** from living organisms..

Spheres of the Earth



1. **Evaporation** (Sun heat causes water on Earth to get hot and turn into water vapor)
2. **Condensation** (The water in the atmosphere starts to cool down in the clouds)
3. **Precipitation** (clouds start to fill with water, comes back to Earth's surface in rain, snow, hail or sleet)
4. **Runoff** (water joins rivers, oceans)

Other ways water enters the atmosphere:

1. Transpiration: plants release water vapor into the atmosphere through the openings of the stomata.
2. Cellular Respiration: food molecules are broken down and carbon dioxide and water are released as waste.
3. Decomposition: when plants and animals die, their bodies decompose and water is released.

How does water "reapper"

Temperatures in the atmosphere become coller as water vapor rises higher.

It looses thermal energy .

When water vapor looses too much thermal energy, the liquid changes to a solid. This is called **Crystallization.**

Remember:

Thermal energy and Gravity is the what makes the water cycle work.

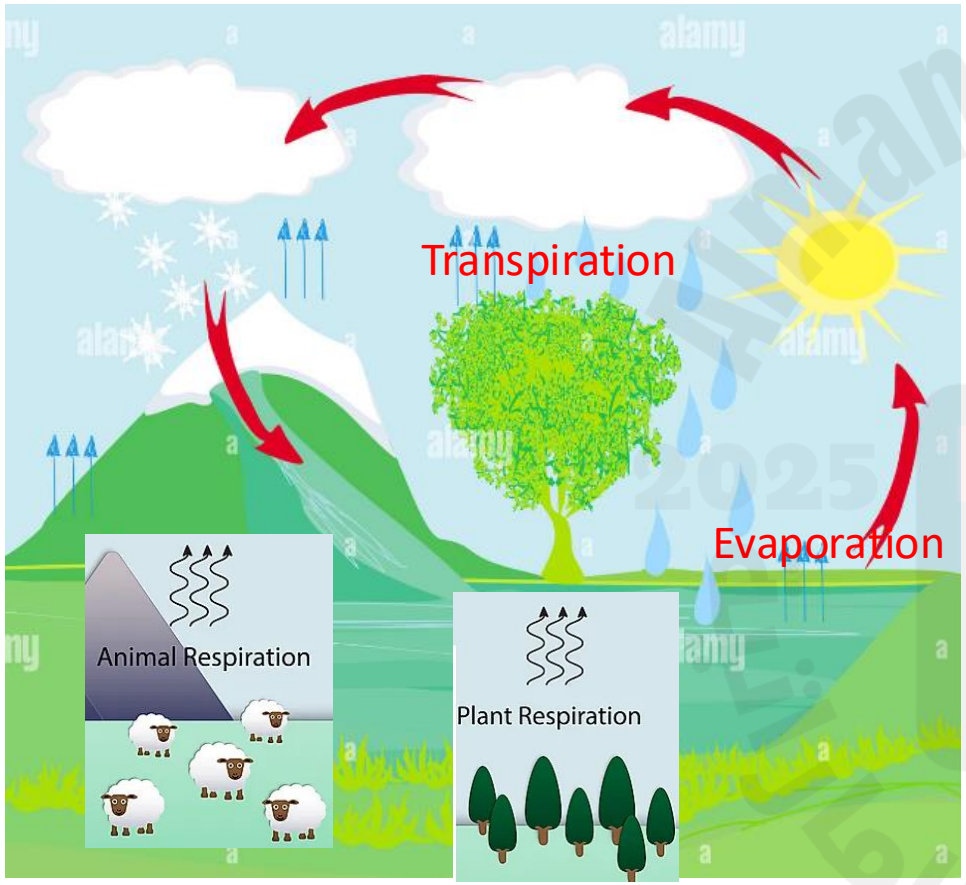
When water turns from liquid to solid, thermal energy is released.

When water turns from solid to liquid, thermal energy is

Pg 113

THREE-DIMENSIONAL THINKING

Model the three ways water enters the atmosphere. Use arrows and labels to show the transfer of energy that drives the cycling of water from Earth's surface to Earth's atmosphere.



Water enters the atmosphere through the processes of **evaporation, transpiration and respiration**. During the process of evaporation, thermal energy from the **sun is absorbed**.

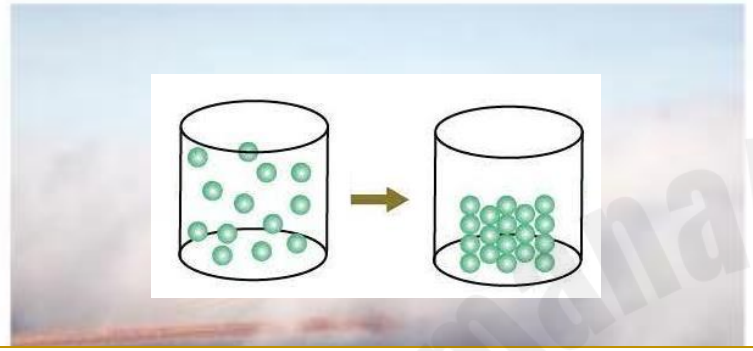
L4

45

116

THREE-DIMENSIONAL THINKING

On the figure below, **model** the process that changes water vapor to liquid water. Label the transfer of **energy** that takes place during this process.



