Project Planning Toolkit

WHAT IS A PROJECT PLANNING TOOLKIT?

This robust template provides the granular details that help teachers design and execute a project. The toolkit is broken down into five categories:

	Begin with the end in mind
	Design the project scenario
	Plan the assessment
	Create the path
	Assess your project before launch

NOTE TO EDUCATORS

We're so excited that you're thinking about using one of the NTN Model Projects! Before you begin, we'd like to share a few thoughts and considerations. **This project is intended to be a model, but only a model to get you started.** As with any instructional materials, you will need to adjust tasks, materials, and scaffolding based on the needs of your students. In addition, adjust your project based on your local context, such as connecting to community partners.

We have created a few examples of scaffolding for each benchmark section to help you get started. NTN Practice Cards are embedded in the "Create the Path" and "Project Calendar". The NTN Culture Practices help you create a safe, inclusive, and emotionally supportive classroom for all students and enrich your trauma-informed work. The NTN Learner-Centered and Assessment Practices help all students, including English Language Learners, in developing Learning Outcome skills. Some include a link to a lesson plan with suggestions for using the practice and adapting it to provide additional support based on your students' needs and your unique context.

"Project Calendars" are meant only to model day to day PBL and will need to be adjusted for various schedules, class period lengths, etc. Please note that on the secondary toolkits, the calendar generally assumes a 90 minute block.

Each toolkit is part of a Curriculum Framework that models the scope and sequence of projects throughout the academic year. See NTN Curriculum Frameworks and NTN Glossary in the Help Center to learn more.

Project Planning Toolkit

PROJECT TITLE

Cold Cats & Hot Dogs

AUTHOR(S)
Courtney Vandebunte

DURATION
4 weeks/ 20 days

BEGIN WITH THE END IN MIND

Consider the standards you'll be addressing in this project as well as the rubric indicators (rows of bullets) from the NTN Learning Outcome rubrics you'll be targeting.

SUBJECT AREA	STANDARD	LEARNING TARGETS
NGSS Physical Science: Thermal energy	MS-PS3-3 Apply scientific principles to design, construct, and test a device that either minimizes or maximizes thermal energy transfer. MS-PS3-4 Plan an investigation to determine the relationships among the energy transferred, the type of matter, the mass, and the change in the average kinetic energy of the particles as measured by the temperature of the sample.	I can design a home and test it for stray and shelter animals that minimizes energy transfer to keep the animals warm in the winter and cool in the summer.
NGSS Engineering Design: Engineering, Culture	MS-ETS1-1 Define the criteria/constraints of a design problem with sufficient precision to ensure a successful solution, taking into account scientific principles, potential impacts on people and the...environment that may limits...solutions. MS-ETS1-2 Evaluate design solutions using a systematic process to determine how well they meet the criteria/constraints of the problem. MS-ETS1-3 Analyze data from tests to determine similarities/differences among several design solutions to identify the best characteristics....to be combined into a new solution to better meet the criteria for success. MS-ETS1-4 Develop a model to generate data for iterative testing....optimal design can be achieved.	I can design a dog/cat shelter by using the design process of brainstorming, planning, prototyping, testing and revision to create the best possible model for the solution.

2

Cold Cats & Hot Dogs

🏁 BEGIN WITH THE END IN MIND (Continued)

LEARNING OUTCOME	RUBRIC INDICATOR/S	LEARNING TARGETS
Knowledge & Thinking [Scientific Research](#)	Provides general content information that is related to the question being tested Experimental design is generally related to the testable question Gathers data from several replications of the experiment	I can provide scientific content such as the concepts of thermal energy and energy transfer when writing or communicating about this project. I can use experimental design to create our prototype housing for cats and dogs and gather data from several tests or expe
Agency	Identifies challenges or failures and describes reactions to them (e.g. giving up or trying harder)	I can identify challenges I face when designing and testing our model and am able to describe how to appropriately react to those challenges.
Collaboration	Words and tone indicate respect and sensitivity to others	I can use words and tone of voice to show respect and sensitivity to my classmates and adults.
Oral Communication	After listening, shows recall of key facts and main points	I can recall or repeat facts and main points after listening to someone.
Written Communication	Provides a partial explanation of background and context of topic/issue Ideas and evidence are mostly developed	In my writing, I can provide a background explanation of the project to give context to my audience that I am writing to. In my writing, I develop my ideas and my evidence to explain or persuade my audience.

