

**Problem Set "Cell Biology Experiment Cycle"** id:[10092]**1) Assistment #78106 "78106 - 78106 - Demographics"**

A) Are you Male or Female?

**Multiple choice:**

- Male
- Female

B) What is your age?

**Multiple choice:**

- 9 years old
- 10 years old
- 11 years old
- 12 years old
- 13 years old
- 14 years old
- 15 years old
- 16 years old

C) What grade are you in for the 2009-2010 school year?

**Multiple choice:**

- 5th grade
- 6th grade
- 7th grade
- 8th grade
- 9th grade

D) Which subject(s) do you like the most at school?

**Ungraded open response:**

E) How would you rate your enjoyment for learning Science?

**Multiple choice:**

- I enjoy learning Science at all times
- I enjoy learning Science sometimes
- I am neutral about learning Science
- I don't enjoy learning Science sometimes
- I don't enjoy learning Science at all

F) Do you find Science easy?

**Multiple choice:**

- I find that Science class is usually easy
- I find Science class somewhat easy
- I find Science class difficult

G) What kind of grades do you usually get in Science classes?

**Multiple choice:**

- Mostly in the A range
- Mostly in the B range

- ✓ Mostly in the C range
- ✓ Mostly in the D range
- ✓ Mostly in the F range

H) How are your grades in school overall?

**Multiple choice:**

- ✓ Mostly in the A range
- ✓ Mostly in the B range
- ✓ Mostly in the C range
- ✓ Mostly in the D range
- ✓ Mostly in the F range

2) Assistentment #45680 "45680 - Hypothesis: If th..."

A) Hypothesis: If the amount of sugar increases then the candy bar will taste sweeter. Which is the independent variable?

**Multiple choice:**

- ✗ The number of candy bars tasted
- ✓ The amount of sugar in the candy bar
- ✗ The sweetness of the candy bar
  - That's a result of how much sugar is in the candy bar so that is the dependent variable.
- ✗ The sweetness of the sugar
- ✗ The size of the candy bar

B) Hypothesis: If the amount of sugar increases then the candy bar will taste sweeter. Which is the dependent variable?

**Multiple choice:**

- ✗ The number of candy bars tasted
- ✗ The amount of sugar in the candy bar
- ✓ The sweetness of the candy bar
- ✗ The sweetness of the sugar
- ✗ The size of the candy bar

3) Assistentment #78140 "78140 - Homer Variables"



A) Homer notices that his shower is covered in a strange green slime. His friend Barney tells him that coconut juice will get rid of the green slime. Homer decides to check this out by spraying half of the shower with coconut juice. He sprays the other half of the shower with water. After 3 days of the "treatment" there is no change in the appearance of the green slime on either side of the shower.

a) What was the control group?

**Multiple choice:**

- ✗ Barneys idea to use coconut juice
- ✓ The half of the shower spraved with water

✓ The half of the shower sprayed with coconut juice

✗ The half of the shower sprayed with coconut juice

✗ The 3 days spent spraying the shower

✗ The appearance of the shower

**B) b) What was the independent variable?**

Don't forget - you can scroll back and read the description again if you need to.

**Multiple choice:**

✗ Barney's idea to use coconut juice

✗ The amount of slime removed

✗ The change in the appearance of the shower

✗ The shower halves

✓ Whether juice or water is sprayed

**C) c) What was the dependent variable?**

**Multiple choice:**

✓ The amount of slime on the two halves of the shower

✗ The amount of water or juice on the two halves of the shower

✗ Whether juice or water is sprayed  
Barney's idea to use coconut juice

✗ The 3 days spent spraying the shower

**D) d) What would be a valid hypothesis for Homer's experiment?**

**Multiple choice:**

✓ Coconut juice removes more slime than water.

✗ 3 days is enough time to remove slime.

✗ Coconut juice tastes better than water.

✗ Barney believes that coconut juice removes slime, so it must be wrong.

✗ Barney believes that coconut juice removes slime, so it must be right.

**4) Assistment #29462 "29462 - Inquiry Pre 6"**

Which of the following is an important thing to remember when testing if one particular variable affects the outcome of a science experiment?

**Multiple choice:**

✗ You should keep some of the variables the same and change the other variables, especially the variable you are testing.

