~ Maker Kit ~
Explore, Imagine, Create, Share

An *Applied Design, Skills and Technologies* Kit
for grades K-3

compiled by Doug David, Debbie Nelson, Joan Pearce and Carol Walters, SD71

BIG IDEAS

Designs grow out of natural curiosity.	Skills can be developed through play.	Technologies are tools that extend human capabilities.

Learning Standards

Curricular Competencies	Content
Students are expected to be able to do the following: **Applied Design** ***Ideating*** • Identify needs and opportunities for designing, through exploration • Generate ideas from their experiences and interests • Add to others' ideas • Choose an idea to pursue ***Making*** • Choose tools and materials • Make a **product** using known procedures or through modelling of others • Use trial and error to make changes, solve problems, or incorporate new ideas from self or others ***Sharing*** • Decide on how and with whom to **share** their product • Demonstrate their product, tell the story of designing and making their product, and explain how their product contributes to the individual, family, community, and/or environment • Use personal preferences to evaluate the success of their design solutions • Reflect on their ability to work effectively both as individuals and collaboratively in a group **Applied Skills** • Use materials, tools, and technologies in a safe manner in both physical and digital environments • Develop their skills and add new ones through play and collaborative work **Applied Technologies** • Explore the use of simple, available tools and **technologies** to extend their capabilities	*Students are expected to use the learning standards for Curricular Competencies from Applied Design, Skills, and Technologies K–3 in combination with grade-level content from other areas of learning in cross-curricular activities to develop foundational mindsets and skills in design thinking and making.*

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COMMUNICATION
CORE COMPETENCY

The Communication competency encompasses the set of abilities that students use to impart and exchange information, experiences, and ideas, to explore the world around them, and to understand and effectively engage in the use of digital media. Communication competency provides a bridge between students' learning, their personal and social identity and relationships, and the world in which they interact.

1. Connect and engage with others (to share and develop ideas)

Sample "I" Statements

- I ask and respond to simple, direct questions.
- I am an active listener; I support and encourage the person speaking.
- I recognize that there are different points-of-view and I can disagree respectfully.

2. Acquire, interpret, and present information (includes inquiries)

Sample "I" Statements

- I can understand and share information about a topic that is important to me.
- I present information clearly and in an organized way.
- I can present information and ideas to an audience I may not know.

3. Collaborate to plan, carry out, and review constructions and activities

Sample "I" Statements

- I ask and respond to simple, direct questions.
- I am an active listener; I support and encourage the person speaking.
- I recognize that there are different points-of-view and I can disagree respectfully.

4. Explain/recount and reflect on experiences and accomplishments

Sample "I" Statements

- I give, receive, and act on feedback.
- I can recount simple experiences and activities and tell something I learned.
- I can represent my learning, and tell how it connects to my experiences and efforts.

The profiles emphasize the concept of growing and expanding.
They are progressive and additive.

CREATIVE THINKING
CORE COMPETENCY

Creative thinking involves the generation of new ideas and concepts that have value to the individual or others, and the development of these ideas and concepts from thought to reality.

1. Novelty and value

Sample "I" Statements

- I get ideas when I play. My ideas are fun for me and make me happy.
- I can get new ideas or build on other people's ideas, to create new things within the constraints of a form, a problem, or materials.
- I generate new ideas as I pursue my interests.
- I can develop a body of creative work over time in an area I'm interested in or passionate about.

2. Generating ideas

Sample "I" Statements

- I get ideas when I use my senses to explore.
- I build on others' ideas and add new ideas of my own, or combine other people's ideas in new ways to create new things or solve straightforward problems.
- I deliberately learn a lot about something (e.g. by doing research, talking to others or practising) so that I am able to generate new ideas or ideas just pop into my head.
- I have deliberate strategies for quieting my conscious mind (e.g. walking away for a while, doing something relaxing, being deliberately playful) so that I can be more creative.
- I have interests and passions that I pursue over time.

3. Developing ideas

Sample "I" Statements

- I make my ideas work or I change what I am doing.
- I can usually make my ideas work within the constraints of a given form, problem, and materials if I keep playing with them.
- I build the skills I need to make my ideas work, and usually succeed, even if it takes a few tries.
- I use my experiences with various steps and attempts to direct my future work.
- I can persevere over years if necessary to develop my ideas. I expect ambiguity, failure, and setbacks, and use them to advance my thinking.

The profiles emphasize the concept of growing and expanding.
They are progressive and additive.

A framework for Wonder

Significant Content: A focus on the Applied Design, Skills and Technologies Curriculum. Students should find the content to be significant and engaging in terms of their own lives, their interests and wonders.

A Need to Know: Activate learner curiosity and wonder! Engage student interest and initiate questioning with an entry event: this could occur through sharing a curious object, a story, a video clip, or a photograph that inspires wonder.

A Driving Question: A question that captures the heart of the wonder in clear, compelling language, giving students a sense of purpose and challenge.

Authentic Purpose: Learners share their stories of curiosity and design and explain how their design contributes positively in some way to the individual, family, community and/or environment.

Voice and Choice: Guided by the teacher, learners have voice and choice in terms of investigating their wonders; the tools, materials and technologies they will explore and use, how they will represent their learning and how they will structure their time.

Revision and Reflection: Learners go through a process of trial and error to make changes, solve problems and incorporate new ideas. Learners reflect on their ability to work effectively both as individuals and collaboratively in a group.

In-depth Inquiry: Learners follow a trail that begins with their own curiosity and wonder; identifying needs and opportunities for design through exploration, generating ideas from experiences and interests, and choosing an idea to pursue.

Core Competencies: questioning and investigating, connecting and engaging with others to share and develop ideas, collaborating to plan, carry out and review constructions; contributing to community and caring for the environment.

Adapted from: *Larmer, J. & Mergendoller, J. (2012). 8 essentials for project-based learning. Originally published in 2010 in Educational Leadership, 68(1), 34.*

Inspiring Wonder in the Maker Space

Creating Spaces that inspire Wonder

Consider sharing:
Objects that inspire Wonder
Books that inspire Wonder
Photos that inspire Wonder: (i.e. National Geographic photos)
Websites that inspire Wonder:
http://thekidshouldseethis.com/
http://wonderopolis.org/wonders

Offering Different Kinds of Wonders

Wonders you Can Test
How-to Wonders (i.e. How to make origami? How to make something with Lego? How to do magic tricks?)
Wonders from the Heart (i.e. How do I be a kind friend?)
Research Wonders: *Kid Rex* search engine; *World Book* on our Destiny site

Inquiry-Based Learning

Inquiry-based learning is a dynamic and emergent process that builds on students' natural curiosity about the world in which they live. Inquiry places ideas at the center of the learning experience. Teachers using an inquiry-based approach encourage students to ask and genuinely investigate their own questions about the world. Teachers further facilitate students' learning by providing a variety of tools, resources, and experiences that enable learners to investigate, analyze, reflect, and rigorously discuss potential solutions to their own questions about a topic the class is studying. (An excerpt from www.naturalcuriosity.ca)

Types of Inquiry

Structured inquiry

- the teacher determines the big idea, and what the students will come to understand by the end of the inquiry
- the teacher provides the guiding questions
- the students will help create the plan and guide the inquiry with their questions, interests, ideas, analysis, reflections and understandings

