Unit 1 Lesson 1

Intro to Problem Solving

Resources

Name(s)_____ Period _____ Date _____

Activity Guide - Aluminum Boats

Goal
Build a boat that holds the most possible pennies, using a piece of aluminum foil. You will build two boats and will try to improve your design between the first and the second.

Rules
- You may only use a single piece of foil to build your boat
- You may not touch or adjust your boat once it is in the water
- You must add pennies one at a time

Develop a Plan
- What kind of boat does your group plan to make? Write a description or draw a picture below.

- What are the strengths of this design? What possible weaknesses might this design have?

Test Your Boat
- How many pennies did your boat hold?

- Why did your boat eventually sink? What needs to be improved?

Evaluate and Improve
- What are the most common kinds of problems you see among the boats tested?

- What ideas seem to be working well?

Develop a Plan
- What kind of boat does your group plan to make? Write a description or draw a picture below.

- What are the strengths of this design? What possible weaknesses might this design have?

Test Your Boat
- How many pennies did your group's new design hold?

- Why did your boat eventually sink? What needs to be improved?

Reflect
- How did working in a team make this activity easier?

- How did it make the activity more challenging?

- What helped your group overcome these challenges?

Unit 1 Lesson 2

The Problem Solving Process

Resources

Name(s)_____ Period _____ Date _____

Activity Guide - The Problem Solving Process

The Problem Solving Process

Having a strategy for approaching problems can help you develop new insights and come up with new and better solutions. This process is generally useful for solving all kinds of problems.

- **Define**
  - What problem are you trying to solve?
  - What are your constraints?
  - What does success look like?
- **Prepare**
  - Brainstorm / research possible solutions
  - Compare pros and cons
  - Make a plan
- **Try**
  - Put your plan into action
- **Reflect**
  - How do your results compare to the goals you set while defining the problem?
  - What can you learn from this or do better next time?
  - What new problems have you discovered?
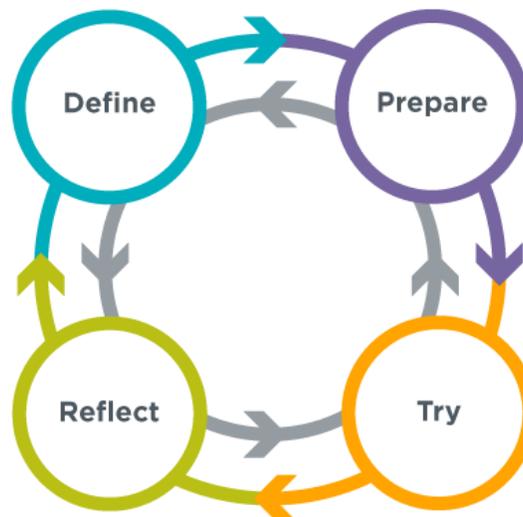
What it Looks Like

You're going to list the strategies and processes you and your classmates already use for each step in this process. Fill out the tables below for each of the three problems.

Building Challenge

For each step in the Problem Solving Process list the parts of this activity you believe fall within that step

- **Define**

- **Prepare**

- **Try**

- **Reflect**

What strategies did you use in solving this problem that could help you solve other problems?

A Problem You Are Good at Solving

You should have brainstormed a type of problem that you're good at solving. Write down the steps of your process that you believe fall into each step of the Problem Solving Process

Type of Problem: _____

- **Define**

- **Prepare**

- **Try**

- **Reflect**

What strategies do you use in solving this problem that could help you solve other problems?

A Problem You and a Classmate Want to Get Better at Solving

Find a classmate and talk to figure out a type of problem you both could get better at solving. Fill out the questions below with strategies or steps you would want to use to try to solve this problem using the problem solving process.

Type of Problem: _____

- **Define**

- **Prepare**

- **Try**

- **Reflect**

What strategies could you use in solving this problem that could help you solve other problems?

Unit 1 Lesson 3

Exploring Problem Solving

Resources

Name(s)_____ Period _____ Date _____

Activity Guide - Using the Problem Solving Process

Word Search

Overview
Working with a team find the following words in the grid. They may be horizontal, vertical, or diagonal in any direction.
DEFINE, **PREPARE**, **TRY**, **REFLECT**, **PROBLEM**, **SOLVE**, **COMPUTER**, **SCIENCE**

Objective
Find and circle all 8 words as quickly as you can!

```
E S Q H J H R C F A X M G M U E B L N I
S R K E R E T U P M O C E C M Z T Y J C
D X A P N X Q L Y V K L S X X N C E H N
J M X P K W W O J Q B B O Q M H E A H T
B I U O E Y H K M O A R L F R D L P H A
N J H T Y R A E R C F L V M S C F A J M
T I R Y Q W P P H D X Q E Q U N E R G S
H Y R I M I X D Z K B M N G O J R B K U
P U B U E U J E G D T F B D T I M V V P
H V W S K F D G K V D M S O X Y O R S F
S C I E N C E W P Q T E O R I A S Q M U
H R G D Y V N H I J D C F G V H E M Z M
U O H H N A G X O Q K K B I G M T W O L
O P E I O Q G B A R V H P N N A Z E X V
Y I S W E N R N U U W G H X H A E B O P N
L X D J X R P V Y J H U H X D Y F O I D
F U D J X V U K F C V D Q B P D Z I B D
F B R D S I W P K F K V T R D R G Y C R
Y E T Y O D M X H L L V P T J V I J C D
H E X K R O I P B W E T O Y X I B W V O
```

Once You're Done
Head to the last page of the activity guide and fill in the row there for the "Word Search" in the table.

