

Tools and Equipment of Science

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The use of equipment and tools in the classroom is an important part of a scientific investigation.

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A companion presentation, "Tools and Equipment of Science" and a downloadable activity, "Metric Madness," in PDF format, is available at <http://www.bioedonline.org/videos/content-presentations/tools-and-techniques/tools-and-equipment-of-science/>

The "Metric Madness" activity allows students to apply the skills of estimation and measurement as they rotate through six activity stations based on the metric system. The activity is best suited for students in grades K-5.

Tools and Equipment

- Tools of the Trade
 - Carpenters use a hammer.
 - Chefs use a whisk.
 - Plumbers use a plunger.
 - Scientists use a microscope.
- Students also must use the tools of science.



Beakers



Thermometer



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It is important for students to be able to use and identify the importance of the tools of science. The type of tool used differs depending on the task at hand. In this vein, the tools that a student would use for a math or social studies class is different from the tools they would use for a science investigation.

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Abilities for Scientific Inquiry

“Students must be able to employ simple equipment and tools to gather data and extend the senses.”

National Science Education Standards. National Research Council, 1996.



Tape measure, ruler, meter stick



Lab balance



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The ability to use simple equipment is employed as National Science Education Standard and is a basic necessity in conducting scientific investigations.

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Elementary Science Equipment

- Observation tools: Hand lens, simple microscope
- Metric measurement tools: Ruler, tape measure, laboratory balance (such as a triple beam balance; sometimes called a balance scale), thermometer
- Other tools and equipment: Computer, calculator, timer, clock, camera, sound or video recorder, compass, hot plate, beaker, graduated cylinder, safety goggles, apron, collecting net



Magiscope



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Although there is a great variety of scientific tools that can be used, some equipment is essential and should be found in every elementary science classroom.

This includes observation tools such as hand lenses and simple microscopes which allow students to view objects at a greater magnification.

Measurement tools; such as rulers, balances and thermometers, help students measure different properties of objects.

There is also other miscellaneous equipment which is necessary for the classroom, including a computer, calculator, compass, hot plate, beaker, graduated cylinder, safety goggles, and apron. Other safety equipment should be incorporated into the classroom as needed.

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Introducing Tools and Equipment

There are several different ways to introduce them to different tools by using specific activities.

- Tools inventory
- Tools sort
- Diagrams
- Scenarios
- Graphic organizers with tools
- Game: “Describe that Tool”



Graduated cylinders



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There are several different ways to involve students and introduce them to different tools.

By taking a tools inventory, students can observe tools and discuss the possible uses of the tool, as well as where they may have seen the tool before.

Students may also sort tools by different properties (appearance, measurement volumes, what they measure) to help reinforce their understanding.

Students can also create a diagram, or draw the tools onto a poster and then label them. For a more hands-on activity students can discover which tool is best for different scenarios. For example, if collecting specimens from outdoors they might find that a hand lens or microscope helps them observe small details more clearly.

Graphic organizers with all the tools listed can be useful, as can different games. In a “describe the tool” game, the teacher can give hints describing the tool while the students try to guess which tool is being described.

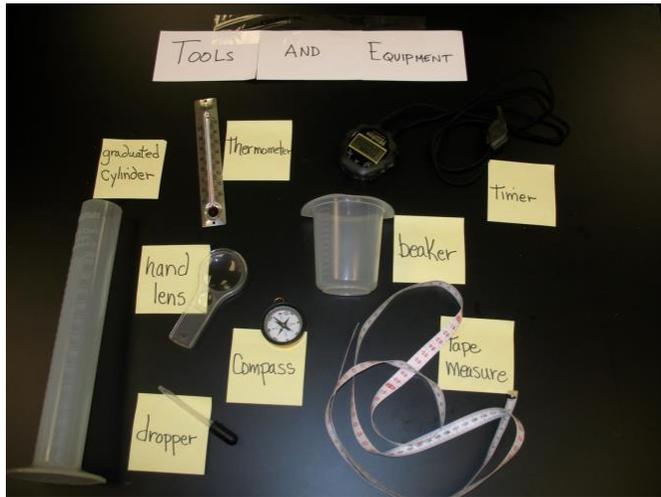
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Create a Tools and Equipment Wall



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Posting tools with labels in a visible area can help reinforce the names of the different tools for the students, and get them more familiar with what the tools look like.

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Add Vocabulary



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Another useful idea, especially helpful for ESL students, is to focus on a certain tool and list all of the vocabulary words that might be associated with the tool. The words, and if possible the tool, may be posted somewhere visible in the room.

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Science Tools and Equipment

- Make science equipment and tools readily accessible to your students.
- Use vocabulary related to tools and equipment as often as possible, and in a variety of contexts.
- Allow students to plan ahead and select appropriate tools for their investigations.



Hand lens



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A simple way to making the students comfortable and familiar with the tools is to have the tools readily available and available for the students whenever needed.

Associated vocabulary should be incorporated into the classroom as often as possible. Teachers can also allow students to decide the appropriate tools they should use for each investigation.

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