Guided inquiry

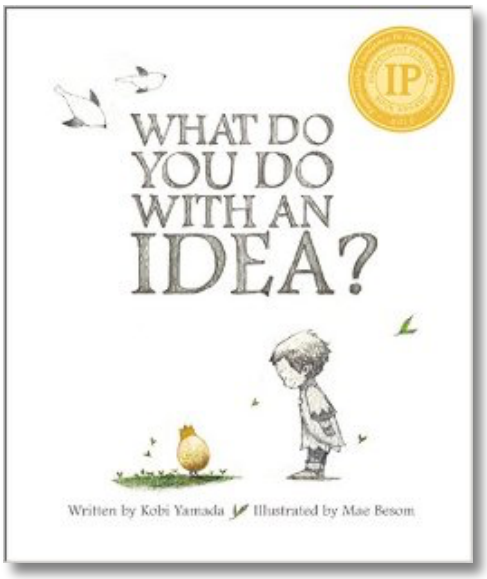
- the teacher determines the big idea or topic and the students and/or the teacher come up with the questions
- the students are responsible for designing and following their own procedures to test the question and then communicate their results and findings

Open inquiry

- the students determine the purpose and formulate the questions
- the students design the procedures, gather the materials and communicate their findings
- the teacher facilitates, supports, asks questions and redirects the investigation

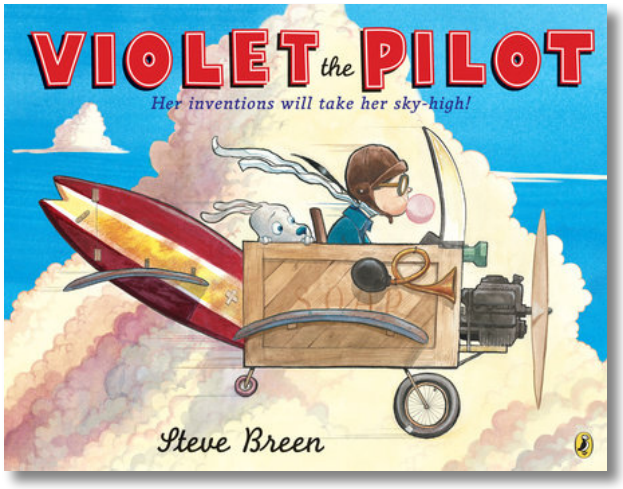
Adapted from Michelle Hikida, mhikida@sd38.bc.ca ~ *BCPTA Fall Conference, 2016*

Books inspire a Maker Mindset

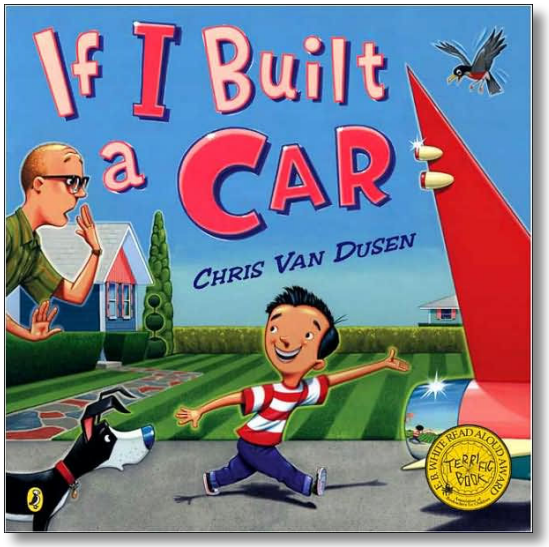


This is the story of one brilliant idea and the child who helps to bring it into the world. As the child's confidence grows, so does the idea itself. And then, one day, something amazing happens. This is a story for anyone, at any age, who's ever had an idea that seemed a little too big, too odd, too difficult. It's a story to inspire you to welcome that idea, to give it some space to grow, and to see what happens next. Because your idea isn't going anywhere. In fact, it's just getting started.

By the time she's two years old, Violet Van Winkle can engineer nearly any appliance in the house. And by eight she's building elaborate flying machines from scratch—mind-boggling contraptions such as the Tubbubbler, the Bicycopter, and the Wing-a-ma-jig. The kids at school tease her, but they have no idea what she's capable of. Maybe she could earn their respect by winning the blue ribbon in the upcoming Air Show. Or maybe something even better will happen—something involving her best-ever invention, a Boy Scout troop in peril, and even the mayor himself!

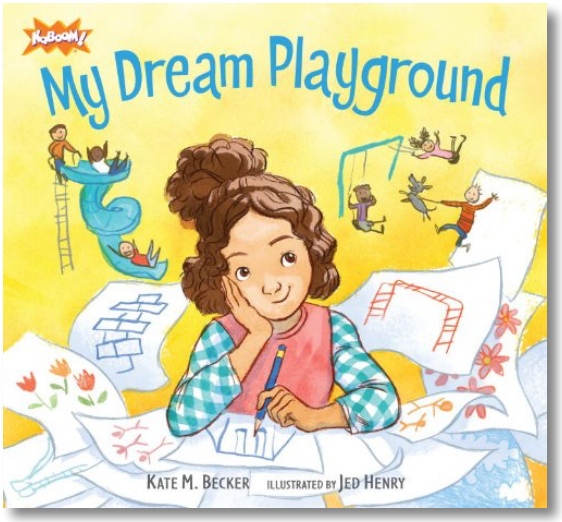


Books inspire a Maker Mindset



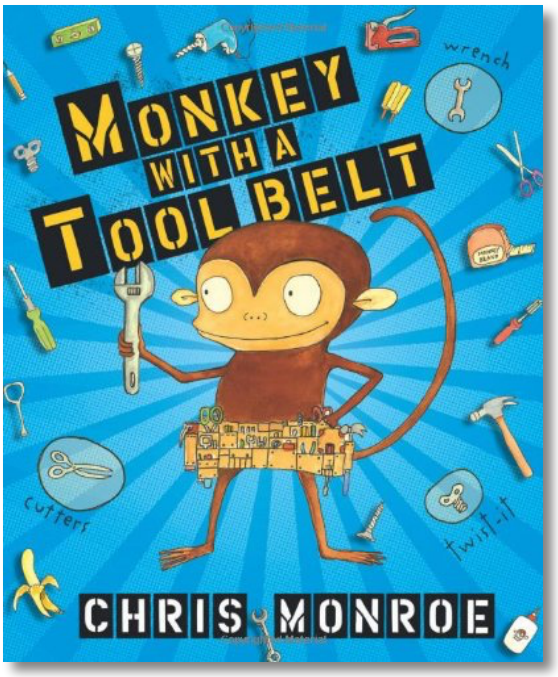
"If I built a car, it'd be totally new! Here are a few of the things that I'd do. . . ." Jack has designed the ultimate fantasy car. Inspired by zeppelins and trains, Cadillacs and old planes, with brilliant colours and lots of shiny chrome, this far-out vision is ready to cruise! There's a fireplace, a pool, and even a snack bar! After a tour of the ritzy interior, Robert the robot starts up the motor . . . and Jack and his dad set off on the wildest test drive ever!

EVERYTHING CAN BE USED AGAIN! That's Dawson's motto. He collects junk that people throw away and turns it into something STUPENDOUS. But when Dawson uses his skills to create a machine to do his chores for him, he discovers he might have invented something a little *too*... AWESOME. Can he stop the rampaging robot before it destroys the entire town?



