

Name: _____

Science Teacher: _____ Period: _____



Stimulus & Response Workbook

Hopewell Middle School 7th Grade Science

Unit 5: Stimulus and Response Part 2

TEKS Analysis

TEKS 7.13A- investigate how organisms respond to external stimuli found in the environment such as phototropism and fight or flight

What does the phrase "fight or flight" mean?:

Define stimuli-

Circle examples of external stimuli:

- Sun
- Hunger
- Temperature
- Thirst
- Touch
- Predator

Essential Questions

How do organisms respond to **external stimuli** in order to maintain homeostasis?

TEKS 7.13B- describe and relate responses in organisms that may result from internal stimuli such as wilting in plants and fever or vomiting in animals that allow them to maintain balance

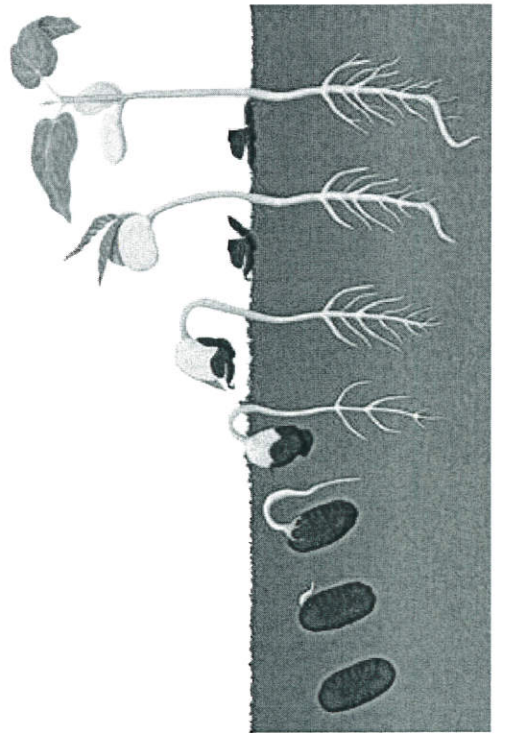
How does your body respond when it is invaded by bacteria?

The scientific term used to describe maintain balance is

Essential Question

How do organisms respond to **internal stimuli** in order to maintain homeostasis?

TEKS 7.7C- demonstrate and illustrate forces that affect motion in everyday life such as the emergence of seedlings, turgor pressure, and geotropism.



Use the diagram on the left to complete the following tasks:

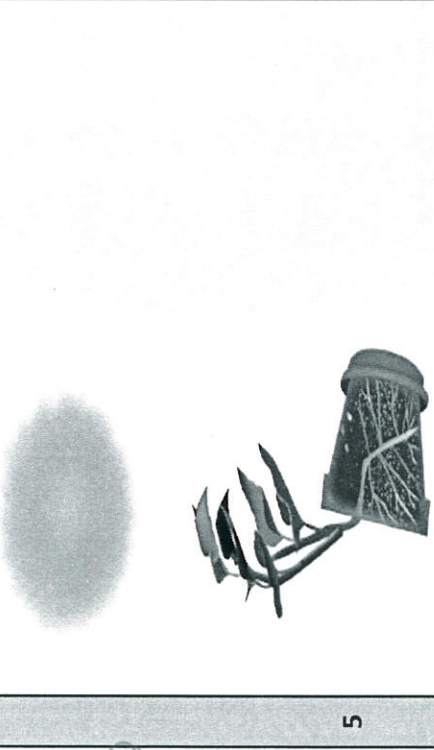
1. Draw the accurate location of the sun.
2. Draw arrows showing the direction of gravity. Label each arrow Gravity
3. Use an arrow to label the direction of water flow. Label the arrow H₂O.

Essential Question

How do forces affect motion in living systems?

