

## **Integrating Literacy & Engineering in Make Way for Ducklings and Other Book Ideas!** Courtesy of Mary McCormick

- Character analyses for thinking about engineering design
  - What are explicit character needs? What is important to the character that might be implicit to the text?
    - What do ducklings need?
    - What do Mr. and Mrs. Mallard need in the story?
- Story Setting visualization
  - What are the criteria and constraints of the story settings?
    - Location – visualizing and drawing
      - Making connections to Boston
      - Making connections to parks
      - Making connections to environment, ponds, grassy landscape
    - When did this take place? What season? What is this season like in New England? How can we tell what season it is?
- Plot Structure
  - What are problems in the book?
    - What are big problems? (Finding safe home for family)
    - What are small problems? (Ducklings need to safely cross the street, travel together to the pond, find food, stay warm, etc.)
  - How do characters overcome problems?
    - How do the ducklings find their way to safe home?
  - Is the plot structure flexible?
  - What if we build duckling protectors? Or a device to help them find food? How do engineering designs change the plot?
- Themes
  - Safety- why is safety important for the Mallards? What does it mean to be safe? How do families stay safe? (Making connections to home and family life)
  - Environment –What are the different parts of a park environment? What are the animals that live in this environment? How do ducklings find food? How do they build homes?
  - Trying multiple solutions before finding the right one – did the ducklings find a home right away? What did they do when they ran into challenges?

### *Other Literacy Building Strategies*

- Story mapping – Tying together characters, settings, and themes to show how they are all connected
- Story boarding – What are the changes in the plot that occur as results of engineering solutions? (Story telling and event sequences- SAM animation may be useful)
- Perspective changes – How might the ducklings or Mr. and Mrs. Mallard tell the story differently?
- KWL (Embedded in IEL)
  - Know: What do we know about the subject, about the story setting, about the problem?

- Want: What do we want to know? What are things that might happen? What do we need to know about the story setting, characters, plot structure? What are contingencies?
- Learn: What do we learn about the story and the plot when things start to shift? What do we need to learn about ducklings' need for food and habitat? What does Boston Common look like?
- Engineering journals to document what worked, why we make decisions, and what we are changing.
- Creating a “retelling rubric” of the story for self-assessment and teacher-assessment.
- Telling the story from the perspective a character who now has the engineering design. How might duckling Jack tell this story? Or Mr. and Mrs. Mallard?

#### Other Book Ideas, K-2

##### *Strega Nona, by Tomie dePaola*

Engineering Question: How could we make something to help Big Anthony contain or clean up all the spaghetti?

##### *Harry the Dirty Dog, by Gene Zion*

Engineering Question: Can we design something to clean Harry while he is in the yard? How can we protect him from getting so dirty?

##### *The Mitten, by Jan Brett*

Engineering Question: Can we make something to prevent Nicki from losing his mitten? Can we something else to keep all the animals warm?

##### *Frog and Toad Together, by Arnold Lobel*

*The List:* Engineering Question: How can we design something so that Toad does not lose his list again? Can we make something to help Toad find his list?

*Cookies-* Engineering Question: What can we design to keep the cookie box closed so Frog and Toad do not eat all the cookies? Or can we make something to pop up to remind them not to eat all the cookies?

##### *Fairy Tales, The Three Little Pigs*

Engineering Question: What could we design to make the three little pigs' house stronger? How else could we protect them from the wolf?

##### *Fairy Tales: Goldilocks and the Three Bears*

Engineering Question: How can we make a bed that is just right for Goldilocks?

##### *Curious George, Margret and H.A. Rey*

*Curious George visits a Toy Store:* Engineering Question: How could we design something to help George get the toy down from up high?

*Curious George and the Birthday Surprise:* Engineering Question: Could we make something to prevent George from spilling the birthday cake batter?

*The Tale of Peter Rabbit, by Beatrix Potter*

Engineering Question: Could we make something so that Peter Rabbit does not go into the garden to eat the vegetables? How can we protect the vegetables?

