

Lesson 13 – Wrap-up / Final assessment

Assess students using the concrete exam.

Later, when concrete prototypes have cured, complete the evaluation sheet .

Name_____ Period_____

Project_____ Date_____

Evaluation For Concrete Project

1. Appearance of this project (FORM) is this project aesthetically pleasing?
POOR NICE VERY NICE

1 2 3 4 5 6 7 8 9 10

2. Creative (Boring, or Interesting)

1 2 3 4 5 6 7 8 9 10

3. Concrete mixture (Concrete has proper mixture, is durable enough to complete desired task)

1 2 3 4 5 6 7 8 9 10

4. Accuracy (Follows plans)

1 2 3 4 5 6 7 8 9 10

5. Craftsmanship (Project is neat and well built, square)

1 2 3 4 5 6 7 8 9 10

6. Ergonomics (Project takes into consideration the human factors engineering),

1 2 3 4 5 6 7 8 9 10

7. Group safety (My group cleans up and takes into consideration others safety)

1 2 3 4 5 6 7 8 9 10

8. Safe and proper use of machines and tools

1 2 3 4 5 6 7 8 9 10

9. Proper use of materials (Project uses materials efficiently, does not waste or misuse wood, plastic, metal, or concrete)

1 2 3 4 5 6 7 8 9 10

10. Function (Project operates well, completes what it was intended to)

1 2 3 4 5 6 7 8 9 10

Total Points = preliminary Grade_____

Choose to redo project, and re-evaluate Evaluation date_____

Total points after re-evaluation FINAL GRADE_____

Name _____

Date _____

Eighth Grade Technology Quiz: Concrete Unit

- 1) Name the four ingredients that are used to **make** concrete. (8 pts)

1) _____

2) _____

3) _____

4) _____

- 2) Name four waste materials that could be used as aggregate in concrete? (8 pts)

1) _____

2) _____

3) _____

4) _____

- 3) Why would we want to use waste aggregate and not regular stone in concrete? (5 pts)

- 4) Circle the word that correctly fills in the blank: (4 pts)

As concrete cures, it should be kept _____.

Dry wet

- 5) Circle the word that correctly fills in the blank: (4 pts)

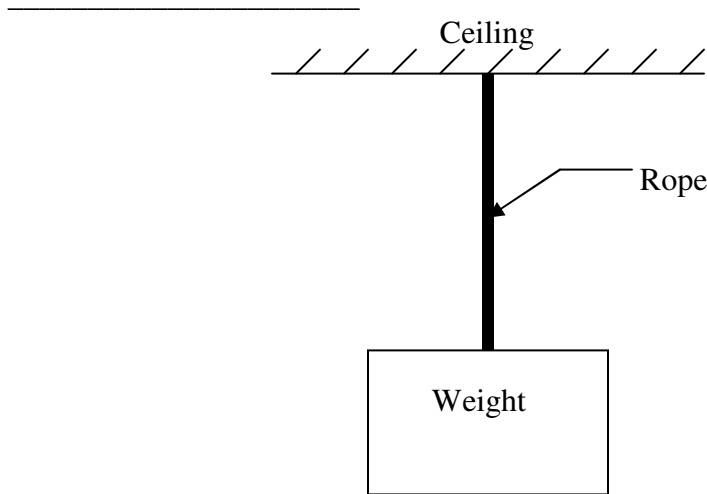
Concrete can withstand high _____ forces.

compression tension

- 6) What safety concerns would you consider when making concrete? (4 pts)

7) Is the rope in the following diagram in tension or compression?

(8 pts)



8) A set of concrete stairs needs to support an elephant as it walks into and out of its cage. The concrete must have a compressive strength of at least 10,000 pounds per square inch (psi) to hold the weight of the elephant. The circus people have to move these steps every time they travel, so they want these steps to be as lightweight as possible. According to the data in the chart below, what should the circus people use as aggregate in the concrete steps? Circle your answer. (8 pts)

Aggregate	Weight (pounds)	Compressive strength (psi)
Stone	5.0	20,000
Rubber	2.5	11,000
Glass	3.0	12,000
Paper	1.5	8,000
Wood	2.0	9,000

Stone

Rubber

Glass

Paper

Wood

Why did you choose this aggregate?

9) A concrete test cylinder with a 1-inch radius is tested and can withstand 2,000 pounds of compressive force. The area of a cylinder is equal to $\pi*r^2$, where r is the radius. The engineer who is testing the cylinders wants to get the results in terms of stress.

a. What units are used to show stress? (5pts)

b. Calculate the stress, knowing the force and the area. Show your work! (8 pts)

10) Imagine that you are asked to build a concrete storage building that is 8 feet high, 8 feet long and 10 feet wide, and you need to use some type of waste aggregate in your concrete mix:

A. List 2 *criteria* that you might consider when deciding which waste materials to use. (8 pts)

1.

