**Laboratory 12 Answer Sheet**

For use with the AGI/NAGT Laboratory Manual in Physical Geology, 11th ed.

**INSTRUCTIONS**

(1) Your responses on this answer sheet must be the result of **your work alone.** This is not a group-work exercise.

(2) This answer sheet with your responses is a **confidential document** that you must not provide to anyone else or to any group file (digital or paper) where others might gain access to the answers.

(3) Before you submit it to your TA for grading, **you must rename this document with your first and last names in the title**. So if the answer sheet was submitted by Yvon Chouinard, the document (saved as a Word file) would be renamed Yvon-Chouinard-Lab12Answers.docx

(4) Send this form, completed, to your graduate teaching assistant in an email from your Baylor email account. Be certain that the **subject line is your first and last name plus "Lab 8 answers."** So if this answer sheet was submitted by Yvon Chouinard, the subject line of the email would be " Yvon Chouinard Lab 12 answers." **Include this completed document in the email as an attachment.**

 All Tuesday labs: Zequn Wu Zequn\_Wu1@baylor.edu

 Wednesday 12:20-2:25 lab: Kate Hobart Kate\_Hobart1@baylor.edu

 Wednesday 2:30-4:25 lab: Amanda Wang Zhao\_Wang1@baylor.edu

 All Thursday labs: Sam Barber Samuel\_Barber1@baylor.edu

(5) Wherever you encounter <response> in the raw answer sheet, **replace** <response> **with your answer or response.**

 EXAMPLE

 What is your favorite color? <response> might become

 What is your favorite color? teal

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**Your Name:** <response>

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**Activity 12.1 Groundwater Inquiry**

A-1 Does water seem to pass more rapidly or less rapidly through a finer-grained sedimentary rock like a shale, compared with a coarser-grained sedimentary rock like a sandstone? <response>

 Is a finer-grained sedimentary rock like a shale able to store more or less groundwater than a coarser-grained sedimentary rock like a sandstone? <response>

 Why? <response>

A-2 Does water seem to pass more rapidly or less rapidly through a coarser-grained sedimentary rock, compared with a finer-grained sedimentary rock? <response>

 Is a coarser-grained sandstone able to store more or less groundwater than a finer-grained shale or mudstone? <response>

 Why? <response>

B Look at the videos posted at [http://CroninProjects.org/Vince/GW/index.htm](http://croninprojects.org/Vince/GW/index.htm)

B-1 How long did it take for the water in both sides of the tube to equilibrate to the same elevation by flow through a coarser-grained sand? <response>

B-2 How long did it take for the water in both sides of the tube to equilibrate to the same elevation by flow through a finer-grained sand and silt? <response>

B-3 How does the rate at which water flows through sand differ, if at all, from the rate at which water flows through the finer-grained sediment? Why? <response>

Note: you can download and print a copy of Figure A12.1.3 for use in Activity 12.1C at <http://croninprojects.org/Vince/PhysGeoLab/FiguresForGW-activities.pdf> .

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C This response involves drawing on Figure A12.1.3 (page 338 in the paper version of the lab manual). ***Be quite certain that the drawn lines and labels on the version you submit for credit are clear and legible, perhaps by going over them with a dark pencil or pen.***

A PDF image of Figure A12.1.3, which is copyright © 2017 by Pearson Higher Education and AGI, is available via a link Dr. Cronin sent to you in an announcement accessible via your email or in Canvas. This can be used by students who are using the etext.

When you complete your graphics work on Figure A12.1.3, ...

(1) Scan or photograph the completed graph

(2) Get the image file onto the computer you are using to complete this Word document. For example, you can take a picture of the profile box with your smartphone, send it to yourself via text or email, and download the graphics file to your computer.

(3) Open this word document with your Lab 12 answers

(4) Highlight the response prompt

(5) Go to the "Insert" drop-down menu in the menu bar at the top of the page, select "Pictures" and "Picture from file..."

(6) Choose the graphics file you just downloaded.

The graphic should now be a part of this Word answer document.

 The response prompt Activity 12.1 part C is on the next line:

<response>

 Contact Dr. Cronin if you run into trouble uploading your answer.

 How is the distance of the water jet related (if at all) to the height of water in the bottle? <response>

 Why? <response>

D About how high would the water rise in the tube as compared with the water level in the bottle? <response>

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Activity 12.2 Where is the Nasty Stuff Going?

