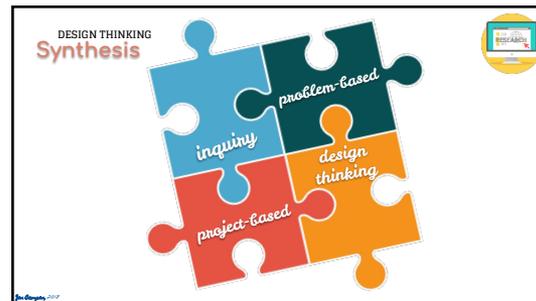


DESIGN THINKING

- Design Thinking is an approach to learning that focuses on developing students' creative confidence.
- Teachers and students engage in hands-on design challenges that focus on developing empathy, promoting a bias toward action, encouraging ideation, developing metacognitive awareness and fostering active problem solving.



DESIGN THINKING Synthesis

"...open-ended problems result in idiosyncratic solutions, derived from a process of exploration in which students practice evidence-finding, thoughtful exchange, and creative design. During that process, they change and grow as people, not just as test-takers" (Markham, 2013) Mind Shift

DESIGN THINKING Synthesis

"... increases long-term retention of content, helps students perform as well as or better than traditional learners in high-stakes tests, improves problem-solving and collaboration skills, and improves students' attitudes towards learning"



(Strobel & von Borneveldt, 2002; Walker & Leary, 2002)

DESIGN THINKING Synthesis

"...work is rooted in four dimensions of informed inquiry:

- developing questions
- applying disciplinary concepts and tools
- evaluating sources & using evidence
- communicating conclusions and taking action"


(Scherer & Pappert, 2015)

DESIGN THINKING Synthesis

What is needed to facilitate the Design Thinking process?

"...well designed, carefully thought-out materials and connected classroom practices are needed to capitalize on inquiry-based approaches"



(Darling-Hammond, 2008)

DESIGN THINKING Synthesis

"...well designed, carefully thought-out materials and connected classroom practices are needed to capitalize on inquiry-based approaches"



- thoughtful curriculum with clearly defined learning goals
- rich informational resources
- developing norms and structures within groups that allow individuals to work together.
- explicit opportunities to learn the skills associated with developing arguments and with effective small group discussion
- ongoing assessment
- assessments require application and measure quality of reasoning

Developed by the author

BENEFITS of DESIGN THINKING

Works within ELA Curriculum
The highly-adaptable approach works within an already existing language arts curriculum where teachers choose books that work best in their classrooms.

Enhances Reading Comprehension
The exciting and different way to practice literacy provides students who struggle with language arts a new way to demonstrate comprehension.

Engages All Learners
Engaging in the Engineering Design Process allows students to practice important 21st century skills such as collaboration, creativity, critical thinking, and communication.

Provides Integration of Different Disciplines
Using texts to find engineering problems and engineering to promote the text provides synergistic integration of different disciplines and meets Common Core and NGSS.

Introduces Realistic Engineering Problems
Looking for problems in the text as 'engineers' introduces students to rich, realistic engineering problems that enable them to achieve higher-level engineering standards than expected at their grade levels.

Fosters Future Readiness!
Engaging in the Engineering Design Process allows students to practice important 21st century skills such as collaboration, creativity, critical thinking, and communication.

Students, draw anywhere on this slide!