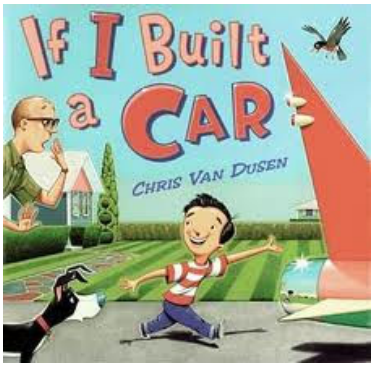
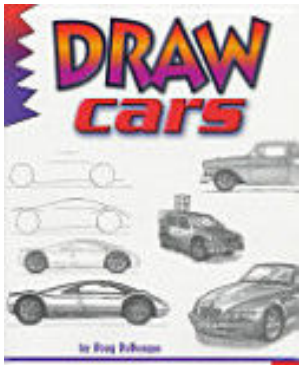
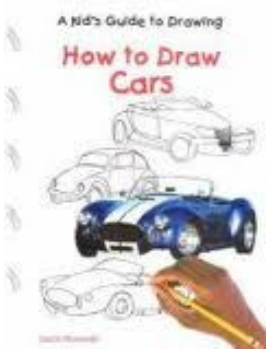
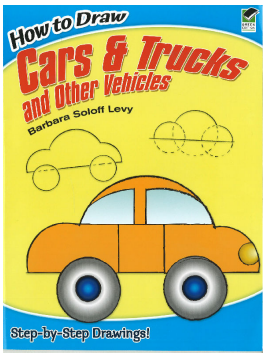
Right now there is just an empty lot down the street, but this little girl dreams that one day there will be a playground — a real playground, a fun playground — right in her own neighbourhood. When she sees a man measuring the empty lot, she's sure that he's there to help make her playground dream come true. And he is! Inspired by the real story of the first-ever playground built by KaBOOM!, a national nonprofit that has helped build more than two thousand play spaces across the country, here is the tale of how a determined young girl, with the help of her family, friends, and community, makes her dreams of a playground in her own neighbourhood a reality.

Whether you need a beebersaw or a chisel, Chico Bon Bon's your monkey. He can build or fix just about anything—from a dock for the ducks to a clock for the Clucks, even a small roller coaster for local chipmunks. But will his tools and his sharp wit save him when an organ grinder sets his sights on making Chico a circus star? Chris Monroe's quirky hero and detailed illustrations will absorb readers in an entertaining adventure that shows there is an inventive way out of every problem—if you have the right tools.



Writing Traits: Ideas, Word Choice, Voice

Learning Intention: I can design, draw, label, and write about an imaginary car after reading Chris Van Dusen's book.

			
By Chris Van Dusen	By Doug Dubosque	By Laura Murawski	By Barbara Soloff Levy

Before Reading:

Before reading, have students use the title and cover illustration of Chris Van Dusen's **If I Built a Car** to predict what this book might be about. Have students turn and talk about their car; what they like about it and what they don't. Ask what they would change about their car if they could do anything and money wasn't an issue. The more they talk to a friend, and share as a group before reading this book, the more anticipation there will be.

During Reading:

As the book is read, ask students to take note of any car-specific vocabulary that is used. Once they've had a chance to chat about these words and share with each other, provide them with the ABC Brainstorm sheet. This will help stretch vocabulary before drawing, labeling and writing. If vocabulary is limited, or just to get outside, take a trip to the school's parking lot and look at cars. With clip boards and ABC Brainstorm sheet in hand, the vocabulary-building will take on a little more fun!

After Reading:

Let students have lots of fun with the how-to-draw-cars books. Photocopy a few key pages for all to use and experiment with. Once the basics have been mastered, challenge kids to add creative designs to their cars like the suggestions in the book and beyond! Labels should be added to explain each innovative feature that is added.

After lots of sketching, playing and talking, have students write about their originally designed car. You may want to share the sample-write on page 4 to model what theirs might be like.