Birthday Guests

Overview
A big group of 15 guests is getting together at a restaurant for a birthday. The restaurant has 3 tables that can each seat only 5 people. Below you can find some information about the people who are attending the party.

Aysha, Ben, Carla, Damien, Eric, Fan, Genaro, Hannah, Isaias, Jessica, Kyla, Laila, Max, Nazek, Owen

Close Friends (Try to put them together)	**In a Fight** (Try to keep them apart)
Aysha and Damien	Aysha and Genaro
Max and Isaias	Ben and Hannah
Nazek and Laila	Fan and Max
Owen and Genaro	Damien and Laila
Ben and Jessica	Isaias and Owen
Genaro and Eric	Kyla and Jessica

Objective
Find the best possible arrangement of guests at the party. Draw your solution in the space below. To help you can cross out the letters of the names you've assigned in the row below.

A   B   C   D   E   F   G   H   I   J   K   L   M   N   O
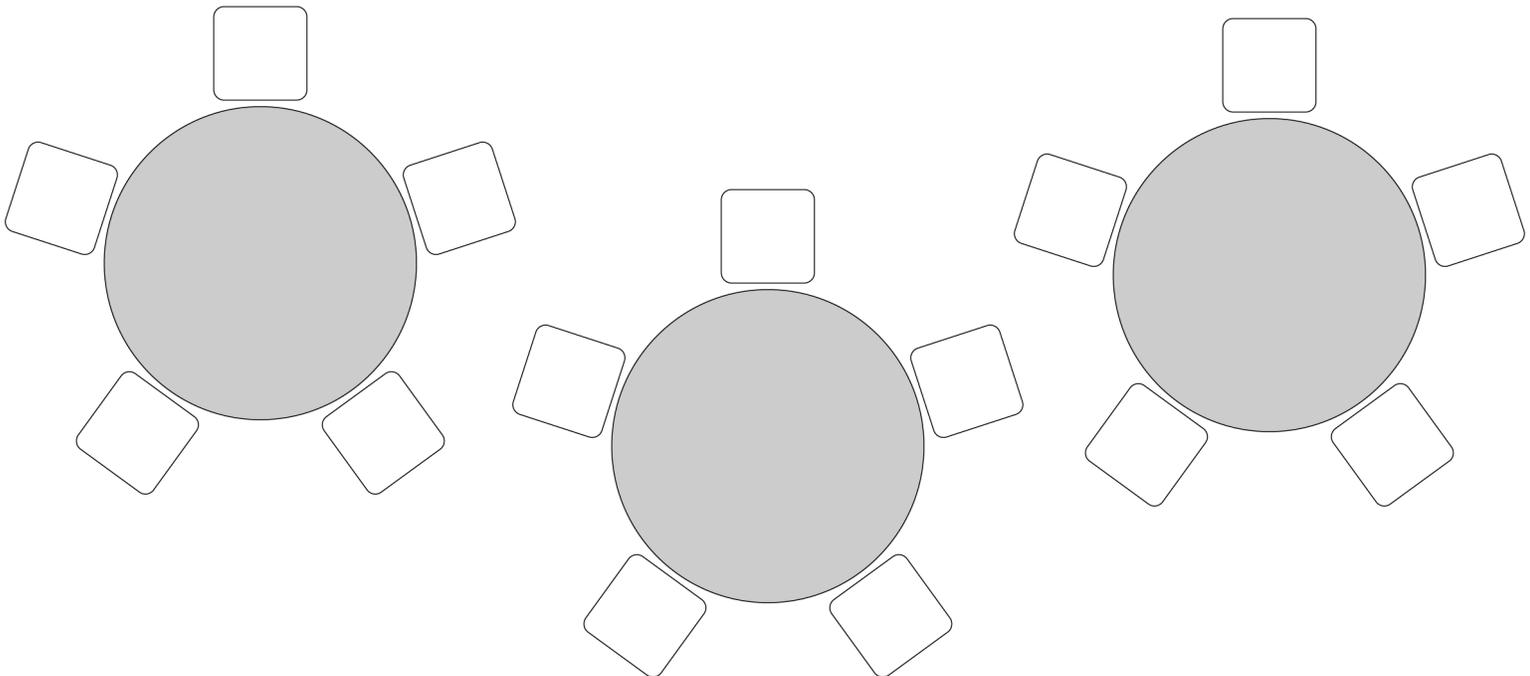
Once You're Done
Head to the last page of the activity guide and fill in the row there for the "Birthday Guests" in the table.

2

Redesign Your Classroom

Overview
You and your friends will be redesigning your classroom. You've only have one school day to make it happen, but otherwise how you plan goes it up to you. Plan the best looking classroom that you can!

Develop Goals
Talk with your group for a few minutes. What are the most important things about the classroom? Can everyone see the teacher? How will you move everything? Write down the goals you'll use to decide what makes a good plan.

Goals	How My Plan Helps Reach this Goal
Everyone can still see the teacher	
Everyone should be able to _____.	

Make a Layout
Every member of your group should separately start designing a layout. You should select what should go where and make sure it all fits in the room. For each goal your group chose, list how your layout helps to reach it in the right column. In the space below draw or describe your redesigned classroom.

New classroom design:

Share Your Layout and Get Feedback

Share the layout you developed with your teammates and explain why you think it is the best possible layout given the goals you chose. Afterwards, record their feedback and reactions to your design in the space below. Is there anything that needs to change? How could your layout improve?

Improve and Finalize

Using the feedback from your teammates update your layout. In the space below, write down the new design that you and your group agreed on.

Redesign

Once You're Done

Head to the last page of the activity guide and fill in the row there for the "Redesign Your Classroom" in the table.