Peer Deck Interactive Slide

SAMPLE of DESIGN THINKING

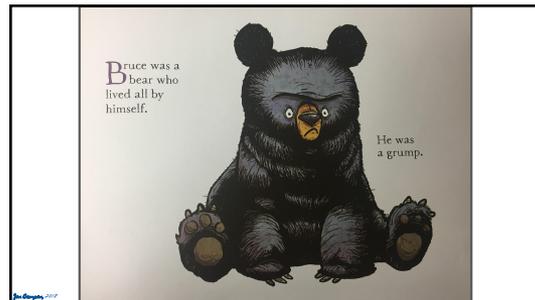
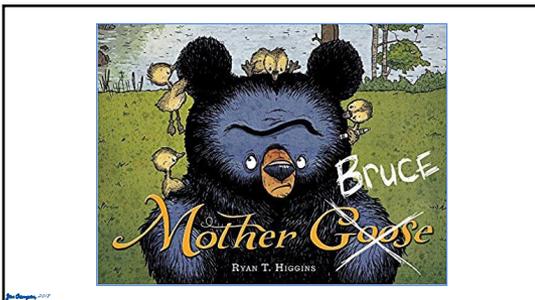


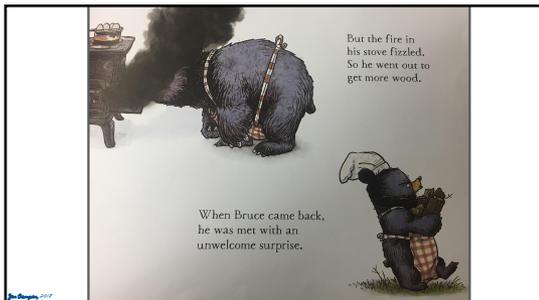
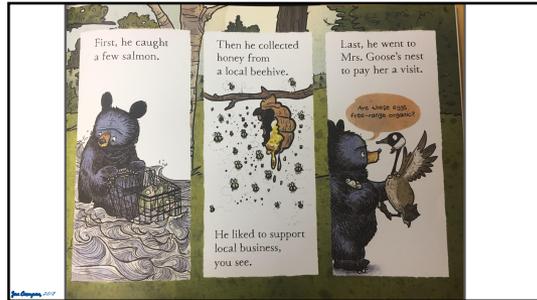
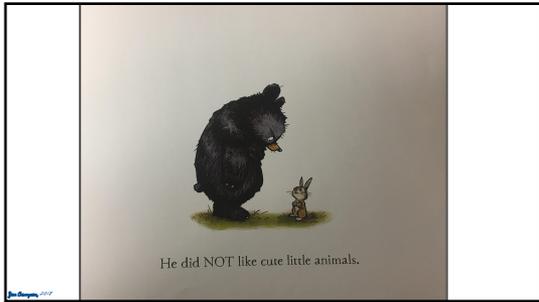
HELP WANTED

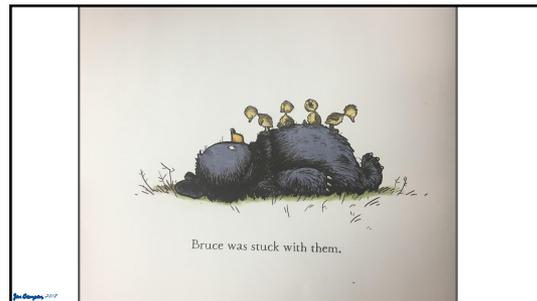
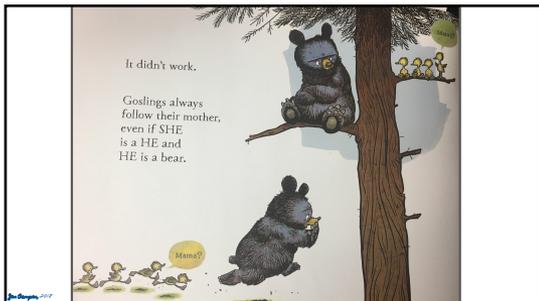
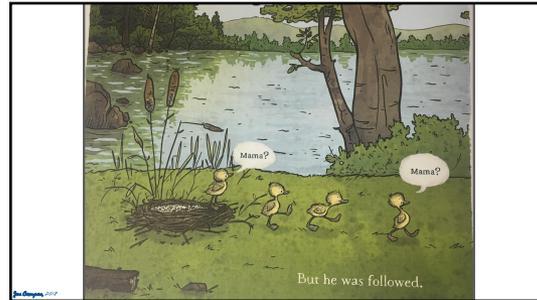
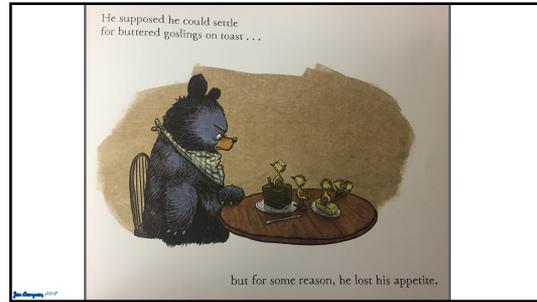
Dear Kindergarten Beginners,
Bruce is having trouble getting his house to migrate south for the winter. He is in desperate need of a long-statured sap and needs your help getting the house to go!