ABC BRAINSTORM

by: _____

Topic: _____

A _____

B _____

C _____

D _____

E _____

F _____

G _____

H _____

I _____

J _____

K _____

L _____

M _____

N _____

O _____

P _____

Q _____

R _____

S _____

T _____

U _____

V _____

W _____

X _____

Y _____

Z _____

ABC BRAINSTORM

by: _____

Topic: CARS

A air-conditioned

B bumper

C _____

D dashboard

E engine, electric windows, exhaust system

F fuel gauge, fender, fuel economy

G gasoline

H heated seats, heater

I ignition

J _____

K _____

L leather seats

M motor

N _____

O oil gauge, odometer

P _____

Q _____

R _____

S seats, stereo, speedometer, side-view mirror

T tires

U _____

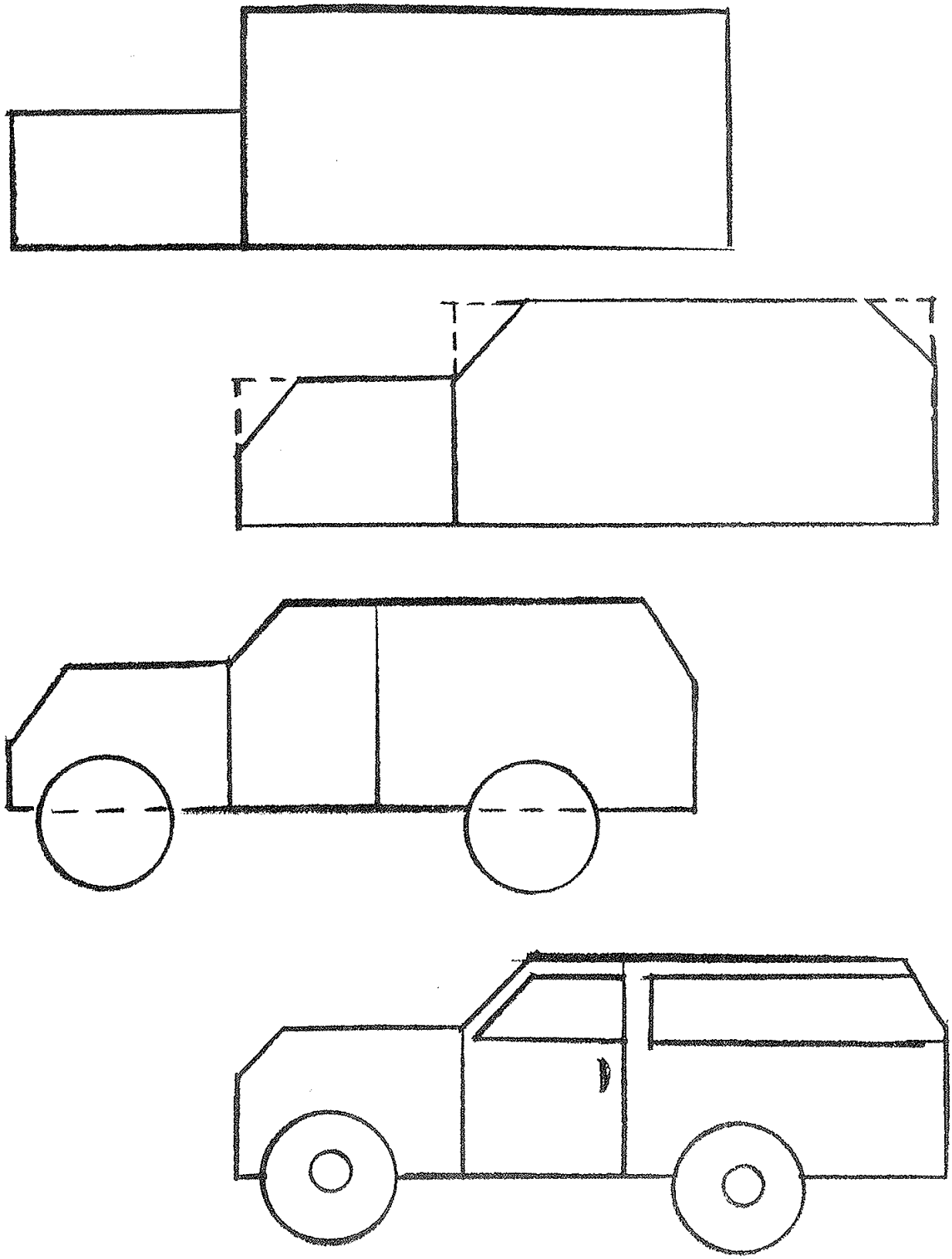
V _____

W windows, windshield, wipers

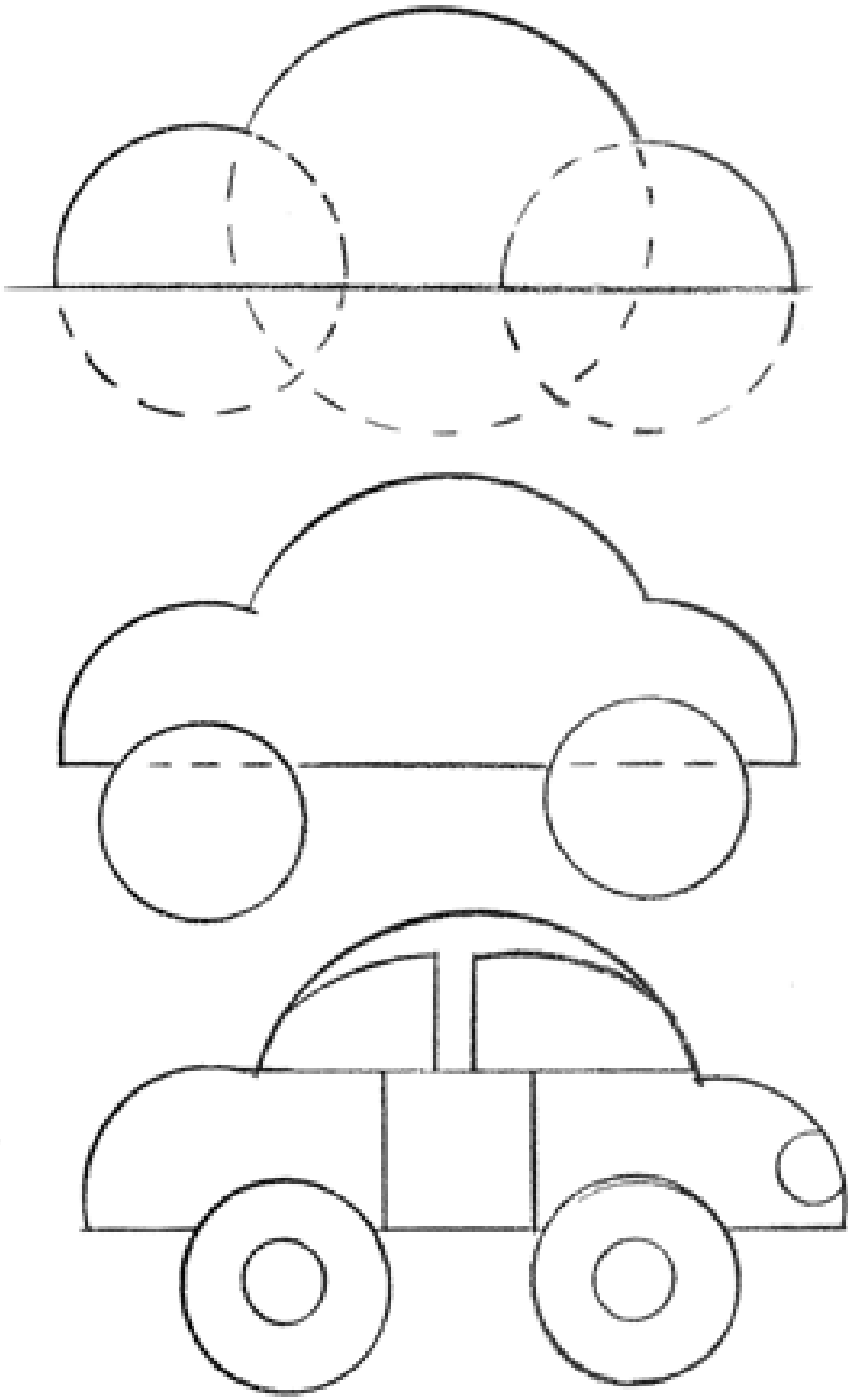
X _____

Y _____

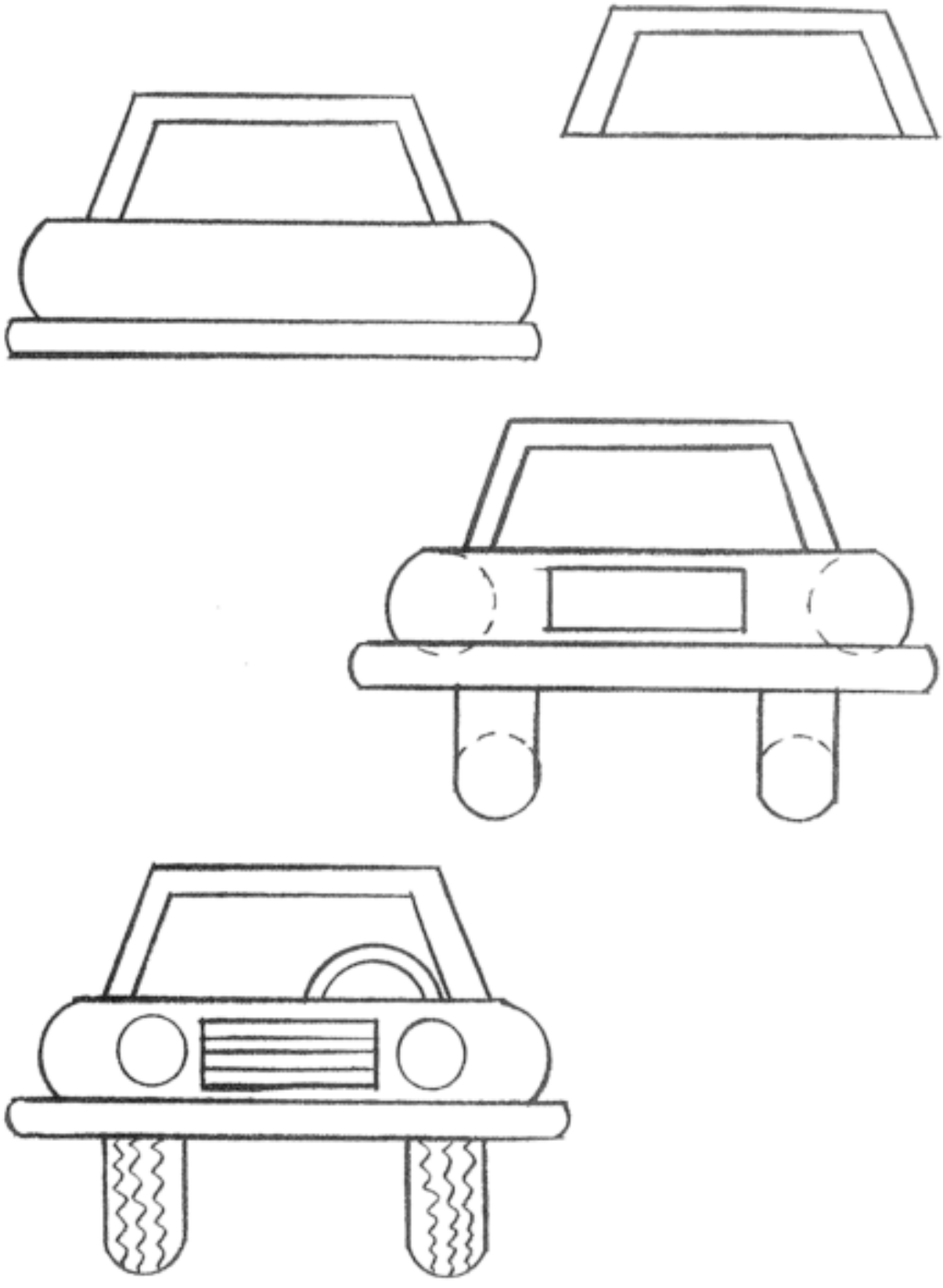
Z _____



2 STATION WAGON

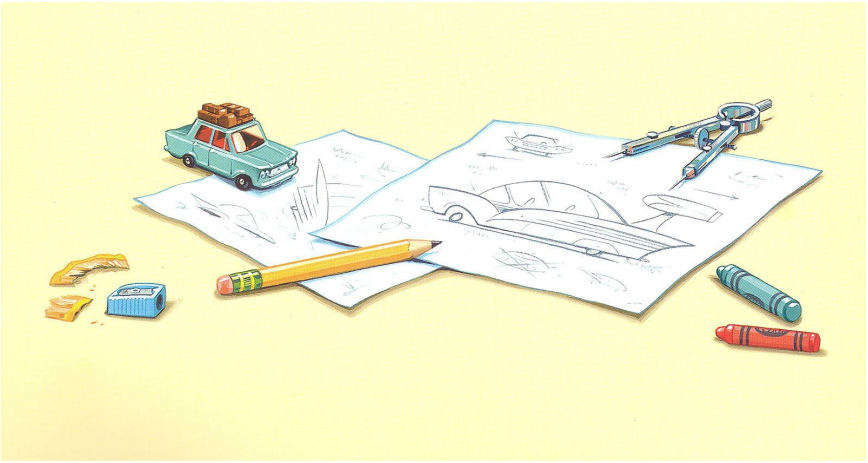


4 CAR (Side view)



6 CAR (Front view)

Divine Designs for Driving
or ...Cool Creative Cars!



Think beyond the box. Extend those lines. What would the perfect car be like? Personally those long drives down island get a bit boring. Keeping your eyes on the road is really a bit much don't you think? So how about the "rail car"? Simply hitch your car to the rail and leave the driving to the rail mechanism. If someone suddenly stops in front of you; no worries. The rail will ensure that you float to a comfortable stop.

But what will you do with all your extra time if you don't have to drive for hours on end? Well that's simple; just hit the word, "Paint" on your dashboard and a full set of artists supplies will appear ~ everything from paintbrushes, to an easel and the finest acrylic paints money can buy. And no need to worry about the clean-up as there's a button that will take care of that too. Your car will be as clean as it was when new. It will even smell showroom clean!

