

### *Seeds of Life*, a BYKids film, directed by Diya Payal

**Rationale:** Seeds are like nature's time capsules, holding the genetic blueprint of life itself to grow into a new plant. Seeds have evolved various mechanisms for survival and dispersal, ensuring the continuation of plant species. The cycle of life, starting from a seed and resulting in new plants producing more seeds, is fundamental to our planet's ecosystems and our lives as well. Diya Payal's film reminds us that we must protect the life force of seeds by ensuring their survival and we must preserve their biodiversity. It is truly humbling to think that not only can a tiny seed bring us new life, but also that, crucially, life on Earth can depend on a tiny seed.

#### ***Seeds of Life***

Diya Payal, a 14-year-old in India, explores how biodiverse farming keeps us in harmony with our environment and ourselves.

Diya tells the story of generations of Indian farmers who live off the land and sell the surplus, and the importance of maintaining traditional organic seeds versus genetically modified seeds. She explores how industrial-scale farming can lead to local habitat loss, invasive species, water and air pollution and global warming.

Her film takes us to the Navdanya Biodiversity Farm, an initiative to promote organic farming and fair trade, and to one of its community seed banks. *Seeds of Life* stresses the need to educate globally about sustainable farming and food practices, with critical lessons for the preservation of humankind itself.

#### **Featured Individuals**

- Diya Payal (director)
- Sohan Payal (Diya's father)
- Meenakshi Payal (Diya's mother)
- Sheela Godiyal (Head Seed Keeper, Navdanya Biodiversity Conservation Farm)
- Dr. Vandana Shiva (founder, Navdanya Biodiversity Conservation Farm)
- Dr. Andre Leu (International director, Regeneron International)
- Saraswati Payal (Diya's Grandmother)
- Kanta Devi and Prabha Payal (Diya's Aunts)
- Jagdish and Maya Negi (Diya's Grandparents)

## Key Terms and Concepts

- Biodiversity: refers to the variety of life in a particular habitat or ecosystem. It includes the diversity of species, genetic variation within species, and the range of ecosystems that support diverse forms of life.
- Ecosystem: An ecosystem is a geographic area where plants, animals and other organisms, as well as weather and landscapes, work together to form a bubble of life. ([National Geographic](#))
- Seed Bank: A seed bank is a storage facility where seeds of various plants are preserved for future use. These seeds are stored under controlled conditions to ensure their viability and longevity.