Problem Solving Process Notes

Reflecting on Using the Process

How did you use each step of the problem solving process to solve this problem? Give examples of what each step looked like as you were solving that problem.

	Define	Prepare	Try	Reflect
Word Search				
Birthday Guests				
Redesign Your Classroom				

The Purpose of Each Step

For each step in the problem solving process, write one sentence explaining its purpose. Why is it included in the problem solving process?

Define:_____

_____

Prepare: _____

_____

Try:_____

_____

Reflect:_____

_____

Defining Problems with Questions

Before starting to solve a problem it's important that you have defined it well. What questions or strategies can you use to better define or understand a problem? Record them in the space below.
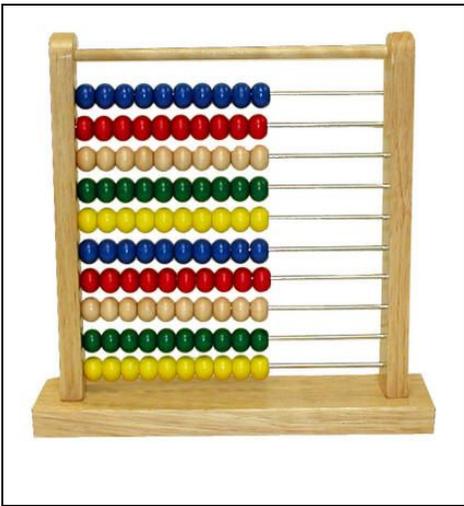
Unit 1 Lesson 4

What is a Computer?

Resources

Name(s)_____ Period _____ Date _____

Activity Guide - What Is A Computer? [Set B]

Cut out the following pictures and attach them to your poster

Name(s)_____ Period _____ Date _____

Activity Guide - What Is A Computer? [Set A]

Cut out the following pictures and attach them to your poster

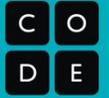# Unit 1 Lesson 5

Input and Output

Resources

Name(s)_____ Period _____ Date _____

Activity Guide - Input and Output

Key Vocabulary:

Input - the information computers get from users, devices, or other computers
Output - the information computers give to users, devices, or other computers

Pet Chooser

Try out the pet chooser app a few times to see how it works. What are its inputs and outputs?

Inputs	Outputs

Story Creator

Now try the story creator app a few times. What are its inputs and outputs?

Inputs	Outputs

Your App Idea

With your partner, think of a new app idea. What does the app do? What inputs and outputs does it need?

What it does	Inputs	Outputs

Other Inputs

So far, all of the input that we have seen comes directly from the user. With your partner, brainstorm other ways an app might get the information that it needs.

1. _____

2. _____

3. _____

4. _____

Improved Pet App

Try out the improved version of the pet app that gives the user information about pet stores close by, which uses new sources of input. Determine the information that the app gets from each source of input.

User	Phone Sensors	Internet

Your App Idea

How could you use other sources of input to improve your app idea?

_____

_____

_____

_____

_____

Unit 1 Lesson 6

Processing

Resources

Name(s)_____ Period _____ Date _____

Activity Guide - Apps with Processing

Key Vocabulary:

Processing - The thinking work computers do to turn input into output.

Apps and Processing

For each app, choose one type of processing it uses and explain how it helps turn the input into output.

App Name	Type of processing	How does it help turn input into output?
Is It Your Birthday?	(if/then) counting **finding a match** **comparing**	*If the birthday is today, then it shows the happy birthday message.*
National Park Quiz	**if/then** **counting** **finding a match** **comparing**	
How many countries…?	**if/then** **counting** **finding a match** **comparing**	
My Famous Birthday	**if/then** **counting** **finding a match** **comparing**	
Stamp Notebook	**if/then** **counting** **finding a match** **comparing**	

More Processing

For each app, choose **two** types of processing it uses and explain how they help turn the input into output.

App Name	Type of processing (choose two)	How do they help turn input into output?
Fastest Finger	if/then counting finding a match comparing	
Guess the Number	if/then counting finding a match comparing	
Where should I live?	if/then counting finding a match comparing	

Your App Idea

With your partner, think of a new app idea. What inputs does it need? What outputs? What types of processing does it use to change the input to output?

App idea	
Inputs	
Outputs	
Types of processing	
How processing turns helps turn input to output	

Unit 1 Lesson 7

Storage

Resources

Name(s)_____ Period _____ Date _____

Activity Guide - Apps with Storage

Key Vocabulary:

Storage - Information that is saved for the computer to use in the future

Sample Apps

Outfit Picker

What information should be **stored**?

Information	Should it be **stored**?	Why? Or why not?
Favorite color		
Season		
Weather		

Friend Finder

Information	Should it be **stored**?	Why? Or why not?
List of friends		
Friend locations		
Friend requests		

What information should be **stored**?

Information	Should it be **stored**?	Why? Or why not?
Favorite movie		
What are you in the mood for?		
Do you want an animated movie?		
Recommendation		

Guidelines

Now that we've seen some examples of input that should and should not be stored, brainstorm at least two guidelines about what types of information should and should not be stored. Your guidelines should follow this format:

"If the information _____, then that information (should / should not) be stored because _____. For example, _____ (should / should not) be stored."

1. _____

    _____

    _____

    _____

2. _____

    _____

    _____

    _____

Unit 1 Lesson 8

Project - Propose an App

Resources

Name(s)_____ Period _____ Date _____

Project Guide - Apps and Problem Solving

Overview

Computer science is an extremely powerful tool for solving real world problems. For this project you will combine what you've learned about the problem solving process and the way computers work in order to propose an app that could help solve a real world problem of your choosing.

