Seed Dispersal Investigation Overview

These lessons are designed to help students think about how the choices they make in designing an investigation help them understand something about how their seed travels. In these lessons, we hope that they will experience uncertainty, agree and disagree with each other (and the teacher), and make sense of results that may not be what they expected or not definitive.

How students think about the purpose of their work really matters:

- We want students to design and make sense of investigations with the purpose of **figuring something out:** this means that a test in which their seed does not travel is not a failure- it gives information about the seed and how it travels.
- This can be difficult because sometimes students move into a purpose of **making something happen** during an investigation**;** for example, blowing on the seed until it moves. It's not that this is "entirely bad." Trying to get something to happen and figuring out when it happens is a key way engineers work. But it can get in the way of developing fair tests and making sense of results like a berry dropping in front of a fan because it is not a good wind traveler.
- Finally, we want students to think about how they are **representing the backyard** in their investigations to understand something about it. For example, the furry cloth in an investigation can represent furry animals that move in the backyard. But we don't want them or us to get stuck in the idea that we are copying the backyard, which we couldn't ever do. Instead, we're trying to make a test that will help us figure out something about what could happen outside.

Each investigation has the same structure and uses similar tools that help students experience uncertainty in the investigation as productive and bring their ideas about representing the world and making something happen as resources **for figuring out how their seeds travel**. (See teacher notes in lessons for further detail).

Tool/Structure	Rationale	Examples
Making connections back to the investigation question	Students and teachers can easily lose sight of the investigation question. Our lessons keep these clear and consistent. We suggest translating them into multiple languages if you have a multilingual classroom and often referring to the investigation question.	● Ask children to make predictions, e.g. "Which of our seeds do you think might be really good at flying by wind?" "Which do you think might be less good?" ● Ask children, "Which material would be good for helping us figure out if our seeds can travel by sticking to animals?"
Making choices about how to use materials	We have found it is more helpful to provide choices that will elicit key forms of uncertainty than allow children to make all decisions in designing the investigation.	● In the sticking investigation, we've selected materials that have the texture of different animals and materials that *look like* but do not *feel like* animals.
Mistake or outrageous idea	We often demonstrate doing something that will make a seed stick/move but is not a good test for figuring out to help students think critically and cue a figuring out purpose.	● In the sticking investigation, we discuss whether tape would be a good material so that students can note that tape makes all seeds stick, so it doesn't help us figure out if they are good at traveling by sticking.
Students do the test & make sense of results	Students learn a lot by working with the materials and seeing what is happening; new questions and sense-making will come up here.	● As students watch seeds in the water tub, they develop new questions about what it means to float (on the top of the water? In the middle) and whether it counts as floating if something floats for a few minutes and sinks.
Whole group sense-making: Is our seed good at traveling by X?	As students share what they found and make claims about whether their seeds can travel, there is opportunity for disagreement and to connect seed structures to ways of traveling.	● Students might disagree about whether a maple seed can travel by wind- their maple seed did not travel far with a fan but they think that it could if it fell from higher, prompting a discussion of how high a maple seed usually is and a redesigned investigation.
Applying ideas to the backyard	As students apply ideas to the backyard, they develop their sense of scale (how far can seeds travel?) and think further about aspects of the environment that matter.	● Students consider whether it is likely that their seeds travel by water near the school, using a map and considering whether there is a river or ocean nearby

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