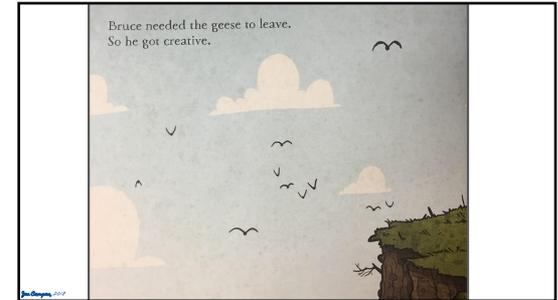
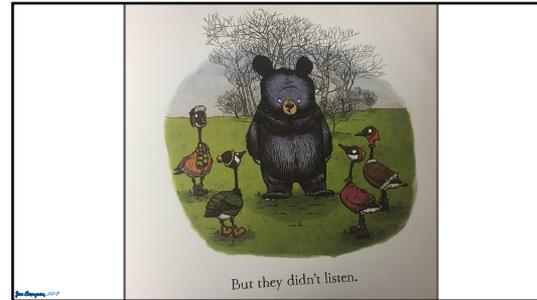
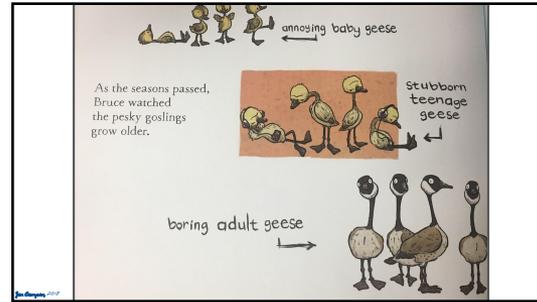
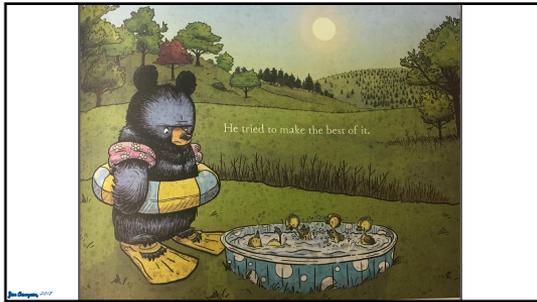
Your challenge is to engineer a tool that could be used to get the house to migrate south for the winter. Be sure to prepare your design, be sure to consider what resources Bruce has available. Be ready to be able to make your design with those he has or can easily find in the forest.

-Good Luck!









LITERATURE + DESIGN THINKING

INTERACT ANALYZE & REVISIT
This could occur over 2-3 days within school year or over the course of multiple years for a course.

GATHER INFORMATION
Explore Problems and Challenges presented within the text and evaluate any associated solutions.

DEFINE A DESIGN PROBLEM
Problem is generated by teacher or collaboratively determined by students and teacher.

DEFINE
Dear Kindergarten Regulators,
Bruce is having trouble getting his geese to migrate south for the winter. He is in desperate need of a long winter's nap and needs your help getting the geese to go!

