Team Responses: Intro to the Scientific Method & Night Light Case Study

Team No. 5 **Section** B
Biol 211 – Fall 2012

Key Questions

1. Carefully analyze tables 1 and 2, and then give a definition (*using your own words*!) that demonstrates your understanding of the following terms.

   a.) ***Independent variable***

   A factor that is changed which will affects the variables dependent ~~to it.~~

   b.) ***Dependent variable***

   factor(s) that are measured in response to the independent variable

   c.) ***Controlled variables*** Grammar !!

   Factors that ~~has~~ have to be remained unchanged /the same

2. Should a scientific study have one or more than one ***independent variable***? *Explain.*

   A scientific study should only have one independent variable because the purpose of ~~the~~ an experiment is to know the effects of that independent variable. If there are more than one independent variable, then it will be difficult to determine the influence of each variable in the final result.

3. Do you agree or disagree with the following statement. *Explain your reasoning*. "*The number of **dependent variables** in an experiment varies, but there is often more than one.*"

   I agree, because manipulating the independent variable can cause many different things. ??

   Unclear

Give e.g.'s for #'s 1-3!

4. Does an experiment typically have one or more than one ***controlled variable***? *Explain.*

yes, an experiment typically have more than one controlled variables because in the experiment, in order to find the effects of manipulating the independent variable, we must control all other variables that might affect the final result.

eg. ?

5. Should ***controlled variables*** be held constant or be allowed to change during an experiment? *Explain.*

They should be held constant because if not, it will disrupt the final result.

eg. ?

Exercises

6.) As a judge at a middle school science fair you are asked to evaluate a student project that is designed to answer the question, "Which AA battery type maintains its voltage for the longest period of time in low, medium, and high current drain devices: Alkaline, Lithium, Nickel-cadmium, or nickel-metal hydride batteries?"

a.) What is the ***independent variable*** of the project?

The AA battery type

b.)What is the ***dependent variable*** of the project?

The time the battery can maintain its voltage

Team Responses: Intro to the Scientific Method & Night Light Case Study

Team No. 4 **Section** A

Biol 211 – Fall 2012

Key Questions

1. Carefully analyze tables 1 and 2, and then give a definition (*using your own words*!) that demonstrates your understanding of the following terms.

   a.) ***Independent variable***

   The variable that is changed or manipulated or tested there should only be one per experiment. → Be specific

   b.) ***Dependent variable***

   The variable that is changed or affected by as a result of the independent, there can be more than one.

   c.) ***Controlled variables***

   The variables that are kept the same throughout the experiment. There should be as many as possible. → Why?? Effect on Dep. Variable?

2. Should a scientific study have one or more than one ***independent variable***? *Explain.*

   There should only be one because otherwise there would be no way of knowing which dependent variable was ~~caused~~ affected by what independent variable.

3. Do you agree or disagree with the following statement. *Explain your reasoning*. "*The number of **dependent variables** in an experiment varies, but there is often more than one.*"

   Yes we agree, this is because most of the time the independent variable can influence several dependent variables. Such as the fertilizer affecting the height, number of leaves, and length of leaves.

#s 1-3 → Give eg.'s !

4. Does an experiment typically have one or more than one ***controlled variable***? *Explain.*

It typically will have more than one. This is because the more controlled variables that are brought into an experiment the more accurate the results. e.g. ?

5. Should ***controlled variables*** be held constant or be allowed to change during an experiment? *Explain.*

They should always be held constant throughout the trials because otherwise it would become an independent variable and possibly affect the dependent variables.

e.g. ?

Exercises

6.) As a judge at a middle school science fair you are asked to evaluate a student project that is designed to answer the question, "Which AA battery type maintains its voltage for the longest period of time in low, medium, and high current drain devices: Alkaline, Lithium, Nickel-cadmium, or nickel-metal hydride batteries?"

a.) What is the ***independent variable*** of the project?

The type of battery being used within trials.

b.)What is the ***dependent variable*** of the project?

The time the battery type maintains it's voltage.