Cold Cats & Hot Dogs

DESIGN THE PROJECT SCENARIO

Consider an authentic project scenario that will allow you to develop and assess the standards and outcomes you determined above.

PROJECT SCENARIO
What is the scenario that will guide student inquiry throughout the project?

According to the Humane Society of the United States, animals being left outside in dangerous weather is one of the most common forms of animal cruelty. This form of abuse is more investigated by police and animal control agencies than any other form of animal abuse. Stray animals are also impacted by dangerous weather. According to the ASPCA, approximately 6.5 million companion animals enter U.S. animal shelters nationwide every year but only 3.2 million shelter animals are adopted. This imbalance results in many stray animals being turned away due to shelters being at full *indoor* capacity. But what if shelters could safely expand their *outdoor* capacity?

In this project, learners will work as teams to design a structure that either minimizes or maximizes thermal energy for dogs or cats that can be used by pet owners who are unable to house their pets indoors or by local animal shelters needing to expand their outdoor capacity during times of dangerous weather. As learners build alliances, they will reflect on ways they can lean on each other's experiences and strengths to foster an inclusive and supportive community. As a class, they will produce community agreements, and develop rituals and routines to cultivate a learning community that continues to honor each other's unique identities.

DRIVING QUESTION
Open-ended, high interest, thought provoking

How can thermodynamics help design a structure that provides animals a safe and comfortable place to rest during dangerous weather?

PROBLEM STATEMENT
Role, task(s), purpose

We are (role)..... Thermal engineers
who will do/create (product)…create blueprints to a design for safe, energy efficient and comfortable outdoor animal structure
so that (purpose)…pet owners can keep their outdoor pets safe and comfortable during dangerous weather and local animal shelters can increase the number of strays they rescue

WRITTEN PERFORMANCE TASK
See NTN Written Task Templates and the Quality Checklist for help writing a prompt.

Write a persuasive letter to local animal shelters/pet owners to use your blueprint design to build thermodynamic structures that will provide safe and comfortable living spaces for animals and allow shelters to increase their stray capacity without expanding their buildings/keep pet owner's pets safe without having to bring them inside.
OR Write the instruction manual to your design for a thermodynamic structure explaining not only how to build it but why the energy conservation and thermodynamic principles allow for the dog/cat to remain safe and comfortable during periods of extreme heat or cold.

CULMINATING PRODUCTS
Be sure to allow for student voice and choice in the products.

Presentation / Performance:
- Informative presentation on how the thermodynamic animal structure creates a safe and comfortable living space
- Persuasive presentation to local shelter/pet owners on why they should use your blueprint design and how it will keep animals safe/comfortable in dangerous weather.

Artifact(s):
- Blueprints of thermodynamic animal structure
- Prototype of thermodynamic animal structure

AUTHENTICITY AND PARTNERS
How will you make this project as real-world as possible, and who will help you?

- Communication with local animal shelters
  - Q&A session about their needs and current protocol and procedures during dangerous weather
- Communication with local animal control
  - Q&A session about where and why strays are picked up and the condition they are in when brought to the shelter
- Audience: Local animal shelters and/or pet owners

4

PLAN THE ASSESSMENT

*Create the rubric you'll use to assess your students' work. Pull from the learning targets and the **NTN Learning Outcome Rubrics**, keeping in mind what you selected above in **STEP 1: BEGIN WITH THE END IN MIND**. Consider whether or not your students will need a separate rubric with more student friendly language.*

TEACHER PROJECT RUBRIC

Try using the **CRAFT RUBRICS** practice below to build your rubric.

You can also reference the New Tech Learning Outcome rubrics in the [Help Center](#) for help creating your rubric.

LINK TO YOUR RUBRIC

[Cold Cats and Hot Dogs Project Rubric](#)

CRAFT RUBRICS

What?
Create rubrics from NTN Learning Outcome Rubrics

Why?
- Help learners focus on specific indicators and master skills/outcomes over time
- Skillfully crafting rubrics takes time and a clear understanding of exactly what you hope students will be able to produce
- Not only do you need to clearly understand what your standards mean, you also must contextualize that content for your learners in the project or problem

How?

1. **Select one or two key indicators** (rows of bullets) from each NTN Learning Outcome rubric to focus on in a project or on a task.

2. **Create a project** or task rubric just from those indicators.

3. **Add any additional content indicators** based on your standards, as needed. IMPORTANT: As you craft the language, articulate different levels of skill or mastery, ***not*** simple differences in number or quantity. For example, "Thoroughly supports opinions with evidence and warrants" rather than "Supports each opinion with two to three facts."