Energy is released while gas changes to liquid during condensation.

116

COLLECT EVIDENCE

How do clouds form?

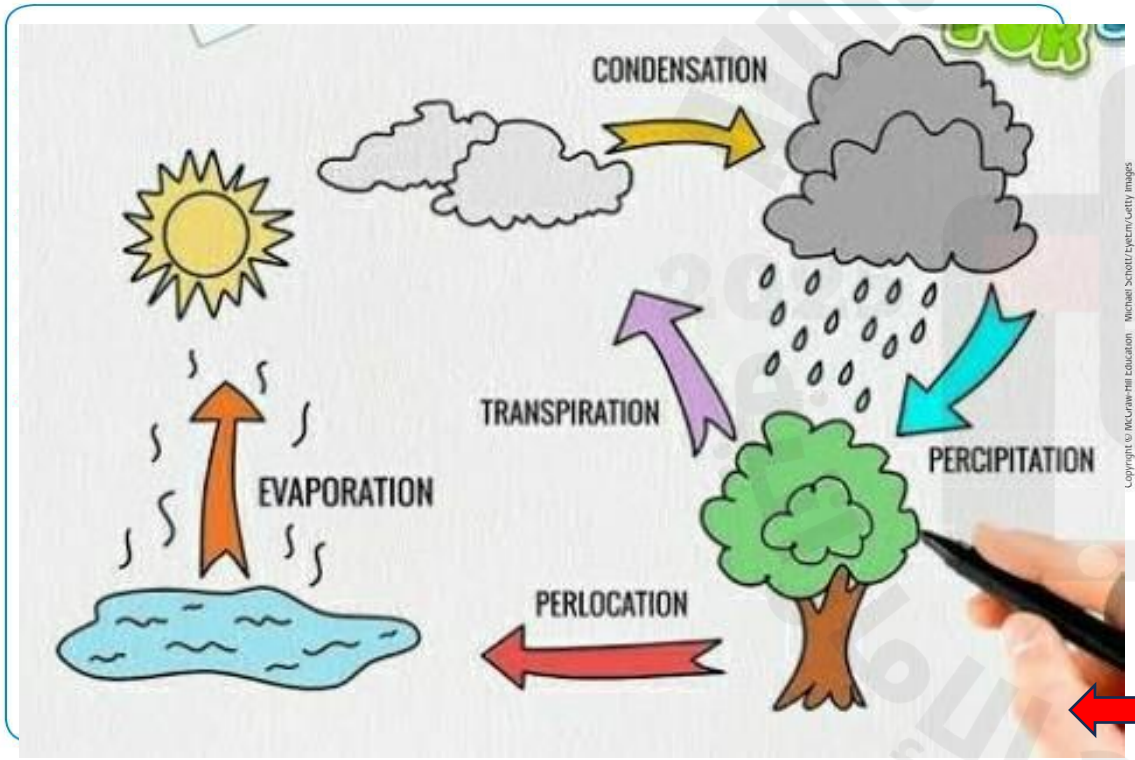
When water vapor in the atmosphere cools, it loses thermal energy and condenses into liquid water. Water droplets in the atmosphere block and reflect light making them visible as clouds. Crystallization can also cause clouds to appear.

LESSON 1

Review

Summarize It!

1. **Sketch** Create a concept sketch that models how water cycles into and through the atmosphere. To construct a concept sketch, begin by listing the processes and relationships you want to describe. Then, draw your sketch and write complete sentences describing the sketch. Include labels for the energy that drives water cycling, the state that water is in at each step (solid, liquid, or gas), and the transfer of thermal energy. Be creative!



Pg 118

1. Evaporation -Water evaporates under the suns heat.
2. Condensation -Water condenses in the atmosphere to form clouds.
3. Precipitation -Water is released from the clouds.
4. Collection - Water is collected and held in different areas.

Pg 119

Three-Dimensional Thinking

Jorge wanted to model two processes that cycle water in the atmosphere for a class project. He began by filling a self-sealing plastic bag half-full of water. After sealing the bag, he taped it to a sunny window. After a few hours, water beaded along the inside of the bag.

2. Which processes are represented by Jorge's model?

A transpiration and respiration

B condensation and crystallization

C respiration and evaporation

D evaporation and condensation

Examine the photo below.

3. Which statement best describes the transfer of energy in the photo above?

A When water changes state from a liquid to a solid, thermal energy is absorbed.

B When water changes state from a solid to a liquid, thermal energy is absorbed.

C When water changes state from a liquid to a solid, thermal energy is released.

D When water changes state from a solid to a liquid, thermal energy is released.

