

Early Childhood Engineering



Literature & Engineering

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Design Challenges Overview

- Goldilocks Design Challenge #1 - design and build a chair
- Goldilocks Design Challenge #2 - design and build a bed

- Cinderella Design Challenge #1 - design and build a means of transportation to get Cinderella to the ball
- Cinderella Design Challenge #2 - design and build a cleaning tool to help Cinderella get her work done faster

- Gingerbread Man Design Challenge #1 - design and build a way to catch the Gingerbread Man
- Gingerbread Man Design Challenge #2 - design and build a way for the Gingerbread Man to get to the other side of the river safely away from the fox

- Three Billy Goats Gruff Design Challenge #1 - design and build a bridge across the stream that will support the weight of all 3 goats and be tall enough for the Troll to stand under
- Three Billy Goats Gruff Design Challenge #2 - design and build an Old Troll Home for the troll to live in instead of living under the bridge

- Jack and Jill Design Challenge #1 - design and build a water transporter
- Jack and Jill Design Challenge #2 - design and build a way for Jack to get down the hill safely without falling

- Humpty Dumpty Design Challenge #1 - design and build a way to keep Humpty on the wall so he won't fall off
- Humpty Dumpty Design Challenge #2 - design and build a way to protect Humpty from getting hurt in case he did fall off the wall

- Hey Diddle Diddle Design Challenge #1 - design and build a musical instrument
- Hey Diddle Diddle Design Challenge #2 - design and build a device that will help the Cow get over the moon

- Tikki Tikki Tembo Design Challenge #1 - design and build a way to keep people from falling into the well while allowing them to access the water supply
- Tikki Tikki Tembo Design challenge #2 - design and build a way for Tikki Tikki Tembo to escape from the well without the help of others

- The Mixed Up Chameleon Design Challenge #1 - design and build a mixed up animal
- The Mixed Up Chameleon Design Challenge #2 - design and build a habitat for the Mixed Up Chameleon

- Tops and Bottoms Design Challenge #1 - design and build a place where Bear can sleep that will be outside and fit him comfortably
- Top and Bottoms Design Challenge #2 - design and build a maximum yield garden

Goldilocks & the Three Bears - Design Challenge #1

Problem: Goldilocks is inside the bears' house. She is tired and needs a place to rest.

Challenge: Design and build a chair that is just the right size for Goldilocks.

Design Criteria:

- You may use only given materials in your design.
- The chair must have legs, a seat, and a back.
- The chair must be able to support the weight of a "More Mass" and a "Less Mass" Goldilocks.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Goldilocks & the Three Bears - Design Challenge #2

Problem: Goldilocks is inside the bears' house. She is tired and needs a place to rest.

Challenge: Design and build a bed that is just the right size for Goldilocks.

Design Criteria:

- You may use only given materials in your design.
- The bed must have legs, a headboard, and a footboard.
- The bed must be able to support the weight of a "More Mass" and a "Less Mass" Goldilocks.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Cinderella - Design Challenge #1

Problem: Cinderella doesn't have transportation to the ball.

Challenge: Design and build a means of transportation to help Cinderella get to the ball.

Design Criteria:

- You may use only given materials in your design.
- The transportation must allow Cinderella to be protected from weather since she will be dressed for the ball.
- The transportation must provide a seat for Cinderella.
- The transportation must include at least one simple machine.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Cinderella - Design Challenge #2

Problem: Cinderella can not go to the ball because she has too many cleaning chores to do.

Challenge: Design and build a cleaning tool that will help Cinderella finish cleaning quicker.

Design Criteria:

- You may use only given materials in your design.
- The tool must be appropriate for more than one cleaning task and must include more than three materials.
- The tool must allow Cinderella to multitask her cleaning so her chores will be completed faster.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was #_____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Gingerbread Man - Design Challenge #1

Problem: The Gingerbread Man is running away.

Challenge: Design and build a solution to catch the Gingerbread Man.

Design Criteria:

- You may use only given materials in your design.
- The Gingerbread Man must not get hurt in any way.
- You must allow at least two of the characters in the story to be part of the solution.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Gingerbread Man - Design Challenge #2

Problem: The Gingerbread Man needs to cross the river to escape from the fox.

Challenge: Design and build a solution for the Gingerbread Man to get to the other side of the river.

Design Criteria:

- You may use only given materials in your design.
- The Gingerbread Man must not get hurt in any way.
- You must allow at least two of the characters in the story to be part of the solution.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Hey Diddle Diddle - Design Challenge #1

Problem: The cat is tired of playing the fiddle and is ready for a change.

Challenge: Design and build a new musical instrument for the cat.

Design Criteria:

- You may use only given materials in your design.
- The instrument must be able to make more than one sound.
- The instrument must require the cat to use at least two body parts to operate.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was #_____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Hey Diddle Diddle - Design Challenge #2

Problem: The cow is getting older and finding it more difficult to jump.

Challenge: Design and build a device to aid the cow in jumping over the moon.

Design Criteria:

- You may use only given materials in your design.
- The device must keep the cow safe while jumping.
- The device must include at least one simple machine.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Humpty Dumpty - Design Challenge #1

Problem: Humpty fell off the wall and got hurt.

Challenge: Design and build a solution to keep Humpty securely on the wall.

