Shedding light on shadows with early learners

WHAT IS THE TINKERING STUDIO?


tape
tack
paint
fold
knot
squish
cut
doodle
stuff
velcro
sew
measure
fray
zip-tie
bend
glue
play
tangle
knit
sand
screw
gild
drill
stencil
leaf
melt
Caution
SHARP TOOLS
Caution
SHARP TOOLS

WHAT IS TINKERING

TINKERING IS A HANDS-ON LEARNING PROCESS:

a way to **DEVELOP UNDERSTANDING**


Learning through tinkering
relies on
DIRECT EXPERIENCES
REAL PHENOMENA


PROCESS
PRODUCT

TINKERING HAS

4

IMPORTANT COMPONENTS

TINKERING

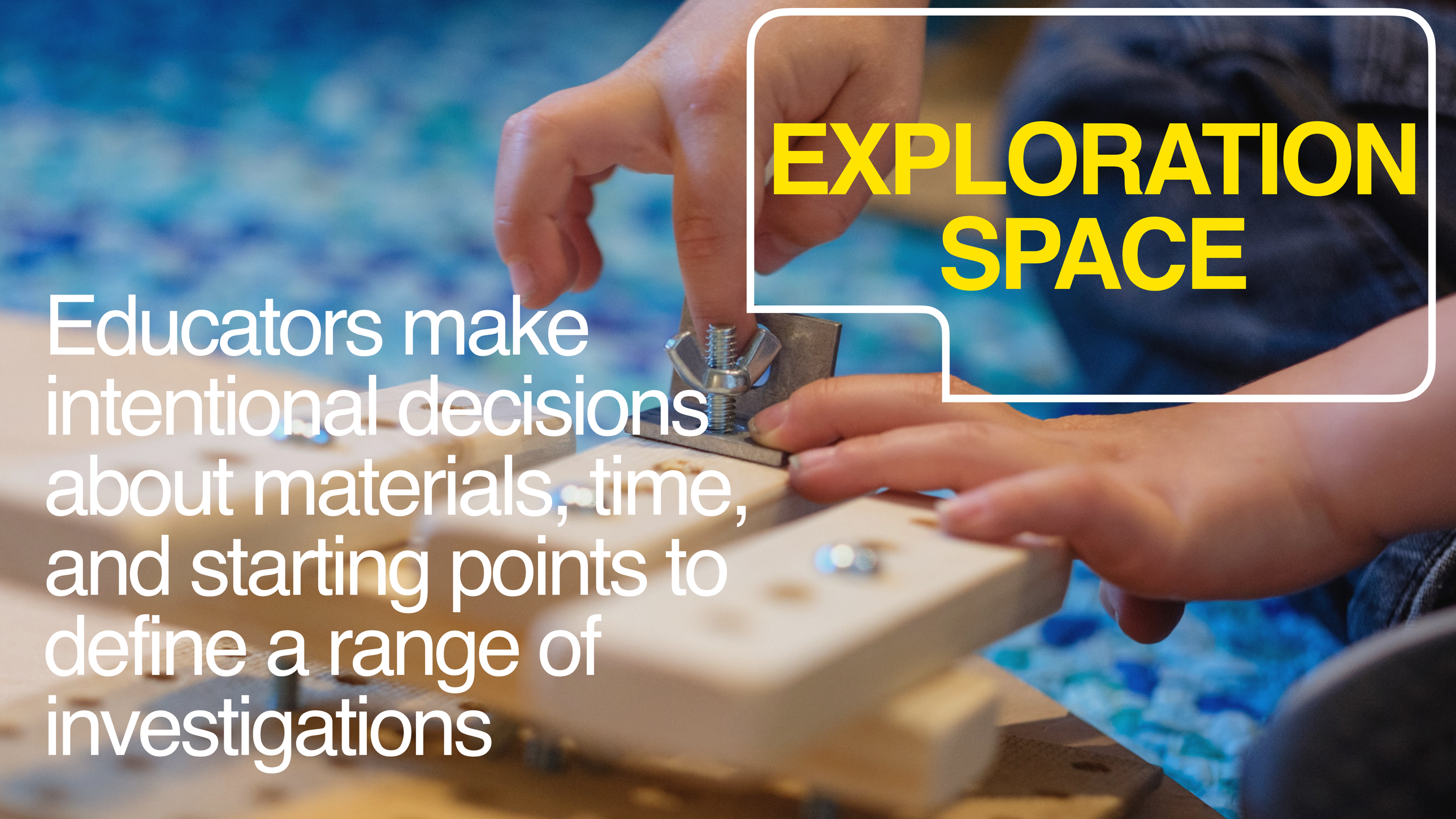
PURPOSEFUL PLAY

EXPLORATION SPACE

TINKERING

LEARNER CHOICE

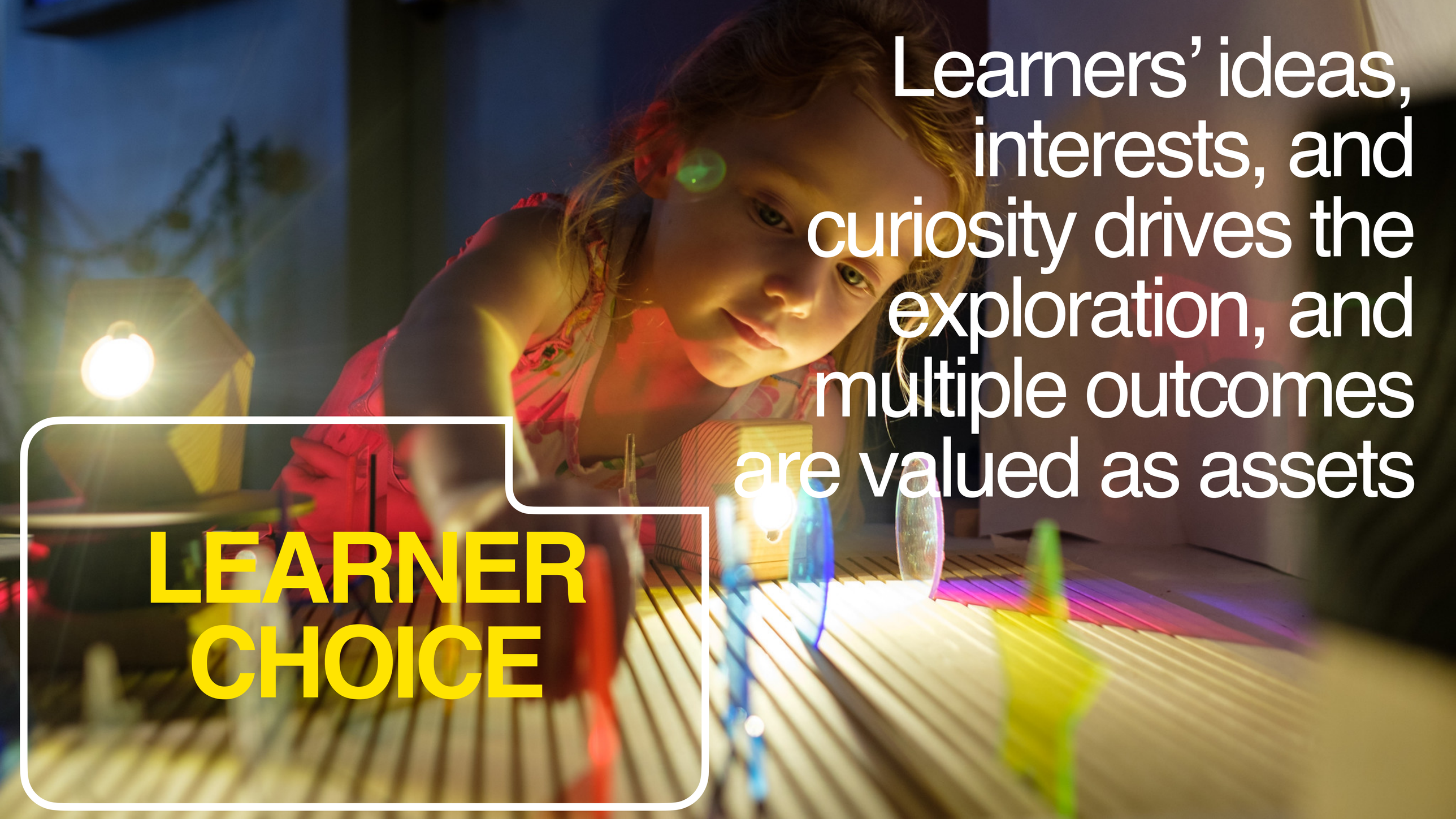
COLLABORATIVE LEARNING



EXPLORATION SPACE

Educators make intentional decisions about materials, time, and starting points to define a range of investigations


PURPOSEFUL
PLAY
Playful interactions
focused on specific
phenomena spark
discovery and
understanding



LEARNER CHOICE

Learners' ideas, interests, and curiosity drives the exploration, and multiple outcomes are valued as assets

Learners and facilitators tinker side-by-side and *both* benefit by making sense of things together

COLLABORATIVE LEARNING

PURPOSEFUL PLAY

EXPLORATION SPACE

TINKERING

LEARNER CHOICE

COLLABORATIVE LEARNING

Tinkering strives for

Early Learning Projects

What is STEAM Starters?

"Every tinkering activity starts with a childs' question. It starts with a question and those are either simple or complex depending on the child."

Ihuoma Ibeukwumere, Child Development Center Site Manager