Daily Work

	A	B	C	D	E
1	<p>Define Tropism</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>	<p>Roots grow downward in the soil in response to –</p> <p>A gravity.</p> <p>B sunlight.</p> <p>C water.</p> <p>D wind.</p>	<p>What are ways to maintain homeostasis?</p> <p>A. Speaking, hearing</p> <p>B. Sweating, vomiting</p> <p>C. Picking, digging</p> <p>D. Jumping, falling</p>	<p>A wilted plant is given water and it becomes tall and strong because of:</p> <p>A Turgor pressure</p> <p>B Buoyancy</p> <p>C Density</p>	<p>Stunted growth of an animal can be a response to –</p> <p>A overexposure to sunlight.</p> <p>B lack of nutrients in diet.</p> <p>C eating a plant-based diet.</p> <p>D living in a hot climate.</p>
2	<p>A predator chases a prey animal. The prey is likely experiencing all of the following EXCEPT –</p> <p>A rapid heartbeat.</p> <p>B dilated pupils.</p> <p>C increased sweating.</p> <p>D onset of fever.</p>	<p>Pain is a stimulus in animals that leads to responses which help the animal to</p> <p>A find food in the habitat.</p> <p>B recuperate after exercise.</p> <p>C avoid harmful situations.</p> <p>D fight serious infections</p>	<p>Define stimulus and provide an example of a stimulus</p> <hr/> <hr/> <hr/> <p>Define response and provide an example of a response</p> <hr/> <hr/> <hr/>		
3	<p>A student places a plant in a dark room next to a growth lamp, while providing sufficient water and nutrients to ensure the plant's growth and survival. The plant will likely respond by –</p> <p>A bending towards the lamp.</p> <p>B wilting and eventually dying.</p> <p>C shedding all of its leaves.</p> <p>D increasing its rate of photosynthesis.</p>	<p>Which of the following is the best example of the human body responding to an internal stimulus?</p> <p>A Body temperature rises from an infection</p> <p>B Leg reflexes when knee is struck</p> <p>C Fingernails grow back after trimming</p> <p>D Scar tissue builds up around damaged area</p>	<p>When a plant wilts due to lack of water, it is responding to which of the following internal stimuli?</p> <p>A Decreased water pressure within the plant cells</p> <p>B Lack of nutrients carried by water in the plant</p> <p>C Decreased rate of photosynthesis in the stem</p> <p>D Increased storage of glucose in the leaves</p>	<p>Which of the following is an example of a plant responding to the external stimulus of gravity?</p> <p>A A seedling growing towards a sunny window</p> <p>B Plant roots growing down into the soil</p> <p>C Flowers producing nectar to attract bees</p> <p>D A potted plant wilting when it dries out</p>	<p>As a <i>seedling</i> is sprouting through the soil, the force it exerts to move up must be greater than which of the following forces that are pulling downward?</p> <p>A Geotropism</p> <p>B Gravity</p> <p>C Friction</p> <p>D Inertia</p>

<p>Which of the following conclusions is best supported by the data in the table?</p> <p>A The plant cells for plants W and Y are demonstrating equal amounts of turgor pressure. B Plants X, Y, and Z can all survive the longest without water. C Plant Y does not need water because it has enough turgor pressure in its cells. D Plant Z is in the greatest need of water to increase the turgor pressure in its cells.</p> <p>4</p>	<p>For each scenario, label the stimulus and response. Then, identify it as an internal stimulus or external stimulus.</p> <p>1. A deer freezes when it senses a cougar near by. S= _____ R= _____ External or internal</p> <p>2. An elephant herd heads for a water hole when they get thirsty. S= _____ R= _____ External or internal</p> <p>3. A bear growls when it sees a predator near her cub. S= _____ R= _____ External or internal</p> <p>4. Light from a window causes a plant to grow bending toward it. S= _____ R= _____ External or internal</p> <p>5. A cat gets hungry and hunts for food. S= _____ R= _____ External or internal</p> <p>6. The sight of a fire causes predators to stay away. S= _____ R= _____ External or internal</p> <p>7. A person tells a dog to "sit" and the dog obeys. S= _____ R= _____ External or internal</p>
<p>The plant shown was knocked over and left to grow on its side. What is responsible for the roots growing downward?</p> <p>A Type of soil C. Source of light B Force of gravity D. Water movement</p> <p>5</p>	

Study online at <https://www.quizlet.com/join/rrisd-natural-selection-and-adaptation-7th-grade>

appendage



Any structure, such as a leg or an antenna, that grows out of an animal's body

external stimulus



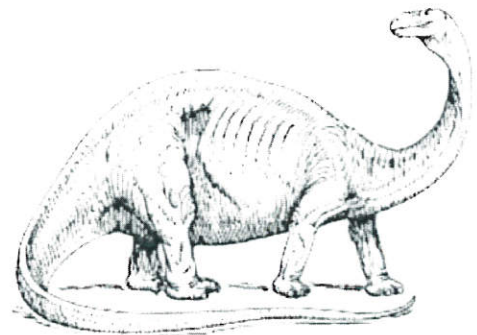
Anything outside the body of the organism that can cause a response in an organism

behavioral adaptation



an inherited behavior that helps an organism survive

extinction



when a species that no longer has any known living individuals.

