



Phenomena Based Products

TOPIC:

NOTES:

1. CHOOSE ONE OR MORE DCI(S):

- Choose a DCI related to your topic, student interest, or next learning moment.
- Look at associated dimensions: Science & Engineering Practices & Cross-Cutting Concepts.
- Look at associated Performance Expectations.

2. CHOOSE A PHENOMENA:

- Decide on a related phenomena for your DCI, in relation to the other dimensions and PEs.
- Think about observable and non-observable characteristics. (For addressing misconceptions, not explicit teaching.
- Think about potential model types and what might be essential to a successful model. (What would you expect to see in student models?)

3. CHOOSE AN INQUIRY PROTOCOL:

- Decide on a conversation/inquiry protocol, or be open to multiple protocols.
- Brainstorm possible probing (teacher) and essential questions.
- Anticipate possible student questions.
- Create space for student questions. (Personalize/Individualize with student voices)

4. BEGIN INITIAL MODELING:

- Students create initial models.
- Students use as much visual and/or textual detail as possible.
- Focus is on description in this phase and the documentation of all that is observable.
- Conjecture, hypothesis, inferences, and wonderments are all ok.

5. REVISIT INQUIRY:

- Engage in the inquiry process you decided on in Step 3.
- Explicitly invite students' questions, or the topic, the phenomena, and/or the model.
- Explicitly invite students to question each other.
- Generate as many questions as possible.
- Sort questions into 3 or 4 big ideas as potential research opportunities.

6. MAKE RESEARCH DECISIONS:

- Take each big idea / research opportunity and refine/revise questions
- Embark on research to discover answers to questions or to find more information.
- Create evidence-based statements that answer the questions or support big ideas.



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7. REVISIT MODELS:

- As a result of both inquiry and research, revisit models.
- Edit, refine, and/or update models with new learning.
- Collaborate with other students to give feedback on models for additional opportunities for edits and revisions.

9. PRODUCT CREATION:

- Create the draft for the publication, performance, or presentation. (Individually or in groups.)
- Edit, revise, and make ready for final publication, performance, or presentation.

11. REFLECTION:

- Reflect on the student work and product delivery.
- Ask students what went well and how they might apply what went well to the next learning experience.
- Ask students which parts of the learning experience would benefit from more individual or more group work, or soliciting more information from alternative resources including experts.

8. PRODUCT DEVELOPMENT:

- With students, decide how they might want to share their work beyond the classroom. (Heat Map Template and Learning Goal Map Template are attached.)
- What could students DO with what they are learning?
- Who is the audience for whom the students will share their learning?
- What are some potential products or deliverables for the learning?

10. PRODUCT DELIVERY:

- Deliver product to intended audience.
- Solicit audience feedback informally as conversation or formally with a survey or descriptive feedback.

12. CONSIDERATIONS:

- Teacher / Student and Student / Student feedback is essential throughout this learning experience.
- Invite experts into the learning experience at any time through letter writing or social media engagement.



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NOTES:

LEARNING GOAL MAP

CHALLENGE:

STANDARDS:

TRANSFER GOALS

UNDERSTANDINGS / ESSENTIAL ?S

CONTENT AND SKILLS

DELIVERABLE:

BASED ON: *AMBITIOUS SCIENCE TEACHING* BY THOMPSON, WINDSCHITL, & BRAATAN
AND *THE QUEST FOR LEARNING* BY ALCOCK, FISHER, & ZMUDA



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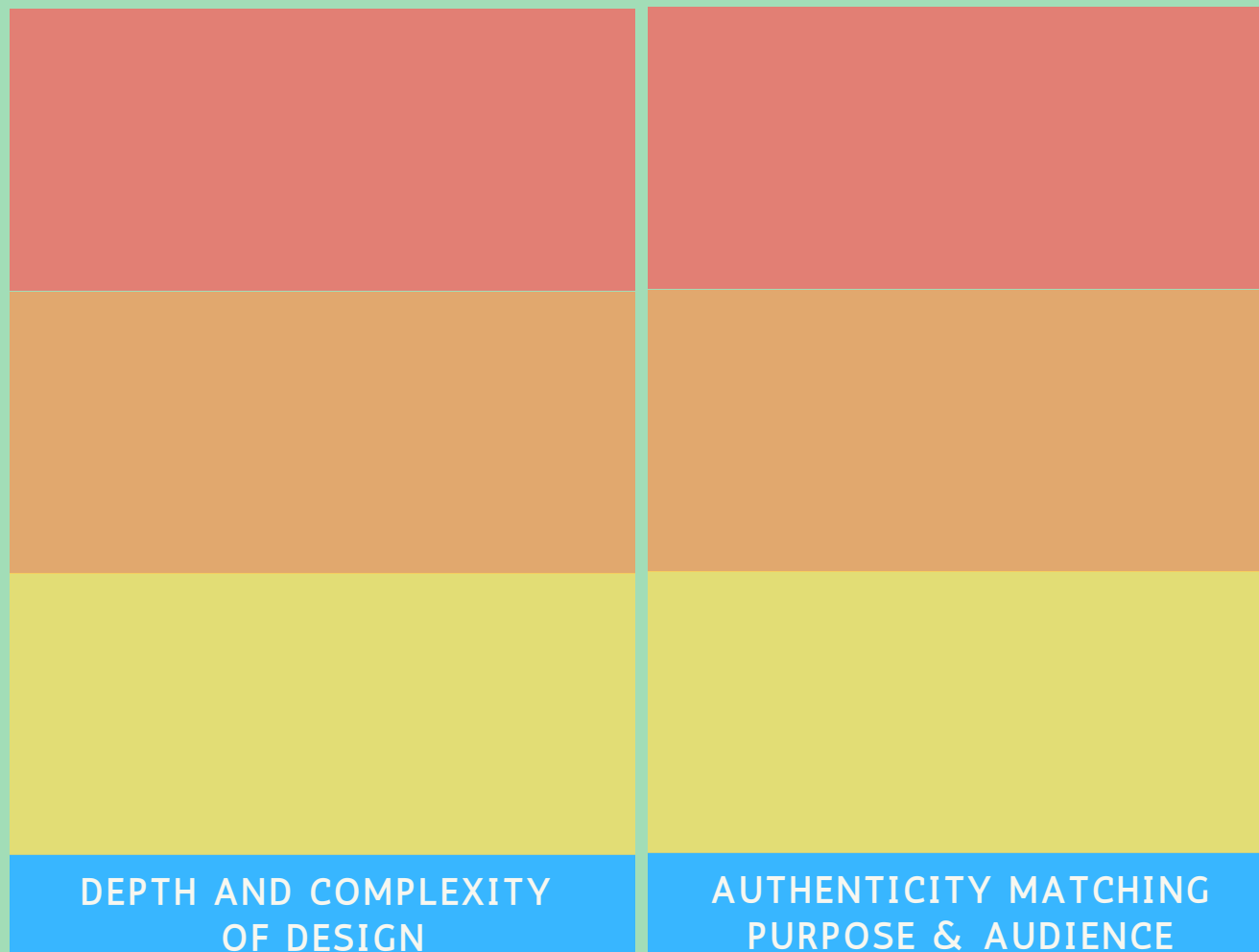
NOTES:

High Autonomy / Loose Design

High Autonomy / Tight Design
Low Autonomy / Loose Design

Low Autonomy / Tight Design

HEAT MAP



BASED ON: *AMBITIOUS SCIENCE TEACHING* BY THOMPSON, WINDSCHITL, & BRAATAN AND *THE QUEST FOR LEARNING* BY ALCOCK, FISHER, & ZMUDA