HELP WANTED
Dear Kindergarten Regulators,
Bruce is having trouble getting his geese to migrate south for the winter. He is in desperate need of a long winter's nap and needs your help getting the geese to go!

YOUR CHALLENGE IS TO INVENT A TOOL THAT YOU'D BE ABLE TO USE TO GET THE GEESSE TO MIGRATE SOUTH FOR THE WINTER. AS YOU PREPARE YOUR DESIGN, BE SURE TO CONSIDER WHAT PROBLEMS THERE ARE AND HOW YOU WOULD BE ABLE TO MAKE YOUR DESIGN EXACTLY FIT IN THE STORES.
-Good Luck!

SAMPLE of DESIGN THINKING

GOING HOME

BRUCE THE MOTHER GOOSE

HELP WANTED
Dear Kindergarten Regulators,
Bruce is having trouble getting his geese to migrate south for the winter. He is in desperate need of a long winter's nap and needs your help getting the geese to go!

YOUR CHALLENGE IS TO INVENT A TOOL THAT YOU'D BE ABLE TO USE TO GET THE GEESSE TO MIGRATE SOUTH FOR THE WINTER. AS YOU PREPARE YOUR DESIGN, BE SURE TO CONSIDER WHAT PROBLEMS THERE ARE AND HOW YOU WOULD BE ABLE TO MAKE YOUR DESIGN EXACTLY FIT IN THE STORES.
-Good Luck!

DESIGN A SOLUTION
Teams collaboratively and creatively determine a solution that would benefit a character and fit within text's limitations.

GATHER FEEDBACK
Teams provide constructive feedback and critique to fellow teams to increase the effectiveness of their solution.

SHARE, CELEBRATE & REFLECT
Teams present completed solutions and reflect upon their experience.

"DESIGNERS DISCOVER THE WORLD THAT EXISTS. ENGINEERS CREATE THE WORLD THAT NEVER WAS."

DESIGN THINKING

DESIGN THINKING

OBSEIVE IMAGINE IMPROVE MAKE SHARE

DESIGN THINKING Synthesis

design challenge options

pre-designed by teacher

developed with students

DESIGN THINKING Synthesis

design challenge must haves

- User Group: *unlike-self*
- Solution: *varied possibilities*
- Scope: *scaled to time and ability*
- Hook: *exciting, meaningful*

DESIGN THINKING Synthesis

observe

pre-designed by teacher

- Review problems/challenges faced by character(s) within the text.
- Present challenge connected to the text for students to engineer a solution.

DESIGN THINKING Synthesis

observe

pre-designed by teacher

Statement Stems

Redesign the ___(situation)___ experience for ___(character)___.

Design a way for ___(character)___ to better ___(situation)___.

How might we help ___(achieve a goal)___?

Sample: "Design a way for Bruce to better teach the goslings to migrate."

DESIGN THINKING Synthesis

observe

pre-designed by teacher

developed with students

- Review problems/challenges faced by character(s) within the text.
- Present challenge connected to the text for students to engineer a solution.
- Examine Problems/ Challenges faced within the text.
- Narrow list to challenges that could be solved with engineering.
- Teams choose which challenge(s) they will solve.

DESIGN THINKING Synthesis

imagine

- Student teams plan and draw (or build) a solution that addresses the needs and criteria of the character as well as the constraints imposed by the story's plot and setting.
- Solutions should make sense for the book's setting.

Design your Prototype

DESIGN THINKING Synthesis

improve

- Groups present their solutions in-progress to the class or individual teams to gather feedback and suggestions.
- Teams explain their solution to the audience and demonstrate how it benefits the character(s).
- The goal is to have a rich discussion as the audience provides critique of presented solution.

DESIGN THINKING Synthesis

improve

RISE MODEL FOR MEANINGFUL FEEDBACK

RISE to the occasion

Elevate

Relate to shared

EX: "Perhaps you can explain this to X clearly to further address Y." OR "Perhaps you can explain to person Z."