dichotomous key

Dichotomous Key to Repternordritic Birds	
1. a. The beak is relatively long and slender	Go to 2
b. The beak is relatively stout and heavy	Go to 2
2. a. The bottom surface of the lower beak is flat and straight	Go to 2
b. The bottom surface of the lower beak is curved	Go to 3
3. a. The lower edge of the upper beak has a distinct hook	Go to Bird W
b. The lower edge of the upper beak is distinctly flat	Go to Bird Z

a key for the identification of organisms based on series of choices between alternative characters

genes

A segment of DNA on a chromosome that codes for a specific trait

geotropism



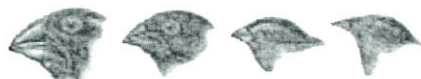
response to earth's gravity, as the growing of roots downward in the ground

domestic animals



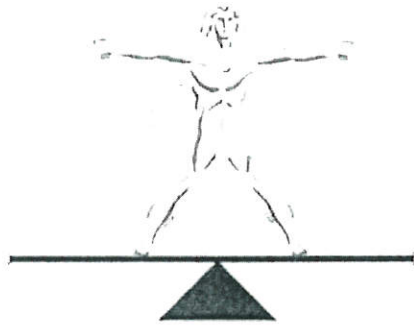
Those species that have been brought under human control and that have adapted to life with humans

evolution



A change in a species over time

10 homeostasis



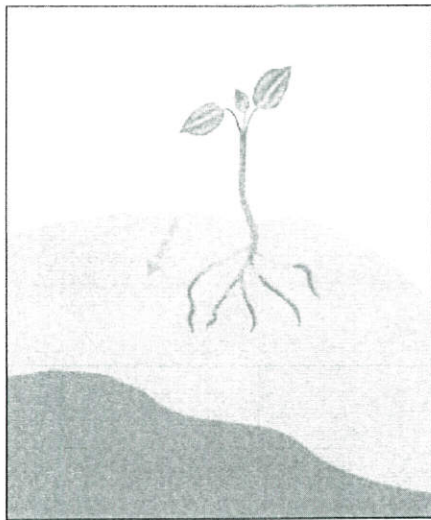
A tendency to maintain a balanced or constant internal state; the regulation of any aspect of body chemistry, such as blood glucose, around a particular level

12 mutation



A change in a gene or chromosome.

11 hydrotropism



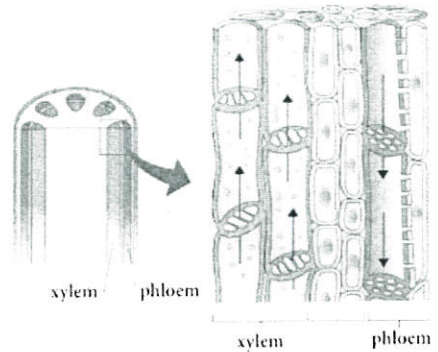
a plant's growth response to water; plant grows towards the water

14 natural selection



Changes in genetic traits over many generations based on organism's ability to survive and reproduce.

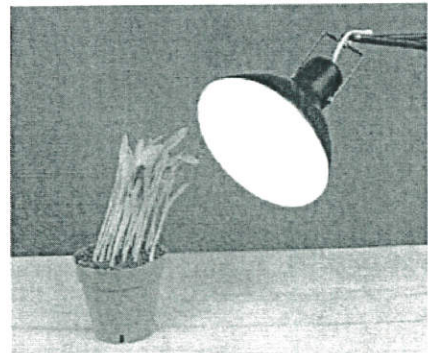
13 phloem



Elizabeth Morales

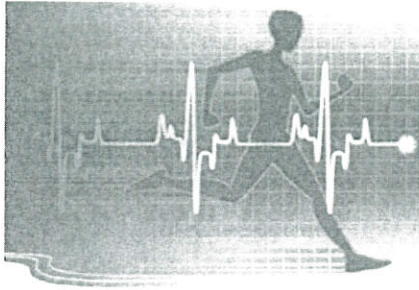
Name the tissue that transports food

16 phototropism



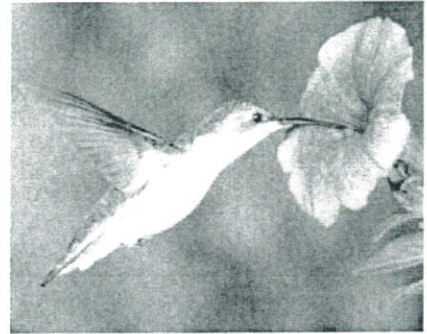
Plant growth in response to light

physiology



the study of how the physical structures of an organism function

structural adaptation



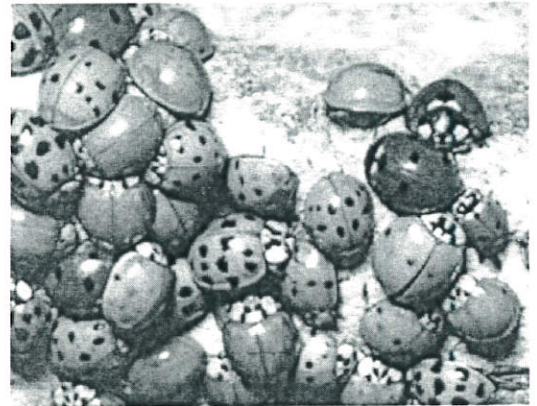
A physical feature that helps an organism survive in its environment

