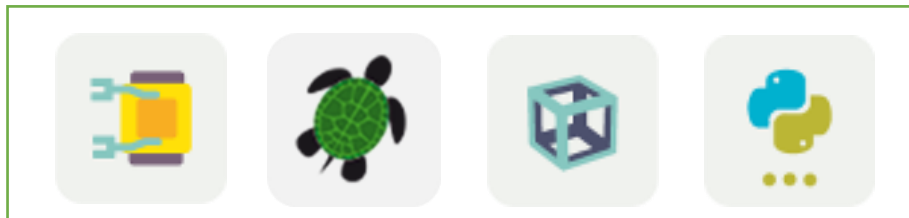# A GUIDE TO
# AFTER SCHOOL PROGRAMS
# AND CAMPS

## INTRODUCTION

NCLab camps and after school programs are a wonderful way to introduce young people to computer programming and 3D modeling (CAD design).  Students will develop skills that prepare them for the 21$^{st}$ century workplace in an atmosphere of fun and discovery.  Children as young as nine have experienced the delight of mastering a logic puzzle, designing a program that works, and building and printing out their own designs with 3D printers.  Schools and libraries have hosted NCLab camps over the past few years with great results.  The NCLab Coding Camp at the Carson City Library was named a Top 10 Summer Program in 2016 by the Young Adult Library Services Association (YALSA).

With this guide, our goal is to provide you with the tools needed for a successful program. You will learn about:

1) The Courses
2) Recommended Age Groups
3) A Balanced Program
4) Choosing Your Coding Environment: Camps, After-School Programs, Clubs, Partnerships
5) Choosing a date and location
6) Costs
7) Selecting and training instructors
8) Instructor resources
9) Accounts, Equipment, 3D Printing
10) Marketing Your Camp
11) Preparing materials
12) Follow up
13) Sample plan for a 2-day camp
14) Sample plan for a 3-day camp
15) Sample plan for a 5-day camp
16) Appendix of games and activities

Our NCLab team is always listening to your suggestions and ready to help solve issues for you as they come up. When you need us, please reach out to us at support@nclab.com or toll-free at (800) 666-2024.

## THE COURSES

NCLab provides four fully self-paced and self-graded courses:

**Karel Jr** teaches fundamental computer programming concepts in a fun setting of a computer game. Students learn to understand problems, design solution algorithms, and translate them into efficient computer code as Karel the Robot goes through various adventures. The course consists of 175 game levels that are followed by bonus challenges for very gifted students. It starts with simple manual controls, and progresses all the way to advanced programming techniques such as defining custom functions, using local and global variables, working with lists, and using recursion. Karel Jr is the next step after drag-and-drop programs such as Scratch and Lightbot. This is the best place to start for students age 10 and up, who have little or no background in coding. Karel eases students into coding by using a simplified version of the Python language, designed so that students can focus on computational thinking and problem solving without being discouraged by complicated syntax. Students can also create their own mazes and games. To see some of them, visit the student gallery at http://nclab.com/karel-gallery/.

**Turtle Tina** is an intermediate computer programming course that combines computer programming with geometry and art. It is designed to follow Karel. In Tina, students learn full Python syntax while still using a simple programming logic. Students can export their creations as STL files for 3D printing. Tina generates 3D objects by extruding 2D shapes or by revolving contours. Students can make a large variety of objects ranging from simple pendants to axisymmetric 3D objects such as chess figures. Visit the student gallery at http://nclab.com/turtle-gallery/ to see examples.

**3D Modeling** should come after Tina. It introduces students to RGB colors, 2D and 3D shapes, and geometrical transformations in the plane and 3D space. The proper name for this subject is *Constructive Solid Geometry (CSG)* - an essential 21st century STEM skill. Students are using the same techniques as architects and engineers, creating their own 3D models, and exporting them for 3D printing. In more than 200 game levels, students progress from elementary 2D objects to advanced transformations and Boolean operations with complex geometries in the 3D space. Visit the student gallery at http://nclab.com/3d-gallery/ to see some amazing 3D designs created by students who took this course.

**Python** – This is an advanced computer programming course where students use the Python language to solve introductory-level real-life problems. Python is a major programming language that is widely used in modern engineering, science and business applications. Students learn in great detail about many of its specific features, and use computing power to solve problems which would be very difficult or impossible to solve without a computer. This course assumes that students have computational thinking skills from Karel and master Python syntax from Tina. This course is not recommended for students who have not taken both Karel and Tina first.