The *What is Tinkering?* video and written document will provide an introduction of the tinkering approach, and the impact for educators and learners.

What Is Tinkering?

Select the button to play video with descriptive audio. Video will open in a

DESCRIPTIVE VIDEO

What is Tinkering?

TINKERING is an open-ended approach to STEAM learning that offers children opportunities to identify problems and work on solving them in playful, creative ways. It involves using tools, playing with materials, and collaborating with others to build, test, and develop new understanding about the world.

Playful exploration brings joy and empowers children to pursue investigations that interest them, and the collaborative nature of tinkering supports children to work with and learn from peers and adults.

Tinkering leads to deepened knowledge, stronger skills, and increased agency and confidence for all learners.

TINKERING INVEST
involve Science, Te
Engineering, Arts,
(STEAM) learning
direct experiences
phenomena. In ST
tinkering explorat
experimenting wi
shadow, changing
ball rolling down
a track, or arrang
on a balance bea

Phenomenon (singul
Something that occu
can be explored and
our senses.

Planning for Tinkering

PLANNING is the first part of the tinkering cycle, followed by facilitating, reflecting, and relaunching. Planning is about intentionally preparing tinkering investigations for children.

During *Planning*, educators experience tinkering themselves and then use these experiences to decide on goals, setup, and starting points for children's tinkering. Planning also includes deciding how you will document children's tinkering, so that you have something to reflect on.

Planning is a step you return to again and again, each time with new insights into children's tinkering experiences. You may find that working with colleagues strengthens your preparation process. Over time and with practice, planning becomes more natural, easier to do, and less time intensive.

and the Marble Track

A TINKERING STO

O SET UP A TINKERING EXPLORATION FOR CHILDREN TO EXPLORE RAMPS

amps and tracks of varying lengths, rolling objects tha
wooden balls, and other materials to catch the rollers
(plastic containers, and different-sized bowls).

tinkered with
with Ryoko's
his own

marble on a
and blew
e it move.
er track
se and he
end to end.

Ryoko suggested, "Now, you have two tracks. Let's see how many tracks you can connect and blow a marble on them." Ren tried three, and blew the marble to the end. Then he added another track to make his course four-tracks long and after attempting to blow the marble down the tracks said, "It didn't work." Teacher Ryoko wondered aloud,

"I wonder why
he explained, "I

Ren continued
eventually cre
so the marble
from track to
back and fort
on the marbl
angles of the
marbles roll.

The Tinkering Cycle

TO TINKER IS TO PLAY,
to try out ideas,
and to invent.
It is a flexible and
creative process.
Teachers and providers
should approach the
learning process
with a spirit of
experimentation.