response



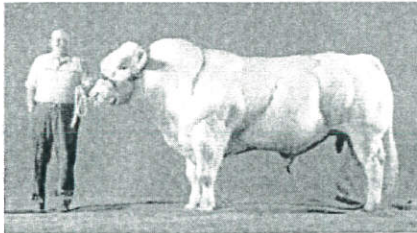
A reaction to a stimulus.

variation



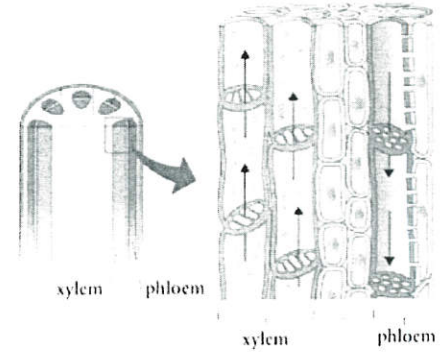
Any difference between individuals of the same species.

selective breeding



The man-made process of selecting a few organisms with desired traits to serve as parents of the next generation.

xylem



Elizabeth Morales

Name the tissue that transports water

stimulus



A change in an organism's surroundings that causes the organism to react

Tropism Notes

A. What are we talking about?

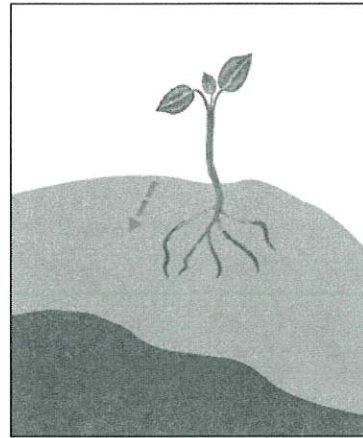
1. Tropism - directional growth of a plant, or part of a plant, in response to an external stimulus

- a) Stimulus - an action or condition that causes a response
- b) _____ - an action or condition that is a reaction to a stimulus
 - 1) Negative response - when the growth of a plant is away from the stimulus
 - 2) Positive response - when the growth of the plant is towards the stimulus

B. Types of Tropism

1. Hydrotropism

- a) Stimulus - _____
- b) Response - a plant's roots grow towards a water source
- c) What type of response is this?



2. Gravitropism

- a) Stimulus - _____
- b) Response -
 - 1) Negative - the stalk/stem grows upwards, against gravity
 - 2) Positive - the roots grow downwards, towards gravity



3. Phototropism

- a) Stimulus - _____
 - 1) Response - the plant grows in the direction of a unidirectional light (it only comes from one direction)
 - 2) What type of response is this?



Attach Cards here to
turn in!

Name _____ Per. _____

Stimulus/Response Trading Cards

Directions:

- Create a minimum of 8 trading cards using the items listed on the right.
- Your cards may be handwritten or typed.
Pictures may be drawn or glued.
- Your cards may be real or imaginary organisms, as long as they match the definition.
- Must mention if tropism example shows positive or negative tropism
- Turn in cards along with these instructions

Stimulus/Response

Choose 4: wilting fever vomiting sweating
turgor pressure Fight or flight

Tropisms

MUST do all 4: phototropism geotropism
thigmotropism hydrotropism

**Bonus: homeostasis heart rate
(5pts each)

Grading:

Expectation	Points Available	Points Earned	Comments
8 Cards	80pts		
Neatness	10pts		
Color & Creativity	10pts.		

Format:

Front

Illustration of
Example

Title

Back

Definition:

Description of picture:

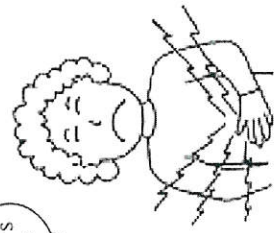
(8)

Human Stimulus and Response

An animal uses its senses to detect the condition of its environment. If the conditions of an environment changes the animal will usually react to those changes.

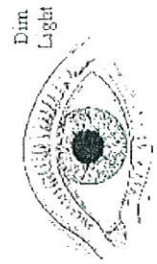
Anything that causes a reaction is called a stimulus. What the effect the stimulus has on a living thing is called a response to the stimulus. Living things often move in response to a stimulus. If you hear someone call your name, you turn toward the sound. The sound of your name is a stimulus. Turning toward the sound is a response.