Once your masterpiece is complete, you may be a bit hungry. Once again, no worries, simply tap the word "chef" on your touch screen computer and tell the chef what you would like to eat. Within minutes, your meal will be prepared and several car cleaning elves will whisk away the crumbs once eaten too.

The possibilities are endless when you think beyond the lines!

Writing Trait: Ideas

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By Kate Becker

Before Reading

Explain to children that this book is based on a real story. Ask them to turn and talk to a partner to predict what this book might be about. Explain that predictions are never wrong as long as they make sense. Predictions for this book should be based on the cover illustration and title.

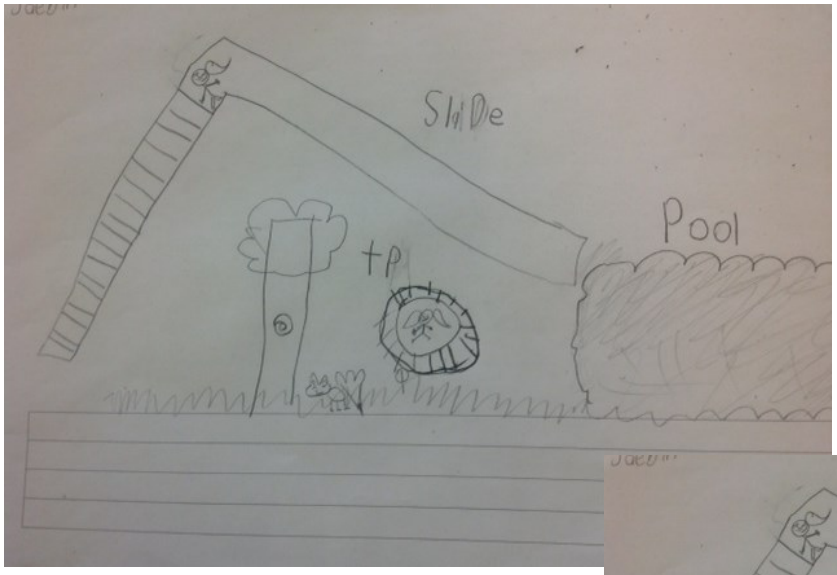
During Reading

Pause during reading and encourage students to think about a playground they would love to have in their neighborhood or at their school.

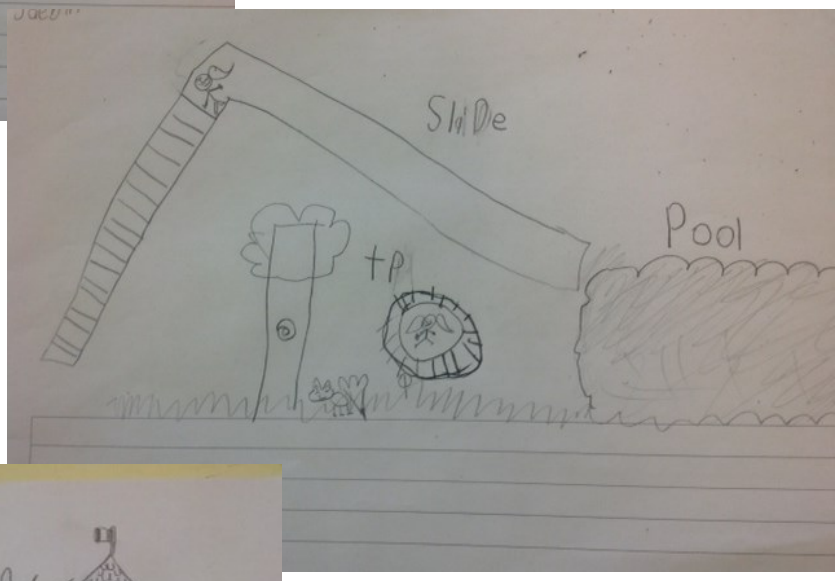
After Reading

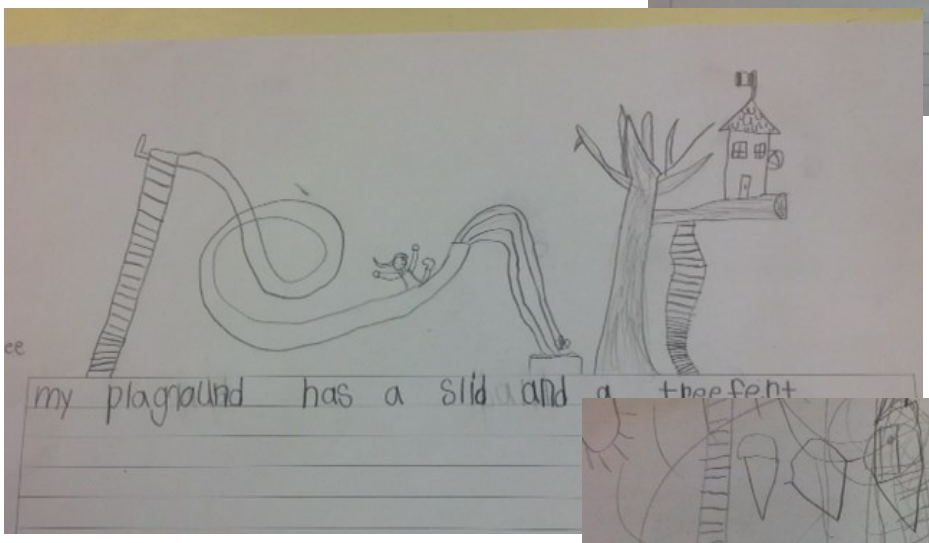
Have students draw and label their idea of a perfect playground. Three dimensional renditions are highly motivational for students so please consider using a variety of materials such as plasticene, toothpicks, straws, nuts, bolts and screws! To increase the size of playground renditions, encourage children to use materials from centres such as blocks, cubes, and any other building materials. Add some boxes, blankets and long branches too!

