Science Fair Background Research Paper Template

This editable template is designed for you to complete background research before designing an experiment. Follow the five-paragraph format, use APA 7 citations and references, and type or handwrite your responses in the space provided.

Format Requirements

• Use 12-point Times New Roman font
• Double-space your paper
• Include APA 7 in-text citations (Author, Year)
• End with a reference page in APA 7 format

Note: Avoid using “I” or other personal pronouns in your work as much as possible. This provides an objective view for your research and shows the reader that you are primarily looking into the research of others and sharing it through your own words and interpretation and are not just using your own biases and ideas to investigate your topic.

Paragraph 1 – Introduction

Introduce your topic clearly. Explain what you chose to study and why it interests you. Provide brief background information and finish the paragraph with a focused research question.
Research Question:

Paragraph 2 – Scientific Background

Explain the science concepts or principles related to your topic. Define key vocabulary and describe how these ideas connect to your research question. Support your explanations with APA 7 in-text citations.

Paragraph 3 – What Research Shows

Summarize information from at least three reliable sources (books, journals, or trusted science websites). Compare what different researchers have discovered and highlight common findings. Use APA 7 in-text citations for each source.

Paragraph 4 – Real-World Connections

Explain how this topic applies to real-world uses or careers in science, engineering, or technology. Discuss why this topic matters to people, industries, or the environment. Include at least one APA-cited example if available.

Paragraph 5 – Summary and Next Steps

Summarize the most important facts you learned from your background research. Reflect on how this information could guide an experiment you may design later. End with one or two new questions you would like to explore.

References (APA 7 Format)

Begin a new page labeled References. Use hanging indentation and list all sources alphabetically by the first author's last name.

Example:
Brown, T. (2024). *Thermal effects on materials.* Science Today Press.
Johnson, L. (2023). *Molecular behavior of polymers in temperature change.* Journal of Materials Science, 32(4), 56–63. https://doi.org/10.xxxx
Smith, A., & Lee, K. (2022). *Elastic properties of rubber compounds.* Materials and Engineering Review, 28(2), 102–110.

Student Self-Check

☐ My introduction explains my topic and research question.
☐ I defined key science vocabulary and concepts.
☐ I summarized at least three reliable sources using APA 7 citations.
☐ I connected my topic to real-world examples.
☐ I ended with a clear summary and next-step idea.
☐ I formatted all references correctly in APA 7 style.

Science Fair Background Research Paper Example (Formal, Third-Person Version)

Title: How Temperature Affects the Bounce Height of a Tennis Ball
Jordan Smith
Grade 8
School: Target Range School
Date: November 12, 2025

Paragraph 1 – Introduction

Science plays a major role in sports, particularly in understanding how materials respond to environmental changes. Tennis balls, for instance, bounce differently under varying temperature conditions. Observations of this effect led to an investigation of how temperature influences the bounce height of a tennis ball. Understanding this relationship can benefit athletes, coaches, and engineers involved in the design of sports equipment. The central research question guiding this study is: How does temperature influence the elasticity and bounce height of a tennis ball?

Paragraph 2 – Scientific Background

The bounce of a tennis ball is governed by the principles of elasticity and energy transfer. When a ball strikes the ground, a portion of its kinetic energy is temporarily stored as elastic potential energy in the rubber shell and then released as it rebounds (Johnson, 2023). Temperature alters the flexibility of the rubber molecules, affecting how much energy the ball can store and release. Warm conditions increase elasticity, while cold conditions make the rubber more rigid and less responsive (Smith & Lee, 2022). The gas inside the ball also expands or contracts depending on temperature, influencing internal pressure and bounce height (Brown, 2024).

Paragraph 3 – What Research Shows

Research consistently demonstrates that tennis balls bounce higher at elevated temperatures. Brown (2024) reported that increasing temperature raises the internal air pressure of a tennis ball, producing stronger rebounds. Laboratory experiments conducted by Johnson (2023) showed that rubber polymers exhibit greater flexibility when molecular motion increases with heat. Smith and Lee (2022) found that balls stored at 30 °C bounced an average of 12 percent higher than those kept at 5 °C. Collectively, these findings indicate that both air pressure and rubber elasticity contribute significantly to the effect of temperature on ball performance.

Paragraph 4 – Real-World Connections

Knowledge of how temperature affects tennis ball performance has direct applications in athletics and equipment design. Players competing in different climates must adjust strategies based on changes in bounce and speed. Manufacturers conduct temperature-controlled testing to ensure that tennis balls meet international performance standards (United States Tennis Association [USTA], 2023). Engineers apply this research when developing materials that maintain consistent performance across a range of conditions. Similar principles apply to other air-filled sports equipment, including basketballs and soccer balls, which also depend on internal pressure and material elasticity.

Paragraph 5 – Summary and Next Steps

Existing research demonstrates that temperature influences both the internal pressure and the flexibility of a tennis ball's rubber shell, directly affecting bounce height. These findings suggest a clear link between thermal conditions and performance outcomes. Future research could explore additional environmental factors, such as humidity, to determine how moisture may influence surface friction, elasticity, and energy transfer. Testing under controlled conditions would help clarify how combined variables impact material performance and bounce behavior.

References (APA 7 Format)

Brown, T. (2024). *Thermal effects on materials.* Science Today Press.

Johnson, L. (2023). *Molecular behavior of polymers in temperature change.* Journal of Materials Science, 32(4), 56–63. https://doi.org/10.xxxx

Smith, A., & Lee, K. (2022). *Elastic properties of rubber compounds.* Materials and Engineering Review, 28(2), 102–110.

United States Tennis Association. (2023). *Regulations for tennis ball performance.* USTA Technical Standards. https://www.usta.com