L6 Water on earth’s surface

- MCQ Pg
- FRQ Pg121,123,129,131,134,135

50

121

L6

Jane was drinking a glass of water. She asked her father where the water came from. Her father said it was groundwater that was pumped up by their well. Jane wondered what the water looked like underground. This is what her family said:

Mom: I think it looks like a huge ocean underground.

Jack: I think it seeps into little holes or spaces between the soil and the rocks.

Annie: I think it looks like a long, underground tube filled with water.

Philip: I think it looks like an underground volcano with water spurting out of the top.

Which person do you agree with the most? Explain your ideas about groundwater.

Jack- because water seeps into the ground and seeps into tiny spaces or pores between soil and rock underground.

123

ENCOUNTER THE PHENOMENON

How might a single drop of water travel from a cloud to a stream to an aquifer?

Water falls to Earth's surface as precipitation in the form of rain, snow, sleet, or hail. The water can enter the ocean or other bodies of water, or seep into the ground to become groundwater.

129

COLLECT EVIDENCE

Why does water on Earth's surface flow and where does it go?
Record your evidence (B) in the chart at the beginning of the lesson.

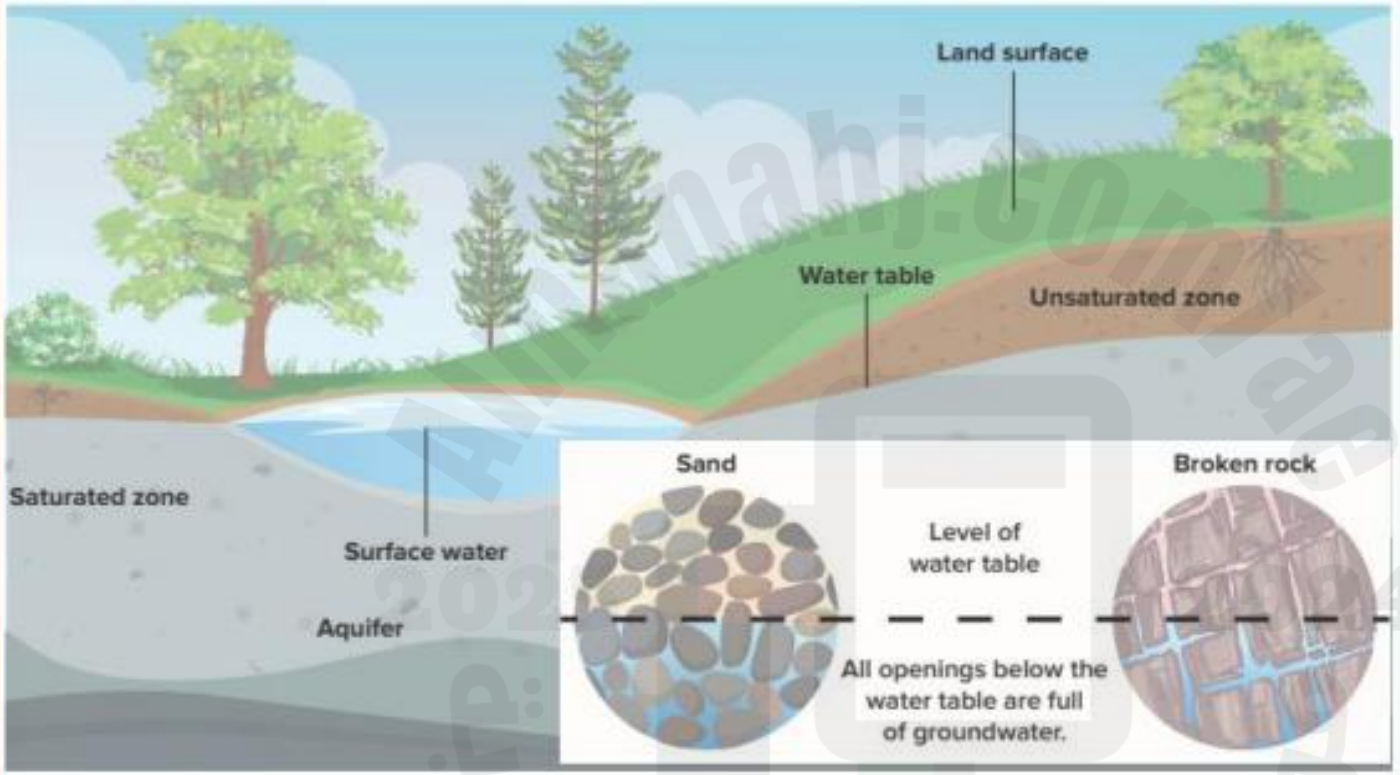
Earth's water flow due to gravity. It seeps into the ground. Water flows into and out to streams via precipitation and groundwater finally flow into the ocean.

131

L6

THREE-DIMENSIONAL THINKING

1. Draw arrows on the figure below to **model** how you think groundwater might flow.



2. Read the first paragraph on the following page and revise your arrows as needed.

3. What force **causes** groundwater to flow?

Gravity causes ground water to flow.