Suggest

Relate to shared

EX: "You might consider involving X for Y." OR "You might want to think regarding Z from the perspective - here's a link"

Inquire

Relate to shared and compare

EX: "Have you considered looking at X from Y perspective?" OR "When you said X, am I understanding you to mean Y?"

Reflect

Relate to shared and compare

EX: "I related to your dialogue with X because..." OR "I liked what you did with X because..."

DESIGN THINKING Synthesis

improve

RUBRIC	
Meets Objective	Does NOT Meet Objective
ELEVATE Plans to highlight or praise a peer's work.	Provides specific ideas for how to improve the design solution.
SUGGEST Offers specific suggestions for improvement based on assigned criteria.	Offers vague or no suggestions for improvement or improvement ideas.
INQUIRE Asks thoughtful and/or probing questions through questioning.	Asks thought-provoking questions that might lead to new ideas or a different approach to the problem.
REFLECT Recalls, predicts, and articulates.	Responds to the project situation with a clear and thoughtful reflection.

The RISE Model was developed to guide the peer feedback process. It is a tool to help students give and receive feedback in a constructive and productive way. It is aligned with the standards of the Next Generation Science Practices and the standards of the Next Generation Science Practices. For more information, visit www.rosehulme.edu.

DESIGN THINKING Synthesis

improve

We liked...

We thought you might...

DESIGN THINKING Synthesis

improve

- Consider making feedback process **anonymous**
- Continually moderate and review feedback
- Ask students to react to the feedback received
- Start small and IN CLASS

Teacher Tip! Consider inviting community experts to provide feedback for team designs.

DESIGN THINKING Synthesis

make

- Students use data gathered during design testing and feedback from classmates to revise and improve their final designs.

CHANGE

We liked... We thought you might...

DESIGN THINKING Synthesis

share

- Teams present their final solution and reflections on their process to the class, write a revised version of the story that includes their solution, or make an advertisement for their solution.

DESIGN THINKING Synthesis

Multifaceted

- Multiple opportunities for students to receive feedback and revise their work throughout process (e.g., benchmarks, reflective activities)
- Multiple learning outcomes provides many avenues for differentiated instruction (e.g., problem-solving, content, collaboration)
- Presentations encourage active participation and signal social value (e.g., exhibitions, portfolios, performances, reports)

DESIGN THINKING Synthesis

Suggested Summative Assessment Criteria (Hargis, 2008)

- Necessary knowledge acquisition (content objectives)
- Depth of study
- Effectiveness & efficiency of research methods
- Logical and effective reasoning
- Conceptual integration of knowledge
- Effective problem-solving strategies

Next Generation Science Standards

DESIGN THINKING Synthesis

Suggested Summative Assessment Criteria (Barnett & Darling-Hammond, 2008)

- Use of evidence
- Accuracy of information
- Evaluation of competing views
- Development of a clear argument
- Attention to writing conventions
- Collaboration

Next Generation Science Standards

DESIGN THINKING Synthesis

Evaluative Rubric Resources

d. INSTITUTE OF DESIGN AT STANFORD

SCALE

STANFORD UNIVERSITY

DESIGN THINKING Synthesis



Questions for Self-Evaluation

RISE MODEL FOR SELF-EVALUATION

The RISE Model for self-evaluation was developed by the Center for Innovation and Entrepreneurship at the University of Colorado Boulder. It is a tool for assessing the progress of your team and your project. It is based on the RISE Model for Innovation and Entrepreneurship. For more information, visit www.risemodel.com.

ELEVATE
Have a higher vision or purpose. Is it clear? How do you know? How do you know you are on the right path? How do you know you are on the right path?

SUGGEST
Include ideas or suggestions. Is it clear? How do you know? How do you know you are on the right path? How do you know you are on the right path?

