

### Geology 204 Midterm

This closed-book exam contains questions worth a total of 100 points. No notes or calculators are allowed.

I strongly encourage you to do the easy problems first, then come back and do the hard ones. Mark answers on these sheets. Print your name on each page. Grades may depend on clarity as well as content of answers. Numbers in parentheses following question numbers are point values.

Do not write in pen! If you need a pencil, ask me for one.

1.(30) In an article in the May-June 2005 issue of *American Scientist*, Peyton West describes experiments designed to uncover why the male lion has a mane. One hypothesis (explanation) was that the mane is a signal to other males of the lion's health and abilities, that lions with longer manes are better fighters than those with shorter manes.

a.(10) Think of a good prediction to test this explanation. One problem is that actual lion fights usually happen in the middle of the night, away from the scientists. \_\_\_\_\_

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b.(10) Comment on the falsifiability of your prediction. \_\_\_\_\_

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c.(10) Comment on the verifiability of your prediction. \_\_\_\_\_

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2.(15) Say the admissions office of some university claims that they are doing their jobs really well (and deserve raises), because 75% of the students they admit to the university go on to graduate within 4.5 years. What comparative data would you need to assess the accuracy of their claim?

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3.(15) Think of two things we could measure in WWU students that you would expect to show a positive correlation without one being caused by the other.

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4.(10) Think about the following excerpt from the New York Times, April 20, 2005:

“People who are overweight but not obese have a lower risk of death than those of normal weight, federal researchers are reporting today...The new study addressed the risk only of death and not of disability or disease. There has long been conclusive evidence that as people move from overweight to obese to extremely obese, they are more and more likely to have diabetes, high blood pressure and high cholesterol levels. But the investigators said it was possible that being fat was less of a health risk than it used to be. They mentioned a paper, also being published today in the journal, in which researchers including Dr. Edward W. Gregg and Dr. David F. Williamson, both of the C.D.C., report that high blood pressure and high cholesterol levels are less prevalent now than they were 30 or 40 years ago, largely because of breakthroughs in medication.”

a.(5) What type of explanations are involved in this study? Possible types of explanation include: Causes, causal mechanisms, laws, underlying processes, and function. \_\_\_\_\_

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b.(5) The study was performed by studying existing data on death certificates (ages, weights, etc.). What type of study is this? Possible types of study include: randomized causal studies, prospective causal studies, and retrospective causal studies. \_\_\_\_\_

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5.(10) You tell your friend that you heard that at one point in the past all the continents were connected and that they have since moved apart into their present configuration. She replies, “Oh I’ve heard of that Plate Tectonics stuff. That’s only a theory. It says so in the textbook.” What is wrong with her understanding?

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6.(20) Consider the following: “Most herbal remedies work by the placebo effect. If I have a headache and take wood betony, then I feel better, but it’s only because I believe that it will make me well. It could be anything, as long as I believed in it. There’s no real effectiveness to the ingredients at all.”

a.(10) What is being explained here? \_\_\_\_\_

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b.(10) What is the explanation? \_\_\_\_\_

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