ASSESSMENT CHART FOR INVESTIGATION 1

STUDENT NAME	PART 1	PART 2	PART 3
	Teacher Observation	Response Sheet—Black Boxes	Teacher Observation
	informal notes	recognizes a model	bases model on observations
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ASSESSMENT CHART FOR INVESTIGATION 2

STUDENT NAME	PART 1 Response Sheet—Hum Dingers explains differences between models	PART 1 Response Sheet—Hum Dingers explains why different models are used	PART 2 Teacher Observation understands circuits and levers	PART 2 Teacher Observation collaborates with others to solve problems	PART 3 Teacher Observation informal notes
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ASSESSMENT CHART FOR INVESTIGATION 3

GO-CARTS

STUDENT NAME	PART 1	PART 2	PART 3
	Teacher Observation	*Response Sheet—Go-Carts*	*Teacher Observation*
	informal notes	*explains design process*	*explains cart performance*
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ASSESSMENT CHART FOR INVESTIGATION 4

STUDENT NAME	PART 1	PART 2	PART 3	PART 3	PART 3	
	Response Sheet— Cart Tricks	*Student Sheet— Design Plan*	*Student Sheet— Project Proposal*	*Teacher Observation*	*Teacher Observation*	
	explains the design process	*explains how design improved performance*	*logical plan*	*independent inquiry/research*	*presentation*	*notes*
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ASSESSMENT CHART FOR SUMMATIVE ASSESSMENT

STUDENT NAME	*Performance*	*Multiple-Choice*	*Short-Answer*	*Narrative*		
	harbor model	*#1–13*	*#14–15*	*#16–18*	*Portfolio Assessment*	*Notes*
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ASSESSMENT SCORING GUIDE

4	**The question or task is completed correctly and contains additional, unexpected, or outstanding features.**
3	**The question or task is completed correctly; there are no mistakes.**
2	**The answer or task is partly correct; it has no big mistakes.**
1	**The answer or task contains big mistakes, or does not answer the question that was asked, but gives information that is related.**
0	**The student does not do the question or task, or gives an answer that has nothing to do with what was asked.**