INQUIRE
Ask questions and probe. How do you know? How do you know you are on the right path? How do you know you are on the right path?

REFLECT
Read, journal, and articulate. How do you know? How do you know you are on the right path? How do you know you are on the right path?

DESIGN THINKING Synthesis



Self-evaluation Rubric

RISE MODEL FOR SELF-EVALUATION	Most Often	Not Often
ELEVATE Have a higher vision or purpose. Is it clear? How do you know? How do you know you are on the right path? How do you know you are on the right path?	Have a higher vision or purpose. Is it clear? How do you know? How do you know you are on the right path? How do you know you are on the right path?	Have a higher vision or purpose. Is it clear? How do you know? How do you know you are on the right path? How do you know you are on the right path?
SUGGEST Include ideas or suggestions. Is it clear? How do you know? How do you know you are on the right path? How do you know you are on the right path?	Include ideas or suggestions. Is it clear? How do you know? How do you know you are on the right path? How do you know you are on the right path?	Include ideas or suggestions. Is it clear? How do you know? How do you know you are on the right path? How do you know you are on the right path?
INQUIRE Ask questions and probe. How do you know? How do you know you are on the right path? How do you know you are on the right path?	Ask questions and probe. How do you know? How do you know you are on the right path? How do you know you are on the right path?	Ask questions and probe. How do you know? How do you know you are on the right path? How do you know you are on the right path?
REFLECT Read, journal, and articulate. How do you know? How do you know you are on the right path? How do you know you are on the right path?	Read, journal, and articulate. How do you know? How do you know you are on the right path? How do you know you are on the right path?	Read, journal, and articulate. How do you know? How do you know you are on the right path? How do you know you are on the right path?

DESIGN THINKING Synthesis

DESIGN THINKING

TALK it OUT



OBSERVE IMAGINE IMPROVE MAKE SHARE

SAMPLE of DESIGN THINKING



CONFIDENTIAL

Dear 4th Grade Researcher,

In a world where entire species of animals are becoming extinct each year, use your knowledge of how body parts help animals live and grow to design an ultimate animal to be released into the animal kingdom.

Your challenge is to design an ultimate animal that could survive in every environment by finding food, air, water, and shelter.

Good Luck!

SAMPLE of DESIGN THINKING



HELP WANTED

Dear 2nd Grade Engineer,

Gather inspiration from ways natural elements, such as animals and weather, disperse seeds. Design a machine that would disperse seeds more efficiently than the fox, bird, or squirrel.

SAMPLE of DESIGN THINKING



HELP WANTED

Dear 4th Grade Engineer,

According to the Laboratory Society, there are over 800 names and Laboratory located in schools in 90 countries worldwide.

Why are laboratories and science thriving in schools? Students respond immediately to the problem. Of course, they need to start with the problem and they need to start with the problem and they need to start with the problem.

Your school sees the benefits of these engineering services and would like for you to design a virtual built on your school's property. We need to consider which services would be best for your school and prepare evidence and reasoning to support your design.

—Good Luck!

SAMPLE of DESIGN THINKING



HELP WANTED

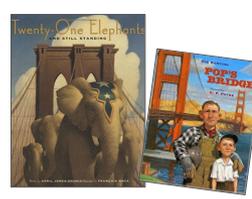
Dear 4th Grade Engineer,

History can be changed by big things such as wars, but did you know that it can also be impacted by something so small you can see it only under a microscope?

Your challenge is to design a way to prevent the spread of illness and diseases in our text.

—Good Luck!

SAMPLE of DESIGN THINKING



Explain

NEEDS	HAS
<ul style="list-style-type: none"> Link their needs here 	<ul style="list-style-type: none"> Link what they have here

SAMPLE of DESIGN THINKING

GHOST Cat

5th Grade Project Arrow

Click to View Student Slides

David Hill

Stevl Engineering