Team Responses: Intro to the Scientific Method & Night Light Case Study

Team No. 1 **Section** A

Biol 211 – Fall 2012

Key Questions

1. Carefully analyze tables 1 and 2, and then give a definition (*using your own words*!) that demonstrates your understanding of the following terms.

   a.) ***Independent variable***

   Changable variable. unclear + vague

   i.e. affected by the Indep. Var.

   b.) ***Dependent variable***

   The variable that is measured with respect to the independent variable.

   c.) ***Controlled variables***

   Variables that are kept constant to prevent unwanted influences from outside factors.

   → on what??

2. Should a scientific study have one or more than one ***independent variable***? *Explain.*

   No, it should have only one variable. Be specific!

   This ensures that the outcome may be attributed to only one variable.

   Indep. variable

3. Do you agree or disagree with the following statement. *Explain your reasoning*. "*The number of **dependent variables** in an experiment varies, but there is often more than one.*"

   We agree that this is true.

   Multiple variables are changed in response to the independent variable. Elaborate w/ e.g.'s

1-3 → Give e.g.'s

4. Does an experiment typically have one or more than one ***controlled variable***? *Explain.*

There is typically more than one controlled variable. This is to ensure that the results are caused solely by the independent variable and no other outside variables.

e.g.

5. Should ***controlled variables*** be held constant or be allowed to change during an experiment? *Explain.*

They must be held constant. Any changes in these controlled variables may result in unwanted effects on the dependent variables.

e.g.?

Exercises

6.) As a judge at a middle school science fair you are asked to evaluate a student project that is designed to answer the question, "Which AA battery type maintains its voltage for the longest period of time in low, medium, and high current drain devices: Alkaline, Lithium, Nickel-cadmium, or nickel-metal hydride batteries?"

a.) What is the ***independent variable*** of the project?

The AA battery type.

b.)What is the ***dependent variable*** of the project?

The longevity of BATTERY voltage in low, medium and high current drain devices.

Team Responses: Intro to the Scientific Method & Night Light Case Study

Team No. 6 **Section** B

Biol 211 – Fall 2012

Key Questions

1. Carefully analyze tables 1 and 2, and then give a definition (*using your own words*!) that demonstrates your understanding of the following terms.

a.) ***Independent variable*** (aka the manipulated variable) The object being changed in response to the question being asked. There is only one independent variable.

b.) ***Dependent variable*** There can be more than one dependent variable. The object being observed in response to the independent variable.

c.) ***Controlled variables*** Variables that need to be examined prior to the experiment that need to stay constant throughout the experiment. There can be several constants.

2. Should a scientific study have one or more than one ***independent variable***? *Explain.*

There is one independent variable. If there are more than one, it is difficult to know what variable is affecting what, which would alter the experiment results.

3. Do you agree or disagree with the following statement. *Explain your reasoning*. "*The number of **dependent variables** in an experiment varies, but there is often more than one.*"

We agree because there are several ways to measure change. With the independent variable being manipulated it may cause more than one effect on the results.

4. Does an experiment typically have one or more than one ***controlled variable***? *Explain.*

yes, there are several factors that can influence data, so keeping them constant can rule out their contributions. Be specific

5. Should ***controlled variables*** be held constant or be allowed to change during an experiment? *Explain.*

They should be held constant during an experiment to allow for minimal interference of results. Be specific

Exercises

6.) As a judge at a middle school science fair you are asked to evaluate a student project that is designed to answer the question, "Which AA battery type maintains its voltage for the longest period of time in low, medium, and high current drain devices: Alkaline, Lithium, Nickel-cadmium, or nickel-metal hydride batteries?"

a.) What is the ***independent variable*** of the project?

The four different typer of AA batteries.

b.)What is the ***dependent variable*** of the project? Inc/Unclear

The period of time of the low, medium, and high current drain devices.