You will…
- Work with a partner
- Define a real world problem
- Brainstorm ways an app could be used to help solve that problem
- Identify the inputs / outputs / storage / processing used by your app
- Share your ideas with another group for peer feedback
- Incorporate feedback to create a final version of the app
- Create a poster of your app to share with the class

You will submit…
- This completed Project Guide
- Completed Peer Review
- A poster of your app

Project Steps

Step 1: Find Your Partner
This project will be completed in pairs. List your partner's name here: _____

Step 2: Brainstorm Problems
Brainstorm interesting and personally relevant problems. Nothing is off limits, and don't worry yet about how computer science can help solve the problem. You might think about

- Things you'd like to improve in your school, neighborhood, or community
- A task in your everyday life that you wish could be completed more easily
- A cause that you feel strongly about
- Something that is currently inconvenient or annoying to do

Record your brainstorm of problems in the space below.

Step 3: Choose Your Problem

Work with your partner to decide on which problem you would like to work on. As you discuss, make sure you consider the following criteria.

- **Interesting:** Both group members are interested in the problem
- **Well-Defined:** You can explain who specifically the problem affects, what needs to change, and how you'll be able to tell that the problem had been solved
- **Computing is Relevant:** The problem is an "information problem" that can be solved with "thinking work."

Step 4: Define Your Problem

1. **What is the problem?** Be as specific as possible. What needs to change or improve? Why does the problem exist? You may need to narrow your problem's focus. Making big changes begins with small steps!

   _____

   _____

   _____

   _____

2. **Who does the problem affect?** Be as specific as possible. Think about the age, location, life conditions, interests, background, etc. of your audience.

   _____

   _____

   _____

   _____

3. **How will you be able to tell that a solution to this problem has worked?** Be as specific as possible. What would you need to measure or observe to know the problem was solved?

   _____

   _____

   _____

   _____

Step 5: Your App

From a high level think about how an app could be used to solve a part of the problem you identified. What features would it need to have? How would someone use it? If you need to update your problem definition above then do so.

Name Your App: _____

What does your app do? Write a short description of your app as though you were describing it to someone you'd want to use it. What does it do? Why would someone want to use it? How does it help solve the problem?

_____

_____

_____

Step 6: Input, Output, Store, Process

You will sketch a version of your app and indicate what all the different outputs are. A classmate should be able to tell how the app works based on the sketch and labels.

App Sketch: Sketch what a screen of your app will look like based on your description above.
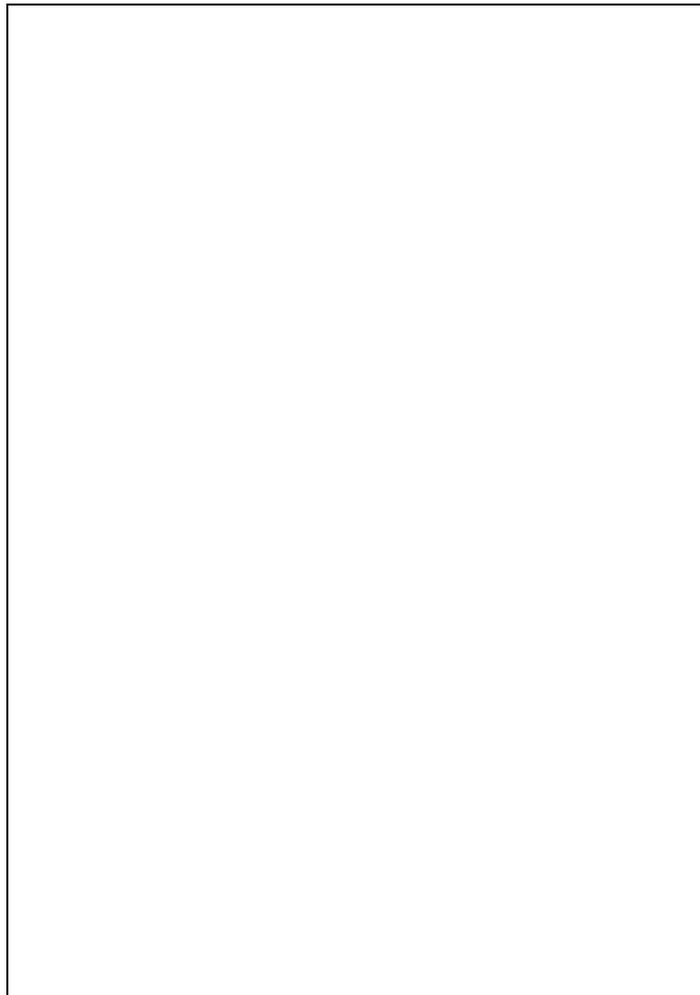
Output Information: Label the different outputs generated by your app by writing what they are and drawing an arrow to where they are located on the screen. (E.g. "List of nearby parks" or "Days until friends' birthdays")

Inputs: What kind of information does your app need as input to work? Will this input come from the user, phone sensors, or an external source (e.g. a database online)? List every piece of information your app will need to work. Your app may have more or less than 6 inputs. Feel free to add extra sheets of paper if you need them.

Type of Information *Example: User age*	Source *User / Sensor / External*	Example *Example: 13 years old*

Process: What sort of processing will your app use?

Store: What information will your app store permanently?

Step 7: Peer Review

Your teacher will provide you with a Peer Review sheet. Trade projects with another group and complete the peer review. As part of this process you should develop new ideas for how you can improve your app.

Step 8: Finalize App and Make Poster

Based on the results of your peer feedback, make any additions or changes you need to make to how you defined your problem or how you describe your app. Then make a poster that presents the final version of your app. Your poster needs to include the following information.

