

“Once upon a time ... a beach sand grain”: a bed-time story and scientific outreach activity for toddlers to increase sediment literacy

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Introduction:

Scientific literacy is the ability to use scientific knowledge to identify questions and draw evidence-based conclusions to understand and make informed decisions about the natural world [1].

NSTA affirms that learning science in early years can foster children’s curiosity and enjoyment in exploring the world around them and lay foundation for progression of science learning [2]. Recent works have identified that storytelling is an effective way of communicating geoscience with children (e.g. [3]).

Here, we present an example of a tailored pre-school scientific activity that is aimed to increase literacy about sediments and to show how important they are to us humans and to nature. The activity comprises a bed-time story and the observation of different sand grains, and it has been developed for preschoolers and adaptable for primary school students.

Methods:

The activity was structured so that basic concepts about sediments could be conveyed with adjustments to children with 2 to 8 years old, using as main theme a story about a grain of sand (the main character) and its journey from the mountains, where it was “born”, to the bottom of the sea. The story develops over 12 pages, with simple phrases, accompanied with cartoon images (Fig 1). The story revolves around:

1) Erosion – the grain of sand is born larger and with more angular edges, and becomes smaller and rounder with time, distance of travel and effect of water (environment); 2) Source to sink – the grain of sand is born on the mountains, travels through rivers until it reaches the beach and will be later deposited at the bottom of the ocean; 3) Different type of sand – the story also talks about different grain composition.

Complementing the main activity there are (A) information cards that communicate about different environments where sand can be found (e.g., beaches, deserts) and the importance of sand as a resource (e.g., for construction, for leisure); and (B) different types of sand to be observed under a geology hand lens.

Results and Discussion: Until now, the activity was repeated 3 times, reaching ~30 children. It provided good results both with pre-school and primary school

students, as they were engaged in the story and enjoyed handling and seeing the magnified grains.



Fig. 1: Bed-time story for creche children (age 2 to 3 years old).

In what concerns the follow up of the information, the toddlers could remember the story and relate it to nature up to 6 months. After that, toddlers forgot the story. This is expected because to effectively build science understanding, young children need opportunities for sustained engagement with materials and conversations that focus on the same set of ideas over weeks, months, and years [2]. Primary schoolers remembered the information and the story longer and more precisely.

References:

- [1] Li & Guo (2021) *Frontiers in Psychology* 12: 758000 doi: 10.3389/fpsyg.2021.758000.
- [2] NSTA (2014) *NSTA Position Statement: Early Childhood Science Education*. 5pp. <https://www.nsta.org/nstas-official-positions/early-childhood-science-education>
- [3] Matias et al. (2020) *Geoscience Communication* 3, 2: 167-177. doi: 10.5194/gc-3-167-2020.

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