## Discussion Questions

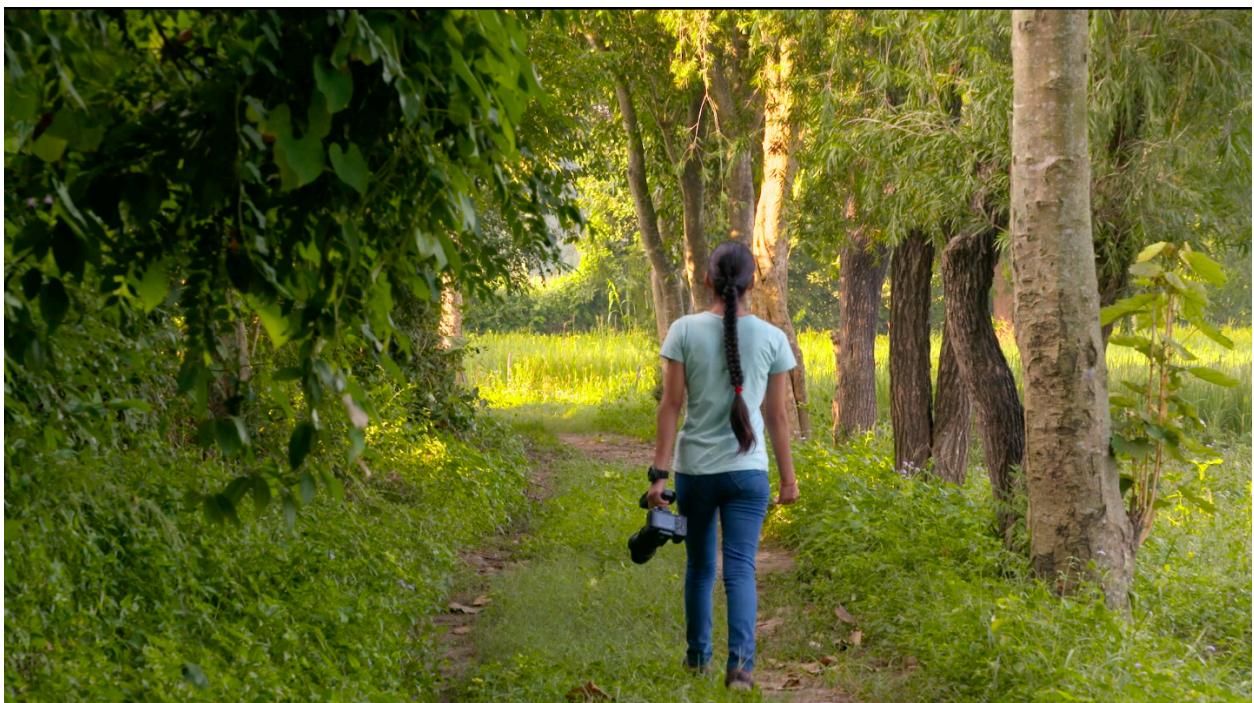
1. What do you notice about the opening camera shots Diya plans in the opening of the film? She begins with the flora and fauna of her home and then she shows her actual home with her mother preparing food. What might Diya be communicating to her audience?



2. Diya interviews many scientists at Navdanya Biodiversity Farm as well as organic farmers themselves. What do you think of her choice of interview subjects? What expertise does each interviewee bring to her film? Why does Diya need to include these particular voices?
3. What does this shot communicate to viewers as the camera films Diya's family's walk from Faldakot, the village of her Grandmother and Aunts, to Nali Badoli, the neighboring village of her maternal grandparents?



4. A call to action is a persuasive technique used to prompt an audience to take a specific, immediate action. This rhetorical device is employed to motivate the audience to respond in a desired way, whether that be by making a change in behavior, adopting a new viewpoint, or engaging in a particular activity. What is Diya's call to action to her viewers (22 minute mark and following)?
5. What are your thoughts of how Diya chose to end her film? Why did she choose to do this and what effect might it have on viewers?



6. How does this film comment upon the value of telling personal stories? Why is it important that Diya reveals who she is and where she comes from (as well as other people she introduces us to)?

#### “Seeds are life”: The crafting of Diya’s Argument

Throughout *Seeds of Life*, Diya tells us what she is learning about biodiversity in nature. However, Diya also makes significant claims about the necessity for biodiversity in our crops to sustain life and how various human activities (monoculture farming, use of pesticides, use of fossil fuels, emission of greenhouse gasses causing climate change, deforestation, etc.) have threatened the biodiversity on Earth.

When crafting an argument, there are three major types of rhetorical appeals that can be used to support your claims and persuade your audience: logos, ethos, and pathos.

#### **Logos:**

- This appeal includes the use of logical reasoning, facts, and well-structured arguments to support a claim.

#### **Ethos:**

- This appeal establishes credibility and trustworthiness through the speaker's character or authority. An appeal to ethos can be enhanced by citing reputable sources or demonstrating the speaker's expertise.

#### **Pathos:**

- This appeal plays to the audience's emotions, values, or beliefs to persuade them. Appeals to pathos may include vivid language, personal anecdotes, or evocative imagery.

In the chart below, identify which appeal you notice Diya using as she interviews her subjects and films her encounters. Then, explain what that interviewer offers as far as evidence or describe what the moment in the film communicates to you.