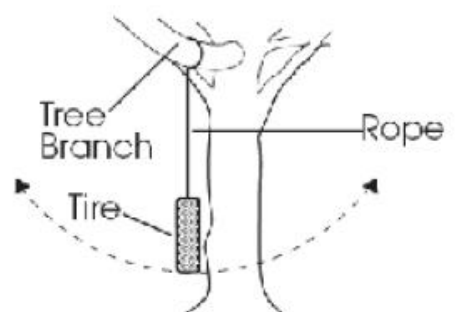
✓ You should change only the variable you are testing and keep all other variables the same.

✗ You should keep all the variables the same at all times.

✗ You should change all the variables at the same time.

**5) Assistment #29464 "29464 - Inquiry Pre 8"**

A) A class investigating the motion of a tire swing collected the data in the table below. The students were able to draw conclusions about the factors that affect the motion of a swing. Two students from the class decide to use the class data to build a different-size tire swing in their backyard. They build the tire swing shown in the figure.



## Tire Swing

Data table

Trial	Length of rope (meters)	Mass of tire (kilograms)	Time for tire to swing back & forth once (seconds)
1	2	10	2.8
2	2	20	2.8
3	4	10	4.0
4	4	20	4.0

After testing the swing, they decide that they want to make it swing faster. Based on the data from the class investigation, what could the students do to make their tire swing move back and forth faster?

**Multiple choice:**

- Use a shorter rope
- Use a longer rope
- Use a less massive tire
- Use a more massive tire

B) Explain your answer.

**Ungraded open response:**

## 6) Assistment #29465 "29465 - Inquiry Pre 9"

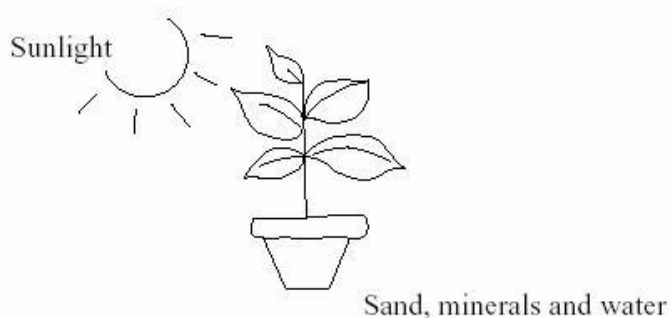
Which statement describes the best procedure to determine if a vaccine for a disease in a certain bird species is effective?

**Multiple choice:**

- Vaccinate 100 birds and expose all 100 to the disease.
- Vaccinate 100 birds and expose only 50 of them to the disease.
- Vaccinate 50 birds, do not vaccinate 50 other birds, and expose all 100 to the disease.
- Vaccinate 50 birds, do not vaccinate 50 other birds, and expose only the vaccinated birds to the disease.

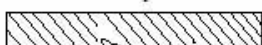
## 7) Assistment #45720 "45720 - Strand-Cary 2"

A girl had an idea that plants needed minerals from the soil for healthy growth. She placed a plant in the Sun, as shown in the diagram below.

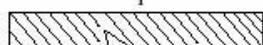


In order to check her idea she also needed to use another plant. Which of the following should she use?

A. Dark cupboard

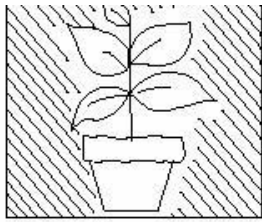


B. Dark cupboard

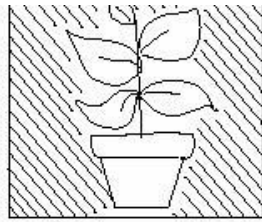


C. Sunlight

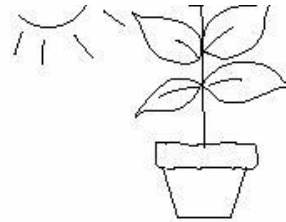




Sand, minerals and water

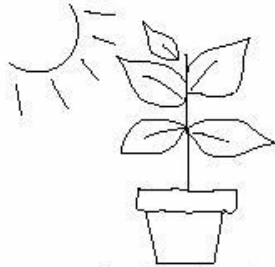


Sand and water



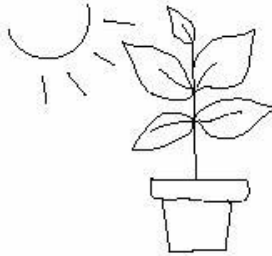
Sand only

D. Sunlight



Sand and water

E. Sunlight



Sand and minerals

Multiple choice:

