Science, Society and Technology

This Packet Belongs To: _____

Index…

Your final grade is based on the following assignments, activities, and assessments…
Test 35%

Test Total ____ / 100 points = _____ x 0.35 = [ ]

4 Quizzes 25%
Quiz 1 (100 points)
Quiz 2 (100 points)
Quiz 3 (100 points)
Quiz 4 (100 points)

Total Quizzes _____ / 400 points = _____ *x 0.25 = [ ]*
Special Assignments **20%**

Pen Pal Letter to Dent (pp.15-16)(10 points)
Chemical Change Activity (pp.18-19)(10 points)
Colloidal Suspension Lab (p.20)(10 points)
Pen Pal Letter to Andrysa (p.22) (10 points)
Pen Pal Letter to Buck (p.29-30)(10 points)
Crank Up Your Brain Project (42-44)(39 points)

Special Assignments total _____ / 89 points = _____ *x 0.2 = [ ]*

Learning Packet **10%**
Physical Science Notes (p. 9)(9 points)
Mass vs. Weight (p.10)(2 points)
Volume Density (p.11)(6 points)
Jumping Jellyfish (p.12)(4 points)
Picture Analysis 1 (p.13)(8 points)
Changes in Matter PowerPoint notes (p.17)(4 points)
Video: Changes in Matter (p.21)(5 points)
Invisible Ink observations (p.23)(2 points)
Picture Analysis 2 (p.24)(8 points)
Energy/Work Situations (p.25)(2 points)
Nonrenewable Resources Definition (p.26)(3 points)
Renewable Resources Definition (p.29)(3 points)
Creating Magnetism Through Electricity Lab(p.36)(10points)
Making Magnets with Electricity Lab(pp.37-38)(10 points)

Learning Packet Total _____ / 86 points = _____ x 0.1 = [ ]
4 OOCA's **10%**
OOCA #1 (15 points)
OOCA #2 (15 points)
--1st two due by interim time--
OOCA #3 (15 points)
OOCA #4 (15 points)
--2nd two due by end of grading period—

Add the numbers in the brackets to find your final

OOCA Total _____ / 60 points = _____ x 0.1 = [ ]

Grading Rubric Categories

1. Completeness

5	4	3	2 or 1
All required elements are present and additional elements that add to the report (e.g., thoughtful comments, graphics) have been added.	All required elements are present.	One or two required elements are missing, but additional elements that add to the report (e.g., thoughtful comments, graphics) have been added.	Several required elements are missing.

2. Appearance/Organization

5	4	3	2 or 1
Quality appearance	Neat and orderly, easy to follow.	Moderately neat, some disorder.	Lacks neatness and orderliness. Hard to understand

3. Pride

5	4	3	2 or 1
Work reflects this student's best efforts.	Work reflects a strong effort from this student.	Work reflects some effort from this student.	Work reflects very little effort on the part of this student.

4. Showing Understanding

5	4	3	2 or 1
Explanations indicate a very clear understanding of topic.	Explanations indicate a mostly clear understanding of topic.	Explanations indicate some understanding of the topic.	Explanations do not indicate much understanding of topic.

5. Accuracy

5	4	3	2 or 1
All information and answers given are accurate	Almost all information and answers given are accurate. Only very few inaccurate information or answers.	Most of the information and answers given are accurate but there is a lot of inaccurate information or answers.	A lot of inaccurate information or answers given.

Common Comments

1 Be sure to explain. Make your explanations clear, possib… giving exam… make them…

2 Use examples to help make y… ou c… uch … …," o… …" o…

3 You forgot to do a portion of th… … or …ent.

4 Put more effort into your work / … Try a …der.

5 It's hard to understand what you mean. Try rewording it or organizing your ideas so that they

6 It seems like you rushed. Take your time, and do the best work that you can do!

7 Make sure you follow the directions. Read the directions completely.

OOCA's for Physical Science

During each grading period (9 weeks), you must complete 4 OOCA's (pronounced "oo—ka"). OOCA stands for "Outside Of Class Activity." Each OOCA is worth 15 points and is graded using Grading Rubric Categories 1, 2, and 3.

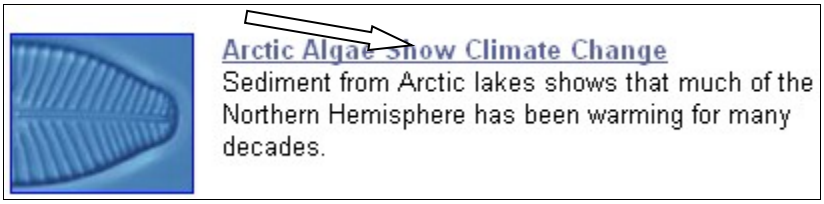
Articles…

1. Go to http://www.sciencenewsforkids.com , you can also find a link to this website on RockaBrain.com Links.

2. Click on "Computers" or "Technology and Engineering" since we are doing "Science, Society and Technology" (see the picture to the right).

3. Select an article that interests you. Remember, there is usually more than one page of articles. Just click "Next Page" or click a page number.

4. To view and read the article, click on the underlined title of the article. (See the picture below).



5. Read the article completely. Then, answer the questions below on a separate sheet of paper. Title the paper "OOCA: *Title of your article*"

OOCA Questions (Answer these on a separate sheet of paper for each OOCA and ***number your OOCA questions on your paper***.

---

1. Write a summary of the article in your own words. This summary must be a 5 sentence paragraph.
2. Why did you pick this article?
3. This article is in one of the "Technology and Society" categories. Do you think this article belongs in this category? Why or why not?
4. Write 3 facts that you found interesting in the article.

Learning

5. Write one thing that you learned from this article that you found to be the most interesting. Explain why it was interesting to you.
6. What is your overall rating of this article. Out of 3 flicks, how many flicks would you give it and why?

UNDERSTANDING TECHNOLOGY…….
…….

1 Explain how technology influences the quality of life.

___a. Be able to define and use the term "technology"
___b. Be able to define and use the term "society"
___c. Be able to define and use the term “influence”
___d. Be able to list and explain 5 ways that technology influences the quality of life

2 Explain how decisions about the use of products and systems can result in desirable or undesirable consequences (e.g., social and environmental).

___a. Be able to define and use the term “consequence.”
___b. Be able to define and use the term “product.”
___c. Be able to list and explain desirable consequences of using products and technology
___d. Be able to list and explain desirable consequences of using products and technology

3 Describe how automation (e.g., robots) has changed manufacturing including manual labor being replaced by highly-skilled jobs.

___a. Be able to define and use the term “automation”
___b. Be able define and use the term “manufacturing”
___c. Be able to define and use the term “manual labor”
___d. Be able to define and use the term “highly-skilled job”
___e. Be able to define and use the term “robot”
___f. Be able to describe how automation (e.g., robots) has changed manufacturing including manual labor being replaced by highly –skilled jobs

4 Explain how the usefulness of manufactured parts of an object depend on how well their properties allow them to fit and interact with other materials.

___a. Be able to define and use the term “manufacture”
___b. Be able to define and use the term “properties”
___c. Be able to explain how the usefulness of manufactured parts of an object depend on how well their properties allow them to fit and interact with other materials.

ABILITIES TO DO TECHNOLOGICAL DESIGN…….

5 Design and build a product or create a solution to a problem given one constraint (e.g., limits
of cost and time for design and production, supply of materials and environmental effects)

___a. Be able to design a product given one constraint
___b. Be able to design and build a product given one constraint
___c. Be able to create a solution to a problem
___d. Be able to create a solution to a problem given one constraint

SCIENCE AND SOCIETY

6 Identify ways scientific thinking is helpful in a variety of everyday settings.

___a. Be able to define and use the phrase “scientific thinking”

___b. Be able to identify 5 ways that scientific thinking is helpful in a variety of everyday settings

7 Describe how the pursuit of scientific knowledge is beneficial for any career and for daily life. ___a. Be able to define and use the phrase “scientific knowledge”

___b. Be able to describe how the pursuit of scientific knowledge is beneficial for any career and for daily life

8 Research how men and women of all countries and cultures have contributed to the development of science.

___a. Be able to do research using resources available online and in books

___b. Research how men and women of all countries and cultures have contributed to the development of science

(p. 7-8)

___ / 6

Welcome to the Science, Society and Technology Unit!