## RECOMMENDED AGE GROUPS

Students age 10 and up are ready to learn programming.  They are starting to develop logical thinking and perseverance, and are familiar with the keyboard - all skills that are needed for problem-solving.  For these reasons, we recommend a minimum age of 10 years. Younger children can be accepted on an exceptional basis if they possess good keyboarding skills and show a strong desire to learn programming.

Students also have more math background as they go through the middle grades.  Some experience with functions and variables is beneficial for all courses; a background in basic geometry and Cartesian coordinate systems will help with Turtle Tina and 3D Modeling.

## A BALANCED PROGRAM

Programming is intensive work.  Students need physical breaks, refreshments, creative activities, and games to balance out the camp experience.  This requires a little planning.  If you program is all day, take into account that parents need a way to drop them off before work.  If students arrive early (around 7:30), consider having a breakfast bar.  Plan on a mid-morning snack, lunch, and afternoon snack break to keep students energized until the camp ends between 5 and 6.  Parents may be able to help you out with snacks and bag lunches. Scope out your facility for physical activities to balance the computer time. Camp Curriculum guides include suggestions for activities and games at the end of this document.

## CHOOSING YOUR CODING ENVIRONMENT:
## CAMPS, AFTER-SCHOOL PROGRAMS, CLUBS, AND PARTNERSHIPS

What kind of coding environment would you like to offer: camps, afterschool programs, clubs, or partnerships?

**Camps** generally run for 2, 3, or 5 days.  Each day lasts about 5 to 8 hours, with breaks for lunch, physical activities, games, and social interaction.  Students are immersed in the courses and creative tools.  Camps can be used to introduce students to the programming courses with live support, to create design and engineering solutions, or both.  If you have not held NCLab camps before, we recommend a 2-day course introduction.

**Afterschool programs** create the conditions for practice over an extended period of time, developing a habit of programming, and providing support when students need it.  These can be designed as open sessions, with help available on a need basis.  Parents can be instructors – no programming or 3D modeling expertise is required.  Programs can also be more structured, with regular meetings in addition to practice sessions.  Create goals for the students, such as being able to print a 3D object once they have completed a certain course level.  A bulletin board with progress charts for the group, notices and calendars, screenshots of successes, and a place to post questions and answers can serve as a focal point.

**Clubs** can be set up as traditional clubs, with meetings, a board, agendas, and so forth; preferably by the students themselves with adult supervision.  The club may decide on their own goals, competitions, events, camps, and so forth.  Clubs can also be fixed programs that run for a few weeks.  Many schools offer this type of club for enrichment at the end of the term, semester, or school year.  The time allotted is usually 30 to 50 minutes a day if in a school schedule.  Libraries and other institutions may choose to use this model for a summer program.

**Partnerships** are needed in two cases:  either your group or institution is providing the NCLab seat for the student, or another institution is doing so.  If you are the lead partner, then you will still be guiding and tracking progress

under your "My Students" app, and may need to communicate goals, assignments, projects, deadlines, and other information to the second party.  If you are a supporting partner, then you will most likely be providing a supporting or collaborative role.   The student may have their seat assignment from a K-12 or post-secondary school and need a place to work on assignments after school.  The collaborative role may be much larger:  your facility may be providing the venue and direction for project work, while the school provides ongoing instruction and regular assignments. There are many possibilities for collaboration between institutions.

## CHOOSING A DATE AND LOCATION FOR CAMPS AND OTHER PROGRAMS

The best times for NCLab camps are in the second half of the summer break. Check with the local school districts for school starting dates, which can vary from the beginning to the end of August.  Most families have taken vacation and kids are refreshed and ready for a new experience.

Spring and Winter Breaks are also a good opportunity for camps.  Again, check with local districts for dates.  Usually, the middle of the week is the best time, as families often have plans for the weekends.  Thanksgiving Break is not recommended since most people have plans to be with the family.  Finally, any weekend can be used for a 2-day camp.  You may want to make Saturday a longer day, and start Sunday later in the day.