Design Criteria:

- You may use only given materials in your design.
- The solution must keep Humpty safe and eliminate the risk of falling off the wall.
- The solution must not allow Humpty to change his body in any way.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was #_____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Humpty Dumpty - Design Challenge #2

Problem: Humpty fell off the wall and got hurt.

Challenge: Design and build a way to protect Humpty from getting hurt in case he falls.

Design Criteria:

- You may use only given materials in your design.
- The solution must protect all parts of Humpty's body.
- The solution may add to, but must not change Humpty's body in any way.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was #_____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Jack and Jill - Design Challenge #1

Problem: Jack and Jill need to bring water from the well back to their family.

Challenge: Design and build a water transporter for Jack and Jill to use.

Design Criteria:

- You may use only given materials in your design.
- The water transporter design must show an element of balance.
- The water transporter must allow Jack and Jill to carry a large quantity of water with little spillage.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Jack and Jill - Design Challenge #2

Problem: Jack fell down the hill and got hurt as he carried his water.

Challenge: Design and build a way for Jack to get down the hill safely without falling.

Design Criteria:

- You may use only given materials in your design.
- The solution must keep Jack safe and include at least two changes of direction.
- The solution must allow Jack to carry a large quantity of water with little spillage.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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The Mixed Up Chameleon - Design Challenge #1

Problem: The Mixed Up Chameleon is unhappy and wants to be like other animals.

Challenge: Design and create a new animal friend to help cheer up the Mixed Up Chameleon.

Design Criteria:

- You may use only given materials in your design.
- The new animal must represent three animal classifications.
- The new animal must be able to swim in the water.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____
If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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The Mixed Up Chameleon - Design Challenge #2

Problem: The Mixed Up Chameleon needs a place to live.

Challenge: Design and create a habitat for the Mixed Up Chameleon.

Design Criteria:

- You may use only given materials in your design.
- The habitat must provide for the Mixed Up Chameleon's basic needs.
- The habitat must show consideration of safety from predators.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was #_____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Three Billy Goats Gruff - Design Challenge #1

Problem: The Three Billy Goats want to cross the river, but the Troll wants to eat them instead.

Challenge: Design and build a bridge across the stream.

Design Criteria:

- You may use only given materials in your design.
- The bridge must support the weight of each goat without going into failure.
- The bridge must be tall enough for the Troll to stand underneath.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was #_____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Three Billy Goats Gruff - Design Challenge #2

Problem: The Troll needs a safe place to live.

Challenge: Design and build an Old Troll Home so the Troll doesn't have to live under the bridge anymore.

Design Criteria:

- You may use only given materials in your design.
- The Old Troll Home must be big enough for the Troll to live inside.
- The Old Troll Home must have a door, a roof, and at least 2 windows so the Troll can watch the goats cross the bridge.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Tikki Tikki Tembo - Design Challenge #1

Problem: Tikki Tikki Tembo's brother fell into the well. He does not want anyone else to do the same thing.

Challenge: Design and build a solution to allow the villagers to obtain their water supply from the well while protecting people from falling into the well.

Design Criteria:

- You may use only given materials in your design.
- The solution must allow villagers to obtain water from the well's bucket.
- The solution must be able to support the weight of the villager with the most mass.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Tikki Tikki Tembo - Design Challenge #2

Problem: Tikki Tikki Tembo has fallen into the well. No one is around to help him. If he can not escape, he will certainly drown.

Challenge: Design and build a solution for Tikki Tikki Tembo to get out of the well without the help of someone else.

Design Criteria:

- You may use only given materials in your design.
- The solution must not involve another person to help Tikki Tikki Tembo.
- The solution must be able to support the weight of Tikki Tikki Tembo.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Tops and Bottoms - Design Challenge #1

Problem: Bear wants to sleep outside, but he has trouble fitting into the chair.

Challenge: Design and build a place where Bear can sleep in comfort.

Design Criteria:

- You may use only given materials in your design.
- The solution must include Bear staying outside so he can "watch" the Rabbit Family.
- The solution must allow Bear to fit comfortably while sleeping.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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Tops and Bottoms - Design Challenge #2

Problem: The Rabbit Family planted two separate gardens to be able to have a variety of vegetables.

Challenge: Design and build a garden that will produce a varied maximum yield.

Design Criteria:

- You may use only given materials in your design.
- The garden must include at least five different kinds of vegetables.
- The garden must include plants of varying heights and parts that are eaten.
- You must design and build within a 20 minute time limit.

PLAN: (What do you need to know before you begin designing?)

DESIGN:

Part A: (Brainstorm at least 3 possible design solutions and then reach consensus on the best design to solve the problem. Label materials and parts on the blueprint sketch.)

Design #1	Design #2	Design #3

Our chosen design was # _____.

Materials we chose to use: _____

We chose this design because _____

DESIGN (continued):

Part B: (Build the chosen design according to the labeled blueprint.)

This went well during construction: _____

This could have been improved during construction: _____

CHECK: (Test the design according to the challenge and design criteria.)

Did the design meet all of the design criteria? Yes _____ No _____

If yes, think about how you could make additional improvements in design.

If no, think about how it needs to be redesigned.

Go back to Part A of the DESIGN and try another design.

SHARE:

Things we want to share about our design: _____

How would you rate your team? _____

- **Great-** Listened to each other, cooperated, and shared ideas
- **OK-** Shared ideas, cooperated most of the time
- **Needs Improvement-** Had difficulties in sharing ideas and cooperating

Concepts/Skills That Could be Taught Through or Along with This Challenge:

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