Welcome to our last unit of 6th Grade Science. This unit involves a lot of thinking and a lot of hands-on work. Science, Society and Technology covers a wide array of topics. We will be talking and learning about many things... things that you may use everyday or feel you may not even be able to live without! Let's face it; this unit is so very important to each and every one of our daily lives. Let's do this!

Our first learning goal is to be able to explain how technology influences the quality of life, which means that we need to know and understand a few terms: *technology*, *society* and *influence*. To do this, we're going to check out a quick, sweet presentation. You will use the information from the presentation to fill in the answers below.

.....

1a,b,c,d

Technology:

Society:

Influence:

(1) Write the definition of the term "technology" in the space above.

(2) Name 5 things that could be considered a "technology."

1._____

2._____

3._____

4._____

5._____

(3) Write the definition of the term "society" in the space above.

(4) Name five things that could be considered a "society."

1._____

2._____

3._____

(p. 8)

___ / 5

4._____

5._____

(5) Write the definition of the term “influence” in the space above.

(6) Name something that can influence another thing._____

_____

1a,b,c,d

.....

.....

Let’s get thinking a bit more about science, society and technology and how they relate to our lives. Below, is a graphic organizer. In the diamond shape, write a technology that you use almost everyday. In the rectangular shape under it, write how it influences your daily life. The first one is done for you.

Ticonderoga Pencil

The pencil makes it quick and easy to write down thoughts, notes or ideas.

Let's check out an interesting video of how technology influences others' lives…

(p. 9)

___ / 5

1d; 2c,d

Short Video (24 min): Two Worlds Touch

1. List 5 technologies that you see during the video below.

   1._____

   2._____

   3._____

   4._____

   5._____

ANSWER THESE AFTER THE VIDEO…

2. When roads are built to connect advanced society to isolated jungle communities is it right for use to disturb them and change their culture?

   _____

   _____

   _____

3. On the other hand is it right for us to keep them isolated and possibly deprive them of the good things modern society has to offer?

   _____

   _____

   _____

4. What are some changes to the Lacandon that have come about since the road was built? Are they good? Are they bad? Or are they some of both?

_____

_____

_____

That was really a great video! Did you like it? Here is technology that you may have some personal experience with: Instant Messaging. Let's read about how the technology of instant messaging can influence our lives.

The Snappy Lingo of Instant Messages

Emily Sohn

The following is part of an actual conversation between two college students, Gale and Sally.

Gale: hey I gotta run
Sally: Okay.
Sally: I'll ttyl?
Gale: gotta do errands.
Gale: yep!!
Sally: Okay.
Sally: :-)
Gale: talk to you soon
Sally: Alrighty.

It would sound silly to say these words out loud, and you wouldn't write like this in a school report. Still, the conversation made perfect sense when Gale and Sally fired it off to each other on their computers.

The young women were having an instant messaging (IM) conversation. Each person could see what the other was writing every time one of them pressed the "return" key, even though they were in different places.

Now, scientists are studying instant messaging, cell phone text messages, and e-mails to try to understand how technology is changing the way we communicate. The research belongs to a field called linguistics, the scientific study of language.

Changing language

Change is a natural part of language development. The words you like to use are probably a little different from those that your grandparents used when they were young. Reading a play by William Shakespeare shows how much language can change in 400 years.

Nonetheless, some language experts worry about the future of languages. They cringe when people break the rules of grammar, fail to use proper punctuation, misuse a word, or even invent a new one just for fun. They don't like the way slang words and pop phrases creep into the way we write and speak.

Another worry is that computers are speeding up the spread of English around the globe and forcing people to neglect their native languages. Like some species, languages have been dying out at an alarming rate, and some linguists fear that the Internet might be partially to blame.

Another group of researchers, however, is fascinated by the interaction between language and the Internet. Instead of killing languages, the rapid rise of Internet communication has opened up an exciting new branch of linguistics, says David Crystal. He's a linguist at the University of Wales in Bangor.

"We should be exulting, in fact, that the Internet is allowing us to explore language in a creative way," Crystal says. "This is a new branch of study. Like no other study of language change in history, it allows us to follow the rate of change of grammar, pronunciation, and vocabulary."

Secret notes

In the meantime, computer-mediated communication seems to be here to stay, says communications researcher Simeon Yates of Sheffield Hallam University.

The more we use IM, text messaging on our cell phones, and other new technologies, he says, the more they shape our lives and relationships.

People can now manage their schedules from anywhere and change plans at the last minute. They can send secret notes to each other over their phones without making a sound. People have even discovered ways to get across complicated feelings and emotions in only a few words.

A few generations ago, no one could have imagined that we would be communicating over computers in real time without ever speaking a word, Yates says. Now, people feel helpless without their e-mail and cell phones.

"This is basically your social life," Yates says. "When I ask British college students what they would do if I took their cell phones away, they say they couldn't live without them."

New technologies may open up additional communication possibilities in the future.

So, keep typing away. Just remember that technology shapes you every time you use it. And that could be a good thing or a bad thing, depending on how you look at it. yup. OK 4 now. C U soon. ttyl!!!

Questions…

1) Give three examples of shortcuts or abbreviations that kids might use in an e-mail or text message to save having to spell out the entire phrase.

_____

(p. 11-12) _____

___ / 5

2) What is linguistics?

_____

_____

3) What is one worry that language experts have about the use of computers?

_____

_____

4) What are three ways that Simeon Yates says IM, text messaging, and other new technologies shape our lives and relationships?

1._____

_____

2._____

_____

3._____

_____

5) In what ways do you think Instant Messaging and text messaging have influenced the quality of life? (i.e. makes communication easier, helps build stronger relationships, etc.)

_____

_____

_____

……
……

BrainPop: History of The Internet

☐

BrainPop: The Internet

☐

(p. 13)

___ / 10

Here is our most recent pen pal letter from the bunch. This one is from Z

Dear Pen Pals,

This is Zeek. How are you? Things are going great here. I'm looking into inventing a new technology called the "Morning Aide" that will automatically pick out clothes, prepare breakfast and organize everything you need for the day. My question is this: would this be helpful to people here on Earth? What influences would it have on daily life? Thanks for your help!

Directions: You are going to write a letter to Zeek telling him of the influence, good and/or bad, that his invention would have on everyday life.

1.a,b,c,d

Dear Zeek,

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Sincerely,

(p. 14)

___ / 6

Picture Analysis

Directions: Answer the questions below. You may also try to find the mistakes in the picture...

1a,b,c,d

1. Write a sentence about the picture above using the term “technology” appropriately.

_____

_____

2. Write a sentence about the picture above using the term “society” appropriately.

_____

_____

3. Write a sentence about the picture above using the term “influence” appropriately.

_____

2a,b,c,d

Consequences of Using Technology

(p. 15)

___ / 4

Our next sweet goal is to be able to explain how decisions about the use of products and systems can result in desirable or undesirable consequences (e.g., social and environmental). In order to do that, we'll first need to know what is meant by the terms *product*, *consequence, desirable* and *undesirable*. Below are the definitions.

Product: Something produced (i.e. made).
Consequence: A result of something
Desirable: Having pleasing qualities or properties
Undesirable: Not desirable; unwanted; not having pleasing qualities or properties

Write a sentence below using the term *product*.

_____

_____

Write a sentence below using the term *consequence*.

_____

_____

Write a sentence below using the term *desirable*.