4. **If you will be providing grades** based on this rubric, determine how you will do that in a way that prioritizes learner growth and acknowledges where learners start. See **Using Rubrics as a Feedback Tool** card for more.

REFLECT
- What data might you need to help you determine what indicators you will focus on? (Data could be formal or informal.)
- How will you keep the rubric alive for yourself and learners?

GO DEEPER
- See NTN Rubrics in Echo
- See sample rubrics in the Help Desk
- [5 Tips for a More Meaningful Rubric](#)

Cold Cats & Hot Dogs

CREATE THE PATH

*Plan how you'll move through the project with students from beginning to end.*

- Entry Event
- Project Phases: Benchmarking & Scaffolding
- Literacy & Math Plans
- Project Calendar

⚑ PROJECT PHASES: SCAFFOLDING AND BENCHMARKS

Consider the sequence of learning that will likely take place based on student need-to-knows and skill development. Consider project benchmarks and scaffolding that can help students to stay on track and focused on the end products, while also allowing you to assess their development towards the learning targets.

CULMINATING PRODUCTS

START! BENCHMARK BENCHMARK BENCHMARK

SCAFFOLDING - - - - SCAFFOLDING - - - - SCAFFOLDING - - - - SCAFFOLDING - - -
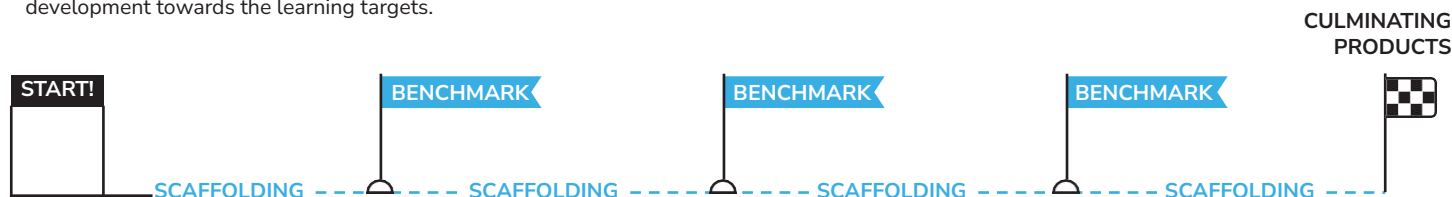
ENTRY EVENT

DESCRIPTION AND PLAN What will be the hook to spark curiosity and initiate the inquiry? How will you introduce the students to their role and tasks? Will you use a document to accompany the entry event? What should it include (i.e. academic vocabulary, description of role/tasks)?

Cold Cats and Hot Dogs Entry Letter

Guest Speaker: animal shelter/animal control/animal hospital representative to speak about lack of space in shelters/the importance of keeping dogs/cats safe and comfortable during inclement weather.

Request from: Animal shelter, animal control OR animal hospital asking students to design a structure that can comfortably and safely house a cat or a dog during extreme heat or cold. (Include thermodynamic vocab here)

ANTICIPATED KNOWS AND NEED TO KNOWS

Generate two lists that students may come up with during the entry event. Afterwards, revisit your standards and entry document and revise as needed to ensure alignment (i.e. does the entry event generate need to knows that are aligned to the standards?) Note: This list should be used for planning purposes only. Students should generate their own know / need-to-know list and revisit it frequently throughout the project.

KNOWS

- *Weather can be dangerous*
  - Extreme cold: snow, wind
  - Extreme heat: high temperatures
- Energy is conserved
- Cats/dogs are mammals with fur
- cats/dogs pant when hot
- We are designing blueprints to a model that keeps animals cool/warm during dangerous weather
- We will show the blueprints to pet owners and/or shelters
- We will use scientific processes to design a model
- We will use heat and energy concepts to help with the design process

NEED TO KNOWS

- What is thermodynamics?
- How cold is too cold/how hot is too hot?
- How do cats/dogs naturally stay warm/cool?
- Can we build a "model" structure?
- Where can we get materials to build a model?
- How can we test its effectiveness?
- Are we just going to build blueprints?
- How can we control the temperature of our design without heating/ac?
- What does a finished blueprint look like?