Subject	Appeal	Evidence given/Message being communicated
Dr. Vandana Shiva		
Sheela Godiyal		
Dr. Andre Leu		
Saraswati Payal		
Hariyali Prayer Service		

## Pathways for Humanities

"You were a little seed: an embryo in your mother's womb. So all life begins with seeds."

-Dr. Vandana Shiva

### **Robert Frost's "Putting in the Seed"**

You come to fetch me from my work to-night  
When supper's on the table, and we'll see  
If I can leave off burying the white  
Soft petals fallen from the apple tree.  
(Soft petals, yes, but not so barren quite,  
Mingled with these, smooth bean and wrinkled pea;)  
And go along with you ere you lose sight  
Of what you came for and become like me,  
Slave to a springtime passion for the earth.  
How Love burns through the Putting in the Seed  
On through the watching for that early birth  
When, just as the soil tarnishes with weed,  
The sturdy seedling with arched body comes  
Shouldering its way and shedding the earth crumbs.

After reading this sonnet or listening to it [here](#), discuss the following questions:

- How does Frost use imagery in the poem to convey the process of planting and growth?
- Discuss the significance of the speaker's "springtime passion for the earth." What is this 'passion' like for the speaker?
- What does the poem suggest about the relationship between love and the act of planting seeds? How does Frost intertwine these two concepts?
- How does Frost depict the connection between humans and the natural world in this poem? In what ways does the act of planting serve as a metaphor for other aspects of life?
- How does the sonnet form contribute to the overall impact of the poem? Discuss the significance of the poem's rhyme scheme and meter.
- How can the themes and messages in "Putting in the Seed" be related to modern-day concerns about the environment and sustainability?

## Pathways for STEM

“...85,000 species [of plants] is what humans ate. Now we grow and trade in about 12.”  
—Dr. Vandana Shiva

### Biodiversity Case Study: Preserving Maize Genetic Diversity

The International Maize and Wheat Improvement Center (CIMMYT) stores seeds from more than 28,000 different native maize varieties to preserve genetic diversity. This genetic diversity is crucial for the resilience and adaptability of maize in a changing world. After watching [this video](#), discuss the following questions:

- Explain the role of genetic diversity in maize and why it is important for the crop's resilience against environmental changes.
- Describe the process by which scientists at CIMMYT preserve maize genetic diversity.
- How do scientists use allele frequencies to identify traits that help maize thrive in different environments?

**Extension Activity:** Choose a type of food crop (e.g., rice, wheat, potatoes, tomatoes, etc.) that interests you. Ensure that the crop has a variety of types or species.

- Investigate the different varieties of your chosen crop. Consider factors such as shape, color, texture, taste, and where they are grown.
- Explore the cultural significance of the crop in different regions. How is it used in traditional cuisines? What cultural practices are associated with it?
- Examine the nutritional differences among the varieties. Are some varieties more nutritious than others? Look into the agricultural practices for growing different varieties. What conditions do they thrive in? What challenges do they face?
- Identify any efforts to preserve the diversity of this crop. Are there seed banks, research centers, or farming initiatives dedicated to this purpose?

### Svalbard Global Seed Vault

Seed banks play a vital role in preserving [biodiversity](#) by storing and safeguarding the seeds of diverse plant species. The [Svalbard Global Seed Vault](#), located on the Norwegian island of Spitsbergen in the Arctic Svalbard archipelago, is a secure backup facility for the world's crop diversity. It stores duplicates of seeds from gene banks worldwide, providing long-term storage to safeguard against the loss of seeds due to disease, human mismanagement, or natural disasters. The vault, which opened in 2008, is managed by the Norwegian government in partnership with the Crop Trust and the Nordic Genetic Resource Center (NordGen). It currently holds over 1.3 million seed samples from around

the globe. The Svalbard Global Seed Vault is the largest ["backup facility"](#) for the crop diversity of the Earth because it ensures and protects the world's future food supply in the face of global crises.