_____

_____

Write a sentence below using the term *undesirable*.

_____

_____

Let's check out some sweet BrainPops to get us thinking a bit more about products and systems that have a desirable and/or undesirable effect.

2c,d

BrainPop: Pollution

☐

BrainPop: Computer Virus

☐

(p. 16)

___ / 10

2c, d; 8b

Top Ten Engineering Accomplishments of the 20th Century

Sometimes the use of certain products and/or systems can result in desirable consequences and sometimes they can result in undesirable consequences. Social things as well as environmental things can be affected because of technology.

Below are the top ten engineering accomplishments of the 20th century. Take a minute to think about, write down and discuss at least one desirable consequence and one undesirable consequence of using each.

Electricifiation
Desirable
Consequence:_____

_____

Undesirable
Consequence:_____

_____

Automobile
Desirable
Consequence:_____

_____

Undesirable
Consequence:_____

_____

Airplane
Desirable
Consequence:_____

_____

Undesirable
Consequence:_____

_____

Water Supply and Distribution
Desirable
Consequence:_____

_____

Undesirable
Consequence:_____

_____

Electronics
Desirable
Consequence:_____

_____

Undesirable
Consequence:_____

_____

Radio and Television
Desirable
Consequence:_____

_____

Undesirable
Consequence:_____

_____

Agricultural Machanization
Desirable
Consequence:_____

_____

Undesirable
Consequence:_____

_____

Computers
Desirable
Consequence:_____

_____

Undesirable
Consequence:_____

_____

Telephone
Desirable
Consequence:_____

_____

Undesirable
Consequence:_____

_____
Air Conditioning and Refrigeration
Desirable
Consequence:_____

_____

Undesirable
Consequence:_____

_____

1d, 2c,d; 8b

Reach for the Sky Article by Kate Ramsayer

Directions: Read the article and answer the questions at the end.

If you could travel anywhere you wanted this winter, where would you go? Would you ski in the mountains, visit friends or family in another state, or lie on a tropical beach somewhere?

Or would you rather take a rocket into space?

That last choice might not be as far off as you think. A handful of companies are designing rockets, testing engines, and building electronic systems to create spaceships that would take everyday people on the trip of a lifetime.

SpaceShipOne, a privately-built spacecraft, has now flown several times into space.

Already, several astronauts have flown into space in a privately-built spaceship. On Sept. 29, Mike Melvill piloted a torpedo-shaped vehicle called SpaceShipOne to an altitude of 64 miles above Earth's surface.

A plane had towed the spacecraft to 50,000 feet, just above where a jumbo jet flies. Then SpaceShipOne broke away, fired its rocket engine, and soared upwards. The ship rolled 29 times as it was climbing out of the atmosphere, adding some unexpected excitement, but Melvill got things under control and landed safely in California's Mojave Desert about 24 minutes later.

Five days later, Brian Binnie earned his astronaut wings by flying SpaceShipOne even higher, to an altitude of more than 69 miles.

Until the flights of SpaceShipOne, all astronauts had zoomed into space aboard vehicles built by government agencies, such as the National Aeronautics and Space Administration (NASA).

"I strongly feel that, if we are successful, our program will mark the beginning of a renaissance for manned space flight," Burt Rutan says. He heads the company, Scaled Composites, that built SpaceShipOne.

"We need affordable space travel to inspire our youth, to let them know that they can experience their dreams, can set significant goals and be in a position to lead all of us to future progress in exploration, discovery, and fun," Rutan says.

Eyes on the prize

Because SpaceShipOne completed two manned space flights within 2 weeks, Rutan and his team won the $10 million Ansari X Prize.

The X Prize had been set up by Peter Diamandis, who was first bitten by the space-exploration bug when he was 9 or 10 years old. As a kid, he tracked the Apollo space program and the race to put a man on the moon.

"One of my objectives in getting the X Prize going was to get people excited about space again and create a new race that they can be involved in," Diamandis says.

In early November, Diamandis handed over a big check to the SpaceShipOne team. "It feels fantastic," he says. "It feels so good to give away $10 million."

Still, winning the X Prize is just the first leg in the race for space tourism. Companies have to continue to improve spacecraft to make travel safe and somewhat affordable.

The X Prize Cup festival will give people a chance to see the latest rocket technology.

Now, instead of having just one X Prize, Diamandis and others are setting up an X Prize Cup competition, a 10-day festival that will be held every year in New Mexico. Visitors to the space fair will get an up-close look at new technology, watch rocket launches, and conduct interactive experiments, among other things.

Vacation in orbit

Most companies developing spacecraft have focused on taking people on brief, suborbital flights 62 miles above Earth. Interorbital Systems in California, on the other hand, is jumping one step ahead. This company is developing an orbital spacecraft that would host guests for 7-day vacations at 250 miles above Earth.

"If somebody is interested in really the ultimate adventure, this is it," says Interorbital Systems co-founder Randa Milliron.

The scientists involved in both orbital and suborbital projects predict that, if all goes well, space tourists could soon be floating weightless, gazing back at the planet.

(p. 20)

___ / 12

"I think we'll see people buying tickets in the next 3 to 5 years," Diamandis says. The rides won't be cheap, however. Tickets could start at $200,000 a trip.

Still, who knows? Although you can't make it this winter, maybe you could celebrate your high school graduation in space. Start saving your pennies now!

Questions…

1. Who is Mike Melvill, and what did he do?

   _____

   _____

2. When will people start being able to buy tickets for space travel? How much will these trips cost?

   _____

_____

3. If you had $10 million to help advance science and technology, how would you spend the money?

_____

_____

_____

4. What kind of desirable consequences might there be from allowing everyday people to purchase tickets to travel or vacation in space?

_____

_____

_____

5. What kind of undesirable consequences might there be from allowing everyday people to purchase tickets to travel or vacation in space?

_____

_____

_____

6. Name at least one way that the technology of private spacecrafts can influence the quality of life.

_____

_____

(p. 21)

___ / 5

Let's check out a video about the spaceships that we read about above!

1d; 8b

Short Video (up to 38 min): Daily Planet Rockets Rip

List 5 facts the you learned from this video.

(1) _____

_____

_____

(2) _____

_____

_____

(3) _____

_____

_____

(4) _____

_____

_____

(5) _____

_____

_____

(p. 22)

___ / 20

Desirable / Undesirable Activity

2a,b,c,d

We're going to do an activity that's pretty cool! We will be making a small poster illustrating the desirable and undesirable consequences from using certain products.

Directions:
(1) Choose a product.
(2) Setup your paper like you see below.
(3) Write your name on the BACK, right corner of the paper.
(4) Draw pictures to illustrate some desirable and some undesirable consequences of using your product. Under each picture, write a description of the desirable and undesirable consequences.

Product Name	
Desirable	**Undesirable**
Desription of desirable consequences goes here.	*Description of undesirable consequences goes here.*

Grading…
This activity will be graded using rubric categories 1, 2, 3 and 4 . The rubric can be found on p. 4 .

8a,b

(p. 23)

___ / 6

Search Engine!

Search engine on the Internet have had huge consequences on Internet use. With them, we are able to search through millions and millions of pages to find the information we want. It's important to be able to use these search engines appropriately so that we can find the information that we need. This outline will help you to use search engines appropriately.

How to Look Up Someone's Name

If you search for a name, for the best results, put the name in quotation marks (Example: "John Adams"). Putting quotation marks around a name tells the search engine to search for the words together. Without quotation marks, the search engine will look for any page with the first and last name, even if the words aren't together.

How to Search a Certain Website

Google.com has a great feature that allows you to search a single website. Type "site:*nameofwebsite*." Then type the words or phrases you're looking for. For example, if you want to search rockabrain.com for information about rocks, you would type this "site:rockabrain.com rocks."