NEXT STEPS

- *Learn about thermodynamics*
- *Talk with animal doctors about safe conditions/temperatures*
- *Look at examples of blueprints*

6

Cold Cats & Hot Dogs

CREATE THE PATH (Continued)

Project Phases: Benchmarking & Scaffolding

⚑ PROJECT PHASES: SCAFFOLDING AND BENCHMARKS

SCAFFOLDING

⚑ BENCHMARK 1

- Community Circle to establish:
  Community Agreements → Your Ideal Learning
  Environment
  *See Culture Practices: Community Circles card
  Design Plan Checklist
- Chalk Talk: Applying Thermodynamics to Animal Structures
  *See Learner Centered Practices : Chalk Talk
- Types of Energy Concept Map
  *See Learner Centered Practices : Concept Map Card
- Investigating Insulators: Conduction and Convection
- The Effect Radiation has on Different Colors (Lab Options)
- Blueprint Checklist

Ongoing Scaffolding: Oral communication workshops/breakouts and "Mindful Moments"/"Community Circles"

B1: Thermodynamics

Group submits:
- Design Plan
- Group Contract

Individual submits:
- Energy CMAP
- Lab Data and Analysis

Feedback on Learning Outcome progress based on rubric

SCAFFOLDING

⚑ BENCHMARK 2

- Card Sort: Examples of Heat Transfer
  *See Learner Centered Practices : Card Sort Card
- Establish "Mindfulness Mondays"
  *See Cultural Practices/Mindfulness card and Rituals and Routines Card
- Writing Workshops: Informative vs. Persuasive
- Guest Speaker Exit Slip
  Community Partner: Local Animal Shelter
- Prototype Materials Checklist
- Popcorn Lab: Which Type of Heat Transfer Pops Popcorn More Efficiently?
- Community Partner: Animal Care Expert
  Exit Slip: "I used to think, Now I think…After 2nd Community Connection"
  *See Assessment Practices : "I used to think, Now I think…" Card

Ongoing Scaffolding: Oral communication workshops/breakouts and "Mindful Moments"/"Community Circles"

B2: Blueprint Design

Group submits:
- First draft of blueprint
- Finalized materials list for prototype

Individual submits:
- First draft of assembly instructions or persuasive argument

Team Conference for Benchmark Check
*see Assessment Practices for Conferencing and Running Rubric Cards

CREATE THE PATH (Continued)
Project Phases: Benchmarking & Scaffolding

🏁 PROJECT PHASES: SCAFFOLDING AND BENCHMARKS

SCAFFOLDING

🏴 BENCHMARK 3

- *Community Partner: Engineering Expert*
  Exit Slip: "I used to think, Now I think…After 3rd Community Connection"
  See Assessment Practices : "I used to think, Now I think…" Card
- What are thermal imagers?
- Praise, Question, Suggestion protocol for Prototypes
  See Learner Centered Practices: Praise, Question, Suggestion Card
- Peer Feedback on collaboration + community circle to reflect
  See Cultural Practices/Community Circle card

B3: Prototype Design

Group submits:
- Revised blueprint
- Final Prototype

Individual submits:
- Prototype test results

Team Conference for Benchmark Check
see Assessment Practices for Conferencing and Running Rubric Cards

Ongoing Scaffolding: Oral communication workshops/breakouts and "Mindful Moments"/"Community Circles"

SCAFFOLDING

🏴 BENCHMARK 4

- Praise, Question, Suggestion protocol for Presentations
  See Learner Centered Practices: Praise, Question, Suggestion Card
- Written/Oral Communication Workshop
- Revision based on feedback

B4: Final Design

Group submits:
- First draft of presentation

Individual submits:
- 2nd draft of written task

Team Conference for Benchmark Check
see Assessment Practices for Conferencing and Running Rubric Cards

Ongoing Scaffolding: Oral communication workshops/breakouts and "Mindful Moments"/"Community Circles"

Cold Cats & Hot Dogs

CREATE THE PATH (Continued)
Project Phases: Benchmarking & Scaffolding

⚑ PROJECT PHASES: SCAFFOLDING AND BENCHMARKS

SCAFFOLDING

- Revision based on feedback
- Written/Oral Communication Workshop

CULMINATING PRODUCTS

Final Product: Presentation

Group submits:
- Presentation with Final Blueprint for animal structure

Individual submits:
- Assembly instructions for designed animal structure

OR
- Persuasive argument for why animals should be protected during dangerous weather

Feedback using rubric

REFLECTION

Allow group members to assess each other on the Peer Collaboration Tool in Echo
Gather Feedback on Project from students using the Critique Card in the Assessment Practices Card Set

9