Science Sprouts

PSS Kit Number 1

Description This interactive classroom experience introduces children to STEM topics through discovery learning. A hands-on approach engages and inspires young minds to utilize the scientific process to build a more thorough understanding. Students will also explore the three states of matter: solids, liquids and gases.

Kit Contains

1 Infrared Thermometer	1 Plastic Beaker-Small
2 Adult Safety Goggles	1 Plastic Beaker-Medium
"Ada Twist, Scientist"	1 Plastic Beaker-Large
2 Stopwatches	20 Student Safety Goggles
2 Rulers	2 Metal Thermometers
1 Measuring tapes	1 Digital Microscope
1 Set of Measuring Cups	1 SD Card
(1 cup, ½, 1/3, ¼)	4 AA Batteries
2 Hot/Cold Packs	1 Food Scale
2 Plastic Spill Trays	1 Tennis Ball
5 Student Lab Coats	2 Small Whiffle Balls
1 Adult Lab Coats	2 Small Foam Balls
1 Time Tracker	2 Golf Balls
	Lesson Plans

Science Sprouts

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Introduction

This interactive classroom experience introduces children to STEM topics through discovery learning. A hands-on approach engages and inspires young minds to utilize the scientific process to build a more thorough understanding. Students will also explore the three states of matter: solids, liquids and gases. During each lesson the students should use their previous experiences and knowledge to ask a question and propose a hypothesis. Then we allow them to explore the topic by engaging and interacting with the materials. Make sure the students have multiple and varied opportunities to do this. Always follow up with a review of what was learned and observed. Make comparisons of results to what was predicted. Revisit learned ideas and concepts.

Guiding Questions

What kind of work do scientists do?

How do scientists discover the way things work?

How do scientist use tools?

Vocabulary

Appearance: *the outward look of an object: color, shape, size, height and weight*

Observe: *see, hear, touch/ feel, taste, or smell*

Investigate: *to gather information*

Predict: *to say what you think will happen*

Compare: *to look at two or more things to find out how they are alike or different*

Materials

Infrared Thermometer
Adult Safety Goggles
"Ada Twist, Scientist"
Stopwatches
Rulers
Measuring tapes
Measuring Cups
Hot/Cold Packs
Plastic Spill Trays
Student Lab Coats
Adult Lab Coats
Time Tracker
Pipets
Plastic Beaker - Small
Plastic Beaker- Medium
Plastic Beaker - Large
Student Safety Goggles
Metal Thermometers
Digital Microscope
SD Card
AA Batteries
Food Scale

PINT SIZE SCIENCE

SPROUT

These activities are designed for students who:have minimal experience with inquiry or the topic or are preschool aged. These activities can also be used as entry activities for older students who need to build background information. These activities meet the Early Learning Standards and can be used to find evidence of mastery of
Gold standards.

SEEDLING

These activities are designed for students who:have some experience with inquiry and the topic or are primary school aged. These activities can also be used as extension activities for younger students who have mastered the Sprout activities. These activities meet the Iowa Core standards.

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PINT SIZE SCIENCE

SCIENCE PROCESS SKILLS

Exploring the natural and made world, learners utilize six process skills that aide in the process of investigation and reaching conclusions based on results.

OBSERVE

Using the senses to gather information about an object or event.
Example: Describe an apple as red.

COMMUNICATE

Using words or graphic symbols to describe an action, object, or event.
Example: Describing how a plant changes over time by drawing a picture of it every week.

CLASSIFY

Grouping or ordering objects or events into categories based on properties or criteria.
Example: Placing all insects with wings into one group and all insects without wings into another.

MEASURE

Using both standard and nonstandard measure or estimates to describe the dimensions of an object or event.
Example: Using a ruler to measure the size of a plant.

INFER

Making an "educated guess" about an object or event based on previously gathered data or information.
Example: Saying that an animal with sharp incisors eats meat because other animals with similar teeth also eat meat.

PREDICT

Stating the outcome of a future event based on a pattern of evidence.
Example: Predicting how many times a ball will bounce when dropped from a spacific height based on previous experiments dropping the ball from the same height.

Adapted from "The Science Process Skills" NARST

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PINT SIZE SCIENCE

HARVEST
Share (authentic audience)
Reflect
Celebration
Parent connection
Report results

BLOSSOM
Project/authentic student work/ authentic representation (write or draw)
Conclusion

GROW
Investigation/inquiry/collect data
Materials to investigate challenge questions
Test/analyze data

WATER
Questions (researchable vs testable)
Nature of Science (what would a real scientist do/how would this look)
Ask a question

SEED/PLANT
Brainstorm vine (web)
Student or teacher/parent connection
Memory/background
Book/experience/guest speakers/videos/entry experience/provocation/ phenomena

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ACHIEVABLE CHALLENGES

Matching ability with challenge - What makes electronic games so attractive?
Improve = pleasure.

Students can see how effort affects improvement through the process rather than just at the end. Brain receives an intrinsic reward.

The brain has filters that impact information that is learned, filters are affected by stress and boredom.

Information goes one of two places: Lower brain - information is not available for higher cognitive processes. Upper brain - information available for thinking. "Only the person who thinks, learns"

NOVELTY

Seeng something new - activates our brain to search for a reward.

The ability to create new connections in the brain is opened.

Increases the potential to learn new concepts and facts.

Performance outcome is best when new facts are mixed with familiar facts.

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EMOTION

Directs cognitive learning - emotional information gained over time influences decisions and behaviors.

When emotion and cognition come together, that creates a platform for learning, memory, decision making and creativity.

Forms future behavior - reaction to result of choices is attached to cognitive knowledge about a topic.

Topic is either "dangerous" and uncomfortable or thrilling and stimulating.

There are relevant and irrelevant emotions depending on the context.

Emotions can hinder learning if they are irrelevant, proficiently nurturing an emotional state that is relevant to grow learning.

Learning is impaired without emotion.

Emotion informs our future choices, without we can't strategize realistically, the brain is unable to use what it knows.

Emotions are not a disruptive force- instead of putting emotions aside, they should be integrated with cognitive processing.

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RENDERING

Reproduce or represent by artistic or verbal means.

Testing out of information learned.

Gives accurate picture of what is learned.

Practice with information makes permanent.

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