If you are planning an afterschool program, decide on how often you will meet with the students.  Will it be twice a week or more often?  Afternoon sessions should be about an hour in length.  A combination of one or two school day afternoons and a Saturday session can be effective.  The Saturday session allows for more computer time and could include games and activities.  The drawback to Saturday sessions is that most youth games are played on that day, so there may be scheduling conflicts.

Schools are ideal locations because they generally have computer labs, better than average connectivity to the Internet, playgrounds for breaks, restrooms, and places where students can eat and relax.  Most modern libraries have computer rooms and are also excellent choices for locations.  Other possible locations include community centers and youth-oriented facilities.   Plan on contacting the school, library or other venue early for access and keys, especially if you will be using it during off-hours.  They may also require a contract or waiver, or provide some guidelines for use.

If you are in a partnership arrangement, you may be hosting the camp at the partner facility.

## COSTS

Costs for putting on a camp or program include NCLab seats for each participant, computers with Internet access, instructor fees and expenses, advertising and marketing, venue access, transportation, food and beverages, regular and 3D printing.  Some of these items will already be in place; others can be donated or sourced for free.  You may want to charge a fee for the camp, keeping in mind that the goal is cost recovery, not making a profit.

**Donations:** many businesses replace their computers and printers on a regular schedule.  They may be willing to donate used items.  If you are a non-profit, businesses and individuals may be willing to contribute funds, volunteer time, or providing a space.
**Grants:** Educational grants may provide funding for NCLab seats, instructors, computers, and 3D printers.
**Vendor educational pricing and bundles:**  check for special pricing and bundles on hardware and materials.
**Schools:** schools may provide all or most of the venue and computer lab costs for free.

Here is a checklist that will help you calculate your costs.  If you do not already have NCLab seats, need instructors or other support, please contact NCLab for details.

| COST ESTIMATOR FOR NCLAB CAMPS AND PROGRAMS | | |
|---|---|---|
| **Item** | **Details** | **How is this item being provided?  What is the net cost?** **How will this cost be recovered?** |
| NCLab Seat cost, one per student plus one seat for lead instructor | Check to see if this is already in place. If not, contact NCLab for estimates. | |
| Computers, one per student | If computers are not available, it may be possible to have them donated from a local business | |
| Internet access | Each computer requires access to the internet.  Get network ID and password information as needed. | |
| Instructor fee and expenses | Costs may include training for volunteers, a paid trained instructor, and travel costs. | |
| Advertising and marketing | See marketing section for ideas.  What combination of free and paid resources will be used? | |
| Venue Access | Check for rental fees, damage deposits, and item rental fees, cleaning fees, insurance and contract requirements. | |
| Transportation | Parents or students are usually responsible.  For disable persons, remote groups, or school partnerships, buses may be needed. | |
| Food and beverages | See food section for suggestions. What will you provide?  What will students or parents provide? | |
| Regular printers | Printing certificates, student journals. | |
| 3D printers | Onsite printers (purchase cost, materials cost, maintenance); or printing services (printing & materials) | |
| Other costs, such as forms, materials for activities. | | |

## SELECTING AND TRAINING INSTRUCTORS

The lead instructor should be someone who is sufficiently experienced with NCLab, such as a teacher who uses NCLab at school, a librarian who has led NCLab programs, or a parent who uses NClab with their kids at home. The lead instructor should be able to deliver instructor-guided activities, model some steps, and supervise the self-paced courses.

The student-instructor ratio should be about 6-8 with a maximum of 10. Students will have a lot of questions, so make sure there are enough aides to assist. These aides can be older students, parents, teacher aides, or volunteers with some NCLab or programming experience. College students studying computer science or engineering are often willing to volunteer and are great coaches and role models for the camp participants.

How do you train instructors? For many people, going through the self-paced course prior to the camp will be enough preparation. NCLab can train instructors via webinar or other online service such as Skype or Hangout. Many local IT people are willing to be hired as a consultant to provide a live training. Please contact us for support if you do not have an instructor to lead your program. We will help you.

## INSTRUCTOR RESOURCES

Each teacher account receives access to:

**Courses lesson plans.** These are section by section and level by level lesson plans that will help instructors provide background, ask questions, and assist students.

**Printable student journals.** The student journals include questions, vocabulary, designing spaces and activities on a section by section basis. These help students reflect on what they have learned, deepening their understanding of key concepts and skills.