[Take a virtual tour of the Vault](#). After you explore the Vault, consider these questions.

- Why might the Svalbard Global Seed Vault often be referred to as the "Doomsday Vault"?
- Explain the significance of the location of the Svalbard Global Seed Vault. How does the environment of Svalbard contribute to the vault's mission?
- Describe the various measures taken to ensure the security and preservation of the seeds. How do these measures contribute to the overall mission of the vault?
- Is the Svalbard Global Seed Vault adequate for preserving *all* of the biodiversity of the Earth? Researchers have been thinking about [a Lunar Ark](#) to back up all of the life on Earth. What do you think is the feasibility of this Lunar Ark?

### [Dr. Vandana Shiva and Navdanya Biodiversity Farm](#)

Founded and directed by [Dr. Vandana Shiva](#), Navdanya is a movement for Earth Democracy that protects India's biodiversity-based food heritage through initiatives like Community Seed Banks, organic farming, and knowledge sovereignty. The organization has created 122 Community Seed Banks in India and Bhutan, distributing seeds to farmers after natural disasters. Navdanya, which literally means "nine seeds," also promotes the importance of local, organic food, protects soil health through agroecological practices, and challenges the [biopiracy](#) of traditional knowledge and indigenous crops.

- Read Navdanya's [Mission Statement](#): What values are most important to this organization? What is meant by the *sovereignty* of "seed, food, and water"?
- Watch [Dr. Vandana Shiva discuss](#) "gardens of hope," or, her description of gardens grown and maintained in schools. Dr. Shiva makes a case for why schools should have gardens and integrate them into curricula and also why students should be involved with their care and maintenance. What do you think are the pros and cons of integrating gardens at schools?
- Consider Navdanya's [Declaration on Seed Freedom](#): Explain the concept of "Seed Freedom" as described in the manifesto. How might the commodification of seeds and patents on seeds impact farmers and biodiversity?
  - In item 9 of the Declaration, seed freedom is directly threatened by "terminator technology." ["Terminator Technology"](#) is an agrochemical industry practice of genetically engineering seeds to be sterile at harvest. This means that farmers would have to repurchase seeds for

each season's harvest, instead of re-planting the seeds that the plants naturally produce. How does this practice threaten the principles of Seed Freedom and sustainable agriculture?

### Pathways for SEL

I love to walk in nature and to visit the farm where plants and insects and birds and animals and people live in a harmonious relationship with one another. There is a balance in nature.

-Diya Payal

### Sowing Resilience: Lessons in Personal Growth from Seeds

Resilience is the “process and outcome of successfully adapting to difficult or challenging life experiences, especially through mental, emotional, and behavioral flexibility and adjustment to external and internal demands” ([American Psychological Association](#)). But resilience isn’t just being able to make it through a challenge or to bounce back from a tough time, it also involves [learning how to control, modify, and grow](#) through those life experiences.

Seeds undergo stages of growth with challenges to survive from seed to seedling to plant. Different seeds need different conditions—optimal light, temperature, soil, nutrients, water, oxygen, environments—to germinate to a seedling. Although seed germination can vary depending on the species, the basic steps of germination are that the seed absorbs water, its primary root comes out, the shoot emerges, and the seedling establishes itself and continues growing.

Think about the challenges we have in our lives— at school, in our personal lives, at home. If we begin to think about those challenges as not just one big problem, but as an opportunity for growth, we can begin to learn the lessons of resilience that seeds teach us. By identifying where we are in our ability to tackle a challenge, we can work our way through difficulties and understand where we can grow from that challenge. Like seeds, our resilience and growth takes time, resources from our ‘environment’ (the spaces and places we inhabit) and ‘nutrients’ (our connection with others, our self-care and wellness, and our growth mindset).

In the Personal Growth Chart below, you can identify what challenges you are encountering or what personal growth skills you are working on in the left column, and document your growth along the right columns. You can also notate in the chart what optimal conditions are helping you achieve these stages of growth. A sample entry is here below and then a blank chart is available for you to use.