END-OF-MODULE ASSESSMENT for Models and Designs

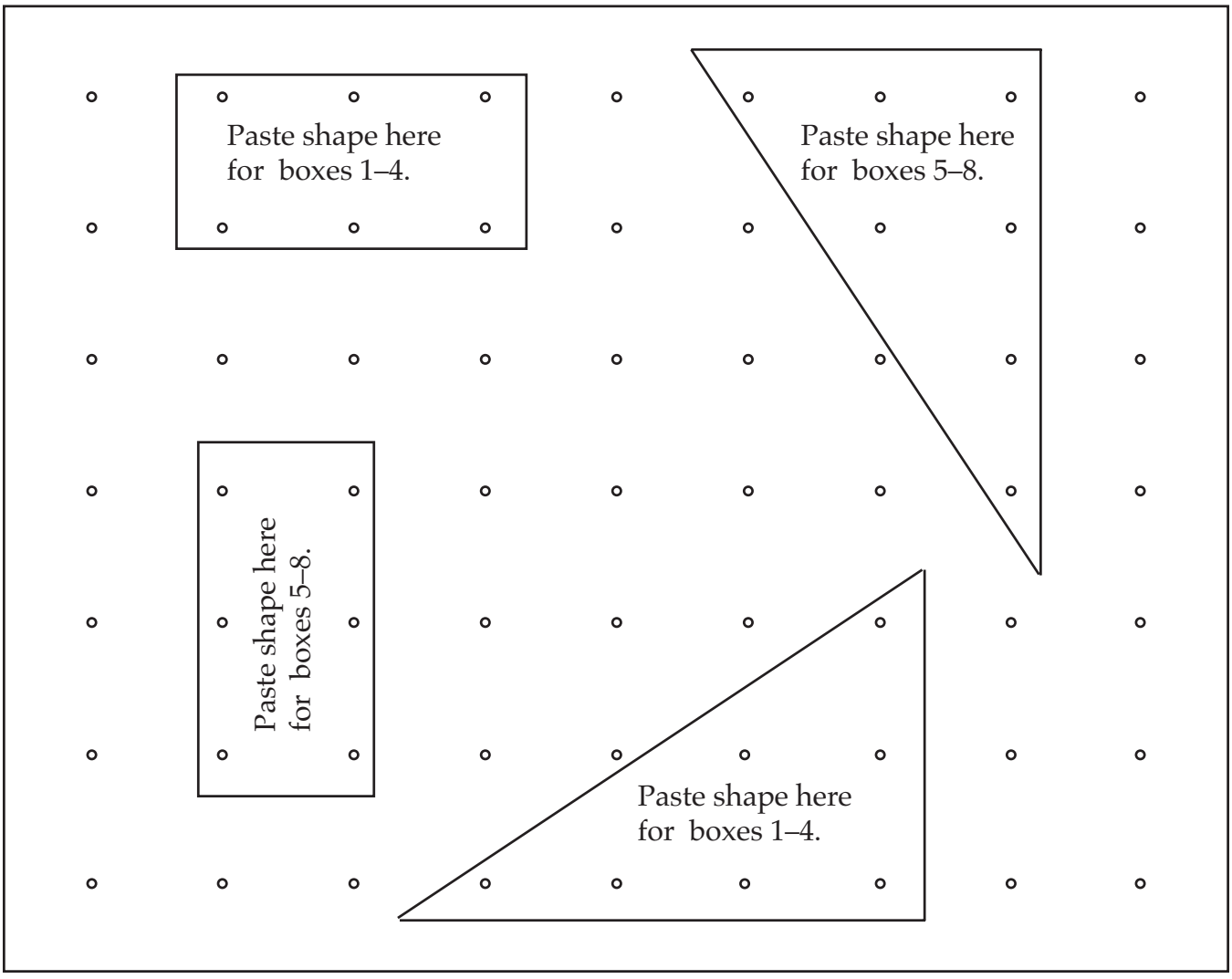
TEACHER CONSTRUCTION SHEET FOR HARBOR MODELS

To construct each harbor model:

1 White cardboard box, 17.5 cm × 14 cm × 4 cm
1 Pushpin *
1 Cardboard triangle
1 Cardboard rectangle
• Glue *

Cut out this grid and use it to punch holes in the lids of the white cardboard boxes to make the harbor models.

This is also the grid you will glue into the bottom of the cardboard boxes for placement of the cardboard shapes.



Name _____

Date _____

END-OF-MODULE ASSESSMENT for Models and Designs

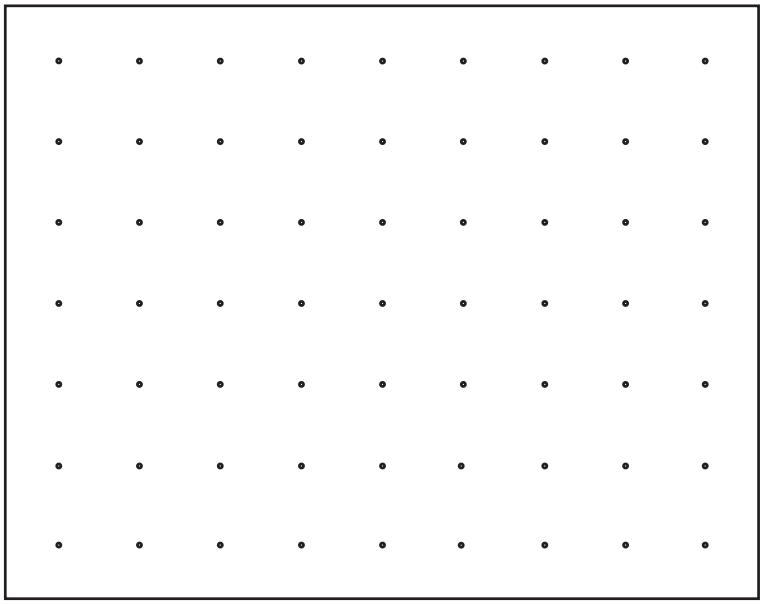
PERFORMANCE ASSESSMENT—HARBOR MODEL

When ships come into harbors, they follow channels marked by buoys in the water. The channels guide ships around sandbars and rocks. But how did people find the channels in the first place? By making a model of the harbor bottom.