- A
- B
- C
- D
- E

8) Assistment #45721 "45721 - Strand-Cary 1"

To find out whether seeds grow better in the light or dark, you could put some seeds on pieces of damp paper and

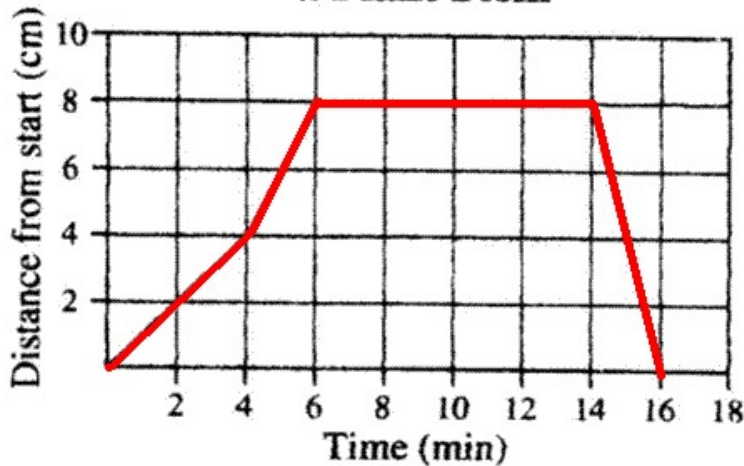
Multiple choice:

- keep them in a warm, dark place
- keep one group in a light place and another in a dark place
- keep them in a warm, light place
- put them in a light or dark place that is cool

9) Assistment #78148 "78148 - The graph below s..."

The graph below shows a beetle's movement along a plant stem.

**Beetle's Movement Along a Plant Stem**



During which span of time was the beetle **not** moving?

**Multiple choice:**

- from 0 to 4 minutes
- from 4 to 6 minutes
- from 6 to 14 minutes
- from 14 to 16 minutes

10) Assistment #78149 "78149 - Curtis conducted ..."

Curtis conducted an experiment to see if some liquids mix with Liquid X. His results are shown in the table below.

Results of Curtis's Experiment

Type of Liquid	Mixes with Liquid X
Gasoline	No
Vegetable Oil	No
Kerosene	No
Turpentine	No

Based on this data, what is the best conclusion?

**Multiple choice:**

- Liquid X cannot mix with any other liquid.
- Liquid X must be able to mix with some other liquid.
- Liquid X cannot mix with these four liquids.
- Liquid X can mix with most other liquids.

11) Assistment #84076 "84076 - 81223 - 78139 - Cell Biology Directions"

**DIRECTIONS**

For the next set of questions, you will answer questions about **Cell Biology**. Some of the questions will be typical multiple choice, open response, or fill-in questions. Others require you to act like a scientist and conduct scientific experiments in a virtual lab.

You may see some repeated questions. This is OK! We ask the same questions to give you more opportunities to answer the question if you learned something during the activity.

Try to do the best you can and be sure to ask the WPI staff for help if you need it.

Thanks for trying your best!

**Multiple choice:**

- OK! I've read the directions.

12) Assistment #85466 "85466 - Bio Pre"

A) What is the smallest unit that can perform **ALL** the functions of life?

**Multiple choice:**

- DNA
- Cell
- Organelle
- Mitochondria

B) What structure surrounds or encloses every type of cell?

**Multiple choice:**

- Cell Wall
- Cell Membrane
- Protein Coat
- Slime Layer

C) All of the following organelles affect protein production and/or transport EXCEPT the\_\_\_\_\_.

**Multiple choice:**

- Lysosomes
- Ribosomes
- Golgi bodies
- Nucleolus

D) There are two types of endoplasmic reticulum (ER): rough and smooth. The rough ER *differs* from the smooth ER because\_\_\_\_\_.

**Multiple choice:**

- It is where energy is stored in the cell
- It has DNA on the surface
- It has ribosomes on the surface
- It can hold more water

E) All animal cells\_\_\_\_\_.

**Multiple choice:**

- Are enclosed by a cell wall for protection and structure
- Contain organelles which function together to maintain homeostasis
- Are flat and make up the organism
- Have the same structure and number of organelles

F) What organelle is called the 'powerhouse' and why is it given that name?

