Topics

Can hybrid or electric vehicles fully replace gasoline-powered ones by 2040?

Remember that, to the extent possible you should address not only support for the proposition in question but also challenges to them.

RESEARCH REVIEW DETAILED OUTLINE

To Do:

OUTLINE a Research Review on your topic, including the following sections:

1. Title
2. Abstract
3. Introduction/Literature review
4. Body (approximately 3 main themes)
5. Conclusion
6. Literature cited

Use **12-point Times New Roman** font and 1-inch margins.

Include a minimum of **8 in-text citations**, **at least 5 of which, must come from a scientific journal article**. *Science, Nature, Ecology, American Naturalist, Geoscience, Conservation Biology, TRENDS in Ecology and Evolution,* and *Global Environmental Change* are good examples and there are many, many more. Note: WileyOnline, Springer and others are NOT scientific journal names (they contain many journal articles). Download the full PDF of an article to see the journal title.

Reminder: References must come from: reputable news sources, books and scientific journal articles (2 min). Do not include youtube videos, blogs, Wikipedia or other non-credible online sources.

HOW TO CREATE AN OUTLINE

You will write a full sentence outline. Most outlines include short phrases, which are also called topic outlines. However, using full sentences can help you better understand your ideas. If you're writing a paper based on your outline, then full sentences will give you a head start on your final paper. You might use short phrases to quickly organize your ideas but then use those to create the full sentence outline.

PROCESS:

Brainstorm to identify your argument or main ideas. Jot down your ideas, important bits of research, and any questions you might want answered. Write down everything you might include in your outline. You can always eliminate ideas later! Here are some ways to organize your thoughts:

- Freewrite as ideas come to you.
- Create a mind map. This is a visual tool with bubbles or words connecting on a page.
- Write your thoughts on index cards.

Group your ideas together. Review your brainstorming, placing related ideas in the same group. It's okay if you have a lot of information at first. You can always eliminate ideas you realize are unnecessary. These groups will become main points, so narrow your groups down until you have your desired number of main points. For an essay or speech, that often means 3, but a creative piece may have more.

- If you jotted down your ideas or made a mind map, use different colored highlighters to identify ideas that belong in the same group.
- Sort your index cards, if you used them to brainstorm. Put cards with related ideas together. For example, you can put them in stacks, or you can line your cards out in rows to make them easier to read.

Put each group in order from broad ideas to specific details. Broad ideas are more likely to be your main points, while details are the bits of information you will use to support those ideas. Depending on the purpose of your outline, you may have many subpoints and supporting details. However, aim to have at least 2-3 subpoints and 2-3 supporting details for each main idea. Assume that you are writing a research paper about the importance of kelp forests to coastal ecosystems and marine life in the Monterey Bay:

- Your main point could be that kelp is part of an integrated ecological system that provides food and shelter to fish which, in turn feed predator species as well as birds that live on the coastal margin, and that changes in water temperatures due to climate change threaten to undermine or destroy these coastal ecosystems.

- Pick subtopics with the most supporting materials, and lead with these. From there, order your major subtopics so each one naturally flows into the next.
- One section could address the life cycle of kelp and its role in the ecosystem, and the role of water temperatures in fostering viable marine conditions.
- If you're including a historical background--why and how the current situation has developed, for example--a chronological section might make sense.
- Your broad subtopics should connect back to your thesis or controlling idea. If they don't, rewrite your thesis to reflect the main ideas you're putting into your outline.

Outline your introduction as the first main point. Using full sentences. Some people prefer to write out their introduction, which is also okay for this outline. Here are the points you need in your introduction

- Hook to grab the audience - this needs to be *fact based* in a STEM paper, *not* based on emotion or opinion. Double check yourself on this- many student papers are too flashy in the hook. Avoid references to popular culture or television or movies.
- 3 of the main themes that you will discuss in your paper about your topic
- Thesis - what do we need to find out about this topic and why?
- Each point in the introduction should probably include an in-text citation (APA style) so it is clear where this information came from. Then the full APA style reference will be included in the Literature cited section (this is also required for your outline).

Create your body headings, if you haven't already. The outline headings are your main points. You'll label these headings with Roman Numerals for an alphanumeric outline (I, II, III) or with Arabic Numerals for a decimal outline (1.0, 2.0, 3.0). These ideas should be drawn directly from your thesis or controlling idea. These will include your:

- **Main point 1 (use actual descriptive subject)**
- **Main point 2 (use actual descriptive subject)**
- **Main point 3 (use actual descriptive subject)**

Write at least 2 subpoints for each main idea. Your subpoints are the second level of your outline, so you'll label them as A, B, or C for an alphanumeric outline or to 1 decimal place for a decimal outline (1.1, 1.2). These are the ideas that further explain your main point.

- Depending on your topic, you might have more subpoints.

Add at least 2 supporting details for each subpoint. Supporting details back up or illustrate the point you're making. Do ***not*** include direct quotes! Do include statistics, facts, or examples. This is the third level of your outline, so you'll use Arabic Numerals for your alphanumeric outline (1, 2, 3). For a decimal outline, you'll go to 2 decimal places (1.1.2).

- In an essay, this is often where you "prove" your argument. In a STEM paper – do not use the word "prove" – instead *present evidence* and state what hypotheses or theories are *supported by* that evidence

Include more layers of your outline, if necessary. Most basic outlines will include 3 layers, but you may need more. If this is the case, you can continue creating sublevels using the formatting structure. For example, you might need more layers to provide more details.

