

Effects of Radiofrequency Waves

Science Grade-Level Expectations

This instructional task addresses content related to the following science grade-level expectations:

- SI-M-A5 Identify and explain the limitations of models used to represent the natural world (SI-GLE 16)
- SI-M-A7 Use evidence and observations to explain and communicate the results of investigations (SI GLE 22)
- SI-M-B5 Explain why an experiment must be verified through multiple investigations and yield consistent results before the findings are accepted (SI GLE 36)
- PS-H-G4, PS-H-G3 Identify positive and negative effects of electromagnetic/mechanical waves on humans and human activities (e.g., sound, ultraviolet rays, X-rays, MRIs, fiber optics) (PS GLE 50)

	Objectives
Task	<ul style="list-style-type: none"> - Evaluate the validity of claims in research summaries on effects of electromagnetic radiation - Interpret conclusions found in research summaries
Sample Student Exemplar Response	

Implementation Tips:

- This task is intended to be integrated into a larger unit that contains hands-on science opportunities, student-led investigations, non-fiction reading, and a variety of other instructional strategies.
- Teachers may choose to use or modify the task as part of an instructional lesson or as a formative or summative assessment.
- Strategic instructional decisions will need to be determined prior to implementation such as:
 - Should the provided text be read aloud to students or read independently by students?
 - Will students work collaboratively or individually to complete the task?
 - What content knowledge and skills will students need to have prior to attempting the task?
 - Does the task need to be modified based on the needs of my students at the time of implementation?

- Read [A Rough Guide to Spotting Bad Science](#)
- Read [A Skeptic's Guide to Health, News, and Diet Fads](#)
- Read the research findings of the first six scientific studies (pages 1-3) published in [Radiofrequency Radiation Research Summaries](#)

Task Part 1

Evaluate the first 6 summaries in [Radiofrequency Radiation Research Summaries](#) to determine which are valid for claiming possible damage to humans from radio frequency radiation. In your response, refer to the research summaries by their sequence (1-6) in the published summaries. Explain your reasoning in determining if each research summary is valid.

Task Part 2

Based on these abstracts, determine what reasonable conclusions can be drawn about health risks in humans from exposure to radio frequency radiation (RFR). Identify each cause and cite evidence of the damages that might occur.

Sample Student Exemplar Responses

Part 1

Summary 2 would be considered valid for claiming possible damage to humans from radio frequency radiation. The research conducted included a good sample size and involved representative samples. A control group was used to validate findings. Data presented from each testing was well documented. The conclusion was supported by the findings in the testing groups.

All other summaries would not be considered valid based on issues with the research. The following points out the flaws in each of the other abstracts:

Summary 1

- Problems with sample size as well as unrepresentative samples used
- Unsupported conclusion

Summary 3

- No human testing
- No control group
- Problems with sample size
- Unsupported conclusion

Summary 4

- No control group
- Conclusion based on correlation and causation
- Selective reporting of data

Summary 5

- Unrepresentative samples
- Small sample size
- Limited findings

Summary 6

- No human testing
- Small sample size
- Unsupported conclusion

Part 2

According to these specific studies, reasonable health risks exist from exposure to radio frequency radiations (RFR) for those living close mobile phone base stations. The radiation may cause lower memory retention, headaches, sleep disturbances, and depression.

According to Summary 2, “The prevalence of neuropsychiatric complaints as headache (23.5%), memory changes (28.2%), dizziness (18.8%), tremors (9.4%), depressive symptoms (21.7%), and sleep disturbance (23.5%) were significantly higher among exposed inhabitants than controls.” The study also concludes from a set of behavioral tests that attention problems and short-term memory may be affected by exposure to RFR. In addition, the study concluded that, “The inhabitants opposite the station exhibited a lower performance in the problem solving test (block design) than those under the station,” indicating that the location of one’s home when compared to the mobile phone base station may impact the symptoms one displays.

In conclusion, humans should try not to live near mobile phone base stations. If they reside near these stations, they should be examined frequently for early detection of biological effects of RFR.