If you are not familiar with the process of contouring data, which is needed to complete part A, you should study Laboratory 9 Topographic Maps, the section entitled "What Are Topographic Maps" on pages 244-250. Pay particular attention to Figures 9.11-9.14.

Note: you can download and print a copy of Figure A12.2.1 for use in Activity 12.2C at <http://croninprojects.org/Vince/PhysGeoLab/FiguresForGW-activities.pdf> .

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A&B This response involves drawing on Figure A12.2.1 (page 339 in the paper version of the lab manual). ***Be quite certain that the drawn lines and labels on the version you submit for credit are clear and legible, perhaps by going over them with a dark pencil or pen.***

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When you complete your graphics work on Figure A12.2.1, ...

(1) Scan or photograph the completed map in Figure A12.2.1

(2) Get the image file onto the computer you are using to complete this Word document. For example, you can take a picture of the profile box with your smartphone, send it to yourself via text or email, and download the graphics file to your computer.

(3) Open this word document with your Lab 12 answers

(4) Highlight the response prompt

(5) Go to the "Insert" drop-down menu in the menu bar at the top of the page, select "Pictures" and "Picture from file..."

(6) Choose the graphics file you just downloaded.

The graphic should now be a part of this Word answer document.

 The response prompt Activity 12.2 parts A and B is on the next line:

<response>

 Contact Dr. Cronin if you run into trouble uploading your answer.

C Which property be the least exposed to toxic chemicals, and hence safest for people who use the new athletic facilities? <response>

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Activity 12.3 Using Data to Map the Flow of Groundwater

A-1 What is the *pressure head* for point A? <response>

A-2 What is the *elevation head* for point A? <response>

A-3 What is the *total head* for point A? <response>

Note: you can download and print a copy of Figure A12.3.1 for use in Activity 12.3 B&C at <http://croninprojects.org/Vince/PhysGeoLab/FiguresForGW-activities.pdf> .

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B&C This response involves drawing on Figure A12.3.1 (page 340 in the paper version of the lab manual). ***Be quite certain that the drawn lines and labels on the version you submit for credit are clear and legible, perhaps by going over them with a dark pencil or pen.***

A PDF image of Figure A12.3.1, which is copyright © 2017 by Pearson Higher Education and AGI, is available via a link Dr. Cronin sent to you in an announcement accessible via your email or in Canvas. This can be used by students who are using the etext.

When you complete your graphics work on Figure A12.3.1, ...

(1) Scan or photograph the completed cross secton in Figure A12.3.1

(2) Get the image file onto the computer you are using to complete this Word document. For example, you can take a picture of the profile box with your smartphone, send it to yourself via text or email, and download the graphics file to your computer.

(3) Open this word document with your Lab 12 answers

(4) Highlight the response prompt

(5) Go to the "Insert" drop-down menu in the menu bar at the top of the page, select "Pictures" and "Picture from file..."

(6) Choose the graphics file you just downloaded.

The graphic should now be a part of this Word answer document.

 The response prompt Activity 12.3 parts B and C is on the next line:

<response>

 Contact Dr. Cronin if you run into trouble uploading your answer.

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Activity 12.6 Land Subsidence from Groundwater Withdrawal

A-1 Where are the areas of greatest subsidence in the Santa Clara Valley? <response>

A-2 What was the total subsidence at San Jose from 1934 to 1967 in feet? <response>

A-3 What was the average annual rate of sibsidence for the period of 1934 to 1967 in feet/year? <response>

A-4 At what places in the Santa Clara Valley would subsidence cause the most problems? <response>

 Explain your reasoning. <response>

A-5 Would you expect much subsidence to occur inthe darker shaded (tan) areas of Fig. 12.11? <response>

 Explain. <response>

A-6 What was the average annual rate of subsidence (in feet/year) for the seven-year period from 1960 through 1967? <response>

A-7 (a) About how much has the elevation of benchmark P7 changed since 1970? <response> ft.

 (b) What is the approximate maximum water-table dept below the ground surface? <response> ft.

 (c) What effect has the rising water table had on the elevation of the ground surface in San Jose? <response>

 (d) What effect might the observed trend in precipitation have had on the water-table depth? <response>

 (e) What trend do you see in the rate of pumping between 1915 and mid-1960s? <response>

 What effect has the rising water table had on the elevation of the ground surface in San Jose? <response>

 (f) What effect did artificial recharge and changes in pumping seem to have had in the Santa Clara Valley? <response>

B How might water usage change in an area like this as it transitions from agricultural to urban? <response>