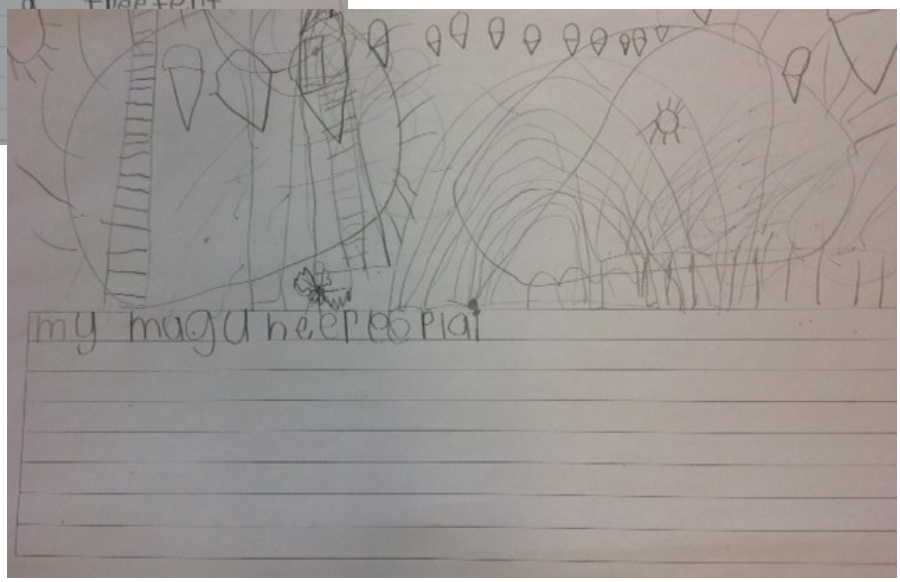
See photos on following pages...

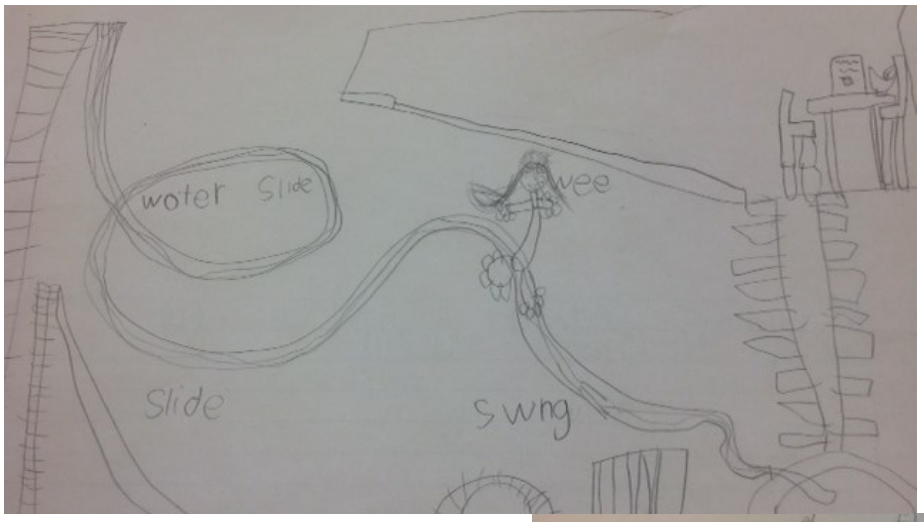


With thanks to the kindergarten children in Marlies Tinkler's class.





