

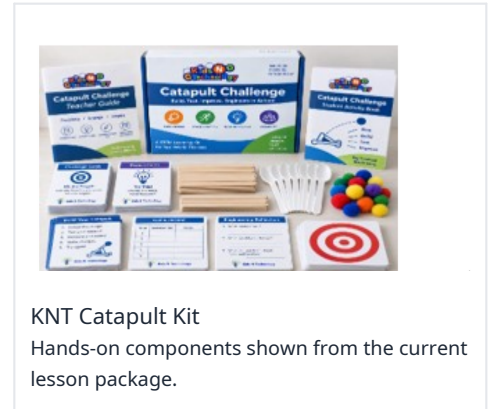
CATAPULT ENGINEERING CHALLENGE

SAMPLE LESSON - KNT I.D.E.A.S.™ INSTRUCTIONAL FLOW

Driving Question

Can we use engineering, data, and AI predictions to design a catapult that performs better?

90-minute lesson sequence: Introduce • Demonstrate • Explain • Activity • Showcase



KNT Catapult Kit
Hands-on components shown from the current lesson package.

I - INTRODUCE | 10 MINUTES

The Launch Challenge

Display a finished KNT catapult and ask: What do you think makes this object launch?

Ask: Where is the energy before the launch arm is released?

Ask: What could we change if we wanted the projectile to travel farther or hit a target more accurately?

Demonstrate one safe launch.

Introduce the driving question and tell students that today they are engineers whose job is to improve performance using evidence.

Facilitator language: “Your job is not simply to build a catapult. Your job is to make it perform better using evidence.”

D - DEMONSTRATE | 15 MINUTES

Where Does the Energy Go?

Demonstration 1 - Potential Energy: Pull the launch arm back without releasing it. Ask whether anything is moving. Explain that energy is being stored.

Demonstration 2 - Kinetic Energy: Release the arm. Ask what changed. Explain that stored energy became motion.

Demonstration 3 - Variables: Show that engineers can change one feature at a time to learn what caused the result.

Possible variables: launch angle

Lever position

Pull-back distance

Approved projectile type/weight

Catapult structure

Engineering habit: change ONE variable at a time whenever possible.



E - EXPLAIN | 10 MINUTES

AI Recommendation + Engineering Evidence

Tell students: "AI can use information, patterns, and scientific models to make a recommendation or prediction about what might happen. But AI does not know exactly what your catapult will do. Engineers have to test the idea and compare the prediction with real-world evidence."

Use one facilitator-controlled AI tool for the whole group. Student accounts are not required.

FACILITATOR AI PROMPT

"We built a craft-stick catapult and want the projectile to travel farther. We can change the launch angle, lever position, or projectile weight. Which variable would you recommend testing first, and what do you predict will happen?"

Facilitator note: AI responses will vary. A response may recommend launch angle and reference an idealized model near 45°, but do not present any AI response as a guaranteed result. The lesson is designed so students test the recommendation against their specific catapult.

AI CAN PREDICT. ENGINEERS TEST. EVIDENCE DECIDES.

No-internet backup: Use a pre-generated KNT AI Prediction Card supplied with facilitator materials so the investigation can continue even when AI websites are blocked.

A - ACTIVITY | 45 MINUTES

Build • Test • Measure • Improve

PART 1 - BUILD | 15 minutes

Distribute KNT Catapult Kits.

Stack five craft sticks and secure both ends with rubber bands.

Place the two remaining sticks together and secure one end with a rubber band.

Carefully separate the two sticks and insert the five-stick stack between them.

Secure the larger stack to the upper stick.

Attach the spoon or launch cup with double-sided adhesive/tape.

Check that the catapult is stable and the launch zone is clear.

PART 2 - BASELINE TEST | 10 minutes

Complete three baseline launches without redesigning the catapult.

Measure or record the target result for each launch.

Discuss: Were the results consistent? Which trial performed best? What might explain differences?



A - ACTIVITY | CONTINUED

PART 3 - ENGINEERING DECISION | 5 minutes

Teams choose ONE approved variable to change.

Record the team prediction and the AI recommendation/prediction.

Decide whether the team agrees or disagrees with the AI and explain why.

PART 4 - REDESIGN & RETEST | 15 minutes

Modify the chosen variable.

Complete three additional launches.

Record Trials 4-6.

Compare the baseline and redesign results.

Use evidence to decide whether the redesign improved performance.

Student Voice & Choice: teams select the approved variable they want to investigate and decide whether the evidence supports or contradicts the AI recommendation.

S - SHOWCASE | 10 MINUTES

The Evidence Wins

What did we change?

What did AI recommend or predict?

What actually happened?

What evidence supports our conclusion?

Optional recognitions: Longest Launch • Most Accurate • Best Redesign • Best Evidence