Humans respond to internal (from inside) and external (from outside) stimuli.



1. What is happening in this picture? _____
2. What would be your response to this event? _____
3. Is this an internal or external stimulus? _____

9



3. What is happening in this event? _____



4. What is the stimulus? _____

5. Is this an internal or external stimulus? _____

Balance is your body's ability to remain stable and coordinated as you move and carry out tasks throughout the day. The inner ear senses any direction or motion that you make, and communicates with your central nervous system and senses to keep you balanced. Your inner ear is able to sense all motions.

Eyesight is another important tool your body uses to keep balanced. With the help of your eyes, the body is able to sense where it is in a room, as well as can sense what direction the body is moving. This gives the body a sense of course, and allows it to align correctly with the room. Although your body can still keep balanced without sight, the process is much easier with the ability to see.

Directions:

1. Place a sticky note on the floor.
2. Have one volunteer try the following challenges while the rest of the group observes the event.

Challenges

1. Balance w/ one foot on the tape and both eyes open
2. Balance w/ one foot on the tape and both eyes shut
3. Slowly spin around 4 times, and then balance with one foot on the tape w/ eyes open
4. Slowly spin around 4 times, and then balance with one foot on the tape w/ eyes shut

Questions:

1. What did you observe as the volunteer tired to maintain a balanced position? _____
2. What actions did the person take to recover his or her balance? _____
3. What was a stimulus in this activity? _____
4. What was the response? _____

We have many defenses against germs that make us sick. But when we are exposed to a large number of germs they can overwhelm the body's first line of defense and get inside. When germs get into our body they release poisons to which our immune system responds. One of ways our immune system responds to the stimulus of the germ's poisons is to cause the body to get hot. This is called a fever. A fever helps in several ways. First, it causes our antibodies (germ fighters) to be produced more rapidly and second it slows down the reproduction of the germs. When body has a fever it is not in balance. The body then must find a way to cool itself. The body is able to cool itself through the production of sweat. When the thermal energy of the body build up to a certain point the body releases fluid through the cells. This sweat then evaporates, cooling the body.

Materials: Dropper bottle of alcohol

What To Do:

1. Your teacher will place several drops of alcohol on your hand.
2. Observe how your hand feels as the alcohol evaporates.

Questions:

1. What was the stimulus in this activity? _____
2. How did your skin respond? _____
3. When germs get into the body they release poisons. Is this a stimulus or response for our body? _____
4. Our body then gets hot(has a fever). Is this a stimulus or a response for our body? _____
5. How do the germs respond? _____
6. How does the body get itself back in balance? _____

Name: _____ Date: _____ Period: _____

Stimulus and Response Worksheet

1. Define stimulus:
2. Define response:
3. Define external stimulus:
4. Define internal stimulus:

Label as Internal (I) or External (E) Stimulus:

5. Bright light in your eyes --
6. Hunger pains --
7. Strange person enters a dog's yard -

Label as Stimulus (S) OR Response (R):

8. Sharks swim toward the smell of blood. -
9. A person feels heat of a stove. -
10. A dog chases a rabbit. -

For the following, complete the missing part.

Stimulus

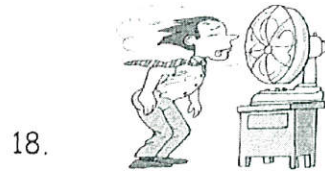
Response

- | | |
|--|--|
| 11. You hear a lunch bell. --- | |
| 12. A hawk sees a mouse on the ground. - | |
| 13. | - Tree leaves turn brown. |
| 14. | - A fish suddenly swims away. |
| 15. | - A deer turns and runs off in the opposite direction. |
| 16. | - A plant leans to the right. |

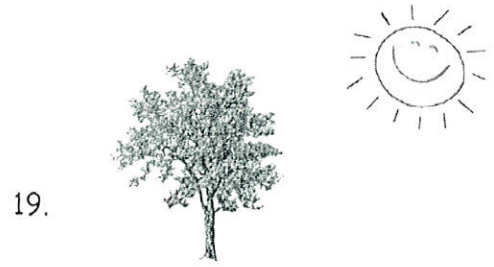
Study each picture below. Then decide what the stimulus and response is in each drawing. In addition, decide if the stimulus is external or internal.



Stimulus: _____
Response: _____



Stimulus: _____
Response: _____



Stimulus: _____
Response: _____

Read the each passage below.

You are walking home from school one day when a large dog jumps out at you from behind a tree. He starts to growl and shows his teeth. You quickly turn around and walk in the opposite direction.