**Ungraded open response:**

G) What role does the vacuole play in maintaining the health of the cell?

**Multiple choice:**

- It provides protein for cell function.
- The nucleus uses it for structural stability
- Isolates and exports waste from the cell and helps maintain water pressure
- Transports vesicles and proteins to and from the nucleus

H) How does a lysosome differ from a vacuole in function?

**Multiple choice:**

- Lysosomes and vacuoles are both involved in waste storage but only vacuoles store water
- Lysosomes transport proteins while vacuoles only produce proteins
- Lysosomes and vacuoles both produce energy but lysosomes also store waste
- Lysosomes and vacuoles are the same and both transport water to the nucleus

**13) Assistment #84077 "84077 - 81242 - CellBio-MW: Describe All"**

Let's diagnose and solve problems with animal cells.

**1) Explore the tools:** There is an empty cell and a toolbox with a collection of organelles. To place an organelle into the cell simply drag it from the toolbox into the cell. To remove an organelle drag it from the cell back into the toolbox.

In the lower right corner you will see a series of gauges. The gauges represent the current health of the cell. Green represents a healthy cell and red represents an unhealthy cell. The gauges will change as you add or take away organelles.

Pretend you have a friend who did not explore the cell. Describe to him or her anything you noticed about how the different organelles affecte

**Ungraded open response:**

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14) Assistent #84074 "84074 - 81213 -Cell Biology Microworld Problem 1"

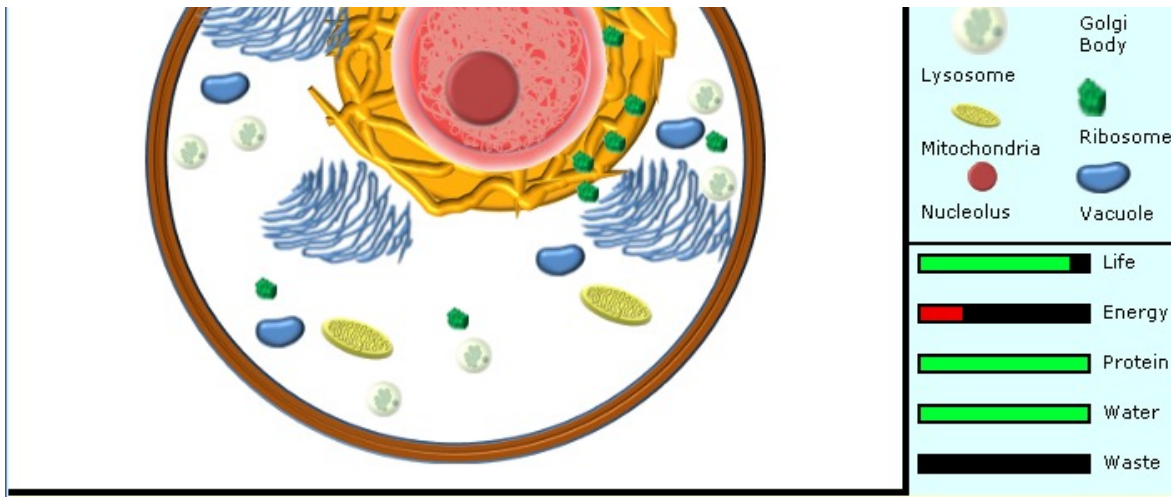
A) Now, let's run some more specific experiments.

**Experiment One:**

Looking at this cell, do you know what is wrong with it? Next, you will add/remove organelles to make this cell healthy.







What is your hypothesis about what is wrong with this cell? How can you make this cell healthy?

**Ungraded open response:**

**B) What are you basing your hypothesis on? Explain your reasoning below.**

**Ungraded open response:**

C) Now, conduct some experiments to test your hypothesis.

The following steps will help you conduct your experiment:

- Hypothesize:** First use the hypothesizing tool to plan your experiments and list your hypotheses.
- Collect data to test your hypotheses:** Add or remove organelles and hit record when you wish to save data you plan on using as evidence.
- Remember to control for variables while collecting data:** You are trying to find out what is causing the problem with this cell. This may in removing many different types of organelles. When you want to test the effects of a specific organelle, remember to only add or remove one ty at a time. That way when you look at the health gauges, and your data table, you know exactly what organelle caused that change.

