

ScienceNews

Activity Guide for Students: Exploring Materials

Directions:

In this activity, you will read and summarize an article about the history of materials science and engineering. You will discuss with your class what materials are and how many scientific disciplines contribute to the development of new materials. For the last part of the activity, you will work in groups to research an engineered material and create a museum-style exhibit describing that material.

The setup

After reading the *Science News* article "[Materials that made us](#)," answer the guiding questions below, including writing an article summary. If you need help summarizing, your teacher can provide additional resources.

Guiding questions

1. What is the article's main point?
2. What three categories of human activity does the author focus on to support the main point?
3. What materials are identified in the article as transforming human activity in one or more of the three categories? Identify at least one material for each of the three categories.
4. Summarize the section "Can we clean up?" in one paragraph.
5. Write a three-paragraph summary of the article's main points.

Class discussion

As a class, discuss the *Science News* article. Answer the following questions during the discussion.

1. The article defines “materials” as “substances having properties which make them useful in machines, structures, devices and products.” List five examples of materials given in the article. Try to name the material itself and not the machine, device or product that includes the material.
2. How is the science of materials cross-curricular? Explain how each of the following scientific disciplines contributes to materials science: physics, chemistry, biology, environmental science and medicine.
3. The author concludes the article by looking forward to materials advances that might occur in the future. Which of those possible advances is most interesting to you? Why?

Research

With your group, use internet resources or other resources to research an engineered material and its properties. Focus on the most reliable sources and cite those sources in your research and presentation. Answer the following questions as you do your research.

1. Look around you and find or brainstorm a material that interests you. Think about building materials, transportation, the health and beauty industry, the food and beverage industry, agriculture, the medical and pharmaceutical industry, science and exploration, aviation and space flight, environmental protection and remediation, technology or another field. What material will you research?
2. What can you find out about the material’s composition and structure? What element(s) is the material made of and how are the atoms or molecules arranged?
3. What about the material’s composition makes it useful?
4. Pick a specific machine, device or product that contains the chosen material. What is the machine, device or product used for? List all the materials in it.
5. How does your chosen material help make the machine, device or product useful?

6. Why was the material you selected developed, and how has it evolved over time?
7. Does the material have any unexpected or surprising properties or uses?
8. Does the material pose any problems to society, culture, human health or the environment?
9. Have there been any innovations to address any problems caused by the material?

Presentation

After you have researched an engineered material, create a museum-style exhibit about the material you researched and the machines, devices or products that use the material. As part of your exhibit, create a poster and include a picture or video of the material you researched. You might also bring in a sample of the material or a product or device that includes it.

Set up your exhibit in the classroom so that it can be viewed by your classmates. Walk through the "museum" and explore the different exhibits. Answer the following questions as instructed by your teacher.

1. How have technological advances driven the production of new materials?
2. What patterns do you observe between why materials are conceived and developed and the impacts and policies that follow that development?
3. What patterns do you observe in who develops new materials?
4. What similarities can you identify in the composition and structure of different materials and how they are used (or the functionality they provide to a device or product)?



© Society for Science & the Public 2000–2022. All rights reserved.