7. Suggest controlled variables for each experimental group in the below.

Experimental Group	Controlled Variables for Each Group
Low current drain: CD Player	-Same type of device/CD player - same volume -Same CD
Medium current drain: Flashlight	- Same flashlight used - same type of bulb - Brightness - New bulb for each trial
High current drain: Digital Camera using flash	- Same rate of pictures & shutter taken - same light conditions - same amount of flash
All groups	- same operator for each device & all trial same { - Temperature -Altitude - Humidity

Key Questions

8. What is the difference between a ***scientific question*** and ***non-scientific question***?

Scientific question must be testable, measurable, definable, controllable using the scientific method and it usually focuses on one specific independent variable.

A non-scientific question usually cannot be answered through scientific method. It is also mostly consisted of immeasurable things and/or abstract concept.

9. Identify the ***independent*** and ***dependent variables*** in the two hypotheses below.

i.) "Raising the temperature of a cup of water will increase the amount of sugar that dissolves."

ii.) "If a plant receives fertilizer, then it will grow to be bigger than a plant that does not receive fertilizer."

	Example (i.)	Example (i.)
Independent variable	Temperature of the cup of the water (°C)	The presence & amount of fertilizer applied (gr.)
Dependent variable	Amount of sugar that dissolves in the water	Size of the plant (growth) measured in stem size, height, # leaves, etc.

Exercises

10. Which of the following questions can be answered using the process of science? *Briefly explain*.
a.) Does linseed oil cause skin cancer in humans?

This question can be tested through the process of science. Trials can be performed because it is specific enough and the other variables can be controlled. VAGUE & UNCLEAR

b.) Does good nutrition lead to a longer life in humans?

The question is too broad to be determined through the process of science. It is best to isolate one specific nutrition / define what good nutrition is.

If Good Nutrition is Defined, is it a Scientific Question?

11. Write a hypothesis for the battery study in question 6: "Which AA battery type maintains its voltage for the longest period of time in low, medium, and high current drain devices: Alkaline, Lithium, Nickel-cadmium, or nickel-metal hydride batteries?"

* If lithium batteries are used in electronic device, then the device will have longer period of maintaining voltage than other type of batteries in low, medium, & high current drain devices.

NightLight Case Study *Part 1. Nightlights no comfort for children's eyes*

1. What is the hypothesis of the researchers in the night light study? Write the hypothesis as an "If ..... , then .... " statement.

If children under the age of 2 sleeps with a night light, then there's an increased risk of short-sightedness later in life

2. What is the independent variable in the night light study?

The amount of light the toddler received when sleeping

3. What is the dependent variable in the night light study?

The development of myopia later in life after toddler age.

7. Suggest controlled variables for each experimental group in the below.

Experimental Group	Controlled Variables for Each Group
Low current drain: CD Player	Volume, type of CD should be the same
Medium current drain: Flashlight	same flashlight, light bulb
High current drain: Digital Camera using flash	Same # of pics + same frequency of pic taking, pixels, same camera
All groups	temp., brand new batteries, handling of batteries, use of gloves, same brand and type of AA batteries

Key Questions

8. What is the difference between a ***scientific question*** and ***non-scientific question***?

Non scientific question more or less asks for an opinion/point of view on a topic or observation a scientific question is testable, definable, measurable, and controllable

9. Identify the ***independent*** and ***dependent variables*** in the two hypotheses below.

i.) "Raising the temperature of a cup of water will increase the amount of sugar that dissolves."

ii.) "If a plant receives fertilizer, then it will grow to be bigger than a plant that does not receive fertilizer."

	Example (i.)	Example (i.)
Independent variable	temp of water	plant that receives fertilizer
Dependent variable	amount of sugar dissolved	size of plant

Exercises

10. Which of the following questions can be answered using the process of science? *Briefly explain*.
    a.) Does linseed oil cause skin cancer in humans?
    Not enough information, too many uncontrolled variables to measure accurately, does not identify what is being measured, controlled, and tested

    b.) Does good nutrition lead to a longer life in humans?
    Cannot be answered properly, too many unknown/ unaccounted for variables, would show a correlation → Unclear & too general! Be specific!