**Processed externally (e.g., by a Flash object or Java applet):**

D) What gauge or gauges indicated that the cell was not healthy? Check all that apply.

**Check all that apply:**

- Life
- Energy
- Protein
- Water
- Waste

E) What caused this problem in the cell?

**Multiple choice:**

- Not enough nuclei
- Not enough mitochondrion
- Too many ribosomes
- Too many vacuoles

F) Which organelle or organelles did you add or remove to make the cell healthy?

**Check all that apply:**

- Ribosomes
- Golgi
- Nucleoli
- Mitochondrion
- Lysosomes

G) Done

**Multiple choice:**

- Done

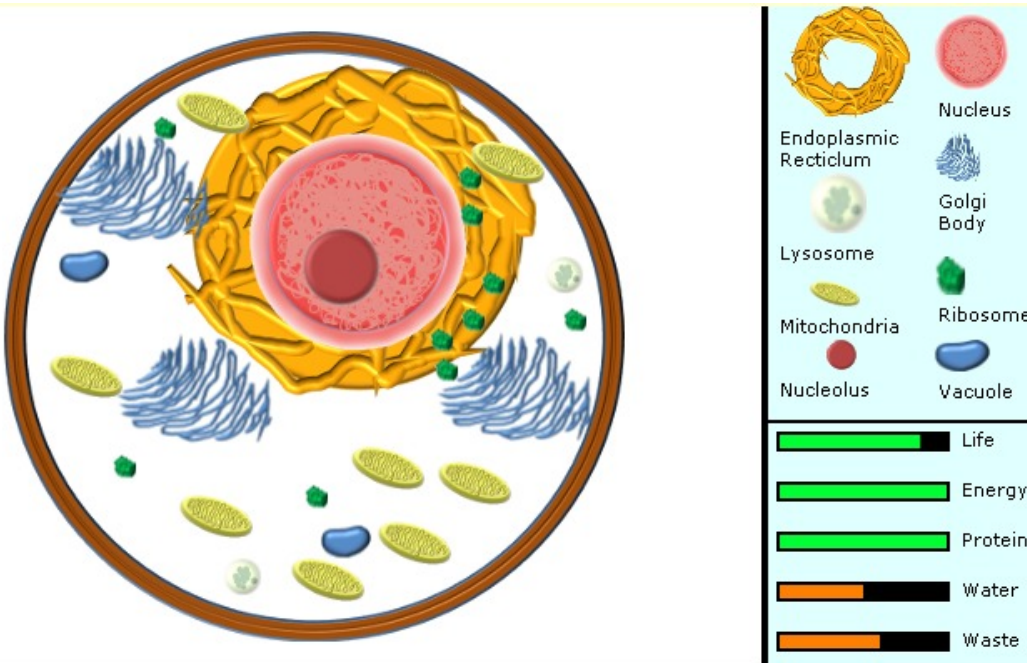
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15) Assistment #85470 "85470 - 84074 - 81213 -Cell Biology Microworld Problem 2"

A) Now, let's run some more specific experiments.

**Experiment Two:**

Looking at this cell, do you know what is wrong with it? Next, you will add/remove organelles to make this cell healthy.



What is your hypothesis about what is wrong with this cell? How can you make this cell healthy?

**Ungraded open response:**

B) What are you basing your hypothesis on? Explain your reasoning below.

**Ungraded open response:**

✘

C) Now, conduct some experiments to test your hypothesis.

The following steps will help you conduct your experiment:

1. **Hypothesize:** First use the hypothesizing tool to plan your experiments and list your hypotheses.
2. **Collect data to test your hypotheses:** Add or remove organelles and hit record when you wish to save data you plan on using as evidence.
3. **Remember to control for variables while collecting data:** You are trying to find out what is causing the problem with this cell. This may in removing many different types of organelles. When you want to test the effects of a specific organelle, remember to only add or remove one ty at a time. That way when you look at the health gauges, and your data table, you know exactly what organelle caused that change.

**Processed externally (e.g., by a Flash object or Java applet):**

D) Which gauge or gauges indicated that the cell was not healthy? Check all that apply.

**Check all that apply:**

- Life
- Energy
- Protein
- Water
- Waste

E) Which organelle or organelles did you add/remove to make the cell healthy? Check all that apply.

