

Practices for Inspiring Inventiveness

“The most productive tool for generating good ideas remains a circle of humans at a table, talking shop.”

Steven Johnson, *Where Good Ideas Come From*

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Inventors use curiosity and empathy to discover meaningful problems and develop novel responses.

You can't really make a good decision without empathy. It requires you to think of everyone's perspective.

Olive, age 11

Children will discover meaningful problems and create novel solutions using curiosity and empathy when adults ...

- articulate and make their values visible through a [Letter of Intent](#).
- pay attention to what children care about
- use documentation to make visible those moments when children are demonstrating curiosity or empathy
- look for and foster connections between the children's interests, the concerns of the learning group, and global issues

Teachers will use curiosity and empathy to discover meaningful problems and create novel solutions when they ...

- reflect on relationships between school experiences and the school's goals and values
- pay attention to what they care about as individuals, professionals, and community members
- articulate their intentions annually, revisit them often, and use them to inform daily planning
- document and reflect on children's thinking as a daily part of planning for instruction

◀ Related Tools ▶

- [Partner-Explore](#)
Use this tool to encourage children to practice negotiating ideas and to identify new possibilities that may not emerge from working alone.
- [Modeling Language to Support Inventiveness](#)
Use this tool when you hear children using language that is not supportive of inventiveness.

◀ Windows into Practice (for Opal School Online Sustaining Members) ▶

- **Jonah's Paper** ([Classroom Video](#))
During Story Workshop, six-year-old Jonah considers alternative layouts for his paper and finds the optimal one for expressing his thoughts. His teacher supports his inventive process through listening and offering suggestions. Jonah's invention ultimately serves his community.
- **Partner-Explore** ([Classroom Video](#) and [Blog Post](#))
When children work together, they encounter and respond to problems that are meaningful to them. Through the structure of Partner-Explore, 1st- and 2nd-graders explore each other's ideas in ways that develop social and emotional capacities.



Inventors embrace ambiguity and complexity by building theories, taking risks, and viewing setbacks as opportunities for learning.

It's OK, we all make mistakes. The important part is fixing it.

Lydia, age 4

Children will learn to embrace ambiguity and complexity when adults ...

- invite children to create, revisit, and reinvent rules and problem-solving strategies
- ask children to reflect on experiences and learning processes individually and in groups
- model and encourage repairing mistakes and taking risks
- ask unanswerable questions so that children can practice theory-building and risk-taking with ideas

Teachers will learn to embrace ambiguity and complexity when they ...

- have regular opportunities to reflect on setbacks and develop plans to move forward
- make public documentation that relates learning experiences to practices that inspire inventiveness
- use the principles of inspiring inventiveness to reflect on classroom experiences and to plan for more
- develop and share theories of learning based on experiences with children in the classroom

◀ Related Tools ▶

- [Letters of Intent](#)
Use this tool to support children's abilities to engage with big questions and to make connections between the known and the unknown.
- [Do-Over](#)
Use this tool when the impact of children's words or actions does not match their intentions.

◀ Windows into Practice (for Opal School Online Sustaining Members) ▶

- **Supporting Children to See Each Other as Resources** ([Classroom Video](#))
Kindergarten and 1st grade children struggle to compose together a piece of writing for publication, and come to value each other's contributions.
- **Stuck Machine** ([Presentation Video](#))
When 1st- and 2nd-graders work to invent a machine that will help people when they get stuck, the class finds that it, too, gets stuck and reflects on the experience.



Inventors explore big questions that normalize uncertainty.

I wonder if we could have a world full of people who know what to do when things go wrong.

How could this ever happen?

Angelina, Age 7

Children will learn to engage with big questions that normalize uncertainty when adults ...

- ask big questions that don't have fixed or known answers
- celebrate big questions from children, teachers, or other thinkers by making them visible in the classroom
- encourage provisional thinking, tinkering, and iteration
- show that they value question-asking by giving children many opportunities to practice posing questions, and by validating questions as much as answers

Teachers will engage with big questions that normalize uncertainty when they ...

- collaboratively generate big questions that tickle their imagination and invite dialogue with other adults as well as children
- plan with clear intentions that make room for surprise
- seek and pay attention to questions that don't have clear answers
- use documentation tools and protocols that encourage a practice of teacher-research

◀ Related Tools ▶

- [Asking Big Questions](#)
Use this tool to normalize uncertainty by encouraging children to ask big questions.
- [Asking Unanswerable Questions](#)
Use this tool to discover children's thinking about questions with more than one answer.

◀ Windows into Practice (for Opal School Online Sustaining Members) ▶

- **Becoming Visible through Materials** ([Presentation Video](#))
A 1st- and 2nd-grade community of learners strives to understand and bring to life each other's wishes.
- **Everything is More Complicated than We Realize** ([Classroom Video](#))
Using materials that invite metaphoric expression, 4th- and 5th-graders and their teacher pose complex questions that connect the personal and the global.



Inventors rely on the connections between emotional, aesthetic, and intellectual experiences.

We should feel and know and learn about what happens. You can be amazed by the process.

