Step 1 rubric: Ecological footprint calculation.

Criteria	**Points earned**	**Points possible**
Original "Quiz Results" page from *www.myfootprint.org* attached.		1
Student briefly explains the concept of ecological footprints.		3
Student states main factors affecting ecological footprint calculations.		3
Student compares his or her ecological footprint to the national average.		3
Student states which factors have the biggest effect on his or her ecological footprint.		4
Student explains why these factors are most important in his or her life.		5
Uses at least one *outside* source for information regarding ecological footprints.		1
Properly cites all sources used for information.		1
Explanations are typed, 12-point font, double-spaced.		2
Explanations total no more than three pages.		1
Appropriate rubric submitted with assignment.		1
Total		25

Step 2: Collecting information.

Greetings, Environmental Chemists!

As responsible citizens of our community, we need your help based on your chemistry expertise. At this point you have examined your ecological footprint to identify two behaviors you would like to change because they potentially have a negative impact on our environment. However, is there valid scientific evidence to support the changes you would like to make? Prove it!

For two articles that you located from reputable sources, write a 1–3 page review of each article that includes

- a summary of the article,
- scientific connections to environmental chemistry topics,
- explanations of the science content included in the article, and
- connection of this information to your ecological footprint calculation.

Your fellow citizens and I are counting on you!

Sincerely,

Mayor of *your city*

Step 2 rubric: Article reviews.

Criteria	**Points earned**	**Points possible**
Article is submitted with review.		1
Article is from a scientific journal or reference book (found using Science Resource Center).		1
Title, author, source, and date of article are included in summary.		3
Student provides a brief summary of the article.		2
Student relates the article to at least two environmental chemistry concepts.		2
Student briefly but accurately explains the science relating to the article.		5
Student makes the connection between the topic(s) of the article, the science, and the ecological footprint.		5
Uses at least one *outside* source for scientific information.		1

Student properly cites source(s) for scientific information.		2
Review is typed, 12-point font, double-spaced.		1
Article review totals no more than three pages.		1
Appropriate rubric submitted with assignment.		1
Total		25

Step 3: Science journal entry.

Science Journal Entry—Double Back and Make a Change!

Once you have recalculated your footprint with the lifestyle changes you are making, write a science journal entry that includes the following:

- Compare short- and long-term effects of your proposed changes on the environment.
- Provide scientific explanations for short- and long-term effects based on your chemistry knowledge and reputable articles.
- Identify the pros and cons of making these changes.
- Decide if you are going to make the changes or not. Provide an explanation for your decision.

Step 3 rubric: Ecological footprint calculation revisited.

Criteria	**Points earned**	**Points possible**
New "Quiz Results" page from *www.myfootprint.org* attached.		1
Student states at least two changes made between original footprint calculation and new calculation.		2
Student relates each change to the information found/discussed in articles that were reviewed.		4
Student explains the short-term effects (on the ecological footprint) of the changes, supported by scientific reasoning, as appropriate.		4
Student explains the long-term effects (on the ecological footprint) of the changes, supported by scientific reasoning, as appropriate.		4
Student describes practical ways these changes could be incorporated into their lives.		4

Uses at least one outside source for environmental chemistry and/or ecological footprint information.		1
Properly cites all sources used for information.		2
Assignment is typed, size 12 font, double-spaced.		1
Assignment totals no more than three pages.		1
Appropriate rubric submitted with assignment.		1
Total		25

Pathway for critical reflection and change based on scientific evidence.

A. Examine daily routines and identify two decisions as potentially harmful.
B. Research the potential impact of each decision.
    1. If harmful, determine the extent of harm and an alternative responsible decision. Go to C.
    2. If not harmful, then identify ways in which you could maintain this lifestyle decision and convince others to do the same. Go to A.
C. Gather scientific explanations that link the decision to a harmful impact on the environment.
    1. If scientific explanations exist and are valid (i.e., make sense and are from a reputable source), summarize each scientific explanation in a way that others will understand using your chemistry knowledge. Go to D.
    2. If scientific explanations do not exist or existing explanations are not valid, summarize any invalid scientific explanation using your chemistry knowledge. Go to A. (**Note:** Remember: "not valid" means that explanations use scientific information inaccurately, or no explanations come from a reputable source.)
D. Identify ways in which daily routines will need to change to adopt this new decision.
E. Provide evidence and valid scientific explanations to support your new routine using your chemistry knowledge. (**Note:** Remember, "valid" means that explanations use scientific information accurately and are supported by evidence from a reputable source.
F. Review the extent to which the new routine is maintained and research its impact on environment.
G. Identify ways in which you can share with others what you learned to support their change.

Step 4 rubric: Newspaper article.

Criteria	**Points earned**	**Points possible**
Creative article title.		1
Student explains concept of ecological footprint and contributing factors.		2
Student states and uses his or her own ecological footprint as an example.		2
Student identifies three major contributors to his or her own footprint and explains why they are significant.		9
Student explains the science behind the three factors identified above.		9
Student suggests realistic ways to reduce or eliminate the negative effects of the three identified factors.		9

Addresses potential counterarguments for each factor and suggested change above.		6
Includes at least one graphical representation of data.		1
Includes at least one table or chart of data.		1
Tone and complexity are appropriate for audience.		2
Properly cites all sources used for information.		2
Article is typed, in columns, 12-point font, single-spaced.		2
Article should be 2-3 pages		1
Article is visually appealing		2
Appropriate rubric submitted with assignment		1
Total		50

Step 5 rubric: Critical analysis.

Your Name _____ Date _____
Author's name: _____

Be honest when evaluating your classmates' articles. Honest, critical evaluation will not cause your classmates to fail this assignment, but a lack of honest evaluation will be detrimental to your grade. Be critical and honest! Fill out the following rubric and answer the subsequent questions for each article you read and evaluate. Your grade will be determined by your responses to the questions below.

Criteria	**Points earned**	**Points possible**
Student explains concept of ecological footprint and contributing factors.		2
Student states and uses his or her own ecological footprint as an example.		2
Student identifies three major contributors to his or her own footprint and explains why they are significant.		6
Student explains the science behind the three factors identified above.		6

Student suggests realistic ways to reduce or eliminate the negative effects of the three identified factors.		6
Address potential counterarguments for each factor and suggested change above.		6
Tone and complexity are appropriate for audience.		2
Total		30

Provide answers to the following on notebook paper (5 points each):
1. What was the author's strongest argument? Why?
2. What was the author's weakest argument? Why?
3. How well did the author explain the science behind the topics addressed? Give at least two specific examples.
4. How clearly did the author present his or her ideas? Explain.
5. How well did the author pull together all of the information to make a solid argument and a suggestion for change?