**Check all that apply:**

- Endoplasmic Reticulum
- Vacuoles
- Golgi
- Lysosomes
- Mitochondrion

F) Which organelle helped remove the waste but did not increase the amount of water being stored in this cell?

**Multiple choice:**

- Lysosome
- Vacuole
- Endoplasmic Reticulum
- Golgi

G) Which organelle helped remove waste and increase the amount of water being stored in this cell?

**Multiple choice:**

- Lysosome
- Vacuole
- Endoplasmic Reticulum
- Golgi

**16) Assistment #88949 "88949 - 85466 - Bio Post"**

A) What is the smallest unit that can perform ALL the functions of life?

**Multiple choice:**

- DNA
- Cell
- Organelle
- Mitochondria

B) What structure surrounds or encloses every type of cell?

**Multiple choice:**

- Cell Wall
- Cell Membrane
- Protein Coat
- Slime Layer

C) All of the following organelles affect protein production and/or transport EXCEPT the \_\_\_\_\_.

**Multiple choice:**

- Lysosomes
- Ribosomes
- Golgi bodies
- Nucleolus

D) There are two types of endoplasmic reticulum (ER): rough and smooth. The rough ER *differs* from the smooth ER because \_\_\_\_\_.

**Multiple choice:**

- It is where energy is stored in the cell
- It has DNA on the surface
- It has ribosomes on the surface
- It can hold more water

E) All animal cells \_\_\_\_\_.

**Multiple choice:**

- Are enclosed by a cell wall for protection and structure
- Contain organelles which function together to maintain homeostasis
- Are flat and make up the organism
- Have the same structure and number of organelles

F) What organelle is called the 'powerhouse' and why is it given that name?

**Ungraded open response:**

G) What role does the vacuole play in maintaining the health of the cell?

**Multiple choice:**

- It provides protein for cell function.
- The nucleus uses it for structural stability
- Isolates and exports waste from the cell and helps maintain water pressure
- Transports vesicles and proteins to and from the nucleus

H) How does a lysosome differ from a vacuole in function?

**Multiple choice:**

- Lysosomes and vacuoles are both involved in waste storage but only vacuoles store water
- Lysosomes transport proteins while vacuoles only produce proteins
- Lysosomes and vacuoles both produce energy but lysosomes also store waste
- Lysosomes and vacuoles are the same and both transport water to the nucleus

17) Assistment #78141 "78141 - Hypothesis (Post)"  
 A) Hypothesis: If the amount of sugar increases then the candy bar will taste sweeter.  
 Which is the independent variable?

**Multiple choice:**

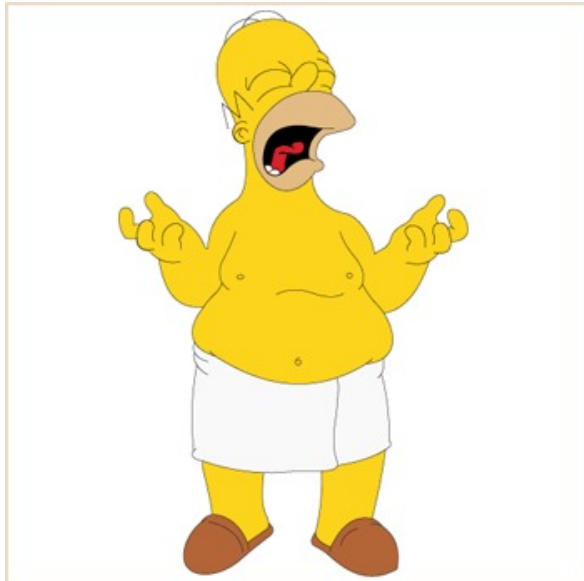
- The number of candy bars tasted
- The amount of sugar in the candy bar
- The sweetness of the candy bar
  - That's a result of how much sugar is in the candy bar so that is the dependent variable.
- The sweetness of the sugar
- The size of the candy bar

B) Hypothesis: If the amount of sugar increases then the candy bar will taste sweeter.  
 Which is the dependent variable?