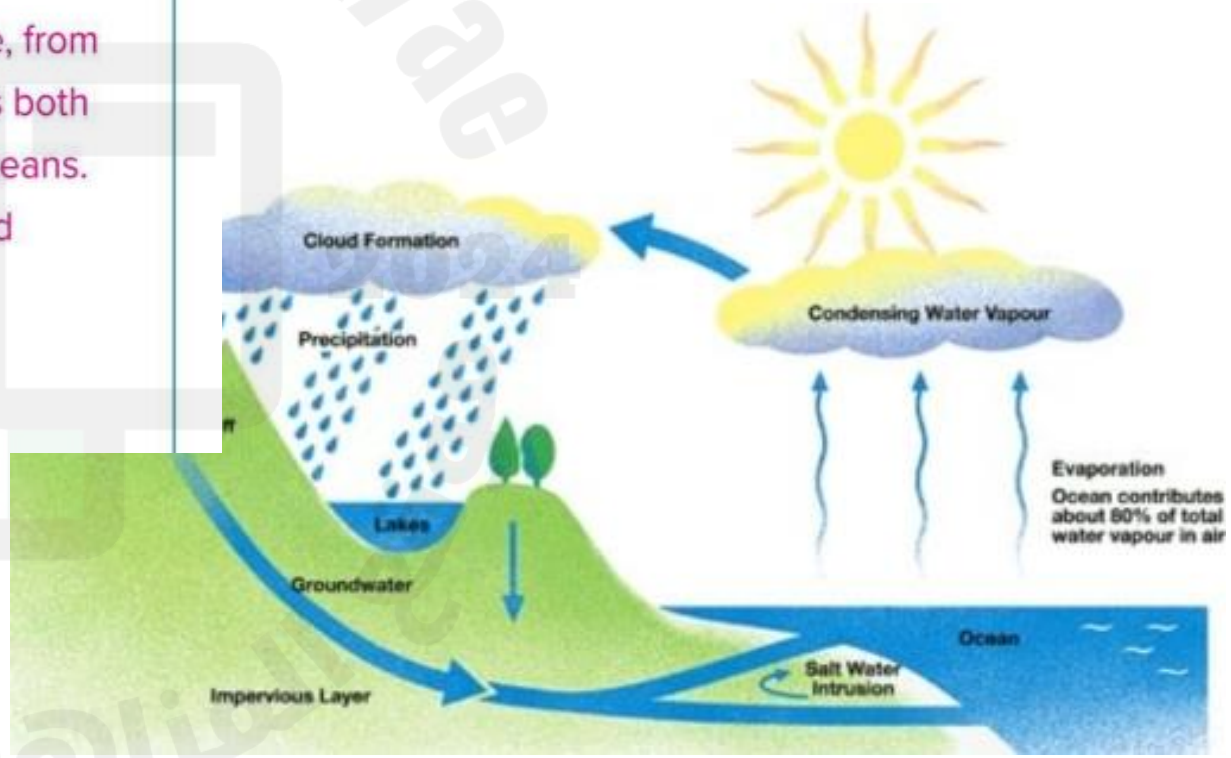
Review

L6

Summarize It!

1. **Organize** Create a graphic organizer that illustrates the role of gravity in keeping water moving on Earth. Include at least four places where water is stored and the state that water is in at each reservoir.

Gravity pulls water from the atmosphere to Earth's surface, from regions of higher elevations to regions of lower elevations both above and below Earth's surface, and eventually to the oceans. Water is stored in oceans, lakes, glaciers and ice caps, and groundwater.



Three-Dimensional Thinking

Four friends are walking along the bank of a stream. They each have differing opinions of why the stream moves along Earth's surface.

2. Which person do you agree with the most?

   A Marco: Wind drags water particles along in the stream.

   B Selma: Gravity causes water in the stream to move downhill.