**Full-course pacing guides.** These are useful for after-school programs, partnerships, or to follow up with students who have been immersed in NCLab courses through a camp.

**Solution manuals.** These are references for teachers only, and are not to be shared with students.

**End of session class surveys**. These provide valuable feedback that can be used to plan future activities.

**Textbooks:** Each course comes with a textbook which is available as a PDF file for download. The textbook is also accessible from within each course.

## ACCOUNTS, EQUIPMENT, 3D PRINTING, PAPERWORK

- **Personal computers or tablets, with Internet access:** one per student. Both PC and MAC platforms are supported. Tablets can also be used. Preferred browsers are Google Chrome, Firefox or Safari.

- **Projector or Smartboard** for demonstrations. Check that audio is sufficient for the room. Check that both video and audio cables are connected.

- **Accounts:** NCLab requires individual accounts (seats) for each student. Visit the Pricing page for information on purchasing accounts https://nclab.com/pricing/ . Have the account names and passwords ready on Day 1 to make logging on a smooth process. Keep in mind that students will forget their passwords and sometimes even usernames. Small cards with this information can be passed out to each student. Make sure that students add the email address of their parents in Settings – course certificates will be sent to this address.

- **Teacher Account:** Anyone leading a camp or program should have a teacher account. This allows progress monitoring of the students/participants. Unlike the student accounts, the teacher account has all levels unlocked. Teachers have access to course materials including lesson plans, textbooks and solution manuals.

- **YouTube videos:** some schools or institutions block YouTube, so the demonstration videos may need to be unblocked by an administrator to make them available to students.

- **Publishing:** All students have access to folders on NCLab to store their projects. The projects can be shared through NCLab, a folder on a local network, or social media. They can also be submitted to NCLab for publication in their online gallery.

- **Printing:** 3D designs from Turtle Tina and 3D Modeling can be exported as .STL files, and printed to either a local printer, or sent to a printing service. Set norms for students on printing, taking time and material costs into consideration.

- **Release Forms:** your institution or group should have a form signed by parents releasing you from liability. You should also obtain permission to photograph the students and their work, especially if you intend to publish a blog. You will need additional permission to publish names.

## MARKETING YOUR CAMP

With a little planning, your marketing can be effective and inexpensive.  The bottom line is finding enough participants for your camp who will be a good match, and hopefully return for more.

**Social media and websites:** Take advantage of social media such as Facebook, email, Snapchat, and Twitter. These are generally free for personal and non-profit groups.  Boosts on sites such as Facebook may cost extra, but could reach a larger audience.  Ask your friends to share the information.  Ask parents and students for dates and times that would work for them before creating an event:  timing is a key to success, and social media provides instant feedback and dialogue. Finally, use your own organization's website and email lists to advertise, inform, and provide application forms.

**Traditional media:** Your local newspaper or radio station can market the course in several ways:  as an item in the community calendar, as a paid advertisement, which may be discounted for non-profits, as a classified ad, and as an article or interview. Many newspapers will publish a press release or articles written by outside individuals: check for guidelines.  Most traditional media also have an online presence, which may be bundled with other advertising or paid separately.

**Schools:** Contact your local schools or school district for guidance on distributing advertising and marketing in the schools.  Again, there are multiple avenues.  Here are some examples:

1) Use the school district electronic flyer system.  Programs like these either post to a bulletin board, or send out flyers to parents who have signed up to receive notices.  There may be a fee for this service.
2) Get permission to distribute paper flyers to the schools.  Plan on printing hundreds or thousands if you want these to go to all students.  Half-sheets will save printing costs.  Schools appreciate it if you bundle the flyers in classroom groups. Check with their office staff for the number of classes, and number of students per class.
3) Get permission to email the flyers to the staff as printable attachments (for example: pdf files), or as shareable links.  Teachers can poll their classes, or may already know who would be good candidates for the camp, and print only those flyers needed to reach those individuals.
4) With permission, post flyers around campuses.  Include QR codes or pull off tabs so that individuals can follow up.
5) Ask to be on the agenda for Parent/Teacher Association meetings and give a short presentation.
6) Give students a taste of programming with an Hour of Code version of Karel (https://hoc.nclab.com/karel/).  Host this session yourself, or contact school computer labs to see if they will host an Hour of Code, or use it as a lesson.  Teacher materials (lesson plans, solution manuals, and command lists) are available at https://hoc.nclab.com/karel/teachers/

**Service groups:**  consider presenting your plans to local service groups.  They may be able to assist with marketing, volunteers, venues, materials, scholarships and donations.