**Multiple choice:**

- The number of candy bars tasted
- The amount of sugar in the candy bar
- The sweetness of the candy bar
- The sweetness of the sugar
- The size of the candy bar

18) Assistment #78141 "78141 - Homer Variables (post)"



A) Homer notices that his shower is covered in a strange green slime. His friend Barney tells him that coconut juice will get rid of the green slime. Homer decides to check this out by spraying half of the shower with coconut juice. He sprays the other half of the shower with water. After 3 days of the "treatment" there is no change in the appearance of the green slime on either side of the shower.

a) What was the control group?

**Multiple choice:**

- Barney's idea to use coconut juice
- The half of the shower sprayed with water

The half of the shower sprayed with water

The half of the shower sprayed with coconut juice

The 3 days spent spraying the shower

The appearance of the shower

**B) b) What was the independent variable?**

Don't forget - you can scroll back and read the description again if you need to.

**Multiple choice:**

Barney's idea to use coconut juice

The amount of slime removed

The change in the appearance of the shower

The shower halves

Whether juice or water is sprayed

**C) c) What was the dependent variable?**

**Multiple choice:**

The amount of slime on the two halves of the shower

The amount of water or juice on the two halves of the shower

Whether juice or water is sprayed

Barney's idea to use coconut juice

The 3 days spent spraying the shower

**D) d) What would be a valid hypothesis for Homer's experiment?**

**Multiple choice:**

Coconut juice removes more slime than water.

3 days is enough time to remove slime.

Coconut juice tastes better than water.

Barney believes that coconut juice removes slime, so it must be wrong.

Barney believes that coconut juice removes slime, so it must be right.

**19) Assistment #78116 "78116 - Inquiry Pre 6 (post)"**

Which of the following is an important thing to remember when testing if one particular variable affects the outcome of a science experiment?

**Multiple choice:**

You should keep some of the variables the same and change the other variables, especially the variable you are testing.

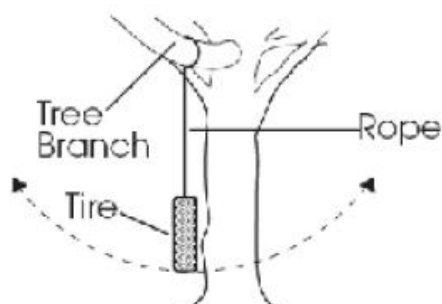
You should change only the variable you are testing and keep all other variables the same.

You should keep all the variables the same at all times.

You should change all the variables at the same time.

**20) Assistment #78117 "78117 - 29464 - Inquiry Pre 8 (Post)"**

A) A class investigating the motion of a tire swing collected the data in the table below. The students were able to draw conclusions about the factors that affect the motion of a swing. Two students from the class decide to use the class data to build a different-size tire swing in their backyard. They build the tire swing shown in the figure.



## Tire Swing

Data table

Trial	Length of rope (meters)	Mass of tire (kilograms)	Time for tire to swing back & forth once (seconds)
1	2	10	2.8
2	2	20	2.8
3	4	10	4.0
4	4	20	4.0

After testing the swing, they decide that they want to make it swing faster. Based on the data from the class investigation, what could the students do to make their tire swing move back and forth faster?

**Multiple choice:**

- Use a shorter rope
- Use a longer rope
- Use a less massive tire
- Use a more massive tire

B) Explain your answer.

**Ungraded open response:****21) Assistment #78118 "78118 - 29465 - Inquiry Pre 9 (post)"**

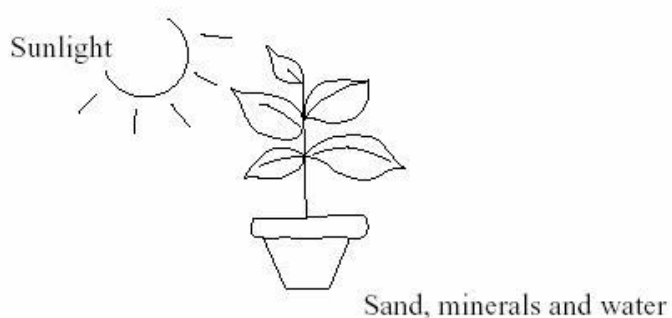
Which statement describes the best procedure to determine if a vaccine for a disease in a certain bird species is effective?

**Multiple choice:**

- Vaccinate 100 birds and expose all 100 to the disease.
- Vaccinate 100 birds and expose only 50 of them to the disease.
- Vaccinate 50 birds, do not vaccinate 50 other birds, and expose all 100 to the disease.
- Vaccinate 50 birds, do not vaccinate 50 other birds, and expose only the vaccinated birds to the disease.