How To Find A Definition

Google.com has a great feature to find multiple definitions for words. To find a definition of a word type "define:*your_word"*. For example, if I needed to find the definition of the term *science*, I would type "define:science" in google. Great feature!

Google or Yahoo?

Both Google and Yahoo are useful search engines. Google lists the most popular pages first, while Yahoo lists the pages that best match what you're looking for regardless of popularity. Using the popular sites is a safe choice. If it's popular, it's more likely that it's a quality page. However, many times there are quality pages that are not popular yet. Therefore, it's wise to use both Google and Yahoo.

……
……

QUESTIONS:

(1) What would you type in the search box if you needed to find some definitions for the term "manufacture?"

(2) Write the first definition that comes up after using your search from questions 1.

(3) What would you type to search your own name at Google.com to ensure that your first and last name will be together?

(4) Use Google.com to search Rockabrain.com for “minerals.” Write down what you typed in the search box and write down the first page that came up.

(5) Search the Internet to find out who invented the lightbulb and when. Also, write down how you found this information (what search engine, what you typed, etc.)

(6) Search the Internet to find out who invented the toaster and when. Also, write down how you found this information (what search engine, what you typed, etc.)

(p. 24)

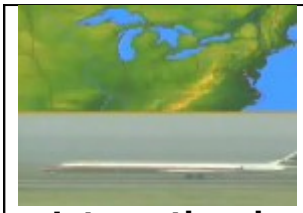
___ / 4

2a,b,c,d

Consequence Clips

The following clips outline and explain a few undesirable consequences of certain products and systems that we may not realize or think about very often. Let's check em' out!

Under each picture, write one undesirable consequence of using the products or systems in the clips.

			
International Airport Screeners (1min 3sec)	**Mustangs: Roamers of the American** Range (44sec)	**Plant Protection and Quarantine Officers** (1min 13sec)	**The Zebra Mussel: A Pest of the Great Lakes** (2min 23sec)
Write an undesirable consequence below.	Write an undesirable consequence below.	Write an undesirable consequence below.	Write an undesirable consequence below.

It's time to start bringing in bottles for your rockets!

Bring in a 1 or 2 liter bottle. Make sure you write your name on it. This bottle cannot be a milk carton. We will use these for our

3a,b,c,d, e,f

(p. 25)

___ / 4

Automation And Its Effects

Our next learning goal is to be able to describe how automation (e.g., robots) has changed manufacturing including labor being replaced by highly-skilled jobs. In order to accomplish this goal, we need to know and understand a few terms. The terms are define below.

Automation: Using equipment to do things automatically, usually involving electricity (robots, machines, etc.)
Manufacturing: The making of goods and services to sell
Manual Labor: Having pleasing qualities or properties
Highly-Skilled Job: Not desirable; unwanted; not having pleasing qualities or properties
Robot: A mechanism that can move automatically

Write a sentence below using the term *automation*.

_____

_____

Write a sentence below using the term *manufacturing*.

_____

_____

Write a sentence below using the phrase *Manual Labor*.

_____

_____

Write a sentence below using the phrase *Highly-Skilled Jobs*.

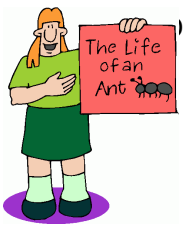
_____

_____

3a,b,c,d, e,f

It's time for a sweet presentation!

Let's apply the definitions above to some real-world stuff. Check out presentation (sst_notes2)



BrainPop: Assembly Line

3e,f

BrainPop: Industrial Revolution

BrainPop: Robots

Video Clip: Fantastic Robots (7min 59sec)

……
……

¡Que Si! Play

3a,b,c,d, e,f

Characters needed: Joe Worker, Joe Owner, Joe Salesman

The Play…

Joe Worker: *Working at a conveyor belt placing parts in a box*.

Joe Boss: *Looks at Joe Worker and says*, "Joe Worker, you need to hurry up. We've got a truck coming to pick up those parts soon. Arg!!

Joe Worker: Yes sir, I'm going as fast as I can, but I'll go a little faster for you.

Joe Boss: *While shaking his head and walking away says* "Good!"

Joe Worker: *Says to himself*, "yeah right, go faster. I've only got two hands!" Arg!

Joe Salesman: *Enters Joe Boss's office* Hello, I couldn't help but overhearing that you're having some problems with your workers. You need them to speed up? Well, have I got the thing for you. This machine here will fill 100 boxes in the time it takes Joe Worker to fill 1.

Joe Boss: *looking very excited says,* Really? How much is it?

Joe Salesman: Price really doesn't matter. You need this machine. You need it.

Joe Boss: OK, I'll take it!

The next day…
Joe Worker: *Joe worker is working beside the machine which is working a lot faster than him. He is jealous.*

Joe Boss: *Walks by Joe Worker and says,* Well Joe Worker, I don't know how to say this so I'll just say it, you're fired. Not needed anymore. Now we need someone that knows how to operate this machine and to keep it running. We need a highly-skilled person. Go get some skills!

Joe Worker: OK, I will go get skills.
THE END

1,2,3 & ~~6b~~

(p. 27)

___ / 11

SST Fun Questions Activity

Answer the following in complete sentences. Be sure to fully explain your answers!

1. How does technology influence the quality of life?

   _____

   _____

   _____

2. Decisions about the use of products can result in desirable or undesirable consequences. Give three examples of desirable and/or undesirable consequences from using products. Be sure to tell what the product is.

   _____

   _____

   _____

   _____

   _____

   _____

3. What are two ways that automation has changed manufacturing? Be sure to explain.

   _____

   _____

   _____

4. Draw a picture of what you think a robot looks like, and tell why your robot can be defined as a robot (i.e. does it meet the definition of a robot?) You may name

5. How do you think the scientific method has been helpful in the advancement of science and technology? Remember, the scientific method is a general set of things that you do when trying to find out a solution to a problem (Question, Observations, Hypothesis, Test, Communicate, etc).

4a,b,c

Usefulness of Manufactured Parts

The usefulness of manufactured parts of an object depend on how well their properties allow them to fit together and interact with other materials. Think about it. You go to the store and buy a 1,500 piece Lego set. You take it home and begin to build a large Lego castle. Unfortunately, you run out of pieces, so you need to go back to the store to buy more.

Let me ask you this: How important is it that the new Legos fit together and interact with your other Legos? That's a pretty easy question. If they didn't fit together you couldn't use them to complete the castle properly. The new Legos wouldn't be very useful!

It's very important that the parts that companies manufacture fit and are able to interact with other materials, otherwise, they would not be very useful at all!

One more example: Let's say that you designed a new part for your computer that can recognize who is using the computer and says "Hello *person's name*" each time the person sits down to use the computer. You want to sell this product on the market and make big money! How important is it that it fits and interacts with other computers besides yours? VERY!! The more computers that it fits and interacts with, the more opportunities you will have to sell your product.

Let's check out a few BrainPops and learn about some of the parts and systems that fit together and interact with each other in order to make certain products…

4,c

BrainPop: Computers

BrainPop: Cars

BrainPop: Air Bags

BrainPop: Fuel Cell

4a,b,c

(p. 29)

___ / 10

Here is the most recent Pen Pal letter from our Alien friends.

Dear Pen Pals,

This is Askum. Yes, I know. You're probably wondering how I'm writing this letter with me being a dog and all… Well, Zeek invented a machine that when connected to my left ear prints out everything that I'm thinking. So I decided… ooo… I smell food… ah…

Anyway, sorry we haven't written in awhile. I bring sad news. We have moved back to Eh-Whey because Zeek has decided to build a factory on our home land to manufacture a product called the "Morning-aide." He talked to you about it I believe. Anyway, he decided to go for it.

We have a question for you: Zeek wants to sell this product on both Eh-Whey and Earth. What measuring systems should he use to make these products? Eh-Whey's or Earth's? Please let me know what you think.