2.

B. Name 2 waste materials you might focus on, and describe what makes each a good choice. (6 pts)

1. Material: Why?

2. Material: Why?

C. Name 2 positive environmental impacts of using these materials.
(6 pts)

1.

2.

D. Before you begin this project, what needs to be considered to avoid long term problems?
(4 pts)

Name KEY

Date _____

Eighth Grade Technology Quiz: Concrete Unit

1) (8 points) Name the four ingredients that are used to make concrete.

1) Coarse Aggregate _____

2) Fine Aggregate _____

3) Cement _____

4) Water _____

2) (8 points) Name four waste materials that could be used as aggregate in concrete?

1) shredded rubber

2) ground glass

3) shredded plastic

4) wood chips (many suitable answers – do not accept sand or gravel)

3) (5 points) Why would we want to use waste aggregate and not regular stone in concrete?

Lower price, saves space in the landfill, may offer better characteristics in the finished product (e.g., rubber makes the concrete “softer”, plastic makes it lighter, glass makes it reflective)

4) (4 points) Circle the word that correctly fills in the blank:

As concrete cures, it should be kept _____.

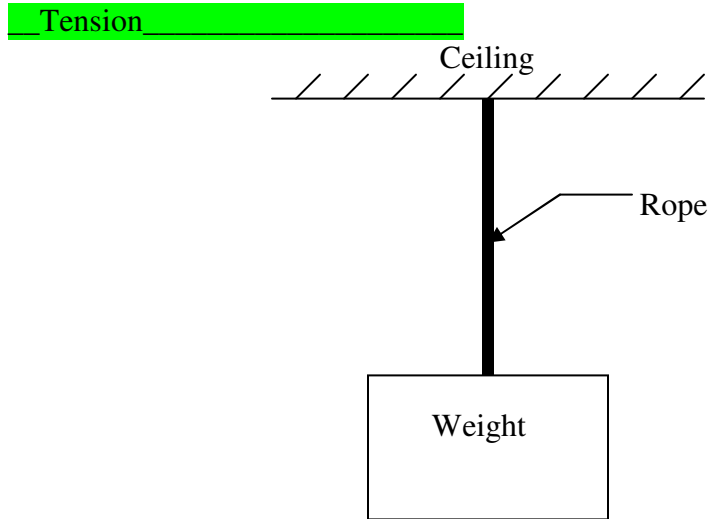
Dry wet

5) (4 points) Circle the word that correctly fills in the blank:

Concrete can withstand high _____ forces.

compression tension

6) (8 points) Is the rope in the following diagram in tension or compression?



7) (8 points) A set of concrete stairs needs to support an elephant as it walks into and out of its cage. **The concrete must have a compressive strength of at least 10,000 pounds per square inch** (psi) to hold the weight of the elephant. The circus people have to move these steps every time they travel, so they want these steps to be as **lightweight as possible**. According to the data in the chart below, what should the circus people use as aggregate in the concrete steps? Circle your answer.

Aggregate	Weight (pounds)	Compressive strength (psi)
Stone	5.0	20,000
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Paper	1.5	8,000
Wood	2.0	9,000

Stone **Rubber** Glass Paper Wood

Why did you choose this aggregate?

_____ **it's strong enough, but lighter than the others.** _____

8) A 2-inch diameter concrete test cylinder is tested and can withstand 2,000 pounds of compressive force. The area of a cylinder is equal to $\pi*d^2/4$, where d is the diameter. The engineer who is testing the cylinders wants to get the results in terms of stress.

c. (5 points) What units are used to show stress?

Pounds per square inch, psi

d. (8 points) Calculate the stress, knowing the force and the area. Show your work!

Area = 3.14 in^2 , so stress = $2,000/3.14 = 636.6 \text{ psi}$

9) Imagine that you are asked to build a concrete storage building that is 8 feet high, 8 feet long and 10 feet wide, and you need to use some type of waste aggregate in your concrete mix:

- (6 pts) List 2 *criteria* that you might consider when deciding which waste materials to use.

Strength, appearance, texture, availability, severity of waste, density...

- (6 pts) Name 2 waste materials you might focus on, and describe what makes each a good choice.

1. Material:	Why?
Glass	heavy, reflective, strong, rough texture
Styrofoam	lightweight, cheap
Rubber	resistant to corrosion, cheap
Pvc	strong, cheap, not bad looking

- (4 pts) What safety concerns would you consider and why?

Avoid skin contact, eye contact, don't breathe in dust – health hazards. Be careful when building! Dangers associated with heavy lifting and power tools.

- (6 pts) Name 2 positive environmental impacts of using these materials.

1. removes material from landfill

2. preserves natural resources

- (4 pts) What concerns would you have about proceeding with the project?

Is the material strong enough? Will it last for the lifetime of my building? Will it hold together in the weather? Can I get enough of it? Will it look OK?