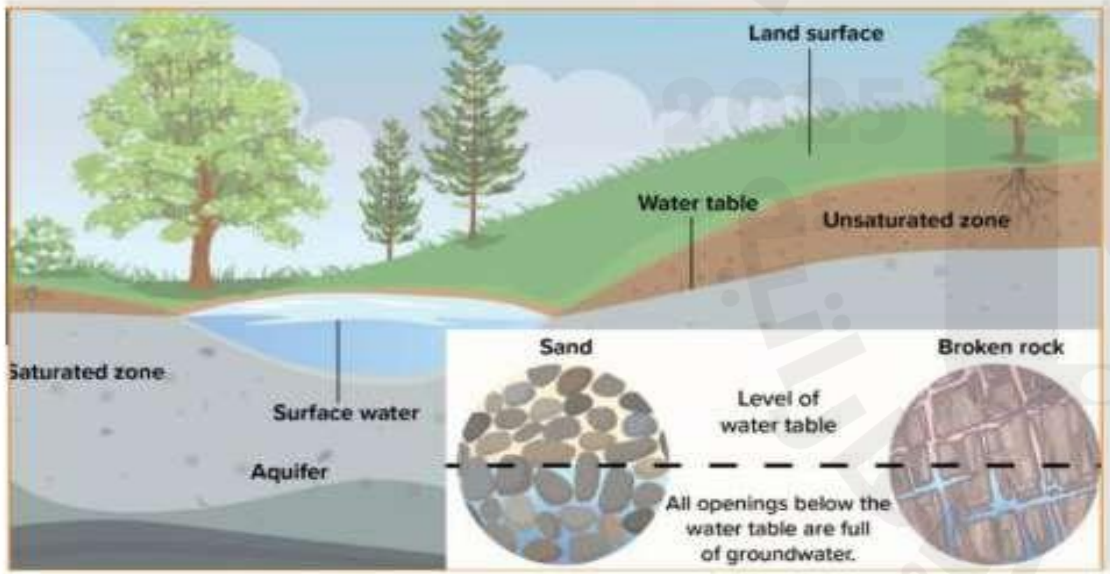
   C Brock: The Sun warms the stream causing it to flow.

   D Chen: The stream moves because of its velocity.

Precipitation

- Energy from the sun causes water on Earth's surface to evaporate into the atmosphere.
- The temperature in the atmosphere is lower so it causes the water vapor to condense.
- Once the water vapor condenses or cystalizes it will form a cloud.
- The liquid that falls is called precipitation.

The 4 types of precipitation are: rain, hail, sleet and snow



Where is water stored?

1. **Aquifers:** Groundwater trapped below earth's surface.
2. **Reservoirs:** Water storage like:
   Oceans, Seas, Lakes, Ice caps and Ground water
3. Permeable layers: Water collects in tiny holes within rocks and move deep underground to aquifers.
4. **Water Springs:** Extra water from aquifer can't go further underground so it pushes back up to the surface of Earth.
5. **Water Wells:** Humans dig up water from deep underground.
6. **Water in the desert:** Water comes from underground aquifer.
   Too much water rises to surface and makes an oasis in the desert.

Remember: Gravity pulls down the water.

L7 Solar Energy on earth

- MCQ Pg- 163
- FRQ Pg 145,147,151,159,164,166

56

145

L7

Four friends are at the beach on a sunny day. They notice that the sand is much warmer than the ocean water. They wondered why the temperatures of these surfaces differed even though they are exposed to the same amount of sunlight.

Carla: I think that land warms faster than the ocean because water requires more energy to be heated.

Ethan: I think the land warms faster than the ocean because solar energy is more attracted to solid surfaces than liquid surfaces.

Max: I think the land warms faster than the ocean because water is clear and sunlight can pass through it more easily than the land.

Talia: I think the land warms faster than the ocean because water depth increases away from the shore.

Circle the name of the friend you most agree with. Explain why you agree with that friend.

Carla. As water has a higher specific heat that land, it takes longer time to heat and cool.

57

147

ENCOUNTER | What effect does the Sun have on water?

THE PHENOMENON

The sun heats up the water on earth.

58

151

THREE-DIMENSIONAL THINKING

Models can be used to represent systems and their interactions. How did this demonstration model energy transfer between the Sun and Earth? Support your reasoning with a real-life example.

Energy from the Sun is transferred to Earth. Surfaces on Earth are exposed to this energy and are heated. For example, energy from the Sun can melt snow and ice on Earth's surface.

L7 Writing

THREE-DIMENSIONAL THINKING

You just investigated how thermal energy from land and water influence the atmosphere. Now, use these cause-and-effect relationships to predict how land, water, and air will absorb and release thermal energy in the following scenarios.

1. Suppose you go to the beach in the morning of a sunny summer day. Explain the rate at which thermal energy is absorbed by the water, sand, and air during the day.

The sand will absorb thermal energy at a faster rate than the water. The air above the land will absorb thermal energy at a faster rate than the air above the water.

2. Explain why the flow of energy between air and sand is different than that between air and water as thermal energy is absorbed from day to night.

Water has a higher specific heat than land. Air has a lower specific heat compared to land and water. Therefore, energy is absorbed at a faster rate between land and air than between water and air. Land and water highly influence the temperature of air.

L7 Writing

Three-Dimensional Thinking, continued

3. As the Sun begins to set, predict the effect on the rate at which the air, water, and sand will cool.

The sand will release thermal energy at a faster rate than the water. The air above the land will release thermal energy at a faster rate than the air above the water.

L7 MCQ

The temperature of the atmosphere is greatly affected by the albedo of the hydrosphere, geosphere, and biosphere. The more reflective a surface is, the less it absorbs solar energy.

GO ONLINE for additional opportunities to explore!

Want to learn more about albedo? Then perform one of the following activities.

- ☐ **Read** about how reflectivity is an important factor in determining the temperature at different locations on Earth in the **Scientific Text** *Albedo*.