**Direct advertising:**  Post flyers, with permission.  Possible locations include libraries, schools, supermarkets and retailers, churches, Scout halls, and community centers.  Use in-house resources to print, or shop for printers: many have special pricing for non-profits.

Whatever combination of marketing you choose, take the time to plan ahead, keeping deadlines in mind.  It is very easy to forget the obvious when designing materials, so here is a checklist:

- ✓ Date or date and times for the camp.  If you plan on several camps, include all the dates so that parents or students can choose which one works for them.

- ✓ Location, maps, entrance point, parking

- ✓ Name of the camp or course, pictures and graphics

- ✓ A brief statement of what will be learned, and what will be provided (e.g. lunch)

- ✓ Your contact information (phone, email, website, links)

- ✓ A persuasive statement or phrase

- ✓ Tear-offs, QR codes

## TWO DAY CAMP

This camp gives students an opportunity to start or continue the course, and create projects using the Creative Suite Applications.

### SCOPE AND SEQUENCE

Day 1 Morning: Karel Jr (returning students continue from where they left off); Karel App in Creative Suite

Day 1 Afternoon: Instructor guided 3D Modeling using the PLASM tool in Creative Suite.

Day 2 Morning: Instructor guided Tina App in Creative Suite; Games; Student Projects

Day 2 Afternoon:  Students create their own project in either Karel, Tina, or PLASM using Creative Suite, or work on an activity of their own choosing, such as Code.org games, their own coding or coursework.

### CHECKLIST

Make sure that you have the following items ready before the camp begins:

- Name tags, markers
- Refreshments: juice drinks, waters, energy bars, string cheese, bananas, etc.
- Bring your own computer speakers in case the audio in the room does not work
- Prepare materials needed for games and activities
- Prepare a roster, including Desktop names and passwords
- Obtain prizes, and giveaways (a printed 3D cube to go with the 3D printing activity, for example)

| 7:45 | Getting Ready | <ul><li>Instructors on site</li><li>Check access to room and computer, including log on names and passwords if needed.</li><li>Check internet and network connections</li><li>Check projector and audio in the room</li><li>Bring snack refreshments<br>(for example: juice boxes, water, bananas, string cheese)</li></ul> |
|---|---|---|
| 7:45 - 9:00 | Drop Off | <ul><li>Upon arrival:<ul><li>Collect release of liability forms</li><li>Check student names in the roster</li></ul></li></ul> |
| 7:45 - 9:00 | Setting Up | <ul><li>In the computer room:<ul><li>Distribute name tags</li><li>Fix login problems</li><li>Students start working on Karel Jr 1 (or wherever they have left off, if they are returning students)<br>while others are still arriving</li></ul></li></ul> |
| 9:00 | Welcome | <ul><li>Welcome students</li><li>Describe the scope of the camp (See Scope and Sequence)</li><li>Write program for Day 1 on the whiteboard</li><li>Show Karel's Wikipedia page – link is available from the Help Menu in Karel Jr. Tell something about the history of Karel.</li><li>Explain why learning with Karel is better that learning with C++, Java or the like (syntax is simplified – much easier to write the code)</li></ul> |
| 9:10 - 10:15 | Karel Coding | <ul><li>**Self-paced**</li><li>Newcomers work on Karel Jr 1</li><li>Returning students can work on completing Karel Jr or whatever course they are currently studying. If they have finished all courses, they can use the tools, or work on their own coding projects.</li></ul> |
| 10:15-10:30 | Break | <ul><li>Make sure that the students get up and move</li><li>Water, snacks, socializing time</li></ul> |
| 10:30 - 11:15 | Big Spy Game | <ul><li>**Instructor-guided**</li><li>See Games and Activity Guide</li></ul> |
| 11:15 - 12:00 | Karel Games | <ul><li>**Instructor-guided** (refer to teacher manual)</li><li>Students work on their computers</li><li>Launch the **Karel app in Creative Suite**</li><li>Show how to use Karel Designer</li><li>Build sample maze and save it</li><li>Switch to game mode</li><li>Write a story, define goals</li><li>Play the game - make sure it works</li><li>Publish game on the web</li></ul> |