- The name of your app
- The target audience
- The problem the app is designed to solve
- The input information the app uses
- A drawing of the output the app produces
- A description of how the app processes and stores information

To create your poster you can and should use your work from this project guide.

Step 9: Present Your App

The last step of this process is to present your app to your classmates. This may be done as a gallery walk or a class presentation. As you present your app make sure you're ready to talk to your classmates about the following points.

- How you defined the problem your app is designed to solve and why you decided on this specific set of people, problems, and ways of measuring success.
- How your app is designed to work and how it aims to solve the problem.
- An overview of the information your app uses as input and output.
- An overview of how information would need to be stored or processed by your app.
- One change you made to your project based on the feedback you received

Unit 1 Project Rubric

Key Concept	Extensive Evidence	Convincing Evidence	Limited Evidence	No Evidence
Understanding Computing Devices	The outputs of the app are clearly described and could be used to address the problem.	Outputs of that app that could address the problem are listed.	Outputs are listed, but it is not clear that they could be used to fully address the problem.	Outputs are not listed.
Understanding Computing Devices	Stored information is listed and is appropriate for the functionality. Information that would change from use to use is not listed.	Stored information is listed and is mostly appropriate for the functionality of the app.	Stored information is relevant to the app, but some important information is missing.	Stored information is not listed or does not relate to the app.
The Problem Solving Process	The problem is well-defined, including a target audience, details of the problem, and how to tell it has been solved.	The problem is defined, including how to tell whether it has been solved.	The problem is defined, but it is not clear how to know when it has been solved.	The problem is not defined in enough detail to understand what it is.
The Problem Solving Process	The app is clearly described in detail,including what it does and how someone would use it.	The app is described, including what it does and how someone would use it.	The app is described in vague terms, but it is not clear exactly how it is to be used.	The app is not described well enough to understand what it does.
Computing and Algorithms	The way that the inputs are processed to produce the output is clearly described in terms of tasks appropriate for computing (e.g. sorting, counting)	The way that the inputs are processed to produce the output is clearly described.	Processing is described, but without enough detail to understand how the output could be produced from the given input.	Processing is not mentioned.
Collaboration	The peer review provides useful and constructive feedback, and peer review feedback has clearly been incorporated into the final version of the project.	Peer review provides constructive feedback, and peer review feedback has been responded to.	Some peer feedback was completed.	Peer review was not completed.

Peer Review - Apps and Problem Solving Project

Pre-Review
Creator's Name: _____

One thing I want feedback on is…_____

_____

Reviewer Section
Reviewer's Name: _____

Evidence I Found	Types of Evidence	Ideas for More
	The outputs of the app are clearly described and could be used to help the user with the problem.	
	Stored information is listed and makes sense for the what the app does. Information that would change over time is not listed.	
	The problem is well-defined, including a who the app will help, details of the problem, and how to tell it has been solved.	
	The app is clearly described in detail, including what it does and how someone would use it.	
	The way that the inputs are processed to make the output is clearly described in terms of tasks that make sense for computing (e.g. sorting, counting)	

Free Response Feedback

I like… _____

_____

I wish… _____

_____

What if… _____

_____

Creator's Reflection

1. What piece of feedback was most helpful to you? Why?

   _____

   _____

   _____

   _____

2. What piece of feedback surprised you the most? Why?

   _____

   _____

   _____

   _____

3. Based on feedback, what changes will you make to your app proposal?

   _____

   _____

   _____

   _____

Name(s)_____ Period _____ Date _____

Practices Reflection
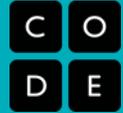
How I've grown	Practice	How I want to grow
	Problem Solving	
	Persistence	
	Creativity	
	Collaboration	
	Communication	

Unit 1 Lesson 9

Intro to Problem Solving - Newspaper Table (Alternate Lesson 1)

Resources

Name(s)_____ Period _____ Date _____

Activity Guide - Newspaper Table

Goal
Build a table that can hold as many books as possible, using only newspaper and tape. You will build two tables and will try to improve your design between the first and the second.

Rules
- You may only use only the newspaper and tape that your teacher gives you.
- Your table must hold the books at least one foot (or 30 cm) off the ground.
- You may not touch or adjust your table while you are adding books.
- You must add books one at a time.

Develop a Plan
- What kind of table does your group plan to make? Write a description or draw a picture below.

- What are the strengths of this design? What possible weaknesses might this design have?

Test Your Table
- How many books did your table hold?

- Why did your table eventually fall? What needs to be improved?

Evaluate and Improve
- What are the most common kinds of problems you see among the tables tested?

- What ideas seem to be working well?

Develop a Plan

- What kind of table does your group plan to make? Write a description or draw a picture below.

- What are the strengths of this design? What possible weaknesses might this design have?

Test Your Table

- How many books did your group's new design hold?

- Why did your table eventually fall? What needs to be improved?

Reflect

- How did working in a team make this activity easier?

- How did it make the activity more challenging?

- What helped your group overcome these challenges?

Unit 1 Lesson 10

Intro to Problem Solving - Spaghetti Bridge (Alternate Lesson 1)

Resources

Name(s)_____ Period _____ Date _____

Activity Guide - Spaghetti Bridge

Goal
Build a bridge that holds the most possible books, using spaghetti. You will build two bridges and will try to improve your design between the first and the second.

Rules
- You may only use the spaghetti and the glue that your teacher gives you.
- The bridge must cross a one foot (or 30 cm) gap.
- You may not touch or adjust your bridge once the books are on it.
- You must add books one at a time

Develop a Plan
- What kind of bridge does your group plan to make? Write a description or draw a picture below.