OR

- ☐ **Survey** an area around your home to explore how human activity can change the albedo of areas in the **Investigation** *Local Reflectivity*.

THREE-DIMENSIONAL THINKING

For Earth to radiate thermal energy, it must first absorb thermal energy. However, some natural surfaces on Earth and in the atmosphere are more reflective than absorbent. Examine the photo below.

Use the photo to describe areas of high and low albedo. **Explain** your reasoning.

The snow peaked mountain tops have a high albedo compared to the darker mountain rocks. This is because lighter colored objects are more reflective than darker colored objects.

LESSON 1

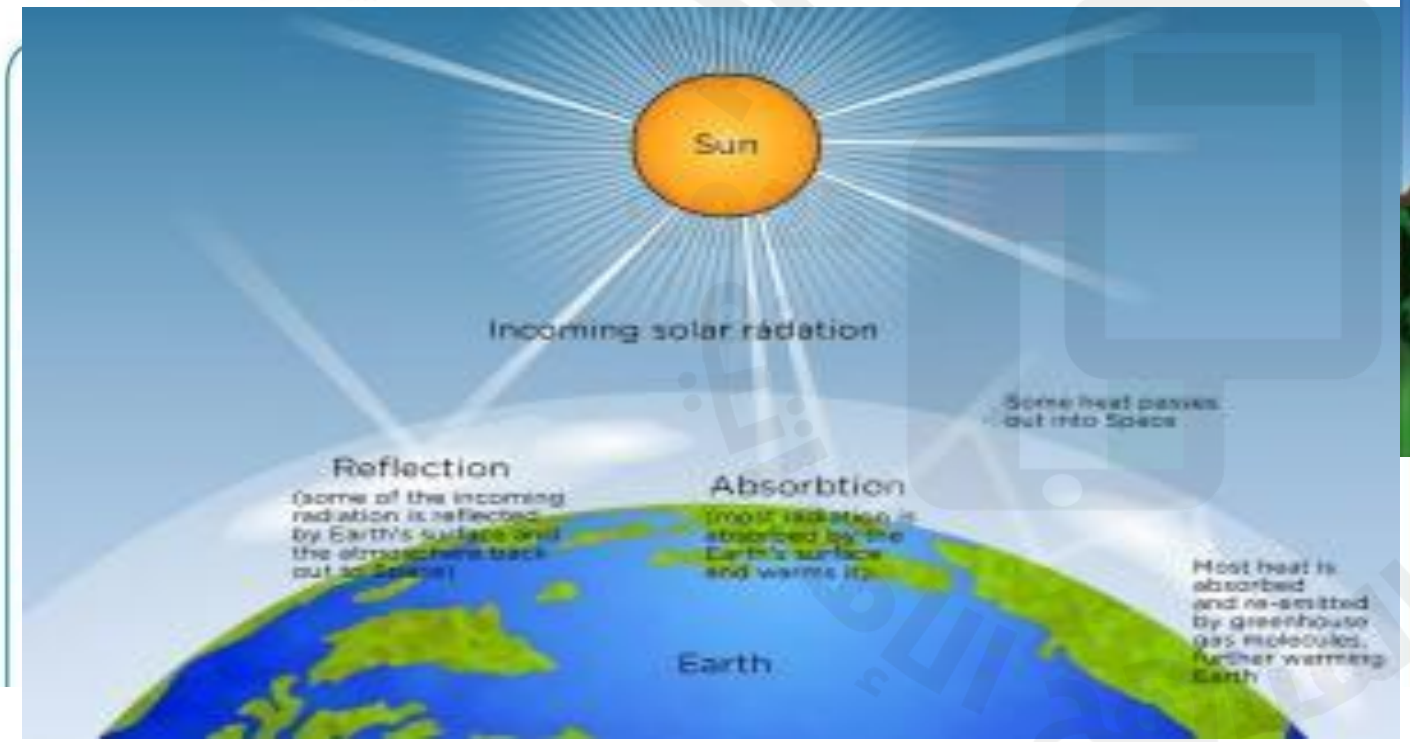
Review

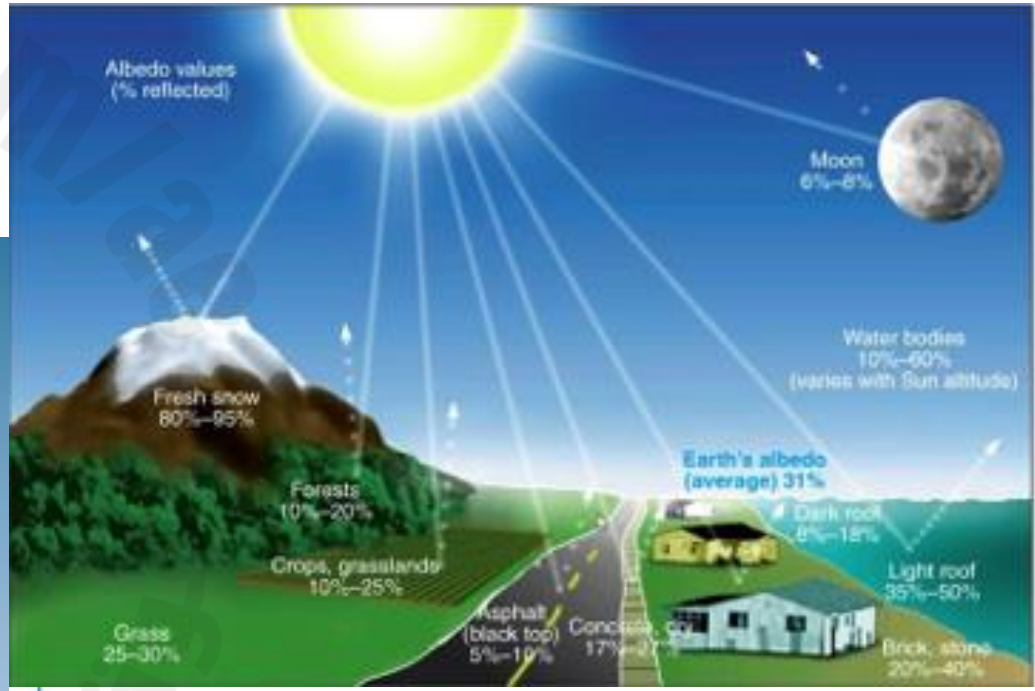
Pg 166

62

166

Diagram Create a visual to show how energy is transferred from the Sun to Earth and the atmosphere. Include how features on Earth's surface affect this transfer of energy.





