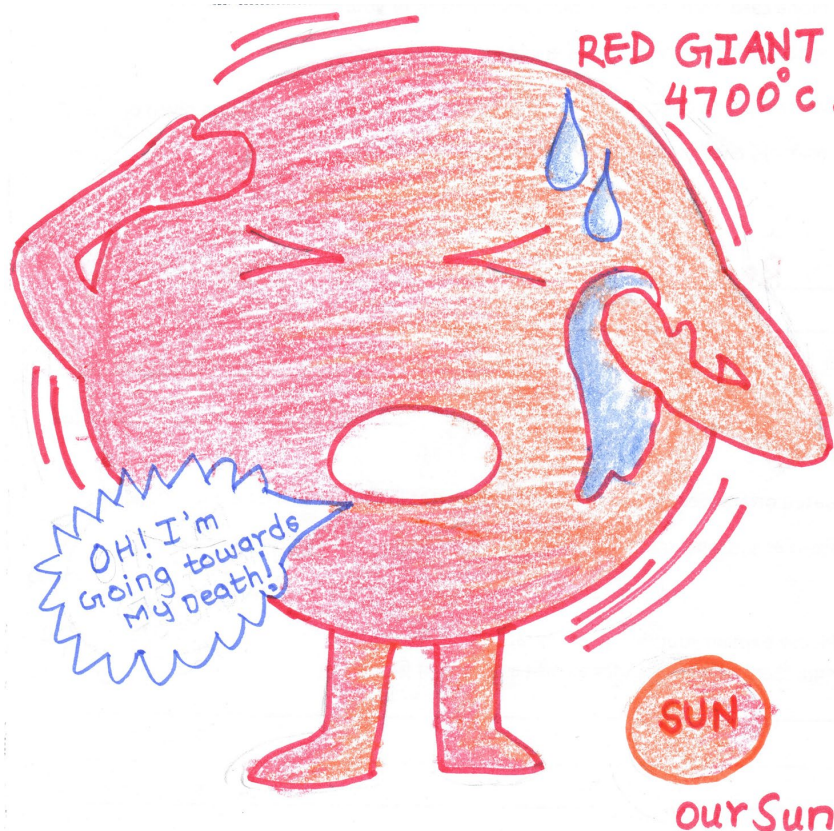


Science Characters



Design a symbolic science character based on the description of a science term. This can be done individually or in groups.

Requirement: A set of flash cards with science terms and their meanings. You may highlight a few terms in the description, if required.

For example: Red Giant

A 'red giant' is a huge star which is red in colour, and is approaching the end of its life. This phase occurs in all stars except the biggest ones. In this phase, the outer layer of the star starts expanding making the star much bigger than its original size. The surface temperature of a red giant can be as high as 4700 Celsius.

Science Characters

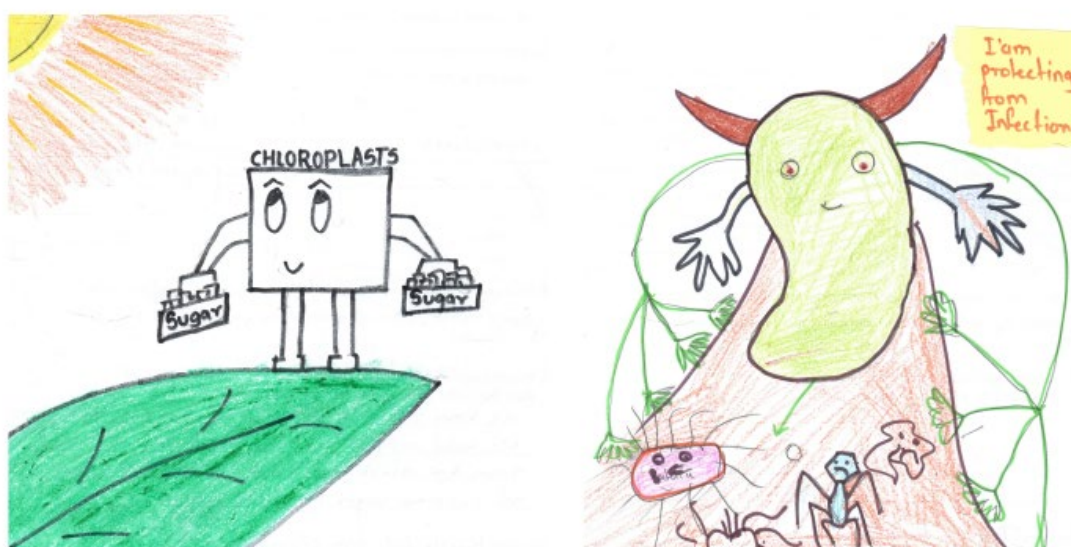
More Examples

Chloroplasts: These are small organelles inside the cells of plants and algae. They absorb light to make sugar in a process called photosynthesis. The sugar can be stored in the form of starch.

Covalent Bond: A covalent bond is a powerful chemical bond that involves the sharing of electron pairs between atoms. The balance of attractive and repulsive forces between atoms, when they share electrons, is known as covalent bonding.

Lymph nodes: These are small bean shaped (or kidney shaped) organs. They play a vital role in our body's ability to fight off infections. They function as filters, capturing viruses, bacteria and other causes of illnesses before they can infect other parts of our body.

Mitochondria: Mitochondria are rod-shaped cell organelles that convert oxygen and nutrients into Adenosine Triphosphate (ATP). This is why they are also called the Power House of the cell. It is the site of respiration. It stores energy in the form of ATP molecules.



All the sketches in this document are works of students, designed by them during National Science Day 2019

Science Characters

Background

Children drawing while learning has been proposed as an effective learning strategy to process information (Weinstein & Mayer, 1986; Pashler et al., 2007). Studies show that children-led or children generated drawing supports understanding across a variety of learning areas and age groups (Lesgold et al., 1977; Van Meter & Garner, 2005; Ainsworth et al., 2011).

According to the ICAP framework (Interactive, Constructive, Active, and Passive), creating drawings requires the ability to generate a visualization (Chi & Wylie, 2014). Visualization is both a cognitive and a creative process. It enables the generation, interpretation, and manipulation of information through spatial representation (Dahl et al., 2001). In the process of generating a new visual, children indulge in deeper understanding of the text and then externalize their understanding using drawings. The new image may thus include information that goes beyond the provided information and can contain ideas that are not explicitly stated in the text (Chi & Wylie, 2014).

References:

- Ainsworth S., Prain V., & Tytler R. (2011). Drawing to learn in science. *Science*, 333, 1096-1097.
- Dahl, D. W., Chattopadhyay, A., Gorn, G. J. (2001). The importance of visualisation in concept design, *Design Studies* 22(1), 5-26.
- Lesgold A.M., DeGood H., & Levin J.R. (1977). Pictures and young children's prose learning: A supplementary report. *Journal of Reading Behavior*, 9, 353-360.
- Chi, M. T. H., & Wylie, R. (2014) The ICAP Framework: Linking cognitive engagement to active learning outcomes. *Educational Psychologist*, 49(4), 219-243.
- Pashler H., Bain P., Bottage B., Graesser A., Koedinger K., McDaniel M., Metcalfe, J. (2007). Organizing instruction and study to improve student learning. National Center for Educational Research, Washington, DC.
- Van Meter P., & Garner J. (2005). The promise and practice of learner-generated drawings: Literature review and synthesis. *Educational Psychology Review*, 12, 261-312
- Weinstein C.E., & Mayer R.E. (1986). The teaching of learning strategies. In M.C. Wittrock (Ed.), *Handbook of research on teaching* (pp. 315-327). NY: Macmillan.