Outline your conclusion Don't expect to write out your final conclusion, as it will be much easier to write it once you've completed the review. However, it's a good idea to start organizing your thoughts. Your subpoints might include the following:

- Restate your thesis.
- 2-4 summarizing sentences of the main findings.
- What (1-2 ideas) do we still need to learn about the topic (future directions)
- Write a concluding statement. What does your research review add to what we already know? What does it *mean* for that ecosystem, habitat, organism, humanity etc.?

Literature cited: Include a full APA formatted reference list.

Edit and proofread your outline. Check for typos, grammatical errors, and formatting flaws. This will help you to get full credit for your work. Keep in mind that it's okay to have sentence fragments if you're making a phrase outline – but the ideas must be well formulated.

- It's a good idea to have someone else check it for errors, as it's often hard to recognize errors in your own work.
- While you edit your outline, refer back to your assignment sheet or rubric to make sure you've completely fulfilled the assignment. If not, go back and correct the areas that are lacking.

SECTIONS FOR RESEARCH REVIEW OUTLINE

I. Title
II. Abstract - an abstract should articulate in 250 words or less
    A. The importance of the topic (background)
    B. The need for this review (why putting it all down in one place is useful)
    C. Your findings from the review (results of this body of work)
    D. Conclusions and next steps. What do we need to learn on the topic next? What further research could be done?

III. Introduction/Literature review

A. Importance of research topic
B. A description of the problem
C. Overview of the background research
D. Please include in-text citations for all ideas that are not your own (like: Graham and Moore, 2019).
E. Where does your research fit in? What gaps will it fill?

IV. Body

A. Main topic 1
B. Main topic 2
C. Main topic 3
D. Optional: main topic 4

V. Conclusion

A. Conclusions and next steps synthesizing what we know about the topic, what it means, and where to go next.
B. What do we need to learn on the topic next?
C. What further research could be done?

VI. Literature cited - include full APA style formatted reference list

A. Include a literature cited (references) section at the end of your paper (minimum 5 sources).
B. Every in-text citation from your introduction must be cited in the Literature Cited section.
C. This should follow the formatting discussed in class and found here: http://guides.libraries.psu.edu/apaquickguide/articles
D. If you have any questions about how to appropriately cite something, ask your instructor.

Examples:

Derwing, T. M., Rossiter, M. J., and Munro, M. J. (2002). Teaching native speakers to listen to foreign-accented speech. *Journal of Multilingual and Multicultural Development,* 23(4), 245-259.

Dresselhaus M.S. and I. L. Thomas (2001). Alternative Energy Technologies. *Nature*, 414, pp. 332-337. doi:10.1037/1065-9293.59.3.209

Moore, L.J., B.T. Benumof and G.B. Griggs, (1999) Coastal Erosion Hazards in Santa Cruz and San Diego Counties, California, *Journal of Coastal Research*, 28, pp. 121-139.

EXAMPLE OUTLINE

(IMPORTANT: your outline should include the abstract, have more detail and full in-text citations and literature cited - do not say example X, Y, Z- actually name them and include references)

Title: Climate change and the future of agriculture in California

I. **Abstract** (may be fully written for outline), do not skip as I have done here

II. **Introduction** (also may be fully written for outline, or as below with more detail)

- a. California's agriculture is a crucial part of the state's economic stability.
- b. Agriculture provides X% of California GDP (Reference, year).
- c. Research on climate change and agriculture in California indicates that to date: crops X, Y and Z (Reference et al., year) have been negatively impacted.
- d. Future projections suggest that this will continue to increase in intensity in the coming decades (Reference et al., year).
    - i. Future projection Example 1 – describe (Reference, year).
    - ii. Future projection example 2 -describe (Reference, year).
- e. Economists suggest that farmers will likely close their operation if their ability to grow crops declines by X percent (Reference, year).
- f. This research review evaluates when certain types of agriculture in California's central coast will no longer be viable and outlines some potential solutions.

III. **Body** (expect to include fully expressed ideas with more detail)

- a. California drought history
    - i. Rainfall (source) has declined over X years
    - ii. Rainfall is projected to decline to X level over the next Y years
- b. Research indicated that crops X, Y and Z have the highest water requirements and lowest thresholds for drought (Reference, year).
    - i. Crop X details
    - ii. Crop Y details
    - iii. Crop Z details
- c. Drought intensifies the damaging impacts of agricultural pests

i. Example 1
ii. Example 2
iii. Projections of future impacts of these and other pests

IV. Conclusion

a. This research indicates that California agriculture will be greatly impacted by climate change in X, Y and Z ways. This is likely to change the types of food products grown in California in the future. The California economy may be impacted in X or Y way.
b. These findings are similar to historical trends in agriculture and drought in other regions of the world.
    i. Describe situation in Australia
    ii. Describe outcome
    iii. What are similarities from AUS to US
c. These findings are similar to historical trends in agriculture and drought in other regions of the world.
    i. Describe situation in Australia
    ii. Describe outcome
    iii. What are similarities from AUS to US
d. Describe what can be done to combat climate change in California
    i. Research suggests implementing X policy (source)
    ii. Research suggests implementing Y policy (source)
    iii. Recent developments in sustainable agricultural design are also promising (give examples)
e. What research could be done to fill in our current knowledge gaps?
f. How could those policy changes or new ways of thinking about agriculture impact CA agriculture? Broad statement and link back to introduction.

V. Literature Cited

Derwing, T. M., Rossiter, M. J., and Munro, M. J. (2002). Teaching native speakers to listen to foreign-accented speech. *Journal of Multilingual and Multicultural Development,* 23(4), 245-259.

Dresselhaus M.S. and I. L. Thomas (2001). Alternative Energy Technologies. *Nature*, 414, pp. 332-337. doi:10.1037/1065-9293.59.3.209

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