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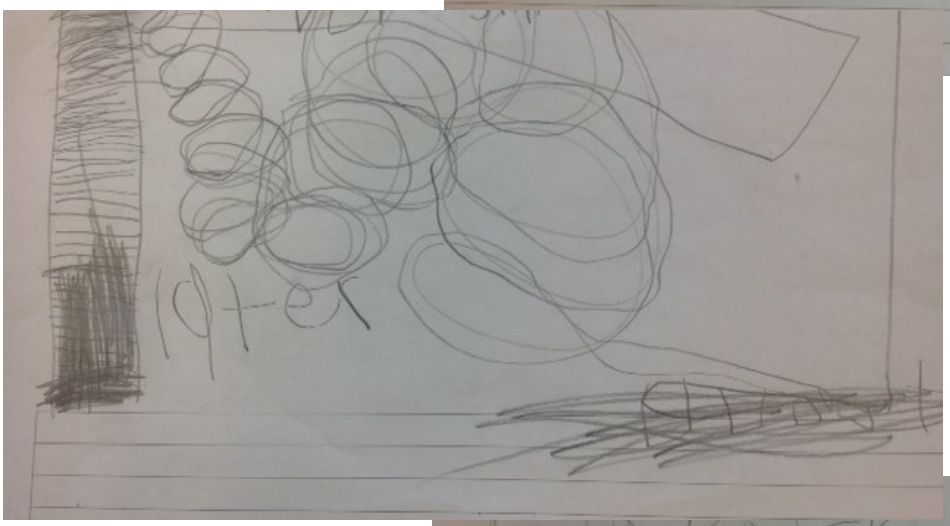
wee
Slide
swng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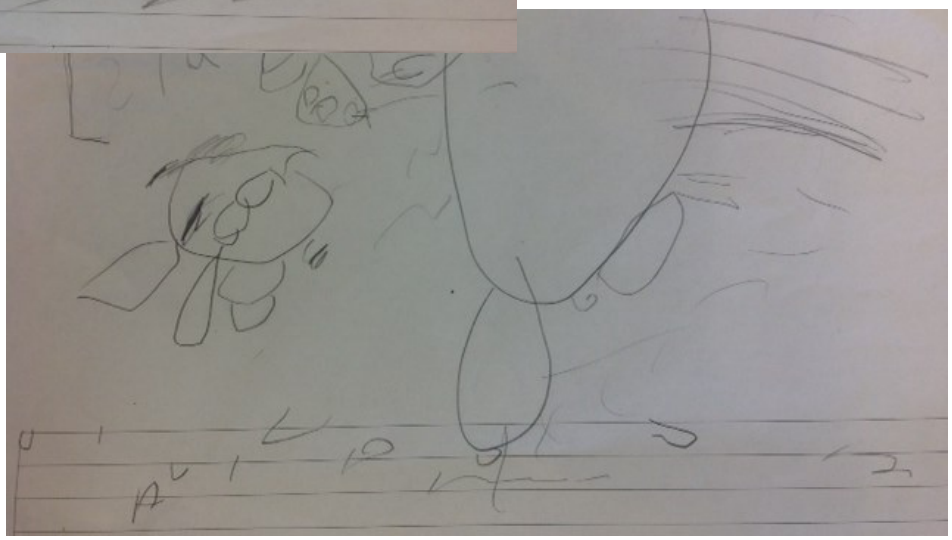
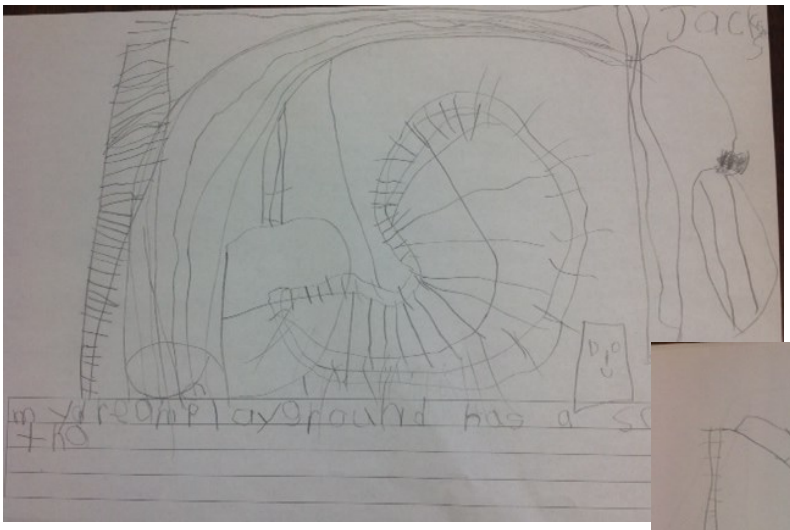
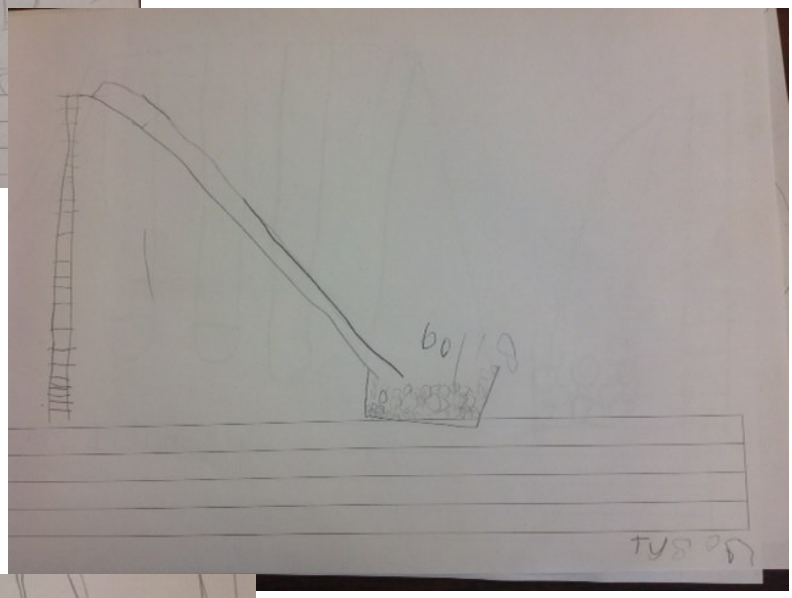
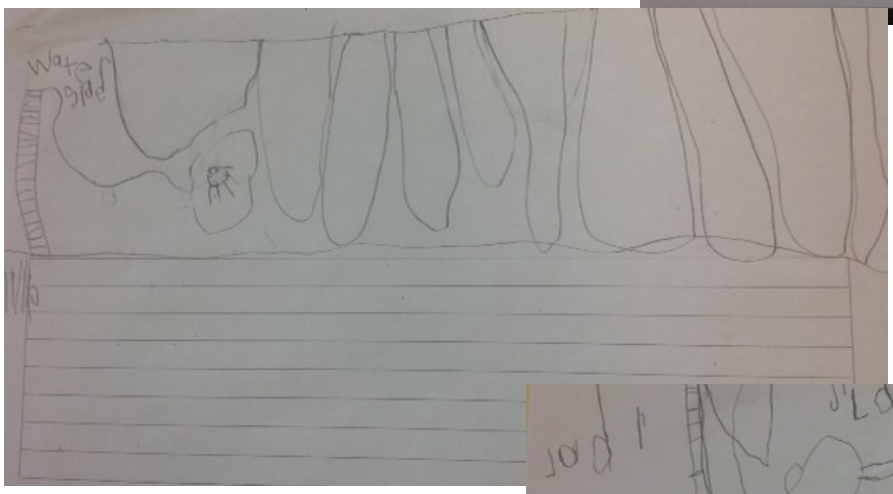
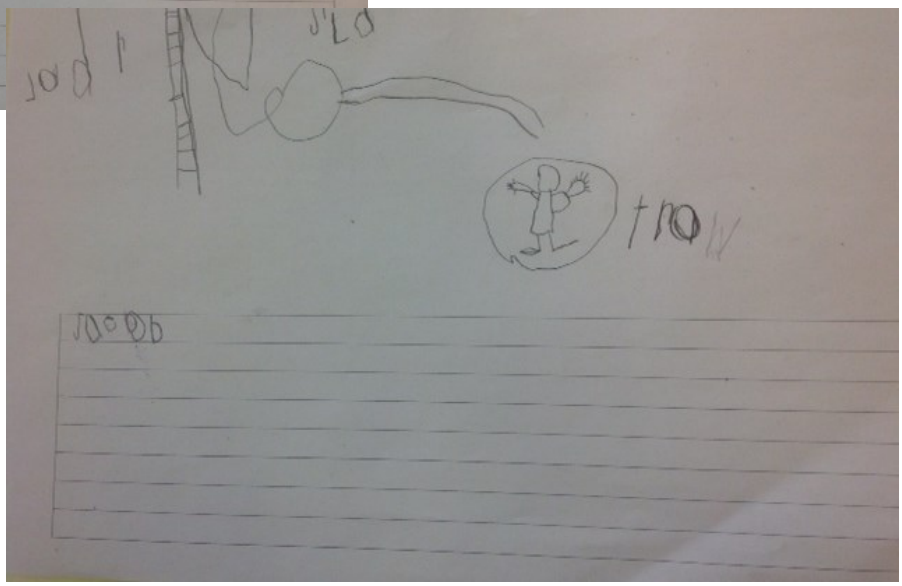










Writing Trait: **IDEAS**

carol.walters@sd71.bc.ca

by Antoinette Portis

Before Reading:

Ask students to share play experiences in which they used something from nature as a toy. Give examples such as a rock, a branch, a log, leaves or flowers. Have all children share ideas with a partner. After a few minutes of talk, have a few students share their ideas aloud.

During Reading:

Have students listen for all the ways this author has described how a stick may be used imaginatively.

An After Reading Writing Extension:

After reading, flip through each page of the book while students turn and talk to review all the ways the stick was used.