20. What was the stimulus in this situation? _____
21. What was the response in this situation? _____
22. Was the stimulus in this situation internal or external? _____

You are at the mall walking through the food court on your way to buy a new CD. You smell fresh baked pizza and realize that you skipped lunch. You buy a piece of pizza and eat it before going to buy your CD.

23. What was the stimulus in this situation? _____
24. What was the response in this situation? _____
25. Was the stimulus in this situation internal or external? _____

Answer each question below.

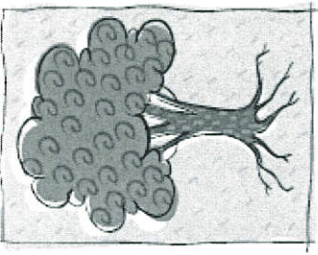
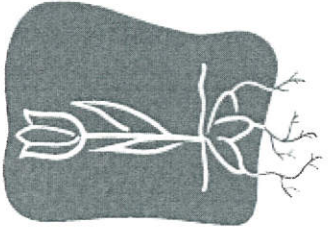


26. What is homeostasis? _____
27. How does homeostasis help your body? _____
28. Give an example of homeostasis in your body. _____
29. How is a thermostat like homeostasis? _____
- _____
30. What would happen to your body without homeostasis? _____
- _____

Name: _____

Period: _____

Tropisms Investigation

Direct Environmental Responses

<p>Geotropism</p> <p>What does gravity do?</p> 	<p>Hydrotropism</p> <p>How important is water to plant growth?</p> 	<p>Thigmotropism</p> <p>What can you see happening to the plant in this picture?</p> 	<p>Phototropism</p> <p>How did sunflowers get their name?</p> 
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13

Geotropism Definition: _____

Hydrotropism Definition: _____

Thigmotropism Definition: _____

Phototropism Definition: _____

1. What is a tropism?
2. Why do plants respond to different stimuli in their environments?
3. Do all parts of a plant respond the same way to stimuli?

Part 1

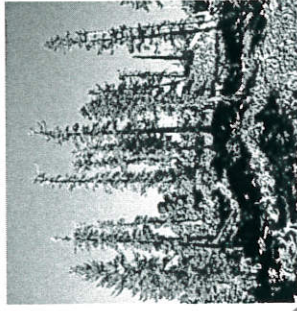
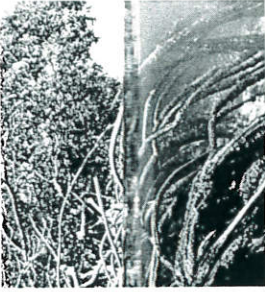
Go to this website <http://plantsinmotion.bio.indiana.edu/plantmotion/movements/tropism/tropisms.html>
View the movies listed below to help you complete the table. You may need to click on "Nastic Movements" to view some of the videos.

Movie	Tropism	Stimulus	Response	Draw a Picture
1. "Cool corn phototropism"		1.	1.	1.
2. "Sunflower phototropism"	Phototropism	2.	2.	2.
1. "Morning Glory Twining"		1.	1.	1.
2. "Sensitive Plant"	Thigmotropism	2.	2.	2.

3. "Venus Flytrap"	Thigmotropism	3.	3.	3.
1. "Corn root gravitropism" 2. Sunflower gravitropism" 3. Coleus shoot gravitropism"	Gravitropism	1. 2. 3.	1. 2. 3.	1. 2. 3.

Part 2

Look at these 3 pictures and determine what kind of tropism is occurring in each. Justify your answer.



16

Plant Tropism

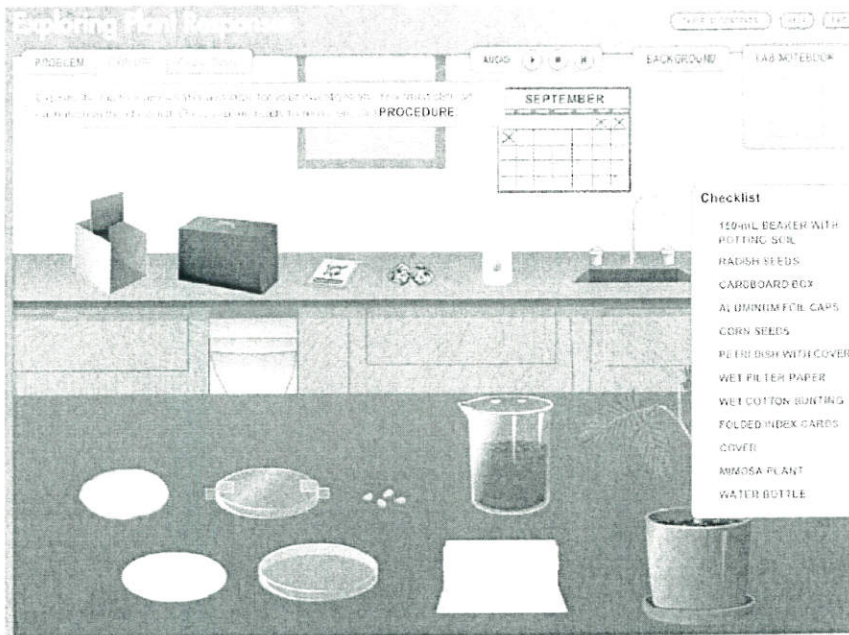
Website: https://www.classzone.com/books/hs/ca/sc/bio_07/virtual_labs/virtualLabs.html