11. Write a hypothesis for the battery study in question 6: "Which AA battery type maintains its voltage for the longest period of time in low, medium, and high current drain devices: Alkaline, Lithium, Nickel-cadmium, or nickel-metal hydride batteries?"
    If each battery is drained at each level (low, med, high) at constant voltage then the batteries will last in this order: Alkaline, Nickel-cadmium, Lithium, Nickel metal Hydride

NightLight Case Study *Part 1. Nightlights no comfort for children's eyes*

1. What is the hypothesis of the researchers in the night light study? Write the hypothesis as an "If ..... , then .... " statement.
   If children under two are exposed to a light for a specific amount of time every night then that would increase their chances of developing myopia later in life
2. What is the independent variable in the night light study?
   light on at night
3. What is the dependent variable in the night light study?
   symptoms of myopia

7. Suggest controlled variables for each experimental group in the below.

Experimental Group	Controlled Variables for Each Group
Low current drain: CD Player	• Same CD • Volume • Same model
Medium current drain: Flashlight	• same model of flash light • Type of bulb
High current drain: Digital Camera using flash	• Type of digital camera • Time of day picture is taken i.e. flash strength
All groups	• Environment • Type of device

Key Questions

8. What is the difference between a ***scientific question*** and ***non-scientific question***?

A Scientific question is testable, definable, measureable and controllable. For a scientific question the scientific method must be used to prove the hypothesis. (A non-scientific question cannot be proven or controlled.) → Inc

→ NOR CAN A Scientific Question be "proven"

9. Identify the ***independent*** and ***dependent variables*** in the two hypotheses below.

i.) "Raising the temperature of a cup of water will increase the amount of sugar that dissolves."

ii.) "If a plant receives fertilizer, then it will grow to be bigger than a plant that does not receive fertilizer."

	Example (i.)	Example (i.)
Independent variable	Temperature of the water	Amount of fertilizer used
Dependent variable	Amount of sugar that dissolves	The growth of the plant

Team Responses: Intro to the Scientific Method & Night Light Case Study

Team No. 4 **Section** B

Biol 211 – Fall 2012

Exercises

10. Which of the following questions can be answered using the process of science? *Briefly explain.*
    a.) Does linseed oil cause skin cancer in humans?

    This can be proven using the scientific method. The linseed oil could be used as the independent variable while the amount of people that developed cancer would be the dependent variable.

    b.) Does good nutrition lead to a longer life in humans?

    This is not as easy to prove with the scientific method because life span is also related to genetics and hereditary conditions.

11. Write a hypothesis for the battery study in question 6: "Which AA battery type maintains its voltage for the longest period of time in low, medium, and high current drain devices: Alkaline, Lithium, Nickel-cadmium, or nickel-metal hydride batteries?"

    If a Alkaline battery is used in low, medium, or high drain device it will last the longest.

NightLight Case Study *Part 1. Nightlights no comfort for children's eyes*

1. What is the hypothesis of the researchers in the night light study? Write the hypothesis as an "If ..... , then .... " statement.

   If a child is exposed to artifical light at night then they are more likely to develop myopia.

2. What is the independent variable in the night light study?

   The independent variable would be the amount of light that the children had been exposed to.

3. What is the dependent variable in the night light study?

   The dependent variable is the percent of children that developed myopia.

7. Suggest controlled variables for each experimental group in the below.

Experimental Group	Controlled Variables for Each Group
Low current drain: CD Player	-Temp -Usage (Time, pressed buttons, etc) -Accesories - Type of CD player
Medium current drain: Flashlight	-Type of flashlight -Temp (environment, device) - Bulbs used -Usage (time, frequency, etc.)
High current drain: Digital Camera using flash	- Type of camera -Type of flash/bulb - Usage -Temp
All groups	-Type - Usage -Temp

Key Questions

8. What is the difference between a ***scientific question*** and ***non-scientific question***?

A scientific question is a question that can be validated/invalidated by experiment. It can also be measured, controlled and reproducable.