| 12:00 - 1:00 | Lunch break | <ul><li>Some kids will relax, some will chat</li><li>Weather and conditions permitting – get the kids outside for some physical activity and fresh air.</li><li>Some will return to their Karel Jr course or to their Karel games</li></ul> |
|---|---|---|
| 1:00 - 2:00 | 3D Modeling Tutorial | <ul><li>**Instructor-guided** (refer to teacher manual)</li><li>Students watch and work on their computers</li><li>Launch the free app</li><li>Build the Pacman</li><li>Show how to save models in NCLab</li><li>Show how to export STL files</li><li>Build Hollow Cube</li><li>If available, give 3D prints of the hollow cube to kids</li></ul> |
| 2:00 - 2:30 | Break | <ul><li>Weather and conditions permitting – get the kids outside for some physical activity and fresh air.</li><li>Water, snacks, socializing.</li></ul> |
| 2:30 - 5:00<br><br>(adjust ending and pick up times as preferred) | Creative Activity | <ul><li>**Self-paced.** Students work on<ul><li>Their 3D models (Creative Suite- PLASM)</li><li>Karel Jr course or project</li><li>Code.org activities: Star Wars, Lightbot, Angry Birds</li></ul></li><li>Allow student to take breaks and relax as needed.</li></ul> |
| 5:00 - 5:15 | Pick Up | <ul><li>Stay until all students have left with their parents.</li><li>It is a good idea to phone parents if they have not arrived by 5:10.</li></ul> |

| 7:45 - 9:00 | Drop Off | ● Usually, students do not need to be told what to do - they will go to their Karel Jr course or to their 3D model by themselves |
|---|---|---|
| 9:00 - 10:00 | Turtle Tutorial | ● **Instructor guided** (refer to teacher manual)<br>● Students work on their computers<br>● Launch the free app<br>● Draw a line<br>● Create a square<br>● Rotate it 10 times with angular increment 36 degrees<br>● Extrude the 2D shape to 3D<br>● Show how to export STL file<br>● Create a hexagon, extrude it<br>● Rotate it with angular increment 60 degrees<br>● Show them how to work with arcs<br>● Build the Triquetra pendant |
| 10:00 - 10:30 | Turtle Time | ● Students do their own experiments with the Turtle |
| 10:30 - 10:45 | Break | ● Make sure that the students get up and move<br>● Water, snacks, socializing time |
| 10:45 - 12:00 | Reversi Tournament | ● See Games and Activity Guide |
| 12:00 - 1:00 | Lunch break | ● Most students will return to their projects after finishing lunch. Some will chat and relax |
| 1:00 - 2:30 | Creative Activity I | ● Self-paced<br>● Students can work on their Karel Jr course, Karel games, Tina, or 3D modeling projects |
| 2:30 - 3:00 | Break | ● Make sure that the students get up and move<br>● Water, snacks, socializing time |
| 3:00 - 4:00 | Creative Activity II | ● Make sure that every student finishes a project - Karel game, Turtle design, 3D model |
| 4:00 - 5:00 | Exhibit | ● Students present their work in front of their peers. Make sure that they verbally describe what they did and why. Use questions to guide them. |
| 5:00 - 5:15 | Pick Up | |

## THREE OR FIVE DAY CAMPS

Three and five day camps follow a similar sequence as Day 2 for the 3rd, 4th and 5th day. The purpose of the longer camp is give students more time to progress in Karel Jr (or subsequent course), and experiment with programming using Creative Suite or Hour of Code apps.   Emphasize course work in the morning when the students are fresh; creative projects in the early afternoon, and the exhibits at the end of the day.

**3D Printing:** If a 3D printer is available, students may have time to load a small file, such as a Tina pendant, to be printed during these longer camps.  Set an upper limit on materials, explaining the cost per unit (usually per cubic inch).  Otherwise, you may want to just provide the students with information on how to get a file printed, and an estimate of cost, if they are going to be paying for the materials.

**Exhibit portion:**  Students demonstrate their projects at the end of Day 2 in the two day camp.  It is worth continuing with the share at the end of each subsequent day as well.  By sharing, students get feedback, which will help them either revise and refine their project, inspire a new one, or decide to collaborate on a project together.