L8 Atmospheric and oceanic circulation

- MCQ Pg 175,176,176,178,179,186
- FRQ Pg 176,189,190

L8

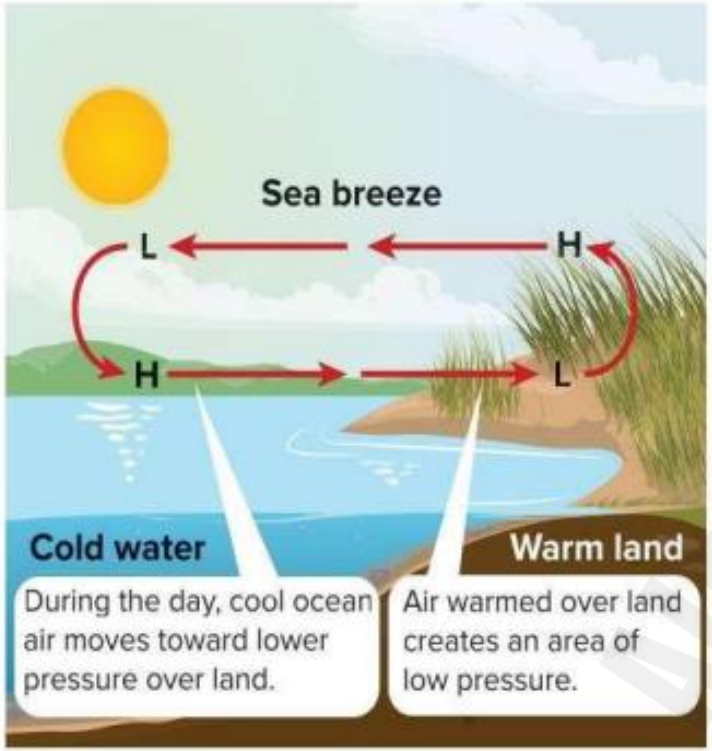
THREE-DIMENSIONAL THINKING

Imagine you are entering a large, air-conditioned building on a hot summer day. As you open the door, you feel cool air rushing past you out of the building. **Model** why you think this happens in the space below.

the cool air in the building moves outside when the door is open because the air pressure is higher inside the building than outside. cooler air is more dense than warm air.

176

L8



At night, the land cools more quickly than the water. Therefore, the air above the land cools more quickly than the air over the water. As a result, cool air over the land moves toward lower pressure over the water.

2. Predict whether a sea breeze could occur at night. Explain.

A sea breeze could only occur at night if the land stayed warmer than the water.