A nonscientific question is a question that is opinion based, subjective, nontestable and cant be reproduced.

9. Identify the ***independent*** and ***dependent variables*** in the two hypotheses below.

i.) "Raising the temperature of a cup of water will increase the amount of sugar that dissolves."

ii.) "If a plant receives fertilizer, then it will grow to be bigger than a plant that does not receive fertilizer."

	Example (i.)	Example (i.)
Independent variable	- change of temperature → OF WHAT? mm	- plant fertilizer used / not used
Dependent variable	- amount of sugar dissolved in a cup.	- size/shape of leaves, branches and overall plant height

Exercises

10. Which of the following questions can be answered using the process of science? *Briefly explain.*

a.) Does linseed oil cause skin cancer in humans? MORE OR LESS TRUE IF THE EXPERIMENT INVOLVES SKIN CELLS GROWN IN TISSUE CULTURE

Testable. This question pertains to just one factor/variable producing an outcome. Since there is one variable being tested, it gives more validity to the experiment/results.

b.) Does good nutrition lead to a longer life in humans? BUT WHAT IF GOOD NUTRITION IS DEFINED?

Not testable because 'good' is too broad of a term. Since it is so broad, its not specific enough to determine what actual factors of 'good nutrition' are being tested to produce longer life

11. Write a hypothesis for the battery study in question 6: "Which AA battery type maintains its voltage for the longest period of time in low, medium, and high current drain devices: Alkaline, Lithium, Nickel-cadmium, or nickel-metal hydride batteries?"

If a Lithium AA battery is used, then it will maintain its voltage for the longest period of time in low, medium, and high current drain devices than using Alkaline, Nickel-cadmium, or nickel-metal hydride batteries.

NightLight Case Study *Part 1. Nightlights no comfort for children's eyes*

1. What is the hypothesis of the researchers in the night light study? Write the hypothesis as an "If ..... , then .... " statement.

- If children under the age of 2 slept with ~~the~~ some room light on, then they are 5 times more likely to become short sighted than those who slept in the dark.

2. What is the independent variable in the night light study?

Light exposure while sleeping

3. What is the dependent variable in the night light study?

Becoming short-sighted / myopia

Night Light Case Study *Part 1. Nightlights no comfort for children's eyes*

4. List at least five examples of variables that should be controlled in this study and then explain how the experimenters might have controlled these variables.
   - Age of the child → know the ages.
   - Light location, light brightness → Measure distance and intensity
   - Time exposure to light → Measure durations
   - Hereditary → whether the parents are short sighted
   - Gender of child

5. Why is it important to control all variables in a scientific study?

   To get the most accurate results possible - unbiased Explain!

   Unclear / Inc.

6. Identify any important variables that were *not* controlled in this study.
   - Time exposure to the light wasn't controlled
   - Inherited short sightedness
   - Gender

7. Describe the control group in the night light study.

   Children who slept in the dark

8. What major assumption(s) concerning the control group did the researchers make in this study?

   Inc

   truthfully

   The children were never expored to nigh light

9. Summarize the evidence/data collected in the nigh light study.

Control group	10 %	Short sighted
Night light	34 %	short sighted
Light on	55 %	short sighted

10. What is the conclusion of the researchers in the night light study?

    Study shows that enviromental exposure to light can lead to short sightedness

Night Light Case Study *Part 1. Nightlights no comfort for children's eyes*

11. Is the conclusion valid? *Explain*.

Consistently

No. Because this wasn't a controlled experiment with controlled variables. Experiment didn't state the number of subjects studied

Part 2. New light on night lights

Key Questions: Evaluate the science in the night light study by answering the questions below.

12. What is the conclusion of the researchers in the night light study conducted at Ohio State University by Karla Zadnik?

Researchers concluded that exposure to night light didn't lead to future short sightedness

PARENTS? Genetics?

WHO TENDS TO USE NIGHTLIGHTS?

Inc

13. Is their conclusion valid? *Explain*.

MOST LIKELY!