Lois, age 9

Children are immersed in the emotional, aesthetic, and intellectual dimensions of learning when adults...

- organize materials within a learning environment that are aesthetically pleasing and engage the senses
- name and appreciate a wide range of emotions
- provide children with a range of strategies for understanding, accepting, and responding to their own and others' emotions
- hold a strong image of children's intellectual capacity

Teachers embrace the emotional, aesthetic, and intellectual dimensions of learning when they...

- organize the physical environment of the classroom with attention to beauty
- understand the social and emotional dimensions of learning
- engage with the arts in open inquiry as professionals
- practice teacher-research that highlights the intellectual experience of children and teachers

◀ Related Tools ▶

- [Exploring Systems with Human Machines](#)
Use this tool when you want to deepen children's understanding of complex systems.
- [Translating Ideas](#)
Use this tool to deepen children's understanding of ideas by exploring their thinking through different materials.

◀ Windows into Practice (for Opal School Online Sustaining Members) ▶

- **Building a Chain Filled by Love** ([Classroom Video](#))
Kindergartners and 1st-graders engage the emotional, aesthetic, and intellectual dimensions of learning by inventing a Love Machine.
- **Setting the Table: Not just filling the space** ([Classroom Video](#))
Grades 4-5 teacher Nicole Simpson-Tanner discusses how she sets up the classroom studio at the beginning of the year.



Inventors develop ideas through collaboration, feedback, and exchange in diverse communities.

When everyone's ideas come together, collaboration tries to work its way through the cracks to make something new.

McCune, age 10

Children participate in and contribute to learning with others when adults ...

- invite children to develop a shared language of collaboration
- foster children's ability to give and receive feedback
- are intentional about the choreography of individual and group learning
- use whole group meetings to make experiences and ideas visible and connect them to each other

Teachers participate in and contribute to learning with others when they ...

- see their work as a valuable part of a professional learning community in which their ideas and experiences matter
- ask pedagogical questions and seek answers through direct experience in the classroom alongside colleagues who are pursuing similar questions
- collectively examine artifacts from learning experiences through the lens of the Inspiring Inventiveness Principles and Practices
- use thinking routines or discussion protocols to support collaborative understanding of student learning

◀ Related Tools ▶

- [Snapping Ideas Together](#)
Use this tool to help children problem-solve on their own with little or no adult guidance.
- [Gallery Walk](#)
Use this tool to help children contribute to and learn from the work of their peers.

◀ Windows into Practice (for Opal School Online Sustaining Members) ▶

- **Constructive Criticism** ([Presentation Video](#))
5th grade children reflect on the challenging process of giving and receiving feedback in math.
- **Giving and Receiving Feedback** ([Classroom Video](#))
4th- and 5th-graders explore the process of feedback and the role it plays while working on observational drawings.



Inventors use play as a strategy for learning within a conflict-rich environment.

In a perfect world there would still be conflict – but people think a perfect world is no conflict.

Ginger, age 10

Children learn to negotiate conflict through play when adults...

- are comfortable facilitating conflict and see the value of this practice
- design daily experiences for children to work in small and large groups
- support children to invent and practice a range of strategies to resolve conflict
- emphasize the value of *having ideas* more than the value of *having the best idea*

Teachers learn to support children to collaborate and negotiate conflict through play when...

- educational experiences and environments provide low-stakes opportunities for children to work through conflict and complexity
- time is organized to allow for long blocks of instruction
- they recognize and nurture the connections between cognitive and emotional development
- they collaborate with colleagues by drawing on practices that mirror those they use to support children

◀ **Related Tools** ▶

- [Making Friends with Conflict](#)
Use this tool to support children's ability to work through conflict toward a satisfying resolution.
- [Reinventing Rules in Outdoor Games](#)
Use this tool to inspire children's agency, collaboration, and systems thinking through whole-body play.

◀ **Windows into Practice** (for Opal School Online Sustaining Members) ▶

- **Building Creativity and Complexity in Outdoor Play** ([Classroom Video](#))
4th- and 5th-graders play an outdoor game that inspires inventiveness and reflect on their play.
- **Inventiveness Emerges through the Tangles Found in Play** ([Blog Post](#))
and Love, Play, and Mail ([Blog Post](#))
Kindergartners and 1st-graders discover and respond to the need for a post office.



Inventors use imagination to challenge the status quo and envision new possibilities.

The most important word is 'yet.'

Eliana, age 4

Children use their imagination to envision new possibilities when adults ...

- deliberately invite children to dream, imagine, and create metaphors or mental images
- are intentional about the use of story and give children ample time to create and rewrite their own stories
- expect children to use materials to make connections and to develop and express their thinking in different ways
- explicitly teach children critical thinking strategies and regularly challenge them to shift perspective

Teachers envision new possibilities and model change-making when they ...