- What are the strengths of this design? What possible weaknesses might this design have?

Test Your Bridge
- How many books did your bridge hold?

- Why did your bridge eventually break? What needs to be improved?

Evaluate and Improve
- What are the most common kinds of problems you see among the bridges tested?

- What ideas seem to be working well?

Develop a Plan

- What kind of bridge does your group plan to make? Write a description or draw a picture below.

- What are the strengths of this design? What possible weaknesses might this design have?

Test Your Bridge

- How many books did your group's new design hold?

- Why did your bridge eventually break? What needs to be improved?

Reflect

- How did working in a team make this activity easier?

- How did it make the activity more challenging?

- What helped your group overcome these challenges?

Unit 1 Lesson 11

Intro to Problem Solving - Paper Tower (Alternate Lesson 1)

Resources

Name(s)_____ Period _____ Date _____

Activity Guide - Paper Towers

Goal
Build a tower that goes as high as possible and can stand for at least 30 seconds, using sheets of paper. You will build two towers and will try to improve your design between the first and the second.

Rules
- You may only use the paper provided by your teacher to build your tower.
- You may not touch or adjust your tower once everyone lets go of it.

Develop a Plan
- How does your group plan to build your tower? Write a description or draw a picture below.

- What are the strengths of this design? What possible weaknesses might this design have?

Test Your Tower
- Did your tower stand for 30 seconds? How tall was it?

- What needs to be or can be improved?

Evaluate and Improve
- What are the most common kinds of problems you see among the towers tested?

- What ideas seem to be working well?

Develop a Plan

- How does your group plan to build your tower? Write a description or draw a picture below.

  .

- What are the strengths of this design? What possible weaknesses might this design have?

Test Your Tower

- Did your tower stand for 30 seconds? How tall was it?

- What needs to be or can be improved?

Reflect

- How did working in a team make this activity easier?

- How did it make the activity more challenging?

- What helped your group overcome these challenges?

Unit 1 Lesson 12

Exploring Problem Solving - Animal Theme (Alternate Lesson 3)

Resources
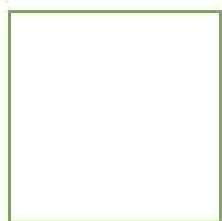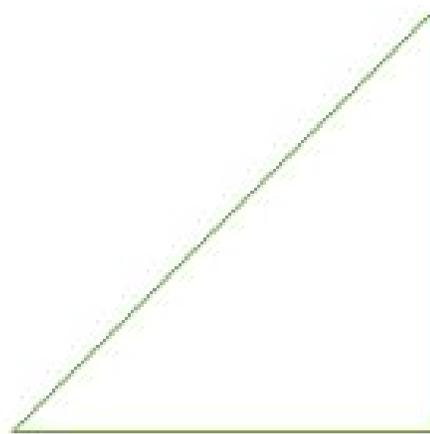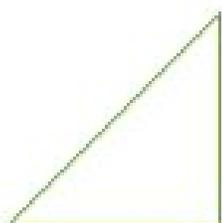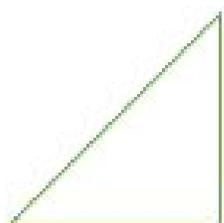
Name(s)_____   Period _____   Date _____
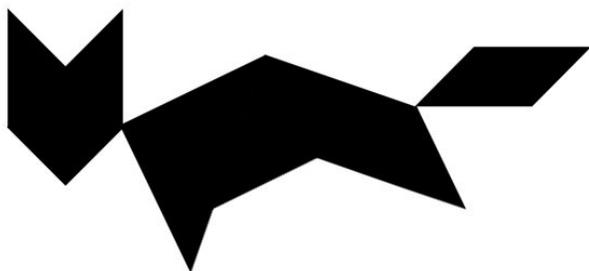
Activity Guide - Using the Problem Solving Process

Tangrams

Overview
Working with a team try to recreate the following images with the tan pieces.

Objective
Make the images as fast as you can!
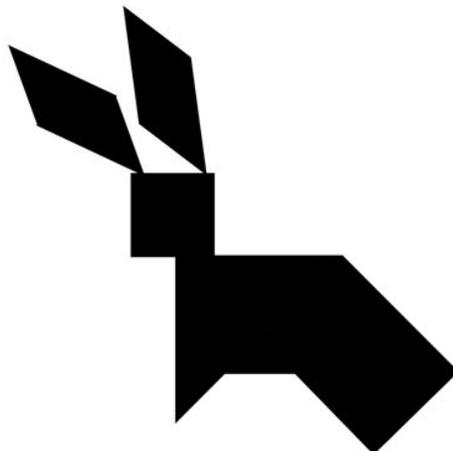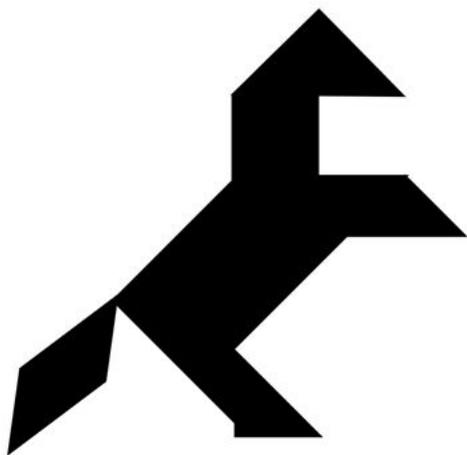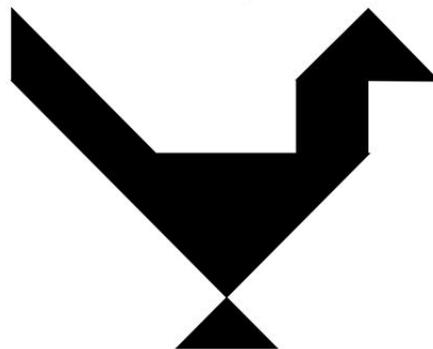
Once You're Done
Head to the last page of the activity guide and fill in the row there for the "Tangrams" in the table.