Personal Growth Chart

	 <p><b>Absorbing</b> <b>(I am thinking and ideating)</b></p>	 <p><b>Taking Root</b> <b>(I understand the concepts and what I need to do)</b></p>	 <p><b>Emerging</b> <b>(I am beginning to be able to achieve the task)</b></p>	 <p><b>Growing</b> <b>(I can show what I know and can do)</b></p>
Procrastination /Time Management	I get overwhelmed when I have a lot of assignments to do, especially on the weekends. I don't want to do the work, so I do other things that are more pleasurable. To get work done, those fun things (watching videos, being on my phone, sleeping) will have to be balanced with doing the work.	I have 2 small assignments and one big writing assignment. If I divide the assignments over Saturday and Sunday, I can tackle them and get them done. The fun things can be available after tasks are finished.	I am making a schedule of each day's assignments, what I need to do, and when I will do them. I am letting my family know what time is blocked off for my work and what time is blocked off for my leisure time. I might even ask a family member to take my phone during my working time to help me focus.	Tackling the assignments and breaking them down into doable bits helps to not make the work overwhelming. I am rewarding myself and taking care of myself when I use my leisure time well alongside doing the work. I am also asking for help at home from those around me to support this plan.

Personal Growth Chart

	 Absorbing (I am thinking and ideating)	 Taking Root (I understand the concepts and what I need to do)	 Emerging (I am beginning to be able to achieve the task)	 Growing (I can show what I know and can do)

Other social-emotional skills/challenges you can think about:

- Self-Awareness
  - Emotional Intelligence: Recognizing and understanding one's own emotions and how they influence behavior
  - Self-Perception: Identifying personal strengths and areas for improvement
  - Self-Confidence: Believing in one's abilities and having a positive self-image.
- Self-Management
  - Impulse Control: Managing impulses and making thoughtful decisions
  - Stress Management: Developing strategies to cope with stress effectively
  - Time Management: Organizing and prioritizing tasks to meet deadlines
  - Self-Discipline: Staying focused and motivated, even in the face of challenges
- Social Awareness
  - Empathy: Understanding and sharing the feelings of others
  - Respect for Diversity: Valuing and appreciating differences in others
  - Perspective-Taking: Seeing things from others' viewpoints and considering their feelings
- Relationship Skills
  - Effective Communication: Expressing thoughts and feelings clearly and respectfully
  - Active Listening: Paying full attention to others and showing understanding
  - Conflict Resolution: Resolving disagreements constructively and peacefully
  - Cooperation: Working collaboratively with peers and adults
  - Trust-Building: Establishing and maintaining trust in relationships
- Responsible Decision-Making
  - Critical Thinking: Analyzing and evaluating information to make informed decisions
  - Ethical Judgment: Considering ethical implications and values in decision-making
  - Problem-Solving: Identifying and solving problems creatively and effectively
  - Goal Setting: Setting achievable goals and working diligently towards them
  - Future Planning: Anticipating and preparing for future challenges and opportunities

### Sharing Your Story of Growth

Sharing your personal story is a powerful way to connect with others and build relationships. It lets people see the real you, fostering understanding and empathy. Your story can also inspire and motivate others who might be going through similar experiences. Plus, reflecting on and sharing your story helps you understand your own journey better and provides a sense of clarity and purpose. It can be a healing and empowering process, helping you make sense of past experiences and how they've shaped you.

Tell or write a personal story about growth. This could be a story about how you grew up, about a moment in time where you realized you 'grew up' and understood something about your life, or about the process of your physical or emotional growth throughout your life. What was the situation and what happened to you? How did you feel about the situation? What were the consequences of the situation? What were the reactions of the people involved? How was the situation resolved? Looking back on the situation, what have you learned about yourself and others as you have grown in your understanding?