PROBLEM



You have a summer internship in a botany research lab at a university. The professor you are working for studies plant responses to various stimuli, including light, gravity, and contact. In order to familiarize yourself with some basic types of plant responses, the professor asks you to perform several experiments.

In this interactive lab, you will test for plant reactions to light, gravity, and touch.



Write a brief description of the items and equipment needed for the experiments.

Equipment	Description
150 ml beaker with potting soil	
Radish seeds	
Cardboard box	
Aluminum foil caps	
Corn seeds	

Petri Dish with cover	
Wet filter paper	
Folded index cards	
Cover	
Mimosa Plant	
Water Bottle	

Table 1: Plant Response Predictions

Describe how you think plant may respond to each of the stimuli listed.

Stimulus	Response
Light	
Gravity	
Touch	

Table 2: Effects of light on Radish Seedlings

Complete Table 2 by entering the direction of growth for each radish shoot.

Seedling	Growth in Light or Dark	Direction of Shoot
1	Dark	
2	Dark	
3	Light	
4	Light	

Table 3: Effects of Gravity on Corn Seedlings

Complete Table 3 by describing the growth of the roots and shoots for each of the four corn seeds. Include a description of the growth.

Seedling	Direction of Pointed Tip	Growth of Roots	Growth of Shoots
1	Down		
2	Left		

3	Up		
4	Right		

Table 4: Effect of Touch on the Mimosa Leaf

Describe what happened when the mimosa leaf was touched.

Conclusion:

1. Conclude: Describe the 3 kinds of reactions to stimuli that you observed in this investigation.
2. Infer: Based on your observations, which part of the radish plants controls the plant's phototropism? Support your answer.
3. Analyze: How did gravity affect the growth of the germinating corn seeds?
4. Analyze: How can you tell that the corn plants were responding to gravity rather than light, water, or the direction the seed was pointing?

7.13.A

(13) **Organisms and environments.** The student knows that a living organism must be able to maintain balance in stable internal conditions in response to external and internal stimuli. The student is expected to: (A) investigate how organisms respond to external stimuli found in the environment such as phototropism and fight or flight;

STANDARD REVIEW

Behavior is one way in which an organism can respond to internal or environmental factors. A behavioral response is a set of actions determined partly by heredity and partly by experience. For instance, how a species moves, gets food, reproduces, or responds to danger are all based on the species' evolutionary history. A behavioral response requires coordination and communication at many levels, from cells to organ systems to organisms. An individual organism's behavior can also change as it adapts to its environment. How the organism is able to react determines how likely it is to survive and reproduce.

For example, if a person feels frightened, the adrenal glands release the hormone epinephrine, which is sometimes called adrenaline. Epinephrine increases your heartbeat and breathing rate. This response is called the "fight-or-flight" response. When you are frightened, angry, or excited, the "fight-or-flight" response prepares you to fight the danger or to run from it.

Plants respond to stimuli as well. For example, they respond to light, gravity, and changing seasons. What happens if you place a houseplant so that it gets light from only one direction, such as from a window? The shoot tips probably bend toward the light. Bending toward the light is a positive tropism. A change in the direction a plant grows that is caused by light is called phototropism. Shoots bend because cells on one side of the shoot grow longer than cells on the other side of the shoot.

Plant growth also changes in response to the direction of gravity. This change is called gravitropism. A few days after a plant is placed on its side or turned upside down, the roots and shoots change direction of growth. Most shoot tips have negative gravitropism. They grow upward, away from the center of the Earth. In contrast, most root tips have positive gravitropism. Roots grow downward, toward the center of the Earth.

What would happen if a plant living in an area that has very cold winters flowered in December? The plant's flowers would likely freeze and die. So, the flowers would never produce mature seeds. Plants living in regions with cold winters can detect the change in seasons. How do plants do this? As fall and winter approach, the days get shorter, and the nights get longer. The opposite happens when spring and summer approach. Plants respond to the change in the length of day.