**22) Assistment #78119 "78119 - Strand-Cary 2 (post)"**

A girl had an idea that plants needed minerals from the soil for healthy growth. She placed a plant in the Sun, as shown in the diagram below.



In order to check her idea she also needed to use another plant. Which of the following should she use?

A. Dark cupboard



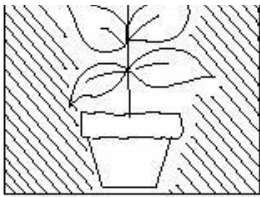
B. Dark cupboard



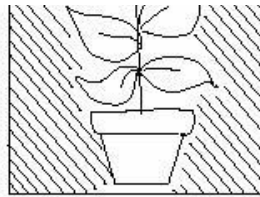
C. Sunlight



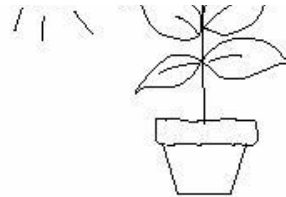




Sand, minerals and water

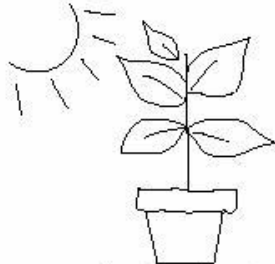


Sand and water



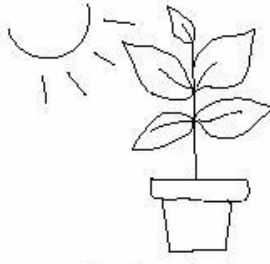
Sand only

D. Sunlight



Sand and water

E. Sunlight



Sand and minerals

Multiple choice:

- A
- B
- C
- D
- E

23) Assistment #78120 "78120 - Strand-Cary 1 (post)"

To find out whether seeds grow better in the light or dark, you could put some seeds on pieces of damp paper and

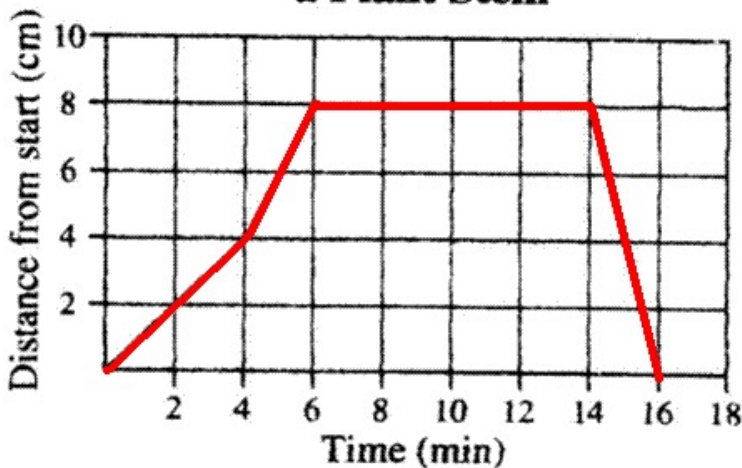
Multiple choice:

- keep them in a warm, dark place
- keep one group in a light place and another in a dark place
- keep them in a warm, light place
- put them in a light or dark place that is cool

24) Assistment #78161 "78161 - The graph below s... (test)"

The graph below shows a beetle's movement along a plant stem.

**Beetle's Movement Along a Plant Stem**



During which span of time was the beetle **not** moving?

**Multiple choice:**

- from 0 to 4 minutes
  - from 4 to 6 minutes
  - from 6 to 14 minutes
  - from 14 to 16 minutes
- 

25) Assistment #78162 "78162 - Curtris conducted... (test)"

Curtis conducted an experiment to see if some liquids mix with Liquid X. His results are shown in the table below.

Results of Curtis's Experiment

Type of Liquid	Mixes with Liquid X
Gasoline	No
Vegetable Oil	No
Kerosene	No
Turpentine	No

Based on this data, what is the best conclusion?

**Multiple choice:**

- Liquid X cannot mix with any other liquid.
  - Liquid X must be able to mix with some other liquid.
  - Liquid X cannot mix with these four liquids.
  - Liquid X can mix with most other liquids.
-