- imagine “going big” to share children’s ideas beyond the classroom
- intentionally connect personal, local, and global issues through a practice of teacher-research
- actively seek resources that connect to children’s questions and theories
- consider the impact of children’s work in the classroom on the society at large

◀ Related Tools ▶

- [Planning for Invention Student Worksheet](#)
Use this tool when children are ready to develop a project or invention.
- [Exploding Systems with Human Machines](#)
Use this tool to deepen children’s understanding of how complex systems can be influenced (after you have tried [Exploring Systems](#)).

◀ Windows into Practice (for Opal School Online Sustaining Members) ▶

- **Invention as Social Justice** ([Classroom Video](#))
An Opal School alumna reflects on her 5th-grade invention of dolls that extend connectedness and identity.
- **Marching for Love** ([Blog Post and Video](#))
A school community responds to the violence that surrounds it.



Inventors work with materials to prototype, share, research, iterate, and refine ideas.

Humans just want to understand life on Earth! We want to understand why.

Zooming in helps us understand why.

Sam, age 5

Children use materials to develop and share ideas when adults ...

- provide a range of materials with different sensory features and qualities
- allow children time to understand the qualities of different materials
- invite children to iterate their ideas using multiple media and dimensions
- expect children to share, collaborate, and offer feedback to each other

Teachers prototype, share, research, iterate, and refine their ideas when they ...

- engage with the arts in open inquiry as professionals
- make a practice of asking themselves, “Where are the arts?” as they develop lessons
- regularly collaborate with colleagues to plan and reflect on their practice
- adopt a stance as a teacher-researcher who is a professional creator of curriculum

◀ Related Tools ▶

- [Thinking with Materials](#)
Use this tool to expand children’s thinking about a key concept or question.
- [What Can this Material Do?](#)
Use this tool to introduce children to new materials.

◀ Windows into Practice (for Opal School Online Sustaining Members) ▶

- **Constructing New Exhibits through Collaboration and Imagination** ([Classroom Video](#))
When 1st- and 2nd-grade children and adults work together to create a public exhibit, both learn about collaboration.
- **Providing a Place for Young Writers to Make their Mark** ([Classroom Video](#)) and **Growing and Celebrating Writers** ([Classroom Video](#))
These videos illustrate approaches to developing inventiveness in young writers, ages 3-5 and grade 3.



Inventors create and use cognitive strategies and tools to stay open, disrupt patterns, and find gaps.

Hana (teacher): What happens when we try scary things?
Lucas (age 5): You find out that things might not be scary anymore.

Children's inventive thinking is supported when adults...

- introduce and make visible concepts and strategies from different disciplines to support critical and creative thinking
- invite children to invent their own conceptual tools or thinking strategies
- make strategies children are developing in the classroom visible so they can be used by the community and further developed
- create their own conceptual tools or thinking strategies that will support children's thinking and metacognition

Teachers' inventive thinking is supported when they...

- engage in an ongoing practice of teacher-research
- create planning tools that support them to facilitate children's developing thinking
- make learning visible through a practice of documentation
- prepare the classroom environment based on their observations of children's conceptual development and social relationships

◀ Related Tools ▶

- [Cracking Open Words](#)
Use this tool to show children that things that appear simple are actually complex when multiple perspectives are welcomed.
- [What Else Could It Be?](#)
Use this tool when children need a nudge towards uprooting assumptions and transitioning to a more open mindset.

◀ Windows into Practice (for Opal School Online Sustaining Members) ▶

- **Growing Compassion** ([Classroom Video](#))
Children crack open a word and develop a theory that has relevance, power, and reach.
- **What Else Could It Be?** ([Classroom Video](#))
Inventiveness is supported when doors are opened wide to possibility. This video shows children (ages 3-5) playing the game, What Could It Be?



Inventors reflect on their thinking and actions in order to make connections they might otherwise miss.

I want to know, what are all of the perspectives?

Pascale, age 9

Children reflect on their thinking and actions when adults ...

- ask children questions like, “What made you say that?” “Where did that idea come from?” “How did it feel when...?” “What did you notice when...?”
- invite children to reflect on their work and what they learned using different materials and through writing
- encourage children to see their work and viewpoints from multiple perspectives
- celebrate novel connections

Teachers reflect on their thinking, and actions when they...

- regularly dialogue with colleagues about their experiences and observations about how children learn
- collaborate with colleagues using discussion protocols for thinking and feedback
- have prepared their minds for, and are open to, chance encounters, serendipity, useful surprise, and wondrous happenstance
- use journals, cameras, and audio recorders to capture and revisit learning

◀ Related Tools ▶

- **[Artist Statements](#)**

Use this tool to build children’s capacity for communicating complex ideas (e.g., metaphors, analogies, etc.) through the written word.

- **[Doing Serendipity](#)**

Use this tool to strengthen children’s ability to seek and make connections.

◀ Windows into Practice (for Opal School Online Sustaining Members) ▶

- **Finding Perspective in the Prairie** ([Presentation Video](#))

A picture book catalyzes an intense discussion among 4th- and 5th-graders about multiple perspectives.

- **Serendipity, Distraction, and Meaningful Metaphor** ([Blog Post](#))

Paying attention to what children in the kindergarten and 1st-grade class pay attention to provokes an unexpected ending to a conflict.

