

Lights Out! Scene

Shadows loomed crazily on the cave walls as the lantern sputtered and flickered menacingly. Suddenly, darkness descended. Chris asked his friend, "Pat, what's wrong with the carbide lantern?"

From the darkness, Chris heard Pat say, "Dude, I think it's busted."

Chris exclaimed, "Oh, that's just fabulous! I've been begging my folks for a new lamp since the last time we went caving. Too late now! Light a candle, will'ya?"

For a few moments, the sound of Pat rummaging through his haversack overwhelmed the slow, steady drip of water. Chris shifted his weight from one foot to the other nervously.

At last, Pat cried "Okay, we're in business!" The match in Pat's hand flamed to brilliant life, and promptly died. So did the second. And the third.

Chris swallowed hard as a terrible thought occurred to him, and he said, "Um, Pat. I think the air might be bad down here."

Pat asked, "What? The guidebook didn't say anything about that, did it?" The darkness seemed to press in around them.

Chris replied, "Not that I remember. But my breath seems a little short, and the matches won't stay lit. Do you think we made a wrong turn?"

Pat answered, "I dunno. But we need to get out of here right now. Shine your flashlight over here while I take another look at the map."

Another minute passed. The sound of Chris rifling through his pack became more and more frantic. Chris cried, "Where is it? I took it out when we stopped for lunch... I must have forgotten to put it away."

Anxiously, Pat said, "You'd better be joking, Chris! We've been walking for a couple of hours since we ate. We can't make it back there without a light."

Chris retorted, "Would I be joking at a time like this? I'm dead serious."

Pat replied, "Never mind, I always keep a small flashlight in my jacket pocket. It's always right... here. Oh, that is not good..."

Nervously, Chris asked, "What? What's not good?"

Pat replied, "Umm... I *had* a flashlight in my jacket pocket. Now I have a number of small, flashlight-shaped pieces in my jacket pocket. And I think one of the batteries is

leaking – gimme some water right now!”

As Pat scrubbed his hands furiously with some water from his canteen he said, “Remember when I fell down that gravel slope and you heard this big crunch and were like ‘Are you okay?’ and I was like, ‘Yeah, I’m fine’ and we kept on going?”

Uncomfortably, Chris replied, “Yeah?”

Pat shouted, “Well, I’m not fine! I’m not fine, because when I fell I crushed our only flashlight, and now we’re lost, in the dark, in a cavern with bad air! So, no – I am most definitely *NOT FINE!*”

Chris was momentarily taken aback by Pat’s outburst, and by his ragged, heavy breathing that filled the cave around them. Echoes receded into the distance.

NOT FINE! NOT FINE! NOT FINE! NOT FINE!

Chris stumbled through the darkness, hands outstretched in front of him. He found Pat’s shoulders and shook them, yelling, “Calm down! We’ve got to think here, man. What would Bryan Boitano do?”

Pat chuckled weakly and his breathing calmed somewhat.

Chris asked, “Okay, seriously: what do we have for a light?”

Pat resumed his search through his pack, and glumly replied, “Well, I do have a spare bulb for my flashlight. But no batteries.”

Chris asked, “Do we have anything else with batteries in it? I’ve got my Discman, but I think it only has two AAA cells.”

Pat exclaimed, “Sweet! I’m sorry I made fun of you for not having an iPod. But I think the bulb needs 6V. Do you think it will work with a couple of AAAs?”

Chris asked, “Even if it does, do you think it will burn long enough for us to retrace our steps?”

Pat suggested, “What if we use them one at a time to make them last longer. It won’t be as bright and we’ll have to walk slower, but maybe one at a time would be better.”

Chris replied, “Don’t ask me. You’re the one who took physics last semester. You ought to know about batteries. What should we do?”

Lights Out! Assignment

Part I

Pat and Chris pose several important questions regarding their idea for constructing a makeshift flashlight. Identify and answer them as thoroughly as possible. Decide, as a group, how Pat and Chris should construct their flashlight to maximize battery life while still providing a useful amount of light. They have a bulb and two batteries – do they need anything else to make a working flashlight? Will their light source last long enough to retrace their path and get back to the missing flashlight? State clearly what assumptions you made in answering the previous question(s).

Your group should write up a brief report that answers the questions above. Appropriate circuit diagrams and supporting calculations should be integrated into your report. Based on the conclusions of your report, write a narrative epilogue to Chris and Pat's story.

Part II

On the table in front of you, your group has:

- a flashlight bulb
- two AAA batteries
- assorted small items that Pat and Chris might find in their pockets

The lights are going out in 30 seconds. Construct a working flashlight, including a simple switching mechanism!

Lights Out! Box Chart

| | |
|---|---|
| <p><u>Facts</u> (What we know right now)</p> | <p><u>Questions</u> (Based on current knowledge)</p> |
| <p><u>Hypotheses</u> (Based on facts and questions)</p> | <p><u>Learning Issues</u> (What we need to learn)</p> |

Lights Out! Grading Rubric – Writing Assignment

| CATEGORY | 4 | 3 | 2 | 1 |
|--|---|---|---|--|
| Components of the report | All required elements are present and additional elements that add to the report (e.g., thoughtful comments, graphics) have been added. | All required elements are present. | One required element is missing, but additional elements that add to the report (e.g., thoughtful comments, graphics) have been added. | Several required elements are missing. |
| Drawings/Diagrams | Clear, accurate diagrams are included and make the experiment easier to understand. Diagrams are labeled neatly and accurately. | Diagrams are included and are labeled neatly and accurately. | Diagrams are included and are labeled. | Needed diagrams are missing OR are missing important labels. |
| Spelling, Punctuation and Grammar | One or fewer errors in spelling, punctuation and grammar in the report. | Two or three errors in spelling, punctuation and grammar in the report. | Four errors in spelling, punctuation and grammar in the report. | More than 4 errors in spelling, punctuation and grammar in the report. |
| Solution/Resolution | The solution to the character's problem is easy to understand, and is logical. There are no loose ends. | The solution to the character's problem is easy to understand, and is somewhat logical. | The solution to the character's problem is a little hard to understand. | No solution is attempted or it is impossible to understand. |
| Creativity | The story contains many creative details and/or descriptions that contribute to the reader's enjoyment. The author has really used his imagination. | The story contains a few creative details and/or descriptions that contribute to the reader's enjoyment. The author has used his imagination. | The story contains a few creative details and/or descriptions, but they distract from the story. The author has tried to use his imagination. | There is little evidence of creativity in the story. The author does not seem to have used much imagination. |
| Focused on assigned topic | The entire story is related to the assigned topic and allows the reader to understand much more about the topic. | Most of the story is related to the assigned topic. The story wanders off at one point, but the reader can still learn something about the topic. | Some of the story is related to the assigned topic, but a reader does not learn much about the topic. | No attempt has been made to relate the story to the assigned topic. |

Self/Group Evaluation

Date _____

Your Name: _____ Group # _____

Instructions: Please circle the response with which you agree the most. This evaluation will only be read by your teacher and will **not** be shown to other students.

1. How would you rate your participation in group discussion and group work?

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

2. How would you rate your effort in completing the case:

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

3. Did you complete the assigned homework? **Yes No**

If no, explain why:

4. How well did you work with everyone in your group:

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

5. Overall, how would you rate your performance in this case?

5 Excellent 4 Very Good 3 Good 2 Fair 1 Poor

6. Your total score _____

7. Rate each group member on a scale of 1-5

| Group Member | Participation in group discussion | Completed Assigned Task | Worked well within group | Overall performance | Total Score |
|--------------|-----------------------------------|-------------------------|--------------------------|---------------------|-------------|
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