Oh… I smell food again… got-to-go… OH!!

Sincerely,
Hungry…
I mean, Askum

Directions: Write a letter back to Askum explaining to him the best measurement systems to use (Eh-Whey's, Earth's, or both) and be sure to explain why you feel this.

Dear Askum,

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Sincerely,

.....
.....

Make sure you remember to bring in your bottle for your rocket!

(p. 31)

___ / 3

Abilities To Do Technological Design

Our final learning goal is for you to be able to design and build a product or create a solution to a problem given one constraint (e.g., limits of cost and time for design and production, supply of materials and environmental effects).

In order to achieve this goal, we're going to practice designing and building a few products. First, let's brainstorm some things that make a good design for a product.

What Are Some Things That Make a Good Design?

- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____
- _____

Designing A Mars Rover

We are going to design a Mars rover. Obviously, we're not going to actually build the design; that would be way too costly. We are simply going to design it. A Mars Rover is a vehicle that has the ability to travel the terrain of the planet Mars. In designing a Mars Rover we need to make sure that it has the ability to drive many places on Mars without getting stuck!

Let's check out a video about Mars and its terrain so that we can learn what kind of features our vehicle needs to have.

(p. 32)

___ / 5

5a,c,d

Short Video ( ): Destination Mars

During the movie, answer the following questions to help you with the designing of your Mars Rover.

(1) What are some of the physical features of Mars?

_____

_____

_____

_____

_____

(2) What are some things that a Mars Rover needs to be able to do?

_____

_____

_____

_____

_____

_____

5a

(p. 33)

___ / 5

Sketch A Mars Rover

Given what you learned about the terrain of Mars and other physical features, design a Mars rover that could be driven by a human across Mars without getting stuck or breaking apart. Remember, since Mars is so far away, it's not going to be easy to find replacement parts for the Rover. This Rover needs to be very sturdy and durable.

Sketch your design below…

8b

The Technology of Automobiles…

We are going to be designing and building some automobiles… we're going to call them "rocket racers." Before we do that, let's learn about some of the things that have led to the automobile being what it is today.

My, How the Automobile has Changed!

In 1900, the typical automobile in the United States was box shaped, with little or no protection form the elements for either its parts or its passengers. Its solid rubber tires could not cushion bumps. Using the hand crank to start it sometimes resulted in injury. Its performance was so unreliable that owners were encouraged to carry a repair kit of over 60 items, ranging from extra parts to material to seal leaks. Kerosene side lamps provided crude lighting. Although there were 50 automobile-manufacturing companies in 1900, each car was hand made and cost twice the average worker's annual wage, so only the wealthy could afford to own a car.

As you examine the timeline below, you will find just some of the many innovations that have made automobiles more affordable and have improved automobile safely, comfort, and reliability.

The Importance of Mass Production

Although Henry Ford did not originate mass production of automobiles, his use of conveyer belts allowed him to cut production time from a day and a half per vehicle to just an hour and a half and to reduce the price of a Ford automobile by more than half.

The Impact of the Automobile on Society

The United States has more automobiles per person than virtually any other country in the world. The availability of reliable, affordable automobiles has changed how we vacation and how we build our cities, and is a major force in our economy. Its basic design has been adapted to produce vehicles ranging form trucks to jeeps to ambulances. From traffic jams to rising gasoline prices to drunk driving to acid rain, the automobile is at the heart of many of the challenges facing our society today. Considering both the positive and negative impacts, how do you think that Henry Ford would feel about the influence his innovations have had, if he were alive today?

8b

Automobile Timeline…

Below is a timeline of some of the events and advancements that the automobile has undergone since its invention.

Timeline of Events Related to Achievement #1:

1900	Packard is the first U.S. car to feature three-speed and reverse gear box.
1901	Ransom E. Olds originates mass production techniques.
1901	British designer Frederick William Lanchester patents disc brakes.
1901	Frederick Simms invents first car fender, based on railway engine buffers.
1908	Henry Ford begins mass production of the Model T.
1908	Henry Ford adds conveyor belt to improve mass production of Model T.
1911	Charles Kettering invents the electric starter.
1911	First mechanically operated windshield wipers.
1911	Interchangeable parts are introduced by Henry M. Leland.
1915	Cadillac introduces the V-8 engine.
1916	Dodge mass-produces first car body made entirely of steel.
1926	First power steering system, installed in the Pierce-Arrow.
1934	Chrysler Airflow becomes the first mass-produced streamlined car.
1940	Karl Pabst designs the Jeep, workhorse of WWII.
1947	B. F. Goodrich Co. introduces the first tubeless tire.
1948	Disc brakes are introduced by Chrysler.
1953	First car whose body is made of fiberglass-reinforced plastic.
1967	Safer car bumpers absorb some of the energy of an impact or collision.
1970	Gary Gabelich travels over 600mph in a rocket-powered car.
1980-90s	Continuing research and experimental work with alternative fuels, electric and solar-powered vehicles, seat belts, airbags, mapping systems, etc.

……
……

It's time to build our Rocket Racers! Remember, your first design might not work as well as you want it to. That happens a lot with first designs. Tweak and change your design to make it work the way you want.

Follow the directions on the next page to build your Rocket Racer.

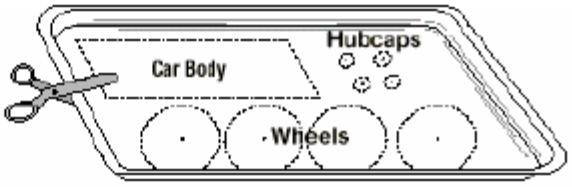
5a,b,c,d

Building A Rocket Racer

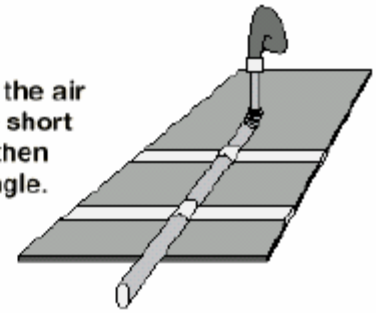
Materials for Each Design Team:

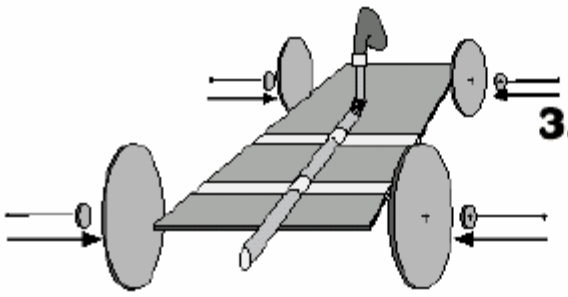
4 Pins	Styrofoam meat tray or cardboard
Masking tape	Flexible straw
Scissors	Drawing (mechanical) compass
Marker pen	Small round party balloon
Ruler	Set of handouts
String	Clothespins or Clamps

1. Lay out your pattern on a styrofoam tray. You need 1 car body, 4 wheels, and 4 hubcaps. Use a compass to draw the wheels.

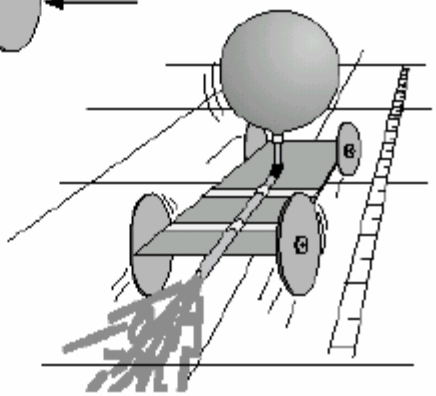


2. Blow up the balloon and let the air out. Tape the balloon to the short end of a flexible straw and then tape the straw to the rectangle.