**Physical activities:**  The need for physical activity can't be overemphasized.  It is very easy to lose track of time while working on the computer, but not good for one's health to stay there for too long.  If you can get the kids outside, even better.  See suggestions in the Appendix.

**Journaling:** With the extra time available in the 3 to 5 day camps, you may want to either provide the students with Student Journals for note-taking, or a grid paper notepad for freehand journaling and sketching.  Have students work on their journals for the last 10 minutes of each course practice session.

| | | |
|---|---|---|
| 7:45 - 9:00 | Drop Off | ● Usually, students do not need to be told what to do - they will go to their Karel Jr course or to their 3D model by themselves |
| 9:00 - 10:00 | Karel Jr | ● **Self-paced –** include mini-lessons as needed |
| 10:00 - 10:15 | Karel Journal | ● Journal responses; maze sketches. |
| 10:15 - 10:30 | Break | ● Make sure that the students get up and move<br>● Water, snacks, socializing time |
| 10:30 - 11:00 | Guided Games | ● See Appendices for suggestions. |
| 11:00-12:00 | Karel Jr | ● **Self-paced;** update journals just before lunch break. |
| 12:00 - 1:00 | Lunch break/ 3D printer demo | ● Most students will return to their projects after finishing lunch. Some will chat and relax.<br>● If printing will be available on site, demonstrate 3D printer. |
| 1:00 - 2:30 | Creative Activity I | ● Self-paced<br>● Students can work on their Karel Jr course, Karel games, Tina, or 3D modeling projects.<br>● If on-site printing is offered, collect .STL files for printing (either via network or using a flash drive), and start printing (Day 3).<br>● Decide on a cut-off time for on-site printing, or<br>● Arrange for a pick up day for printed projects or<br>● Collect addresses for delivering or shipping projects (collect shipping costs as needed) |
| 2:30 - 3:00 | Break | ● Make sure that the students get up and move<br>● Water, snacks, socializing time |
| 3:00 - 4:00 | Creative Activity II | ● Make sure that every student finishes a project - Karel game, Turtle design, 3D model.  Continue with printing. |
| 4:00 - 5:00 | Exhibit | ● Students present their work in front of their peers. Make sure that they verbally describe what they did and why. Use questions to guide them. |
| 5:00 - 5:15 | Pick Up | |

## GAMES AND ACTIVITY GUIDE

For details on any of these ideas, enter keywords into your search engines.  You will find many suggestions and procedures on the Internet.

**Indoor Olympics:** If you don't have access to a playground, try an Indoor Olympics.  Create 4 or 5 events, such as "lawn" bowling, an obstacle course, mini-golf, sack races, and so forth.

**Game Tournaments:**  Reversi, Go, Chess, and other games can all be played as timed tournaments.  Chess can even be played as an outdoor game with large pieces.

**Treasure Hunts and Quests:**  create a classic treasure hunt with prizes at the end.  To make it challenging and practice decoding skills, encode the messages and give students a key or a partial key to figure out the code.

**Manual Logic Puzzles:** Many manual puzzles can be obtained from catalogs or stores.

**Live Karel:** One student is blindfolded and becomes Karel.  The others give him directions limited to "go, left, right, get, put, repeat". Create a home plate, some objects to pick up and some containers.  You may even put some colored paper markers on the ground as objects to avoid.  The other students guide Karel toward the home base, getting and collecting objects, and only moving one step forward at a time, and turning left or right.

## FOLLOW UP

The next day, create a blog post about the camp. Show photos, 3D models, etc. Send an email to all parents and include the link to the blog. Also remind them that students can keep working on their projects from home, when the next camp will be, etc. Keep a file of the parent contact information.

## GOOD LUCK WITH YOUR CAMP!

Many students have discovered that they too can code after attending one of these camps.  The atmosphere is relaxed, safe, and friendly.  Students meet like-minded people.  They learn skills that may not be taught in regular school settings, preparing them for 21st century jobs.

Remember that NCLab is available to guide you and answer any questions you may have.  Contact us at support@nclab.com.  Our website, www.nclab.com, also answers Frequently Asked Questions and provides an array of support materials.

Good luck with your Camp!