Tinkering is an intentional and reflective process that reveals and supports children's STEAM learning through play. The Tinkering Cycle is an iterative process to help educators and providers practice ways of engaging with children through tinkering over time.

The Tinkering Cycle has three phases: *Planning*, *Facilitating*, and *Reflecting to Relaunch*.

Each phase serves a different purpose. You might start off by thinking of the phases as progressing from one to the next. As you experiment with tinkering and develop your approach, you should find yourself moving more fluidly between the phases.

VIDEO PART 1:

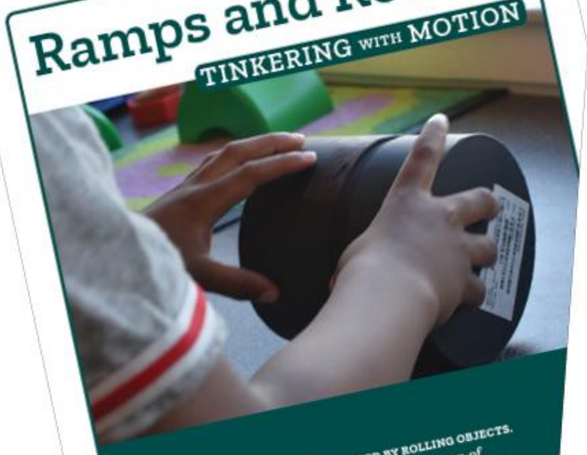
This video highlights the *Shadow Stories* PLANNING process.

Select the button to play video with descriptive audio. Video will open in a

DESCRIPTIVE VIDEO

Ramps and Rollers

TINKERING WITH MOTION



YOUNG CHILDREN ARE FASCINATED BY ROLLING OBJECTS. They become familiar with the phenomenon of rolling because of their natural curiosity and playful experimentation with things that roll or slide. Tinkering with Ramps and Rollers provides opportunities for children to play with rolling objects. They may modify their rollers with materials to change the way they roll, and develop their own theories about how and why they move the way they

Unstable Table

TINKERING WITH BALANCE

FROM STANDING ON ONE LEG TO STACKING WOBBLY STRUCTURES with blocks, children naturally explore balance and stability from an early age.

Balance explorations can be playful, collaborative, and intuitive. They take advantage of everyday materials and even our own bodies, since children often feel a sense of balance before they can explain it in words. And because things constantly fall over, tinkering with balance encourages careful observation, making predictions, testing things out, noticing what happens, and then trying something new.

Shadow Stories

TINKERING WITH LIGHT

CHILDREN ARE NATURALLY CURIOUS ABOUT SHADOWS; it's often one of the first science investigations that young children explore on their own. Shadows can be found all around us, and tinkering with a light source and everyday objects can spark many questions and curiosities that lead to the exploration of fundamental STEAM ideas.

There are many ways for children to tinker with light and shadow. *Shadow Stories is an activity that allows children to explore shadow size and position through storytelling.* Children can create shadows that are large or small and add interesting shadow-making objects to create a story.

Balancing Sculptures

TINKERING FOR YOURSELF

ONE OF THE BEST WAYS TO PREPARE FOR LEADING a tinkering session with children is to tinker with the topic for yourself. It offers a sense of what might be tinkerable within an exploration, and it's a chance to become familiar with the tools and materials that help you explore.

TINKERING FOR YOURSELF is an important first step in becoming more aware of what it's like for children, including children of varying abilities, to engage in the activity. It helps you know more about what questions might come up and what directions might be pursued to enable all children to experience the tinkering activity.

Playfully explore balance and stability and experience tinkering for yourself by designing your own moving balancing sculpture.

In this exploration, you can arrange everyday objects and ordinary materials in surprising ways to create a structure that balances on a point and moves when you poke it.

Tinkering with Balance can be surprisingly challenging. The tinkering activity proposed in this guide is intended for adults to get started with tinkering.

There is a detailed balance activity guide designed for young children included in the STEAM Starters module materials.

STEAM Starters was made possible through the generous support of the California Department of Social Services Child Care and Development Division.

The Tinkering Cycle

The Tinkering Cycle