The Perfect Pet

Overview

A group of people are trying to decide what pet will best fit their needs and lifestyle. Try to match up the pets with the person who will work best with this pet, so that each person is matched with exactly one pet.

Cat Furry Noisy Stays inside	**Dog** Furry Goes outside Noisy Smart	**Fish** Kept in tank Quiet Needs water Colorful	**Parrot** Kept in cage Noisy Smart Colorful	**Hamster** Furry Kept in cage Quiet	**Iguana** Kept in tank Quiet Cold-blooded Colorful	**Horse** Lives outside Smart Noisy

Objective

Given each person's constraints, choose one pet for each person, so that each person gets a different pet.

People	Constraints	Pet They Chose
Aysha	Wants a pet with fur	
Ben	Wants a colorful pet that is also quiet	
Carla	Doesn't want to trap the pet in a cage or tank	
Damien	Wants a pet that is smart	
Eric	Wants a pet that doesn't make a lot of noise	
Fan	Allergic to fur and wants a smart pet	
Genaro	Allergic to fur, wants to spend time outside with the pet	

Once You're Done

Head to the last page of the activity guide and fill in the row there for the "The Perfect Pet" in the table.

Plan a Pet Adoption Event

Overview

You and your friends will be planning an adoption event for animals in shelters. You have the entire school day to make it happen, and how you plan it is up to you. Plan the best adoption event that you can!

Develop Goals

Talk with your group for a few minutes. What are the most important things about this event? What pets will be up for adoption? How will people know about it? Where will it be held? Write down the goals you'll use to decide what makes a good plan.

Goals	How My Plan Helps Reach this Goal
Must have pets that are ready for adoption.	
Need enough people there to adopt most of the pets.	

Make a Plan

Every member of your group should separately start creating a plan on how the event will work. You should select how you will let people know about it and where you will hold it at. Use the space below to explain what you should do to get ready for the event, and what the event will look like.

Getting Ready:

What it looks like:

Share Your Plan and Get Feedback

Share the layout you developed with your teammates and explain why you think it is the best possible plan given the goals you chose. Afterwards, record their feedback and reactions to your plan in the space below. Is there anything that needs to change? How could your plan improve?

Improve and Finalize

Using the feedback from your teammates update your plan. In the space below write down the new ideas that you and your group agreed on.

Getting Ready:

What it looks like:

Once You're Done

Head to the last page of the activity guide and fill in the row there for the "Plan an Adoption Event" in the table.

Problem Solving Process Notes

Reflecting on Using the Process

How did you use each step of the problem solving process to solve this problem? Give examples of what each step looked like as you were solving that problem.

	Define	Prepare	Try	Reflect
Tangrams				
The Perfect Pet				
Plan an Adoption Event				

The Purpose of Each Step

For each step in the problem solving process write one sentence explaining its purpose. Why is it included in the problem solving process?

Define:_____

_____

Prepare: _____

_____

Try:_____

_____

Reflect:_____

_____

Defining Problems with Questions

Before starting to solve a problem it's important that you have defined it well. What questions or strategies can you use to better define or understand a problem? Record them in the space below.

Unit 1 Lesson 13

Exploring Problem Solving - Games Theme (Alternate Lesson 3)

