Materials History Timeline:
Lab Activity
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Overview
In this lesson, students will construct a timeline of the history of materials science.

Science Standards Addressed
E.1 Abilities of technological design
F.5 Science and technology in society
G.3 History of science
Goals/ Objectives

• Students will construct a timeline of the history of Materials Science.

Materials and Equipment

• 10 meters of poster paper
• Tape
• Pencil or pen
• Markers, crayons, colored pencils
• Scissors
• Meter stick
• A copy of Materials Footnotes Through History
• “Caveman” cartoon

Key Vocabulary Words

Stone Age- A broad prehistoric time period during which humans widely used stone for tool making. This period began somewhere around 2.5 million years ago with the first hominid tool makers in Africa, and ended around 4000 BC with the advent of metallurgy

Iron Age- The prehistoric period during which cutting tools and weapons were mainly made of iron or steel, starting around 1200 BC.

Metallurgy- The study of metals and metal alloys

Smelting- A process used to extract metal from ores. Most smelting methods require high temperatures

Safety

None of the materials in this activity are harmful, but remind students to always work safely in the laboratory

Procedure (total estimated 2 hrs)

Set-Up (5 minutes)
Prepare “Caveman” overhead. Have background information on hand to answer questions.
During (two 1 hr class periods)
The teacher shows the students a picture of the “first” materials scientists, cavemen. (Show on overhead transparency, computer, or possibly Promethean Board)

http://www.woodexbearing.com/images/caveman.jpg

Ask the students:
- What is this caveman doing?
- What is the caveman thinking?
- What type of materials is he using?
- What do you think he is trying to do?

Now that the students are engaged and thinking, the teacher should read some background information about materials science and how humans have been using and developing materials for at least 10,000 years of recorded history.

The teacher shows the students an overhead transparency that contains dates and contributions to materials science from 8000 B.C. to 1940 and asks:
- What do you notice about this list?
• Are there things that you have seen or heard about before?
• Are there things that you have not seen or heard about before?

The teacher answers questions and allows for a discussion about materials science, then asks:

• Is there a creative way that can we organize this information visually?
• Why would it be useful to organize this information?

Hopefully, students suggest a timeline. If not, several suggestions can be discussed to decide why they may or may not work. If necessary, the teacher suggests a timeline and asks:

• Why are timelines helpful when organizing or representing historical events?

The teacher does not confirm or reject any answers (that is reserved for after the activity). The teacher divides the students into groups of 4-6 give the students the paper, tape, meter stick, and a copy of the Materials Footnotes Through History. Students are given 5-10 minutes to brainstorm ways to structure their timeline. The teacher asks:

• How do you plan to organize your information on the timeline?
• Why do you have 10 meters of paper?
• Should all of the events be spaced equally apart?

The students should recognize that all of the events did not occur in a linear pattern over the years, but his might be a stretch. The teacher should allow 5-7 minutes for students to develop ideas about the scale, but if it proves too difficult, give the scale:

1 meter = 1000 years
The students then spend the next 1-2 class period constructing their timelines. If classroom computers are available, the students can look up the events and illustrate their timelines.

The teacher explains how timelines, when drawn to scale, can show patterns in events over the years while helping us understand the actual amount of time has passed. If timelines are not drawn to scale, it misrepresents that events occurred in a linear, or even pattern. When students complete the Materials Science Timeline, they can see that most of the contributions to the field occurred in the late 1800’s-early 1900’s.

**Extensions**

The teacher can lead a discussion about why most of the contributions to Materials Science occurred in the late 1880’s-early 1900’s. In groups, students can write down some ideas. The teacher can compare contributions to Materials Science with other fields, such as the Automotive Industry, Technology, or Farming, and lead students to realize that people were learning more about chemistry and physics, and therefore were able made advancements in Materials Science as well as other fields.

**Assessment Examples**

The teacher can evaluate this activity in different ways (examples are included)

- **A rubric** (roles are assigned in groups, students are graded on a point scale~ students can evaluate each other’s timelines using the rubric)
- **A constructed response on a unit test**
- **A presentation of part of the timeline** (different groups can be assigned different eras to explain)
Rubric for Materials Science Timeline

<table>
<thead>
<tr>
<th>Objective</th>
<th>Excellent (6 points)</th>
<th>Average (4 points)</th>
<th>Below Average (2 points)</th>
<th>Not Included (0 points)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The timeline uses the scale 1 m = 1000 years or one approved by the teacher</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The timeline includes all of the contributions/dates from the handout</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Materials Footnotes Through History</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least 10 of the contributions on the timeline are illustrated</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The timeline is neat, complete, and interesting</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The timeline was turned in by the due date</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total Points

Earned: _____

30
Unit: Science and Society
Subject: History of Science
Grade Level: 5–8
Key topics: History, Stone Age, Iron Age

Evaluator’s Comments: ______________________________________________________

____________________________________________________

____________________________________________________

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____________________________________________________
Humans have been using materials for at least 10,000 years of recorded history, but the real beginning of materials' use was long before recorded history. The first materials scientists were cavemen and women. Even in early times, humans had reasons for choosing wood or stone objects for certain purposes. In class, you constructed a timeline organizing the dates and contributions to materials science over the years.

- Identify one way early humans used wood or stone objects.
- Explain why most contributions to materials science were made during the late 1800’s-early 1900’s.
- Choose any one of the contributions to materials science from your timeline and explain how it was used.
Locating Materials
Materials can be found in local office supplies stores.

Background Information
Background information can be found using the references below.

References
Caveman Picture Woodex Bearings Incorporated
Materials Science and Technology Teachers Handbook (page 1.8) from
   Science Education Programs Pacific Northwest National Laboratory
Sass, Steven L. The Substance of Civilization: Materials and Human History
   from the Stone Age to the Age of Silicon. Arcade Publishing, 1998
material science teachers’ aide

Unit: Science and Society
Subject: History of Science
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Acknowledgements
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