3. Push pins through the hubcaps into the wheels and then into the edges of the rectangle.

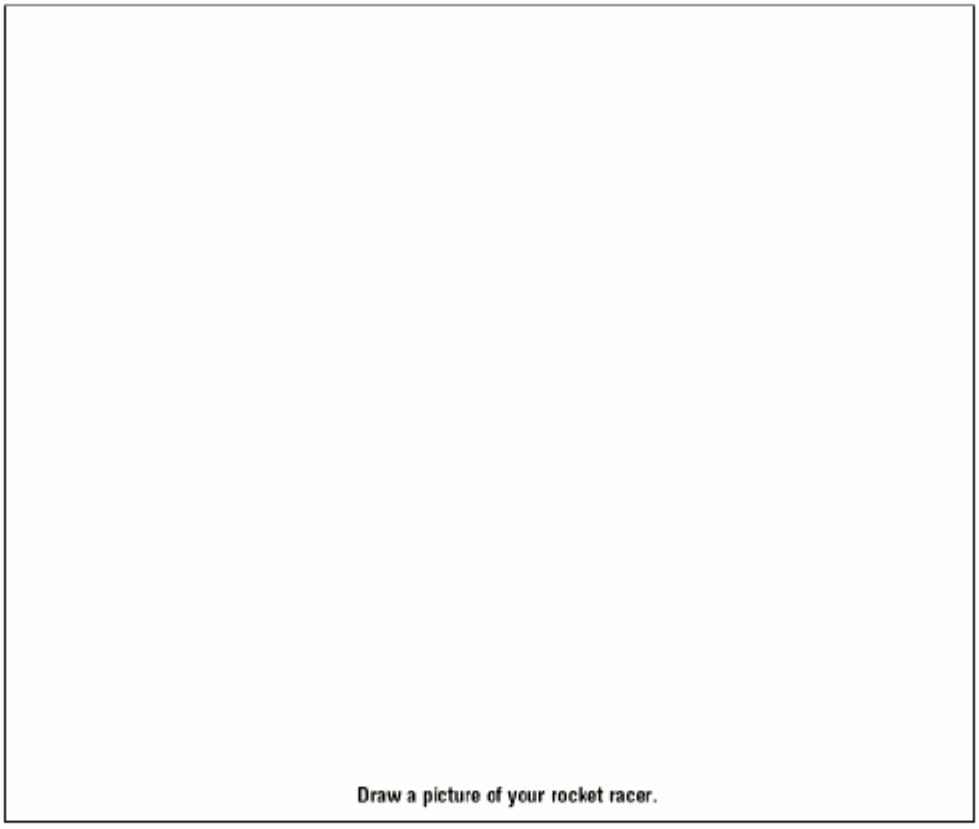


4. Blow up the balloon through the straw. Squeeze the end of the straw. Place the racer on floor and let it go!

(p. 37)

___ / 3

Rocket Racer Test Report



BY

_____

_____

DATE: _____

(p. 38)

___ / 10

Rocket Racer Test Report

Place your rocket racer on the test track and measure how far it travels.

1. Describe how your rocket racer ran during the first trial run.
   (Did it run on a straight or curved path?)

   _____

   How far did it go? _____ centimeters

   Color in one block on the graph for each 10 centimeters your racer traveled.

2. Find a way to change and improve your rocket racer and test it again.

   What did you do to improve the rocket racer for the second trial run?

   _____

   _____

   How far did it go? _____ centimeters

   Color in one block on the graph for each 10 centimeters your racer traveled.

3. Find a way to change and improve your rocket racer and test it again.

   What did you do to improve the rocket racer for the third trial run?

   _____

   _____

   How far did it go? _____ centimeters

   Color in one block on the graph for each 10 centimeters your racer traveled.

4. In which test did your racer go the farthest? _____

   Why? _____

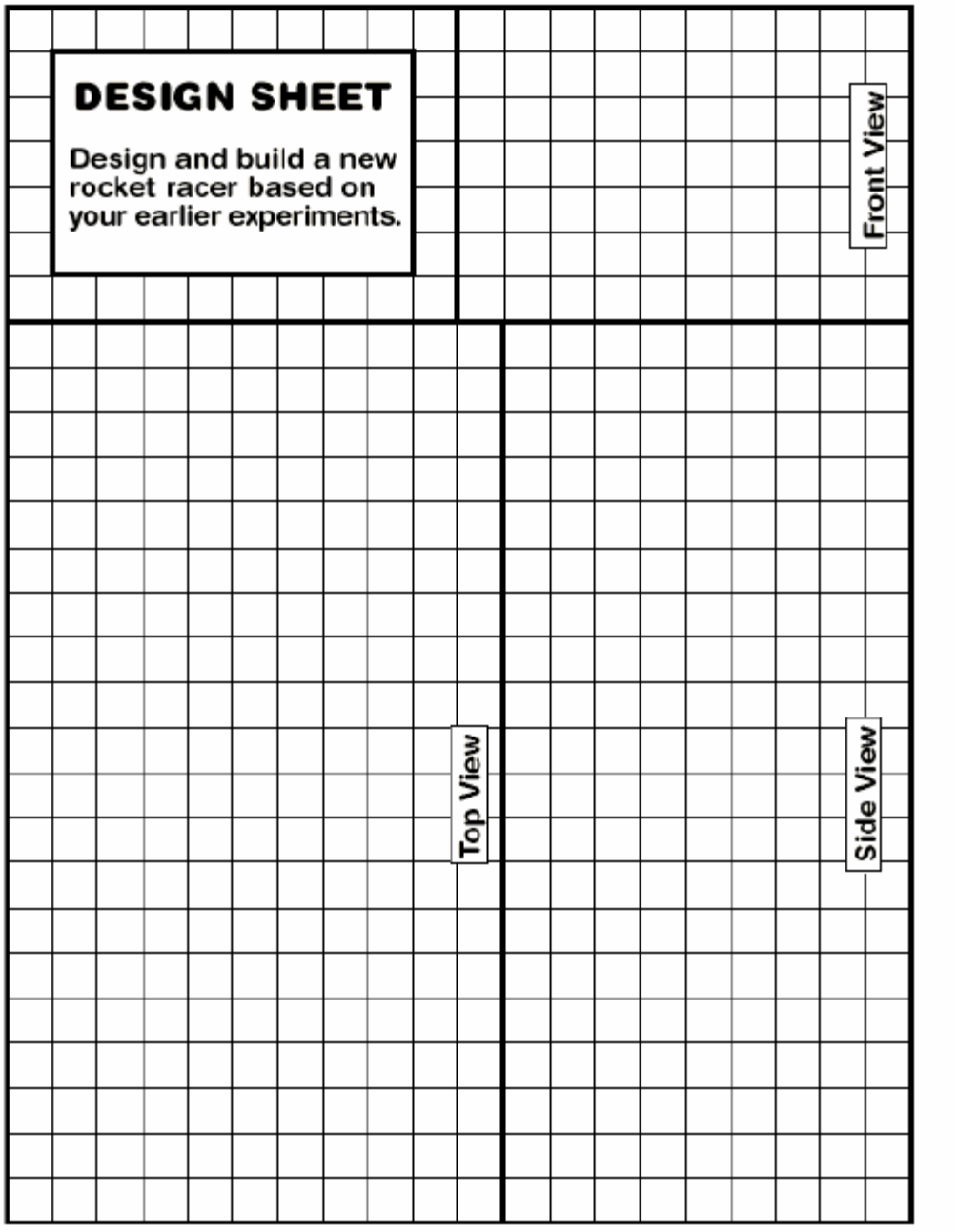
(p. 39)

