

Funds of Knowledge

READING – Funds of Knowledge Excerpts

Building on Prior Interest and Identity

Research suggests that personal interest is an important factor in children's involvement in learning science [52, 53]. Educational experiences designed to leverage the personal interests of learners have been used to increase the participation of girls in middle school [41], of urban high school youth of color [28], and of elementary school children from immigrant families [40]. Tai and colleagues' nationally representative study of factors associated with science career choices suggested that an expressed interest in science during early adolescence is a strong predictor of science degree attainment [54]. But even though early interest in science does not guarantee extended learning in science, early engagement can trigger students' motivation to explore the broader educational landscape and pursue additional experiences that may persist throughout life.

Learning science depends not only on the accumulation of facts and concepts but also on the development of an identity as a competent learner of science with motivation and interest to learn more. As Lave and Wenger explain, "Learning involves the construction of identities. [It is] an evolving form of membership" [55]. Such identity formation is valuable not only for the small number of students who, over the course of a lifetime, will come to view themselves as scientists or engineers but also for the great majority of students who do not follow these professional paths. Science learning in school leads to citizens with the

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confidence, ability, and inclination to continue learning about issues, scientific and otherwise, that affect their lives and communities.

For these reasons, instruction that builds on prior interest and identity is likely to be as important as instruction that builds on knowledge alone. All students can profit from this approach, but the benefits are particularly salient for those who would feel disenfranchised or disconnected from science should instruction neglect their personal inclinations.

Leveraging Students' Cultural Funds of Knowledge

Particular cultural groups frequently develop systematic knowledge of the natural world through their members' participation in informal learning experiences, which are influenced by the groups' history and values and the demands of specific settings [12]. Such culturally influenced ways of approaching nature reflect a diversity of perspectives that should be recognized in designing science learning experiences. Although some kinds of culturally valued knowledge and practices (including spiritual and mystical thought, folk narratives, and various accounts of creation) are at odds with science, a growing body of published research, briefly described below, shows that some of the knowledge derived from varied cultures and contexts provides valid and consistent scientific interpretations. This literature includes evidence from cultural psychology, anthropology, and education [12].

An emerging consensus in education scholarship is that the diverse knowledge and skills that members of different cultural groups bring to formal and informal science learning contexts are assets to build on [9, 12]. For example, researchers have documented that children reared in rural agricultural communities, who have regular and often intense interactions with plants and animals, develop a more sophisticated understanding of the natural world than do urban and suburban children of the same age [56]. Other researchers have identified connections between children's culturally based stories and the scientific arguments they are capable of making [50, 57]. Such research suggests that educators should accept, even enlist, diversity as a means of enhancing science learning [58].

<https://nap.nationalacademies.org/read/13165/chapter/16#287>

Choice 1: Review this slide. Think of a recent learning sequence you provided in science. Spend time thinking/reflecting about the Teacher's Critical Reflection Questions.

Funds of Knowledge: Incorporating knowledge, language, lived experiences, and different ways of knowing science to position students as valuable contributors.

Students' Cultural Expertise

- Students have many ways they engage in meaning-making that. These may be narrative, non-linear, divergent, multiscale and more.
- Students diverse ways of thinking, cultures, and languages are strong assets and can enrich the science community in the classroom.

Teachers' Critical Reflection

- Whose perspectives are reflected in this work? Whose are absent?
- What assumptions are being made?
- Whose interests are served? Whose are not?
- Whose values are being transmitted?
- Who has power in this situation and where does it come from?

Choice 2: Review the chart. What dimensions of the table resonate with you? Challenge you?

Let's broaden how we conceptualize science and challenge our own perspectives / education. What dimensions of this table resonate with you? Challenge you?

Reflective Dimensions of Critical Consciousness & Cultural Awareness	Western Science can be about....	Other Perspectives of Science Invites...
Who?	Scientists, people with degrees in science, white identities.	Youth, multi-generational relations, community members, multispecies
What?	Experimental investigations	Nature walks, stories
Where?	Laboratory, field	Home, neighborhoods, community spaces
Why?	Economic output, competitive progress, advancements	Collective well-being, living in harmony with the universe
Resources?	Textbooks, talks, academia	Family members, communities, cultural knowledge, everyday experiences, ecosystems

Choice 3: Look at the examples of tasks/student work. What did you notice about the tasks and student work in relation to funds of knowledge

1st Grade Example:

setting sun.

Here's your family homework: Do you have friends or family members who live someplace other than Washington state? If so, what would their sky look like if you called them right before your students' bedtime? Take a few moments to discuss with your students about where those friends or family live and what their sky would look like if you were to call them from Lynnwood, WA. Please write a small paragraph of what was discussed below and send it back to school with your student.