Harbor surveyors row over the harbor, lowering heavy weights on ropes to check the depth of the water. That's called sounding. After they gather their data, they make a model of the harbor bottom. The surveyors then make nautical maps, called charts, for ship captains to use.

The box on the table is a model of part of a harbor. Your task is to sound the harbor to find out what the harbor floor looks like. Use the straightened paper clip to sound the depth of the water in the harbor. Use the grid below to record your data and to draw a model of the harbor bottom. If you would like to turn your model into a chart(nautical mao), use the back of this sheet.

BOX # _____



Explain how you gathered information about the harbor floor and how you used that information to make your map.

Name _____

Date _____

END-OF-MODULE ASSESSMENT for Models and Designs

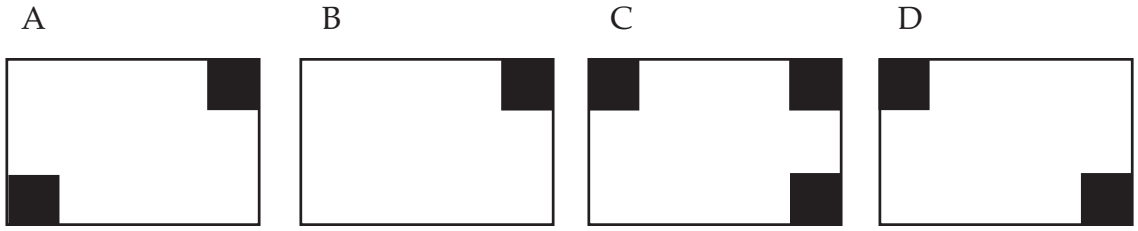
MULTIPLE-CHOICE/SHORT-ANSWER ITEMS

Directions: For each of the questions below, circle the letter of the best answer.

1. A person who uses scientific knowledge to design useful things is called

   A. a doctor.
   B. an engineer.
   C. a producer.
   D. a scientist.

2. A student used a small wooden stick to tap the four corners of a black box and found the lower left corner sounded different from the other three. What is a possible model of the black box?

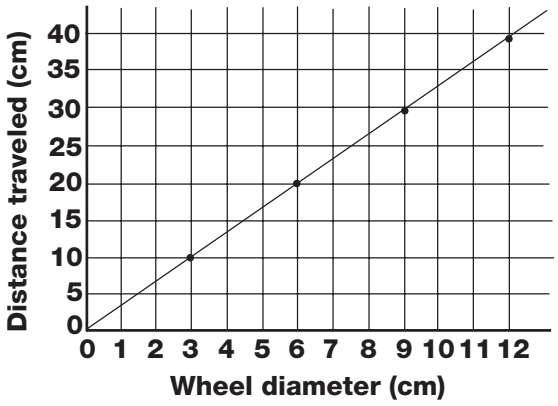


3. Which of these has NO effect on how far a rubber-band-powered go-cart can travel?

   A. the length of the rubber band
   B. the size of the wheel
   C. how smooth the surface is
   D. the color of the rubber band

4. How much farther can a go-cart travel if is wheel size its doubled?

   A. the same distance
   B. 2 times farther
   C. 4 times farther
   D. 8 times farther



5. A situation in which scientists agree is called

   A. collaboration.
   B. investigation.
   C. consensus.
   D. discussion.

Name _____

Date _____

END-OF-MODULE ASSESSMENT for Models and Designs

MULTIPLE-CHOICE/SHORT-ANSWER ITEMS

6. When you know what an object or system does (like a television), but you don't know for sure how it does it, you call it

   A. a model.
   B. a design.
   C. an experiment.
   D. a black box.

7. Which of these is NOT a model?

   A. match-box car
   B. doll
   C. van
   D. picture of the inside of the earth

8. A physical model is a

   A. small drawing of something larger.
   B. device designed to explain how something works.
   C. device that makes noises such as hums and dings.
   D. system of wires, components, and a switch that carries electricity.