The difference between day length and night length is an important environmental stimulus for many plants. This stimulus can cause plants to begin reproducing. For example, some plants flower in fall or winter. At this time, night length is long. These plants are called short-day plants. Other plants flower in spring or early summer, when night length is short. These plants are called long-day plants.

7.13.A

STANDARD PRACTICE

- 1 If a houseplant is placed near a window, the shoot tips will bend toward the direction of the light. What is this response called?
 - A periodism
 - B geotropism
 - C negative tropism
 - D phototropism

- 2 Behavioral response
 - A requires communication and coordination at many levels.
 - B does not change as a result of environment.
 - C is not passed down through generations.
 - D has no influence on an organism's survival.

- 3 What is the hormone that prepares your body for the "fight or flight" response?
 - A thyroxine
 - B insulin
 - C epinephrine
 - D growth hormone

- 4 What is the name for a period of reduced activity that some animals experience during the summer months?
 - A hibernation
 - B estivation
 - C seasonal behavior
 - D learned behavior

7.13.B

(13) **Organisms and environments.** The student knows that a living organism must be able to maintain balance in stable internal conditions in response to external and internal stimuli. The student is expected to: (B) describe and relate responses in organisms that may result from internal stimuli such as wilting in plants and fever or vomiting in animals that allow them to maintain balance.

STANDARD REVIEW

Even though an organism's outside environment may change, conditions inside an organism's body must stay the same. Many chemical reactions keep an organism alive. These reactions can take place only when conditions are exactly right, so an organism must maintain stable internal conditions to survive. The maintenance of a stable internal environment is called homeostasis.

Maintaining homeostasis is not easy. Your internal environment is always changing. Your cells need nutrients and oxygen to survive. Your cells need wastes removed. If homeostasis is disrupted, cells may not get the materials they need. So, cells may be damaged or may die.

One factor that your body keeps stable is temperature. Your body maintains a temperature of about 37°C. When you get hot, your body responds by sweating. When you get cold, your muscles twitch in an attempt to warm you up. This twitching is called shivering. Whether you are sweating or shivering, your body is trying to return itself to normal. Other animals also need to have stable internal conditions. But many cannot respond the way you do. They have to control their body temperature by moving from one environment to another. If they get too warm, they move to the shade. If they get too cool, they move out into the sunlight.

The body's temperature can change in response to infection. A fever occurs when the body's temperature rises above 98.6°F (37°C) when measured orally. Fevers help the body thwart invading pathogens. Vomiting is another way the body maintains homeostasis. Vomiting occurs to rid the body of pathogens.

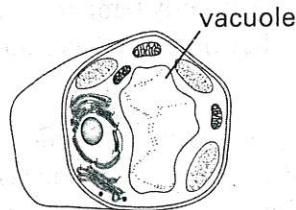
Plants also respond to changes. A vacuole is a vesicle. The large central vacuole in plant cells stores water and other liquids. Large central vacuoles that are full of water help support the cell. Some plants wilt when their large central vacuoles lose water.

7.13.B

STANDARD PRACTICE

- 1 The cells of your body need energy to carry out life functions. Which of the following body responses is a sign that your cells need more energy?
 - A Your breathing rate increases.
 - B You begin to shiver.
 - C You feel hungry.
 - D You feel thirsty.

- 2 What is the importance of homeostasis?
 - A It keeps the body stable.
 - B It keeps the body unstable.
 - C It makes the body shiver all of the time.
 - D It keeps the body cold.



- 3 The diagram above shows a eukaryotic cell with a vacuole labeled. What is the function of the vacuole in this cell?
 - A to give shape to the cell
 - B to store water and other materials
 - C to contain DNA
 - D to assemble proteins

7.13.B

Time tested	Blood-glucose level (mg/1,000 mL)
1:00 P.M.	178
2:00 P.M.	112
3:00 P.M.	100
4:00 P.M.	89
5:00 P.M.	78

- 4 The table above shows the results of a series of hourly blood-glucose tests. When the glucose level in the blood is high, such as after a meal, the pancreas releases the hormone insulin into the blood. Insulin then signals the liver to take in glucose from the blood. How much did blood-glucose levels decrease from 1:00 P.M. to 5:00 P.M, in mb/1,000 mL?

0	0	0	0	.	0	0
1	1	1	1		1	1
2	2	2	2		2	2
3	3	3	3		3	3
4	4	4	4		4	4
5	5	5	5		5	5
6	6	6	6		6	6
7	7	7	7		7	7
8	8	8	8		8	8
9	9	9	9		9	9

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