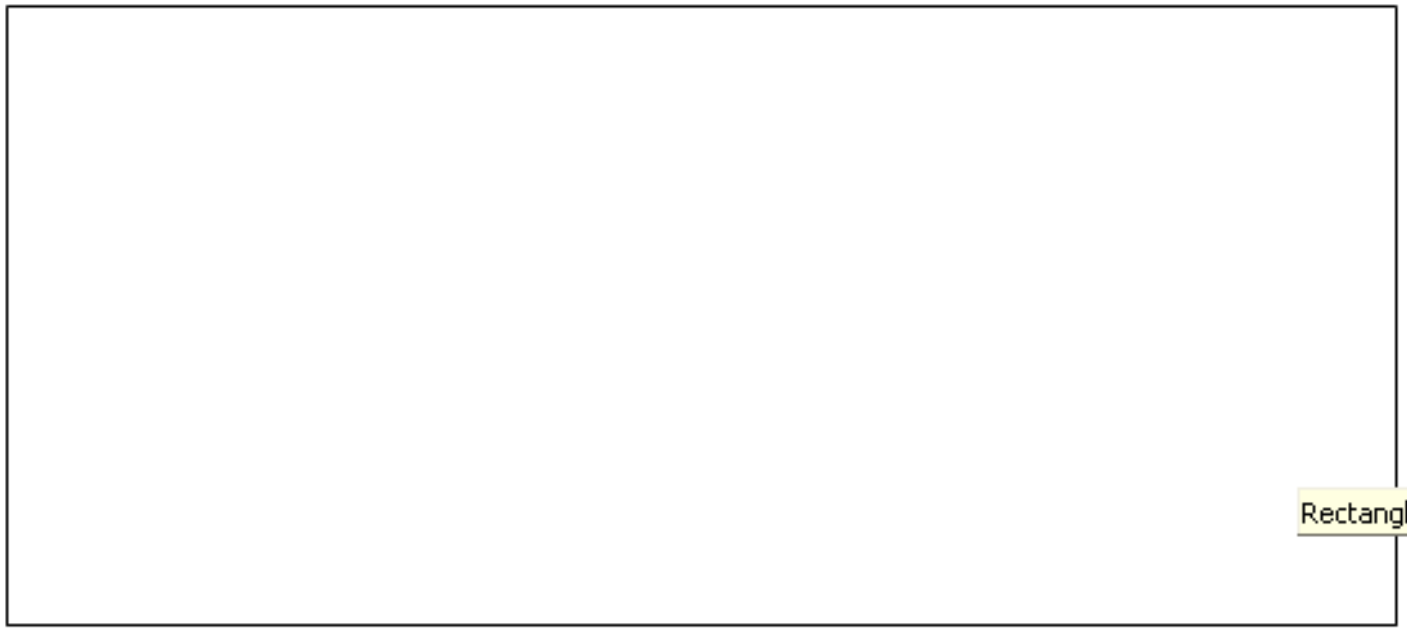
Have children sit in a circle. Explain to them that you have a stick that can be turned into whatever our imaginations can create. Hold up a stick and say, "This is not a stick, it's a magic wand." Or, "This is not a stick, it's a toothpick for a giant." Have students share ideas about other possibilities for the stick. Pass the stick around the circle having students use their imagination to explain what else the stick could be. Challenge students to try not to repeat ideas that have already been said. Allow others in the group to offer suggestions to those not able to contribute.

On another day, use another object such as a rock, ball or piece of fabric and repeat the same process.

As a writing extension provide paper (see BLM) and have students fill in the framework by thinking of an object to turn into something else.

This is not a _____

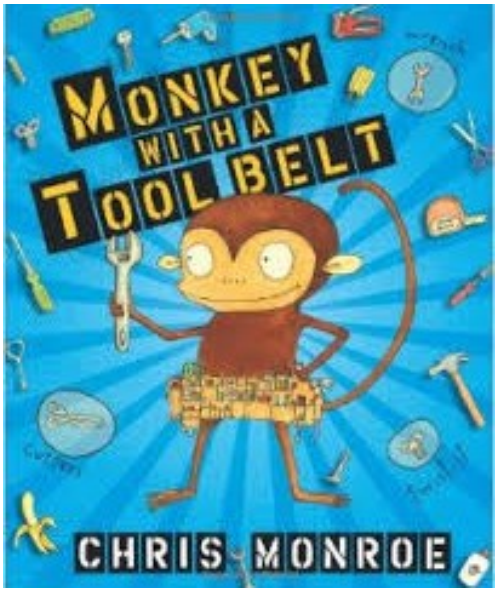
it's a _____.



Writing Trait: Ideas and Organization

Learning Intention: Once armed with too-specific vocabulary, students will create a procedural piece of writing in which they describe the tools and steps needed to escape a box just like the character in this book ~ Chico Bon Bon.

Carol Walters S.D. #71 ~ Comox Valley, Vancouver Island



By Chris Monroe

Before Reading

Our vulnerable students are often lacking specific vocabulary that provides access to text. Without word knowledge there are gaps in their understanding.

In this lesson, tool-specific vocabulary is built. This language is then used in a piece of procedural writing.

Before reading, bring in a tool belt and a bunch of tools. As students provide the name of a tool, ask for demonstration examples, then place in the tool belt. Explain that the main character in this story has a tool belt with lots of tools.

During Reading

While reading have students listen for the names of specific tools. If possible, project the page with the detailed picture of Chico Bon Bon's tools along with all the labels. Pause to discuss the names of all these tools. Are all of them real tools or has the author take a few liberties?

After Reading

Draw students attention back to the page in which Chico's plan is explained in 12 text boxes. Explain to students that their task is to create similar text boxes, with illustrations, which describe the step by step plans to escape from the box using your tools. Review Chico Bon Bon's plan carefully. Did he use tools in creative and imaginative ways? Encourage your students to think flexibly about the use of tools and devise a plan that would trick the organ grinder!

Applied Design, Skills and Technologies Student Self-Assessment

What inspires me to come up with new ideas?

How did/do my ideas change over the process of designing?

How best do I share my curiosity?

How do my ideas contribute - to me, to my classmates, to the community?

Applied Design, Skills and Technologies Student Self-Assessment

What have I learned about being a design thinker?

How did the design process go? What worked? What was difficult?

Where to next? What will I / could I do differently next time?

A core competency I demonstrated was

_____ *because*

Applied Design, Skills and Technologies "I" Statements:

I identify needs and opportunities for design through exploration.

I generate ideas from experiences and interests.

I choose an idea to pursue.

I go through a process of trial and error to make changes, solve problems and incorporate new ideas.

I reflect on my ability to work effectively both as an individual and collaboratively in a group.

Applied Design, Skills and Technologies Student Self-Assessment questions:

What inspires me to come up with new ideas?

What matters to me when I think about designing something?

How did/do my ideas change over the process of designing?

How do I refine my ideas?

How do my ideas contribute - to me, to my classmates, to the community?

How do I share my curiosity?

How best do I represent my understanding? What helps me to explain/recount and reflect on my learning?

What have I learned about being a Maker?

How did the design process go? What worked? What was difficult?

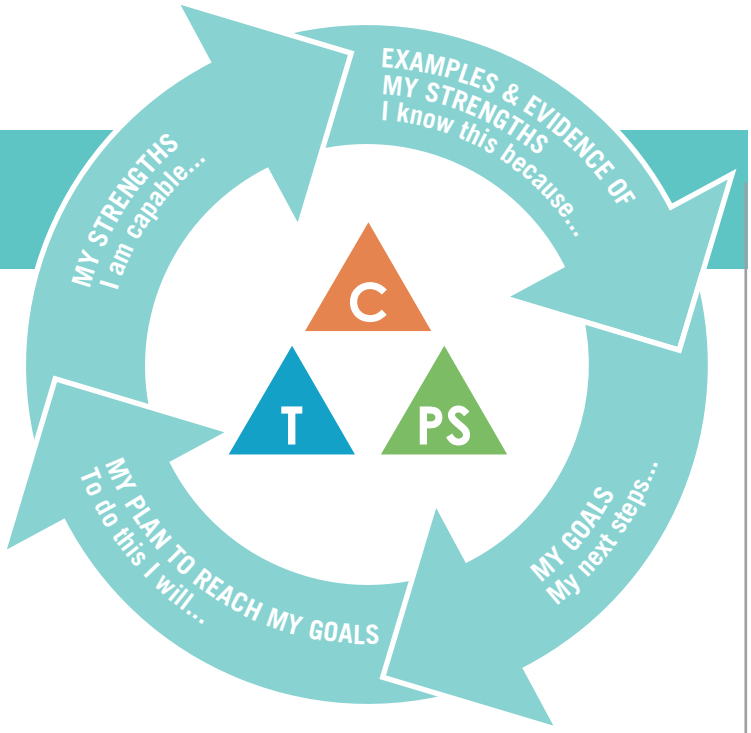
Where to next? What will I do differently next time?

A core competency I demonstrated was _____ because

CORE COMPETENCIES SELF-ASSESSMENT

Name: _____ Date: _____

I can reflect on my learning and describe or draw how I have demonstrated or developed my competencies.



Self-assessment can take many forms and may focus on one, a few, or all of the core competencies.

Adapted from School District No. 36, Surrey

What worked?	What was difficult?	What would you do differently next time?
		
Collaboration	Names: _____	