9. Which of these statements is *always* true about a design team?

   A. Everyone gets their own materials.
   B. Everyone agrees with everyone else.
   C. Designs improve as more people are added to the team.
   D. Designs can be improved with the ideas of different people.

10. What is the *main idea* behind working with black boxes and hum dingers?

    A. Sometimes things in science make noise.
    B. Sometimes science tries to explain things that cannot be seen.
    C. Sometimes working alone is better than working in a group.
    D. Sometimes science does not help us understand the world around us.

11. A rod on which a wheel turns is called

    A. an axle.
    B. a bearing.
    C. friction.
    D. a hub.

Name _____

Date _____

END-OF-MODULE ASSESSMENT for Models and Designs

MULTIPLE-CHOICE/SHORT-ANSWER ITEMS

12. The wheel of a cart is 4 cm across. If this wheel rotates ten times, about how far will the cart go forward?

    A. 12.5 cm
    B. 40 cm
    C. 125 cm
    D. 400 cm

13. In the go-cart activity, the energy to propel the cart 2 m comes from

    A. the axle.
    B. traction.
    C. the wheels.
    D. the rubber bands.

14. Name and describe a model used in science that has not been used in class. Why is this model helpful?

15. What property or properties does a hum dinger share with

a. a doorbell?

b. a desk lamp?

c. a go-cart?

Name _____

Date _____

END-OF-MODULE ASSESSMENT for Models and Designs

NARRATIVE ITEMS

16. What is the difference between building a scientific model and creating a design in engineering?

17. When building a new design, what sort of procedure should an engineer use to get the best design?

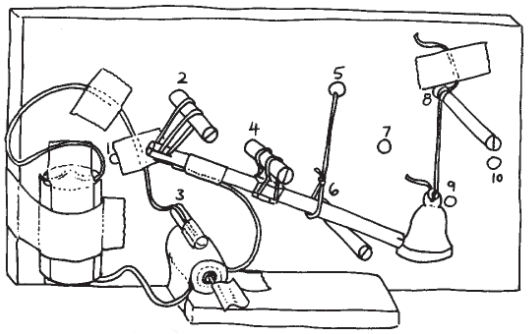
Name _____

Date _____

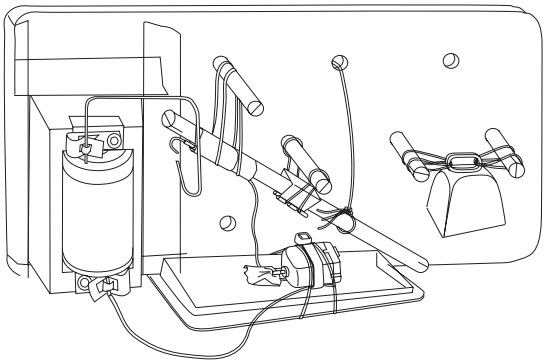
END-OF-MODULE ASSESSMENT for Models and Designs

NARRATIVE ITEMS

18. Each drawing shows a working hum dinger. When you pull the string, the devices hum, and when you let go, they ding.



a. One thing the hum dingers have in common is that they both work. Name two other features they have in common.



b. Describe two features that are different in these designs.

c. Which of these designs is better, or are they equally good? Explain why you think so.

Name _____

Date _____

PORTFOLIO ASSESSMENT for Models and Designs

PORTFOLIO CHECKLIST

Include a piece of work that shows...

- ❑ Something you learned about making models.
- ❑ Something you learned about designing a product.
- ❑ Something that shows you know how to plan an engineering project.
- ❑ Something that shows you know how to give a good explanation and can support it with evidence.
- ❑ Something that uses what you know from another area of study (reading, writing, math).
- ❑ Something that shows improvement.
- ❑ Something that shows your best work.