*Click, clack, Moo, by Doreen Cronin*

Engineering Question: How can we keep the cows and the chickens warm at night?

*The Little Blue Truck, by Alice Schertle*

Engineering: The little blue truck pulls a bigger truck out of the mud. Can we make something that has ramps/slopes to make it easier? (Unit on simple machines, slopes)

Grade Level	Book	Author	Potential Engineering Problems	Guiding Questions	Other Potential Lessons
K-3	Make a Way for Ducklings	Robert McCloskey	Ducklings are in danger when crossing the street	How can we help the ducklings cross the street safely?	Safety in crossing roads, modes of transportation
			Mr. and Mrs. Mallard need a safe place to live	How can we help the ducklings find a safe place to live? What does a safe home have?	Duck habitats, New England seasons, different environments, parks, safety in homes
			Ducks need food, warmth	How can we help them find food or build a warm nest?	Material properties, temperature transfer, size and volume estimates (of ducks and of materials)
	Strega Nona	Tomie dePaola	Spaghetti is all over the place Big Anthony needs to stay out of trouble, pay attention	How can we help Big Anthony clean up the spaghetti? How can we help Big Anthony to be more responsible?	Estimating mass/volume, materials Responsibility, following rules
	Harry the Dirty Dog	Gene Zion	Harry gets very dirty while playing in yard	What is something we could make to clean Harry? Or build something to keep him out of the mud?	Designing mechanisms, structures
	The Mitten	Jan Brett	Nicki loses mittens	How can we prevent Nicki from losing her mittens? Or help her to find her mittens?	Responsibility, self-awareness, designing attachment mechanisms
			keep all animals warm	Could we make something that is big enough to keep all the animals safe and warm?	Space/volume estimates, properties of materials, temperature variations, seasons, animal needs
	Frog and Toad Together	Arnold Lobel	The List: Toad loses his list	How can we prevent Toad from losing his list?	Other ways of remembering, list-making, sequencing, patterns,
			Cookies: Cookie boxes popped open all the time.	How can we build something to remind them not to eat all the cookies at the time?	Health, designing ways of keeping cookie jars shut or having something pop up to remind us
	Fairy Tales, The Three Little Pigs		Structures that are not stable fall down when the wolf blows hard	Can we build more sturdy structures with different materials to protect the pigs from the Wolf?	Material properties, structural soundness, different environments, different settings, considerations in building (wind, snow, rain, earthquakes)
	Aesop's Fables, Three Billy Goats Gruff		The goats are unable to cross the bridge.	Can we build another form of transportation or way around the bridge? Or maybe another bridge to help the goats cross?	Forms of transportation, bridges, structures, bullying
	The Stray Dog	Marc Simont	Willie's friends need to find him in time to save him from the dogcatcher	How can we help Willie's friends find him? Can we design something so that Willie will not get lost or will be protected from the dogcatcher?	Locating others, signaling, ways of communicating, importance of communicating, getting lost, staying safe, following directions
	A Boy, a Dog, and a Frog	Mercer Mayer	The boy can't catch the frog (all picture book)	What can we make to help the boy catch the frog? Will it keep the frog safe? How can the boy let the frog back into his pond?	Animal environments, importance of not removing animals from their environments (bringing frog safely home), designing mechanism for the boy to catch frog without harming or keeping him
	Pancakes for Breakfast	Tomie DePaola	Dog and cat get into the ingredients while the little lady is buying her syrup	Can we build something so that the dog and cat will not be able to get into all the pancake ingredients? Or can we build a separate way for them to get small amounts of milk, but not spill everything?	Dog and cat needs, mischief, hard work, sharing design, something that keep dog and cat well fed and safe without allowing them to get into the pancake ingredients.
Mr. Popper's Penguins	Richard Atwater	Penguins cause trouble	What are some ideas for keeping the penguins out of trouble?	Penguin need and habitats, pets, staying out of trouble, protection, attention	
Popular authors with applicable	Judy Blume Beverly Cleary Jan Brett				