COLLECT EVIDENCE

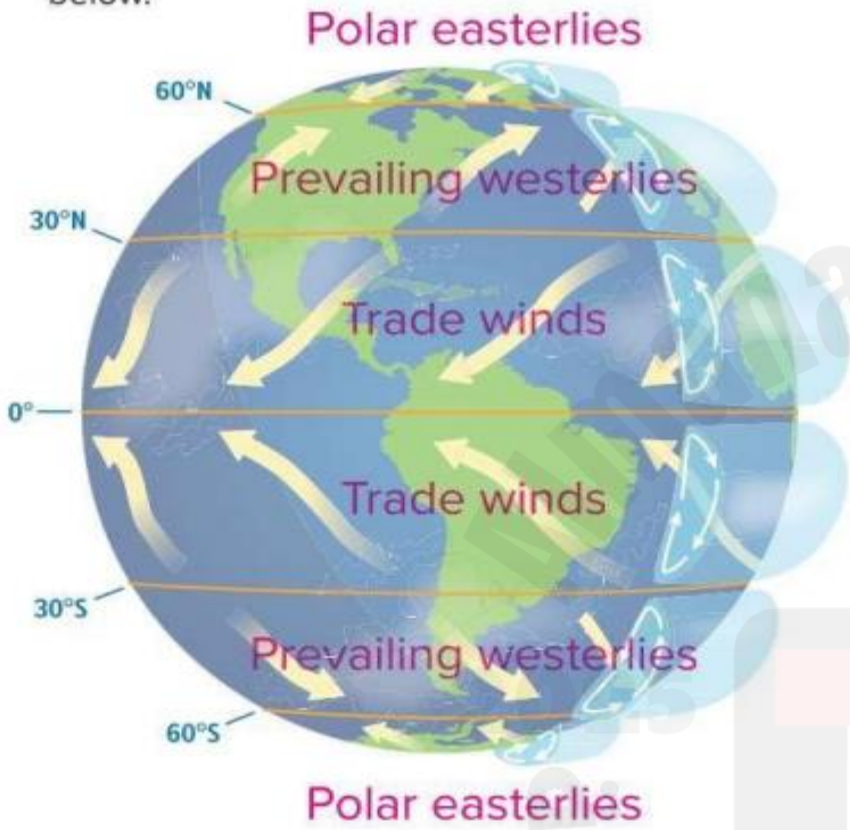
What causes wind to blow?

Change in **temperature** causes **pressure** to change. As a result, air flow from *high pressure area to low pressure area.*

L8

INVESTIGATION

1. Label the image with the global wind systems based on the descriptions below.



- The **polar easterlies** are cold winds that blow from east to west near the North Pole and the South Pole. Polar easterlies begin as dense polar air that sinks.
- The **prevailing westerlies** are steady winds that flow from west to east between latitudes 30°N and 60°N, and 30°S and 60°S.
- The **trade winds** are steady winds that flow from east to west between 30°N latitude and 30°S latitude.

COLLECT EVIDENCE

What are the global wind systems?

Polar easterlies
Prevailing westerlies
Trade winds

L8

COLLECT EVIDENCE

How does the wind influence the movement of water?

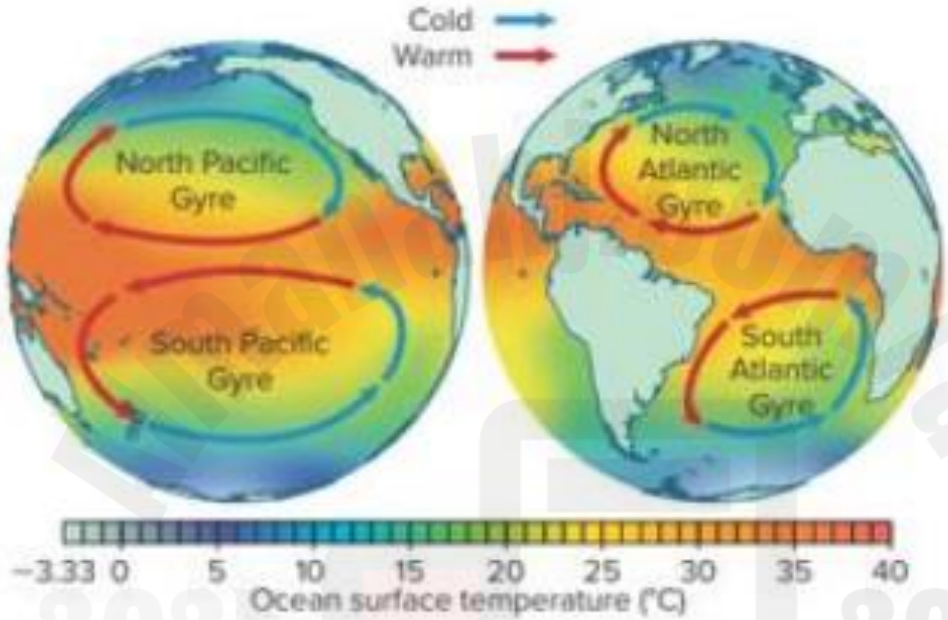
Wind transfers energy to water and causes surface current and upwelling.

L8

189

THREE-DIMENSIONAL THINKING

Analyze the map of gyres below. Then answer the questions that follow.



3. What energy ultimately drives convection in the oceans?

Solar energy drives convection in the oceans.

190

L8

GO ONLINE to watch the animation *Great Ocean Conveyor Belt*.

What is the Great Ocean Conveyor Belt and what does it affect?

What is the Great Ocean Conveyor Belt and what does it affect?

The Great Ocean Conveyor Belt is a model that explains how ocean currents circulate thermal energy around Earth affecting weather and climate.