Across the North Pacific Ocean, our relatives live in South ~~Carolina~~ Korea, a small country on the other far side of the world map. When it is Sia's bedtime in the United States, it is slightly past noon in Korea. The sun is up and the skies appear to be bright blue. Sia and I discussed how the skies look drastically different between ours and our relatives' in Korea.

và bầu trời của các em thấy như thế nào.

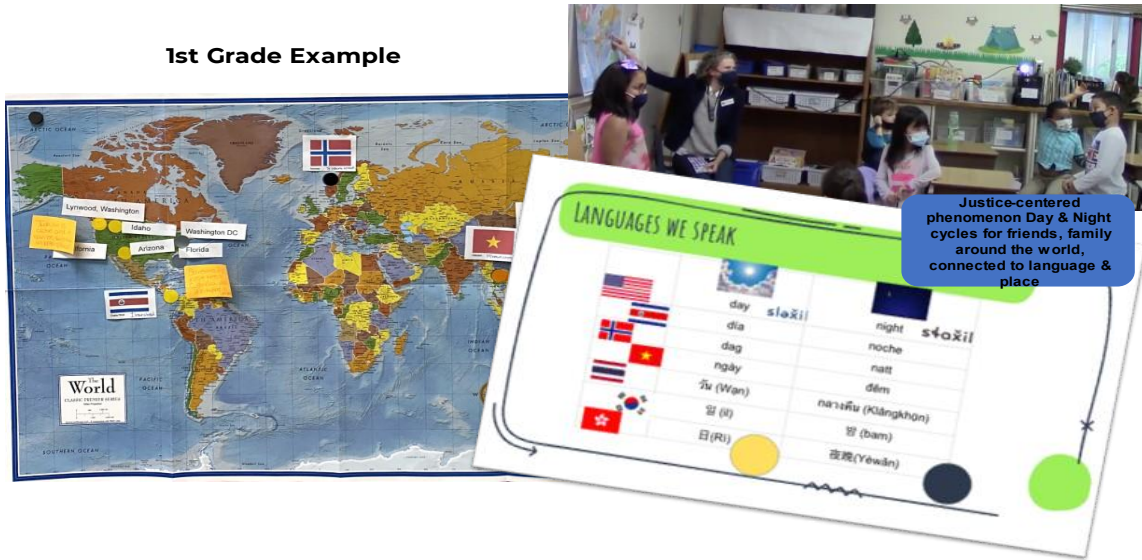
Đây là bài tập về nhà dành cho gia đình của bạn: Bạn có bạn bè hoặc thành viên gia đình sống ở một nơi nào đó ngoài tiểu bang Washington không? Nếu vậy, bầu trời của họ sẽ như thế nào nếu bạn gọi họ ngay trước giờ đi ngủ của học sinh? Hãy dành một chút thời gian để thảo luận với học sinh của bạn về nơi bạn bè hoặc gia đình đó sống và bầu trời của họ sẽ như thế nào nếu bạn gọi họ từ Lynnwood, WA. Vui lòng viết một đoạn văn nhỏ về những gì đã thảo luận dưới đây và gửi lại cho học sinh của bạn.

My grandparents live in Vietnam. When I go to bed, the sky in Vietnam is still bright, and I go to school, my grandparents go to bed, me and my grandparents are different in time.

Aquí está la tarea de su familia: ¿Tiene amigos o familiares que vivan en otro lugar que no sea el estado de Washington? Si es así, ¿cómo se vería su cielo si los llamara justo antes de que sus estudiantes se acuesten? Tómese unos minutos para hablar con sus estudiantes sobre dónde viven esos amigos o familiares y cómo se vería su cielo si los llamara desde Lynnwood, WA. Por favor escriba un pequeño párrafo de lo que se discutió a continuación y envíelo a la escuela con su estudiante.

Nosotros tenemos familia en Florida y cuando Sophie llama a su prima después que llega de la escuela, ella puede ver que es de noche y esta las estrellas que en Lynnwood todavía es de día.

1st Grade Example



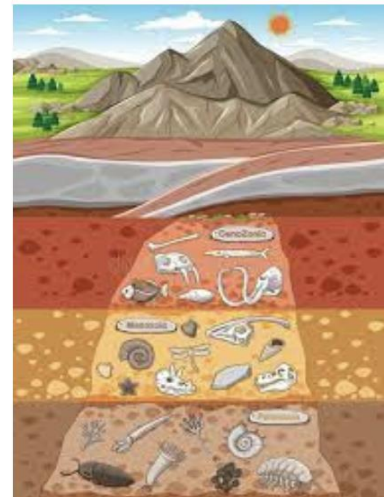
4th Grade Example:

Name: _____ Date: _____

Rocks, Fossils & Landscapes Elicitation

In science, we will be learning about layers of land, fossils and Earth's landscapes. We will be studying how the layers of the Earth form both the features we see, and can't see, below our feet!