Resources

Name(s)_____ Period _____ Date _____
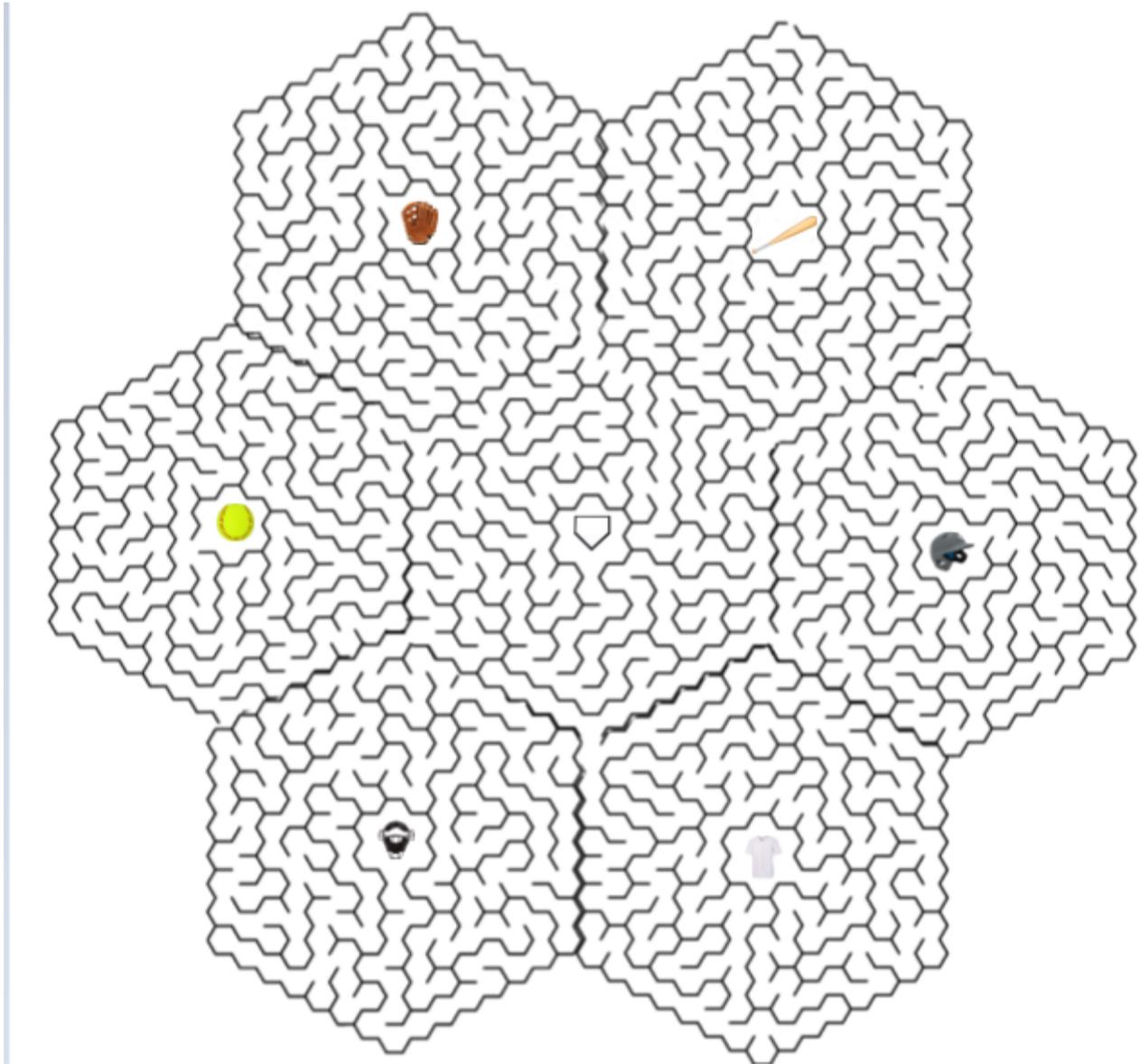
Activity Guide - Using the Problem Solving Process

Maze

Overview
You've lost all your softball gear! Starting from home base in the middle, collect all your gear located in other mazes!

Objective
Working with a team, start at the base in the middle of the maze and get to all of the other softball gear.

Once You're Done
Head to the last page of the activity guide and fill in the row there for the "Maze" in the table.

Partner Race Relay

Overview
Aysha, Ben, Carla, Damien, Eric, Fan, and Genaro are a team in a partner race relay.   For each round of the relay, two people run to the finish line holding a baton. Then one person runs back to return the baton to the starting line. The race ends when everyone is at the finish line.

Rules

Each player can run the race in a different amount of time, but when they run together, they can only go as fast as the slowest person. For example, in Round 1, Aysha and Ben take three minutes to get to the finish line, but Aysha only takes two minutes to return the baton to the starting line, for a total round time of five minutes.

Aysha	Ben	Carla	Damien	Eric	Fan	Genaro
2 minutes	3 minutes	4 minutes	6 minutes	7 minutes	9 minutes	11 minutes

Objective
Decide what order the players should go in so that everyone gets to the finish line as fast as possible. Can they cross in an hour or less? 50 minutes? 45 minutes?

Round	Who races?	Racing Time	Who returns?	Return Time	Round Time	Who is at the finish line?
1	Aysha, Ben	3 minutes	Aysha	2 minutes	5 minutes	Ben
2						
3						
4						
5						
6						

Total Time: _____

Once You're Done
Head to the last page of the activity guide and fill in the row there for the "Partner Race Relay" in the table.

Make a Game

Overview
Field day is coming up and you and your friends will be making a new, special game for it. You've got an entire school day to come up with a new game and its rules. Plan the most fun and exciting game that you can!

Explore Ideas
Brainstorm games you already know or look online for different ideas. Look at the different aspects of each game. Don't worry about making a plan yet, but make sure you notice what you like and don't like about the games.

Develop Goals
Talk with your group for a few minutes. What are the most important things about the game? How many people can play? What kind of game will it be? Write down the goals you'll use to decide what makes a good plan.

Goals	How My Plan Helps Reach this Goal
Can be played at school.	
Must take about _____ minutes.	

Make a Game Plan
Every member of your group should separately start designing a game. You should select what should go where and make sure it all fits in the room. For each goal your group chose, list how your layout helps to reach it in the right column. In the space below describe the setup and materials needed for the game and how to play the game.

Setup/Materials

How to Play

Share Your Game Plan and Get Feedback

Share the game you developed with your teammates and explain why you think it is the best possible game given the goals you chose. Afterwards, record their feedback and reactions to your game in the space below. Is there anything that needs to change? How could your game improve?

Improve and Finalize

Using the feedback from your teammates update your game. In the space below write down the new design that you and your group agreed on.

Setup

How to Play

Once You're Done

Head to the last page of the activity guide and fill in the row there for the "Make a Game" in the table.

Problem Solving Process Notes

Reflecting on Using the Process

How did you use each step of the problem solving process to solve this problem? Give examples of what each step looked like as you were solving that problem.

	Define	Prepare	Try	Reflect
Maze				
Partner Race Relay				
Make a Game				

The Purpose of Each Step

For each step in the problem solving process, write one sentence explaining its purpose. Why is it included in the problem solving process?

Define:_____

_____

Prepare: _____

_____

Try:_____

_____

Reflect:_____

_____

Defining Problems with Questions

Before starting to solve a problem it's important that you have defined it well. What questions or strategies can you use to better define or understand a problem? Record them in the space below.