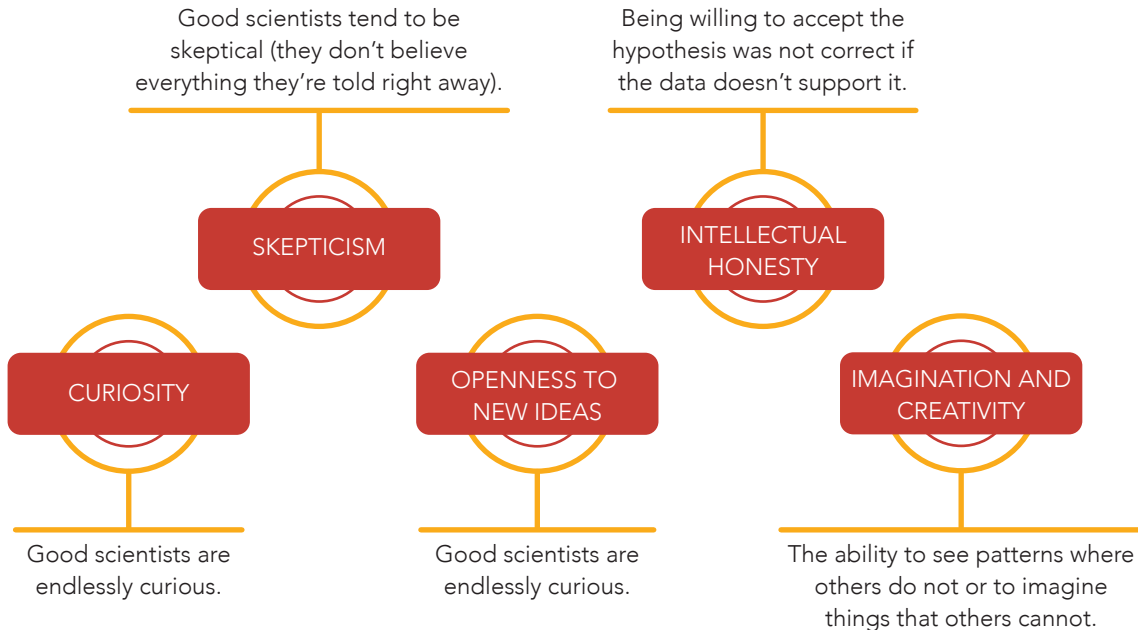


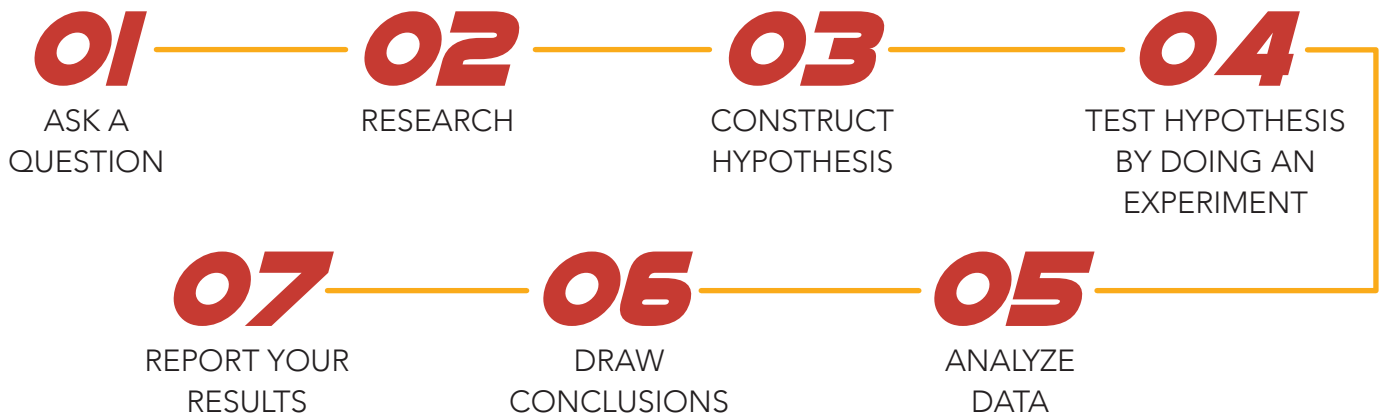
HABITS OF MIND

SCIENCE

There are several variations within habits of mind that prove useful to arts integration and STEAM efforts. We've outlined them in this packet for your quick reference.