Your job is to talk with family and/or friends to learn about personal stories and connections to land, rocks and fossils. You might ask about specific places/landscapes they feel a connection to, or their thoughts about how rocks or fossils are important to them or our community. Also, ask their ideas about how land should be treated. You can write their responses below, and draw your own ideas in the box on the next page!



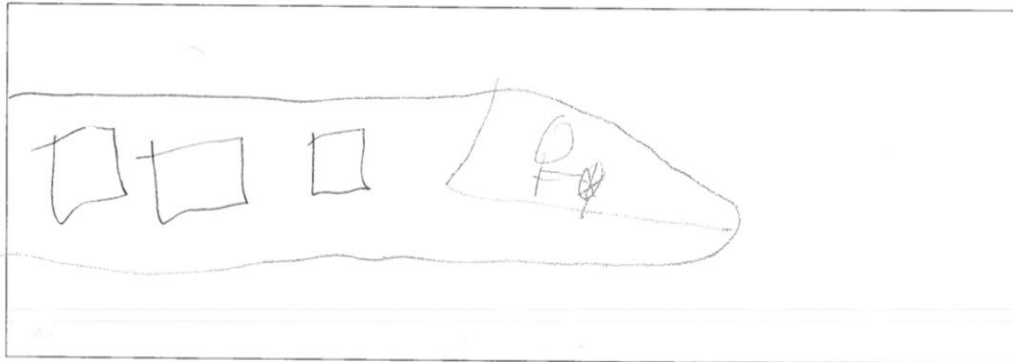
Initials Models:

1) Draw and write about something in your life that this reminds you of:

When I made a lego flying car.



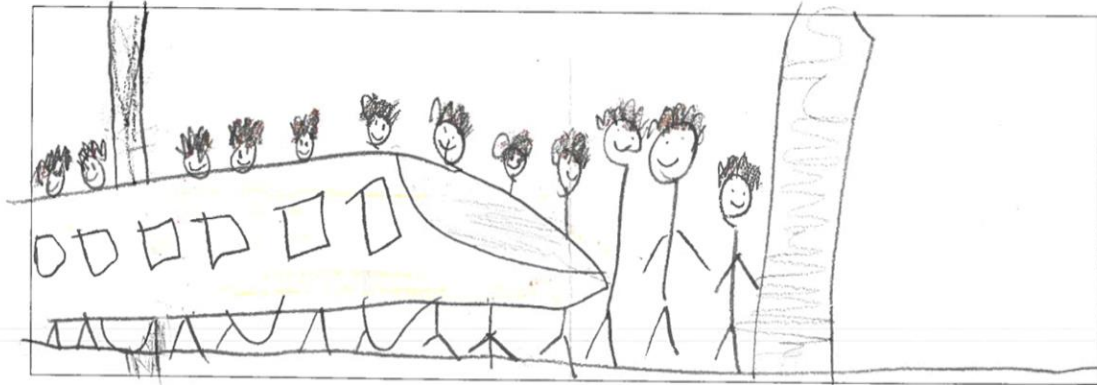
1) Draw and write about something in your life that this reminds you of:



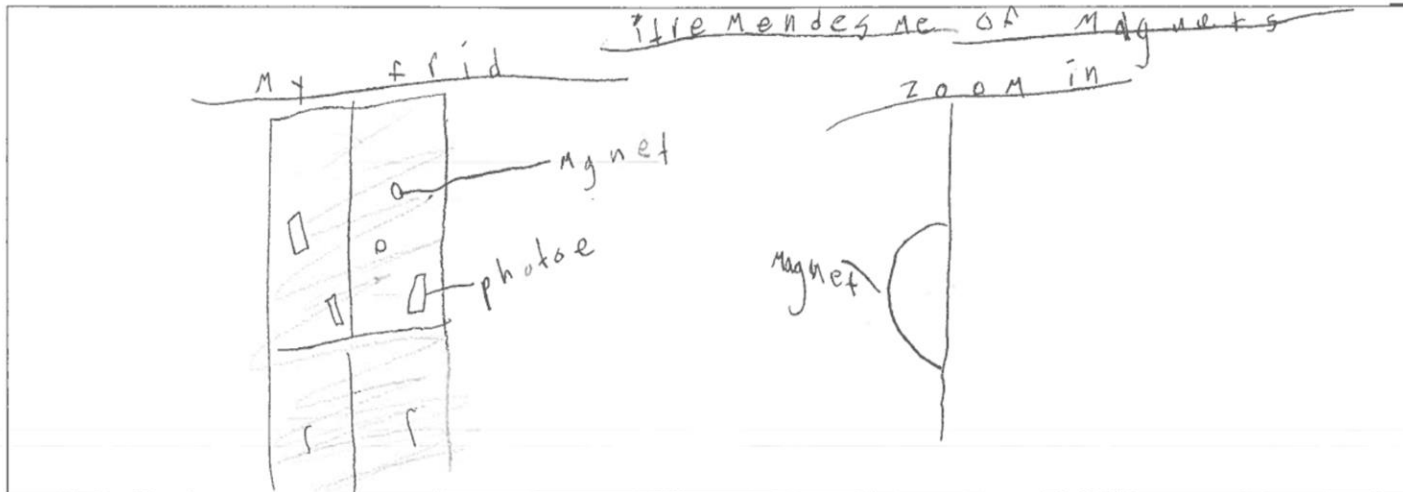
it reminds me of a toy I used
to have

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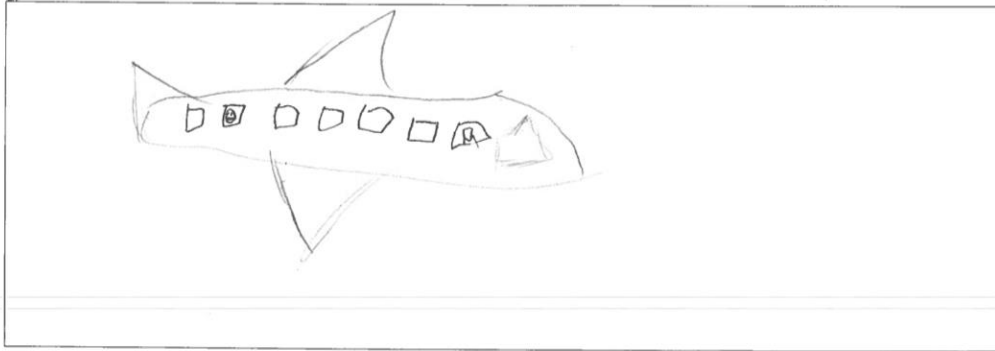
1) Draw and write about something in your life that this reminds you of:



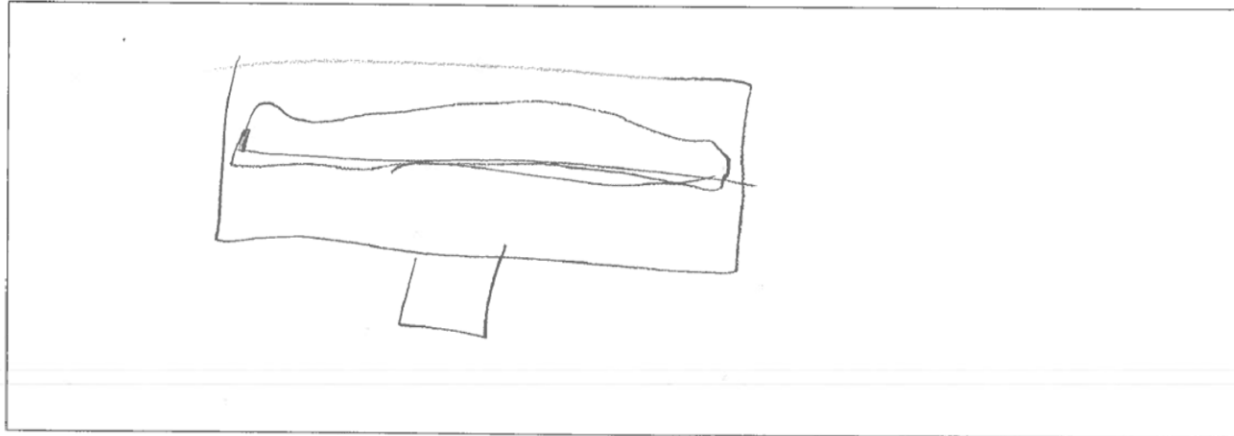
It reminds me of the on rail



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a plane reminds me of the train because it floats.



The hover train in *Incredibles 2*.

Funds of Knowledge Resources:

- <https://nap.nationalacademies.org/read/13165/chapter/16#287>
- Adriana Alvarez, Leah Peña Teeters, William R. Penuel, Moisés Esteban-Guitart, (2023). Considerations to engage a funds of identity approach as a vehicle toward epistemic justice in educational settings, Learning, Culture and Social Interaction, Volume 40, 100718, ISSN 2210-6561, <https://doi.org/10.1016/j.lcsi.2023.100718>.
- Thompson, J. Mawyer, K., Johnson, H., Scipio, D. & Luehmann, A. (September/October 2021). From responsive teaching to culturally and linguistically science teaching. The Science Teacher, 89 (1). [NSTA publication](#)