___ / 5

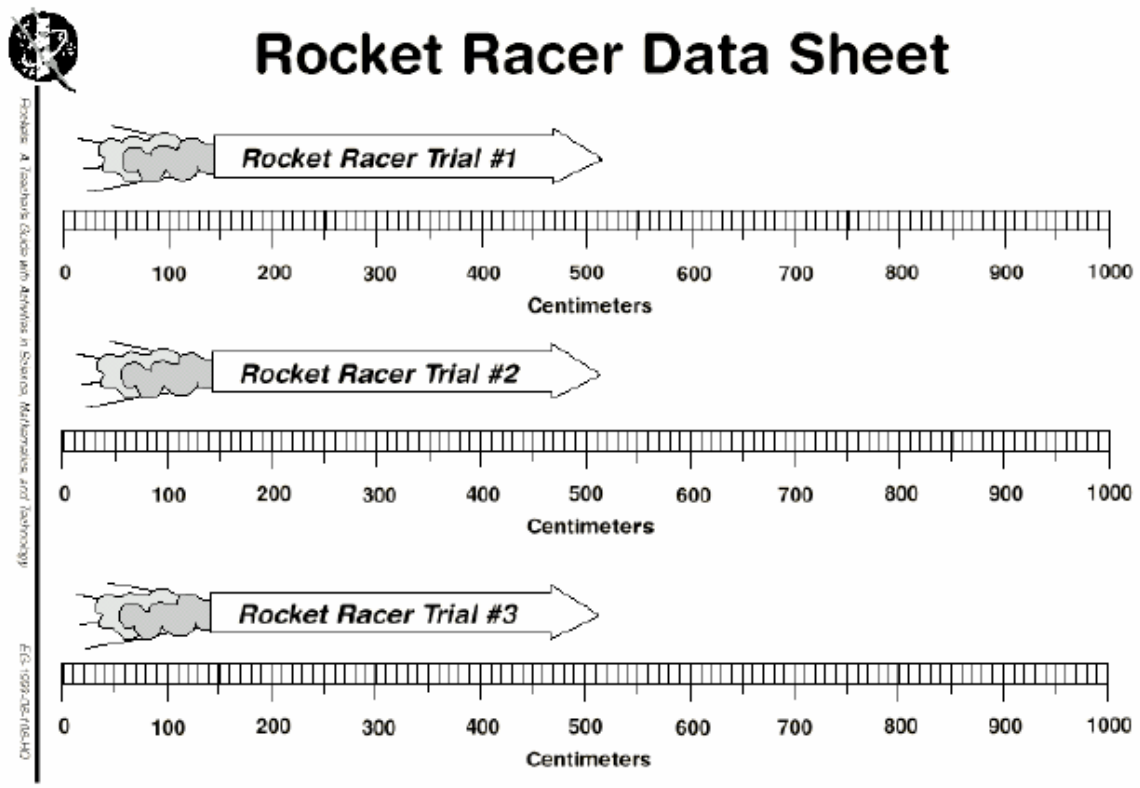
5a,b,c,d

Design A New Rocket Racer

Now that you've tested out your rocket racer, design a new, better rocket racer in the grid below. If we have time, we can build it, too!



Directions: Shade in the distance you Rocket Racer went in centimeters for each trial.



(p. 40)

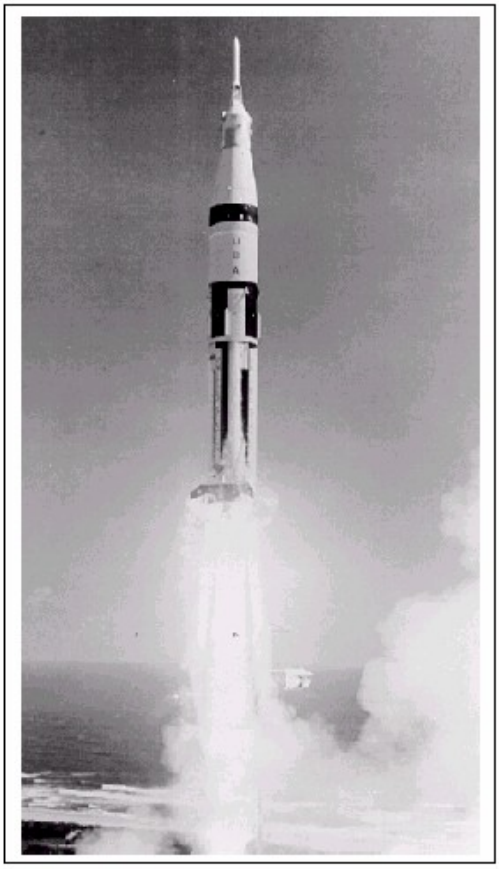
___ / 3

Apollo Moon Landing

Now we're going to be designing and building air powered rockets. Check out some info on the Apollo Moon Landing!

The Gemini was the second manned capsule developed by the United States. It was designed to carry two crew members and was launched on the largest launch vehicle available - the Titan II rocket. President Kennedy's mandate significantly altered the Gemini mission from the general goal of expanding experience in space to preparing for a manned lunar landing on the Moon. It paved the way for the Apollo program by demonstrating rendezvous and docking required for the lunar lander to return to the lunar orbiting spacecraft, the extravehicular activity (EVA) required for the lunar surface exploration and any emergency repairs, and finally the ability of humans to function during the eight day manned lunar mission duration. The Gemini program launched ten manned missions in 1965 and 1966, eight flights rendezvoused and docked with unmanned stages in Earth orbit and seven performed EVAs.

Launching men to the moon required launch vehicles much larger than those available. To achieve this goal the United States developed the nearly 7-meter tall Saturn launch vehicle, shown in the picture. The Apollo capsule, or command module, held a crew of three. The capsule took the astronauts into orbit about the Moon, where two astronauts transferred into a lunar module and descended to the lunar surface. After completing the lunar mission, the upper section of the lunar module returned to orbit to rendezvous with the Apollo capsule. The Moonwalkers transferred back to the command module and a service module, with an engine, propelled them back to Earth.



After four manned test flights, Apollo 11 astronaut Neil Armstrong became the first man on the moon. The United States returned to the lunar surface five more times before the manned lunar program was completed. After the lunar program the Apollo program and the Saturn booster launched Skylab, the United State's first space station. A smaller version of the Saturn vehicle transported the United States' crew for the first rendezvous in space between the United States and Russia on the Apollo-Soyuz mission.

Timeline of Events Related to the Apollo Moon Landing

1926	Goddard launches first liquid-fuel rocket engine.
1932	Wernher von Braun begins experimenting with rocket engines.
1934	Von Braun builds his first successful rocket, the A-2.
1950	A two-stage bumper rocket is launched from Cape Canaveral.
1957	Sputnik I is launched by liquid-fueled rocket built by Sergei Korolev.
1958	The U.S. launches Explorer 1, beginning of the US space program.
1959	Russia lands a probe on the moon and takes the first pictures of its far side.
1961	Russian Yuri Gagarin orbits Earth one time.
1961	Alan Shepard is launched 115 miles into space, lands 15 minutes later in Atlantic Ocean.
1962	John Glenn orbits Earth three times in a Mercury capsule, Friendship 7.
1962	Mariner 2 flies past Venus, the first probe to fly beyond another planet.
1976	Mars space probes, NASA's Viking I and Viking II, launched.
1977	U.S. Space Shuttle program begins.
1981	Columbia Space Shuttle, the first reusable winged spaceship, is launched.
1997	The robotic explorer, Sojourner, lands on Mars.
1997	Discovery Shuttle mission with John Glenn aboard at age 77.

Spinoffs from the Apollo Program

Many product and services incorporate NASA technology, in such areas as health and medicine, environment, public safety, consumer/home/recreation, transportation, computer technology and industrial productivity. These are called **spinoffs**. Here are some of the contributions of the Apollo program:

CAT Scanners and MRI technology (Computer-Aided Tomography and Magnetic Resonance Imaging) used in hospitals world wide, came from technology developed to computer-enhance pictures of the moon for the Apollo program.