~~Yes~~. They carried out a more controlled experiment with a greater number of study subjects

14. Why is science said to be "self-correcting." What role do scientific journals play in the "self-correcting" process?

Hypothesis are tested to ensure accuracy and consistency of results and mistakes can be corrected

Very Inc

Night Light Case Study *Part 1. Nightlights no comfort for children's eyes*

4. List at least five examples of variables that should be controlled in this study and then explain how the experimenters might have controlled these variables.

- The duration of light (use timer for light)
- the genetic history of the patient (keep the patients that are similar
- the medical history of the patient to have an accurate result)
- the intensity of the light (lux meter to measure intensity)
- the age of the patient (keep the patients similar)

5. Why is it important to control all variables in a scientific study?

It is important to controll all variables to have a consistent result for the experiment to be accurate. Also, if there is more than one independent variable than the experiment will be invalid. → Be specific

6. Identify any important variables that were *not* controlled in this study.

the gender and age of the children were not controlled. Also, the exposure of light during the day.

7. Describe the control group in the night light study.

the children who slept with no exposure to light.

8. What major assumption(s) concerning the control group did the researchers make in this study?

The genetic/medical history of the patients. There was an assumption of the duration of the time the children slept were the same.

9. Summarize the evidence/data collected in the nigh light study.

10% of children sleep in dark were short-sighted
34% of children sleep w/ night light were short-sighted.
55% of children w/ light on were short sighted.

10. What is the conclusion of the researchers in the night light study?

Night lights ~~do~~ cause short-sightedness in children.

MAY!

Night Light Case Study *Part 1. Nightlights no comfort for children's eyes*

11. Is the conclusion valid? *Explain.*

No, this experiment is a non-scientific experiment. The results show a positive correlation, since this seems to be a direct cause and effect relationship, but that may be caused by other factors not controlled.

!! Be specific / Elaborate

Part 2. New light on night lights

Key Questions: Evaluate the science in the night light study by answering the questions below.

12. What is the conclusion of the researchers in the night light study conducted at Ohio State University by Karla Zadnik?

Night light does not cause the chance of being short sighted.

Any other Conclusions? !! → Unclear / poor Grammar

13. Is their conclusion valid? *Explain.*

may be valid

Yes, this conclusion is valid because this study included genetics and a larger sample size of children. Also, took in consideration of the genetic and medical history of the patients.

!!

Test & Support !!

14. Why is science said to be "self-correcting." What role do scientific journals play in the "self-correcting" process?

Science is "self-correcting" because as more data becomes available, scientists are able to prove or disprove pre-existing hypothesis. Scientific journals allows others to duplicate the experiments and experimenters could get the same or different results.

!!

Night Light Case Study *Part 1. Nightlights no comfort for children's eyes*

4. List at least five examples of variables that should be controlled in this study and then explain how the experimenters might have controlled these variables.

- age → choose sample from people with the same age.
- same type of light → choose the same brand & intensity of light
- amount of time of sleeping → control the time of sleeping & waking up
- genetic predisposition → control by looking at the medical history.
- diet → same amount calories consumed.

5. Why is it important to control all variables in a scientific study? Be specific

- The more variables are controlled, the more credence the experiment's result(s)
- It can help differentiate factor that affects independent variable.

6. Identify any important variables that were *not* controlled in this study.

- stress
- lifestyle
- diet

7. Describe the control group in the night light study.

Children between 2 & 16 years old inside a dark room.
while sleeping?

8. What major assumption(s) concerning the control group did the researchers make in this study?

- Any differences between the enviroment of control groups.

Unclear

9. Summarize the evidence/data collected in the nigh light study.

10% who slept in dark were short-sighted
34% who slept with night light were short sighted.
55% who slept with light(s) on were short sighted.

10. What is the conclusion of the researchers in the night light study?

The researches concluded that the children might have poor eyesight because of the different amount of light, but it's not merely true.
→ Unclear
↙ While sleeping?

