

STEM vs STEAM



STEM

**STEM stands for
Science, Technology, Engineering & Mathematics**

- STEM asks students to solve problems.
- STEM teaches technical skills.
- STEM tackles challenges.



STEAM

**STEAM stands for
Science, Technology, Engineering, Art, & Mathematics**

- STEAM asks students to imagine new possibilities.
- STEAM combines technical skills with creativity and communication.
- STEAM develops self-esteem, self-image, and self-worth.



Learn more about Dakota STEAM Learning's STEAM Program by following along with our guide!



STEM vs STEAM

STEM

STEM stands for
Science, Technology,
Engineering & Mathematics

- STEM asks learners to solve problems
- STEM teaches technical skills
- STEM focuses on data, logic, and exact results
- STEM builds direct engineering and math solutions
- STEM creates a career path towards tech, science, and coding roles

STEAM

STEAM stands for
Science, Technology,
Engineering, Art & Mathematics

- STEAM asks learners to imagine new possibilities
- STEAM focuses on blending schema with the creative process and open-ended investigation
- STEAM combines skills, creativity, and communication
- STEAM develops self-esteem, self-image, and self-worth
- STEAM creates a career path towards digital and product design and architecture



DAKOTA STEAM

STEAM Guide



Why STEAM?

Helping Children Build Skills for an Ever-Changing Future

STEAM education has a profound impact on children, shaping them not only as learners but as confident, capable individuals. Through hands-on experiences, children develop self-esteem, self-image, and self-worth as they discover the many possibilities within learning. They adopt a growth mindset that empowers them to take on challenging problems, explore unfamiliar ideas, and accomplish tasks they may not have believed were possible. STEAM encourages students to see themselves as thinkers, creators, and problem-solvers who can make a meaningful difference.

Through science, technology, engineering, art, and mathematics, students engage in meaningful learning that connects ideas across subject areas. They are encouraged to ask questions, investigate how things work, develop and test solutions, and reflect on what they discover. This active process strengthens critical thinking and problem-solving skills as children learn to make plans, adapt when something does not work, and use what they learn to guide their next steps.

STEAM also creates opportunities for children to explore their creativity, collaborate with others, and communicate their ideas with purpose. As students design, create, discuss, and revise, they gain confidence in their ability to contribute meaningful ideas and learn from the perspectives of those around them. These experiences make learning engaging while helping children develop essential skills that reach far beyond a single lesson or subject area.

The world continues to change in unpredictable ways, but children who can think critically, create boldly, communicate effectively, and work well with others are equipped to thrive in any circumstance.

When STEAM is embraced from a young age, it prepares children to approach the future with curiosity, resilience, and confidence.

SCIENCE

Think Like a Scientist



What
scientific
principle
are we
exploring?



New Information

Learn from new information about a scientific phenomenon.

Step #1:
Inspire

Identify

Identify a question that needs to be answered based on a scientific principle

Step #2:
Question

Connections

Make predictions and connections based on your knowledge.

Step #3:
Research

Expect

Identify what you expect to happen when testing our question.

Step #4:
Hypothesize

Experiment

Gather data while we follow a procedure to test our hypothesis.

Step #5:
Experiment

Analyze

Look at the data, analyze the results, and make conclusions.

Step #6:
Conclude

Prove

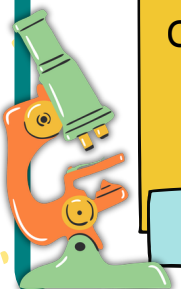
Communicate your reasoning and conclusions with scientific data.

Step #7:
Communicate

Thinking

Find ways to think differently based on your experience with the experiment.

Step #8:
Reflect



TECHNOLOGY

Think Like a Technologist



What
technology
programs
are we
exploring?



Create

Be creative and try to code something you've never seen before.

Reminder

Joy

Be excited for new challenges you've never seen before.

Reminder

Tools

Use appropriate tech tools and handle with care.

Reminder

Structure

Look for patterns to program or decode.

Reminder

Problem-Solving

Find ways to solve problems you encounter.

Reminder

Schema

Make predictions about how the technology might function. Have you used something similar before?

Reminder

Connect

Connect the technology to a real-world application.

Reminder

Try

Know mistakes will happen and debug the issues after each discovery.

Reminder



ENGINEERING

Think Like an Engineer



**What
problem
are we
exploring?**



Problem

Engineers are problem solvers, think about how you will solve the STEAM problem and follow the constraints.

**Step #1:
Ask**

Schema

Use experiences and background knowledge to form initial ideas to solve the problem.

**Step #2:
Imagine**

Research

Learn something new through real-world research and information.

**Step #3:
Analyze**

Decisions

Make strategic decisions based on your knowledge to form an effective idea and plan.

**Step #4:
Plan**

Experiment

Be experimental and try to create something that solves the problem.

**Step #5:
Create**

Changes

Use mini-tests to make predictions and make changes while building.

**Step #6:
Adapt**

Prove

Make final improvements to your creation and conduct evaluations to test final results.

**Step #7:
Evaluate**

Thinking

Find ways to think differently based on your experience with the engineering process.

**Step #8:
Share**



ART

Think Like an Artist



What art
inspiration
are we
exploring?



Notice

Look at things closely to find shapes and patterns. What do you notice?

Step #1:
Inspiration

Schema

Make predictions about how the art style is possible. Have you seen this art before?

Step #2:
Inquiry

Connect

Find the STEAM elements involved and how the elements connect to the art process.

Step #3:
Connect

Process

Use the art process to create a piece of your own art in the same style.

Step #4:
Create

Complete

Use your knowledge and drafts to complete your final piece of art.

Step #5:
Finalize

Reflect

Think about this art style and reflect on your enjoyment and any changes you would make.

Step #6:
Reflect

Unique

Be creative and try to create something you've never seen before.

Reminder

Persevere

Know mistakes happen and keep trying again and again to create a new piece of artwork.

Reminder



MATH

Think Like a Mathematician



What math
concepts
are we
exploring?



Relationships

Make sense of quantities and relationships in problems.

Reminder

Attempt

Persevere and try to solve problems you've never seen before.

Reminder

Tools

Use appropriate math tools.

Reminder

Structure

Analyze structure and patterns to solve challenging problems.

Reminder

Model

Create models to solve mathematical problems.

Reminder

Estimate

Use estimation to help get started and to test the reasonableness of solutions.

Reminder

Connect

Connect the math concept to a real-world application.

Reminder

Thinking

Always prove your thinking and answers using models, representations, and math vocabulary.

Reminder





DAKOTA STEAM

STEAM



Encourages



STEAM education encourages learners to see themselves as thinkers, creators, and problem-solvers who can make a meaningful difference.

Through science, technology, engineering, art, and mathematics, students engage in meaningful learning that connects across subject areas. They are encouraged to ask questions, investigate how things work, develop and test solutions, and reflect on what they discover.

This active process strengthens critical thinking and problem-solving skills as children learn to make plans, adapt when something does not work, and use what they learn to guide their next steps.



STEAM



DAKOTA STEAM

STEAM



Opportunities



STEAM also creates opportunities for children to explore their creativity, collaborate with others, and communicate their ideas with purpose.

As students design, create, discuss, and revise, they gain confidence in their ability to contribute meaningful idea from the perspectives of those around them.

These experiences make learning engaging while helping children develop essential skills that reach far beyond a single lesson or subject area.



STEAM



DAKOTA STEAM

STEAM



Future



The world continues to change in unpredictable ways, but children who can think critically, create boldly, communicate effectively, and work well with others are equipped to thrive in any circumstance.



STEAM