Cool suits, which kept Apollo astronauts comfortable during moon walks, are today worn by race car drivers, nuclear reactor technicians, shipyard workers, people with multiple sclerosis and kids with a congenital disorder known as hypohidrotic ectodermal displasia.

Kidney dialysis machines were developed as a result of a NASA developed chemical process that could remove toxic waste from used dialysis fluid.

A cardiovascular conditioner developed for astronauts in space led to the development of a physical therapy and athletic development machine used by football teams, sports clinics and medical rehabilitation centers.

Cordless power tools and appliances are one of the most successful commercial spinoffs of space-based technology.

Athletic shoe design and manufacture also benefited from Apollo. Space suit technology is incorporated into a shoe's external shell.

Insulation barriers made of aluminum foil laid over a core of propylene or mylar, which protected astronauts and their spacecraft's delicate instruments from radiation, is used to protect cars and trucks and dampen engine and exhaust noise.

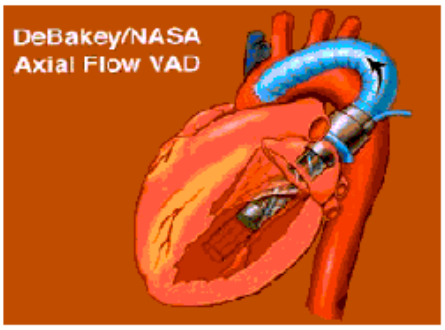
The Heart of a Rocket?

(Information courtesy of NASA'S Aerospace Technology Enterprise)

The last place you'd expect to find part of a rocket engine is attached to the human heart. Rocket engines are notoriously fickle and demand pampering to pump strange fluids like liquid hydrogen for even just a few minutes of pump life. The human heart, on the other hand, is a durable device, changing its output to meet new demands and enduring a range of stresses for decades.

Merging the two was the brainchild of NASA engineer David Saucier of the Johnson Space Center, who received a heart transplant in 1984 after a wait of several months. Why not borrow some space technology, he asked his doctor, to give a failing heart a boost while a patient is waiting for a heart? In response to this question, his doctor, Dr. Michael DeBakey (a pioneer in heart transplants), DeBakey's team at Baylor College, and biomedical experts at MicroMed Technology, worked together to develop a **Ventricular Assist Device** (VAD).

The human heart (like those of all mammals and birds) has four chambers. The right auricle and ventricle receive blood from the body and pump it into the lungs to exchange carbon dioxide for oxygen. The left auricle and ventricle receive blood from the lungs and pump it out to the body. Because it has to push blood out to the entire body, the left ventricle is under the greatest strain and often fails first. The VAD was designed to reduce the left ventricle's load while keeping blood flowing to the rest of the body.



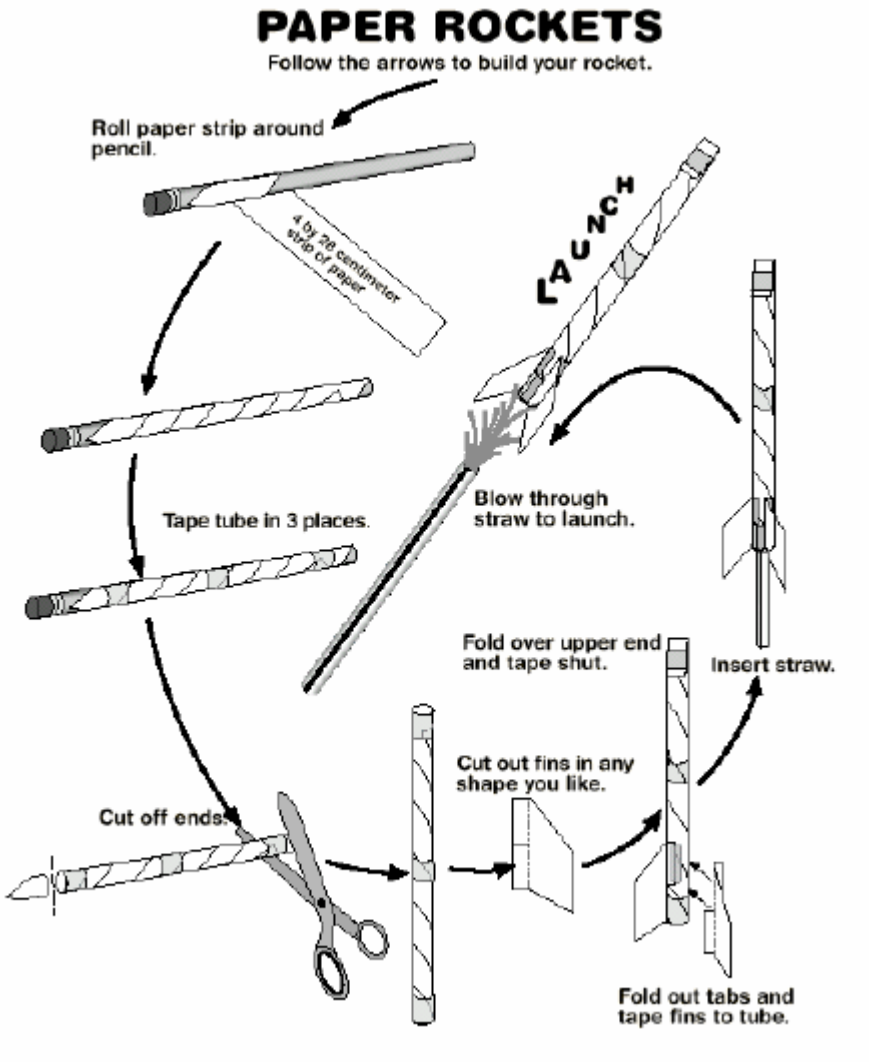
On paper it looked great. In clinical trials with animals, it only worked two days. Longer life of the pump was needed to give longer life to patients. Such differences between planning and testing are not unusual in engineering development work. Soon, design changes increased pump life to an impressive 120 days. In practice, it has operated for five to six months, thus giving patients a longer time to wait for a donor.

For now, the U.S. Food and Drug Administration classifies the VAD as "an experimental device". One day soon it may be approved for general use.

This story illustrates one way that spinoffs occur – when someone's past and present experiences combine with their creativity to trigger new ideas.

Building Our Paper Rockets

Follow the instructions on the following page to design and build your Air Rocket. Make sure you complete the Paper Rocket Test Report, too.


PAPER ROCKETS
Follow the arrows to build your rocket.
Roll paper strip around pencil.
4 by 28 centimeter strip of paper
Tape tube in 3 places.
Cut off ends.
Cut out fins in any shape you like.
Fold out tabs and tape fins to tube.
Fold over upper end and tape shut.
Insert straw.
Blow through straw to launch.
LAUNCH

Paper Rocket Test Report and Directions…

1. Launch your rocket three times. How far did it fly each time. What is the average distance your rocket flew? Write your answer in the spaces below.
2. Build and fly a rocket of a new design. Before flying it, predict how far it will go. Fly the rocket three times and average the distances. What is the difference between your prediction and the actual average distance?
3. Build a third rocket and repeat step 2.
4. On the back of this paper, write a short paragraph describing each rocket you built and how it flew. Draw pictures of the rockets you constructed.

Rocket 1

		Make notes about the flights here.
How far did it fly in centimeters?	1. _____ 2. _____ 3. _____	
Average distance in centimeters?	_____	

Rocket 2

		Make notes about the flights here.
Predict how many centimeters your rocket will fly.	_____	
How far did it fly in centimeters?	1. _____ 2. _____ 3. _____	
Average distance?	_____	
Difference between your prediction and the average distance?	_____	

Rocket 3

		Make notes about the flights here.
Predict how many centimeters your rocket will fly.	_____	
How far did it fly in centimeters?	1. _____ 2. _____ 3. _____	
Average distance?	_____	
Difference between your prediction and the average distance?	_____	