Inc/Unclear

Night Light Case Study *Part 1. Nightlights no comfort for children's eyes*

11. Is the conclusion valid? *Explain*.

no, because the researchers didnot consider other controlled variables which can further analyzed the research done.

Such as??

Part 2. New light on night lights

Key Questions: Evaluate the science in the night light study by answering the questions below.

12. What is the conclusion of the researchers in the night light study conducted at Ohio State University by Karla Zadnik?

They concluded that sleeping with a night light does not increase the myopia rather the parent's genetics are the main cause of it.

WHO TENDS TO USE NIGHTLIGHTS?

Most Likely

13. Is their conclusion valid? *Explain*.

Yes, because they examine the medical history, lighting conditions, and large sample of group.

14. Why is science said to be "self-correcting." What role do scientific journals play in the "self-correcting" process?

- Because there is new discoveries which can further validate or disprove conclusions from previous experiment(s).
- The journals act as a publisher of certain experiment(s), and keep record of scientific hypothesis and conclusions done by researchers. Through this other scientist) are able to do a follow-up test to validate previous conclusion.

Night Light Case Study *Part 1. Nightlights no comfort for children's eyes*

4. List at least five examples of variables that should be controlled in this study and then explain how the experimenters might have controlled these variables.

1) Family history of short-sightedness - study groups with and without a history
2.) Amount of sleep - all kids recieve the same amount
3.) Type of nightlight - all kids use same nightlight
4.) Amount of kids studied - for all groups have the same # of kids
5.) Wattage of bulb in nightlight - always the same

5. Why is it important to control all variables in a scientific study? → Be specific

If all variables are ~~not~~ controlled, it is impossible to denote which change causes the results. Therefore by changing only one variable (the independent), any changes in the results can be assigned to that specific variable. It also makes the experiment repeatable.

6. Identify any important variables that were *not* controlled in this study.

Most important is the fact that the family history of short-sightedness was not controlled. The article also did not mention anything about controlling gender or type of light used, wattage of bulbs, etc.

7. Describe the control group in the night light study.

The control group is the group that recieved zero light exposure during sleep. Every other group was exposed to some amount of light. The control group was not exposed to the independent variable.

8. What major assumption(s) concerning the control group did the researchers make in this study?

Inc

The researchers assumed the parents were honest and correct. Also, they did not control for the children having a genetic history of short-sightedness.

9. Summarize the evidence/data collected in the nigh light study.

- Children exposed to no light at night have a 10% risk of developing short-sightedness.
- Children exposed to a night light have a 34% risk.
- Children exposed to a room light while sleeping have a 55% risk.

10. What is the conclusion of the researchers in the night light study?

The conclusion is that as the amount of light recieved while sleeping increases, the risk of developing short-sightedness increases.

Night Light Case Study *Part 1. Nightlights no comfort for children's eyes*

11. Is the conclusion valid? *Explain*.

The conclusion is not valid, the researchers did not control for a history of short-sightedness in the children they studied. Therefore they had two independent variables, they cannot say where their data came from.

Part 2. New light on night lights

Key Questions: Evaluate the science in the night light study by answering the questions below.

12. What is the conclusion of the researchers in the night light study conducted at Ohio State University by Karla Zadnik?

There is no relationship between developing short-sightedness due to exposure to light while sleeping. Short-sightedness has only been connected to genetics. therefore, the prior conclusion that light while sleeping increases the risk of short-sightedness is proven false because "the proportions of myopic children were equal whether they had slept in darkness, with a night light, or with full room lighting before age two".

13. Is their conclusion valid? *Explain*.

probably valid

This conclusion is ~~not~~ valid because the researchers controlled the necessary variables in order to find why they were getting certain results. They tested children with a history of short-sightedness, and without.

14. Why is science said to be "self-correcting." What role do scientific journals play in the "self-correcting" process?

Science is self-correcting because any errors made are usually found within the group of scientists because of the extensive peer reviews of scientific journals and repeat experiments/revised experiments that are performed to further the initial work of one scientist. Scientific journals provide work for others to correct and build upon.