SCIENTIFIC METHOD



HABITS OF MIND

MATHEMATICS

There are several variations within habits of mind that prove useful to arts integration and STEAM efforts. We've outlined them in this packet for your quick reference.

OVERARCHING HABITS OF MIND

1. Make sense of problems and persevere in solving them.

6. Attend to precision.

REASONING AND EXPLAINING

2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.

SEEING STRUCTURE AND GENERALIZING

7. Look for and make use of structure.

8. Look for one express regularity in repeated reasoning.

MODELING AND USING TOOLS

4. Model with mathematics.

5. Use appropriate tools strategically.

HABITS OF MIND

ENGINEERING

There are several variations within habits of mind that prove useful to arts integration and STEAM efforts. We've outlined them in this packet for your quick reference.

SYSTEMS THINKING

Recognizing essential connections and how the whole can be different from its parts.

CREATIVITY

Engineers are inherently creative throughout the engineering design process.

OPTIMISM

Engineers view the world of possibilities and opportunities within each challenge.

COLLABORATION

Engineering is a "team sport". Collaboration leverages the perspectives, knowledge and capabilities of team members to address a design challenge.

COMMUNICATION

Engineers must communicate effectively with the "customer" and other team members to justify the final design solution.

ETHICAL CONSIDERATIONS

Engineers consider the impacts of engineering on people and the environment, including possible unintended consequences.

CHILDREN WHO DEVELOP ENGINEERING HABITS OF MIND

- Solve problems
- Think flexibly and envision multiple solutions
- Use systems thinking
- Innovate and think creatively
- Apply math knowledge to problem-solving
- Apply science knowledge to problem-solving
- Think about problems in context
- Make tradeoffs between criteria and constraints
- Think analytically and make data-driven decisions
- Communicate effectively
- Work effectively in teams
- See themselves as engineers
- See failure as a learning opportunity
- Are persistent

HABITS OF MIND

ARTISTS

There are several variations within habits of mind that prove useful to arts integration and STEAM efforts. We've outlined them in this packet for your quick reference.

1

DEVELOP CRAFT

Learn to use tools and materials.
Learning the practices of an art form.

2

ENGAGE & PERSIST

Learn to take up subjects of personal interest and importance within the art world. Learn to develop focus and other ways of thinking helpful to working and persevering at art tasks.

3

ENVISION

Learn to picture mentally what cannot be directly observed, hear or written and to imagine possible next steps in making a piece.

4

EXPRESS

Learn to create works that convey an idea, feeling or personal meaning.

5

OBSERVE

Learn to attend to visual, audible, and written contexts more closely than ordinary "looking" requires. Learn to notice things others might not notice.

6

REFLECT

Learn to think and talk with others about one's work and the process of making it. Learn to judge one's own and others' work and processes in relation to the standards of the field.

7

STRETCH & EXPLORE

Learn to reach beyond one's supposed limitations, to explore playfully without a preconceived plan and to embrace the opportunity to learn from mistakes and accidents.

8

UNDERSTAND THE ART WORLD

Learn about the history and practice of the art form. Interact with other artists and the broader arts community.

HABITS OF MIND

INTEGRATED MODEL

Now it's time to explore, create and implement! Use the chart below to help you find the common habits of mind between all of the areas outlined. Use these common threads as a way to shift the mindset of your staff and students. An example has been done for you.

| HABIT THEME/IDEA | FOUND IN | USE FOR OUR OWN? | WRITE THE INTEGRATED HABIT HERE |
|------------------|-------------------------------------|------------------|--|
| Persistence | Science, Math, Engineering and Arts | Yes | We persevere and persist in curiously investigating and designing creative new solutions or works. |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |